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A critical practice-based exploration of interactive panoramas' role in helping to preserve cultural memory

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A CRITICAL PRACTICE-BASED EXPLORATION OF INTERACTIVE
PANORAMAS' ROLE IN HELPING TO PRESERVE CULTURAL MEMORY

by

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A thesis submitted to the University of Plymouth
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Abstract

Karol Kwiatek

A critical practice-based exploration of interactive panoramas' role in helping to preserve cultural memory.

The rapid development of digital communication technologies in the 20th and 21st centuries has affected the way researchers look at ways memory – especially cultural memory – can be preserved and enhanced. State-of-the-art communication technologies such as the Internet or immersive environments support participation and interaction and transform memory into ‘prosthetic’ experience, where digital technologies could enable 'implantation' of events that have not actually been experienced.

While there is a wealth of research on the preservation of public memory and cultural heritage sites using digital media, more can be explored on how these media can contribute to the cultivation of cultural memory. One of the most interesting phenomena related to this issue is how panoramas, which are immersive and have a well-established tradition in preserving memories, can be enhanced by recent digital technologies and image spaces.

The emergence of digital panoramic video cameras and panoramic environments has opened up new opportunities for exploring the role of interactive panoramas not only as a documentary tool for visiting sites but mainly as a more complex technique for telling non-linear interactive narratives through the application of panoramic photography and panoramic videography which, when presented in a wrap-around environment, could enhance recalling.

This thesis attempts to explore a way of preserving inspirational environments and memory sites in a way that combines panoramic interactive film and traversing the panoramic environment with viewing the photo-realistic panoramic content rather than computer-generated environment.

This research is based on two case studies. The case study of Charles Church in Plymouth represents the topical approach to narrative and focuses on the preservation of the memory of the Blitz in Plymouth and the ruin of Charles Church which stands as a silent reminder of this event. The case study of Charles Causley reflects topographical approach where, through traversing the town of Launceston, viewers learn about Causley's life and places that provided inspirations for his poems.

The thesis explores through practice what can be done and reflects on positive and less positive aspects of preserving cultural memory in these case studies in a critical way. Therefore, the results and recommendations from this thesis can be seen as valuable contribution to the study of intermedia and cultural memory in general.

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Author's declaration

At no time during registration for the degree of MPhil has the author been registered for any other University award without prior agreement of the Graduate Committee.

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Relevant seminars and conferences were regularly attended, at which work was often presented; external institutions were visited for consultation purposes and several papers prepared for publication. A list of my publications can be found on the following page. The documentation of the projects is included on two DVDs attached to this thesis.

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JOURNAL ARTICLES:

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Kwiatek, K. & Bolinski, P. (2008) 'Panoramic Visualization of Monuments', *Journal of Conservation-Restoration*, 19 (72-75), pp. 52-57.

BOOK CHAPTERS:

Kwiatek, K. (2011) 'Charles Church and 360° filming'. in Mansfield, C. and Seligman, S. (eds.) *Narrative and the built heritage : papers in tourism research*. Saarbrücken: VDM Verlag, pp. 116-128.

CONFERENCE PAPERS (PEER REVIEWED):

Kwiatek, K. (2012) 'How to preserve inspirational environments that once surrounded a poet? Immersive 360° video and the cultural memory of Charles Causley's poetry'. 18th International Conference on Virtual Systems and Multimedia - VSMM2012. Milan, Italy: 2-5 September, pp. 243-250.

Kwiatek, K. (2011) '360° film brings bombed church to life'. 4th ISPRS International Workshop 3D-ARCH 2011. Trento, Italy: 2-5 March, *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*.

Kwiatek, K. & Woolner, M. (2010) 'Transporting the viewer into a 360° heritage story. Panoramic interactive narrative presented on a wrap-around screen', 16th International Conference on Virtual Systems and Multimedia - VSMM2010. Seoul, South Korea: 20-23 October, pp. 234-241.

Kwiatek, K. & Woolner, M. (2009) 'Embedding Interactive Storytelling within Still and Video Panoramas for Cultural Heritage Sites'. 15th International Conference on Virtual Systems and Multimedia - VSMM 2009. Vienna, Austria: 9-12 September, pp. 197-202. Best Student Paper Award

CONFERENCE PAPERS:

Kwiatek, K. (2011) 'Discover Krakow: Presenting the UNESCO World Heritage Site in Poland using 360° film'. Immersive Education Initiative Boston Summit: 13-15 May, Boston, USA

Kwiatek, K. & Woolner, M. (2010) 'Let me understand the poetry. Embedding interactive storytelling within panoramic virtual environments'. EVA 2010, 5-7 July, London: British Computer Society, pp. 199-205.

1. Introduction

This study explores various forms of making access to memories at the individual and social scales. I will define the concept of cultural memory which is one of a number of memory categories I investigate. I will focus on the potential of digital panoramas for preserving cultural memory and analyse how they can support this process, what their limitations are and also how they might be developed. Cultivation of memories is helped by narratives when linked to artefacts or places and for this reason the role of narratives, in particular interactive narratives, is considered in the process of preserving memories next to the design and type of immersive arenas which could be suitable environments for displaying panoramas. A conceptual model of preserving memories based on digital panoramas, which is established through literature review, is then explored through practice on real cases identified in the area of Plymouth in order to understand to what extent it can be successful for preserving cultural memories. The two case studies reflect the dual nature of cultural memory that relate to an event and a person: the Blitz in Plymouth that left Charles Church a ruin, and the life and work of Charles Causley, a poet from Launceston, whose inspirational environment remained unchanged since his death in 2003. The two case studies rely on personal memories of people who remember them, artefacts, locations and activities to commemorate them.

1.1. Communicative vs cultural memory

As my research relies on personal memories I need to make a distinction between communicative memory and cultural memory made by Jan Assmann (1995), a scholar of cultural theory and religion. Cultural memory originates from communicative memory that refers to a 'still-living' past such that one person could share experiences

of people or events with others. This kind of memory appears and disappears with people who create it. It is also related to the memory of direct witnesses of events; especially to those who are still alive and who experienced a particular event. One of the most important medium of communicative memory is conversation. This memory is alive because of communication and exchange of information. Communicative memory, as Assmann (2011) claims, is temporary and ephemeral until it finally becomes transformed into cultural memory, which is more permanent. The period when communicative memory transforms into cultural memory is described as a 'floating gap' and it is estimated that it takes between 70 and 80 years. Those who share communicative memory are more and more aware of the fleeting nature of this memory. They try to secure this memory through the installation of memory plaques or monuments, the recording of films, organisation of remembrance days or the foundation of veterans associations. Thus, before communicative memory becomes cultural memory (that does not have witnesses and is no one's personal memory), it produces numerable reminiscences of the past, which are taken over as legacy by cultural memory. Communicative memory may be recognised as a starting point in the process of remembering contemporary events when they are mainly subjects of discussion between different groups of society. Establishing the border between communicative and cultural memory is difficult as this border is fluid. Assmann (1995, p.127) suggests that communicative memory is the living part of memory which is discussed by the contemporaries whereas cultural memory is the memory beyond the horizon of living generations. It has its fixed points whose horizon does not change with the passing of time. The fixed points are fateful events of the past, whose memory is cultivated through 'figures of memory' by which Assmann understands artefacts, e.g. monuments and activities such as commemorations.

Fiona Cameron's (a scholar of cultural heritage studies) and Sarah Kenderdine's (2007) (a leading scholar of immersive and interactive media) understanding of cultural memory is different as they refer to intangible cultural heritage which covers festivals, rituals and oral traditions. My understanding of cultural memory lies between Assmann's distinctions of different types of memories and between Cameron's and Kenderdine's interpretation of cultural memory. For me, cultural memory is the memory of events and people who are still remembered by local communities. This memory is cultivated through commemorations, sites of memory or artefact. Cultural memory, in my view, combines the living element with the frozen one and involves activities and artefacts whose meaning is very transparent nowadays, but which may become forgotten in the future.

1.2. A gap in knowledge

In this research I explore the potential of both still and video panoramas to create interactive narratives based on navigable spaces. Virtual navigable space is an environment where active responses from the user are expected during the movement and navigation. Virtual spaces are quite common in computer games where environments based on Virtual Reality (VR) encourage players to interact.

Marie-Laure Ryan (2001), an American literary and hypermedia scholar, Carolyn Miller (2008), an American scholar of technical communication and digital media, or Janet Murray (1998), the author of a book on interactive narrative entitled *Hamlet on the Holodeck*, understand virtual environments as a basis for the creation of interactive storytelling. Very little research has been conducted, however, on a generation of navigable environments created using cameras. And even less on the combination of navigable spaces with interactive narratives. Lev Manovich (2001,

p.260), a scholar of new media art and theory, software studies, and digital humanities, recognises the potential of navigable spaces not based on virtual reality, but rather on camera-based content. He identifies QuickTime VR panoramas¹ as one of the approaches that enable the creation of photo-realistic navigable spaces.

Although in the 1990s Apple's QuickTime VR technology made this technique quite accessible, the idea of constructing a large-scale virtual space from photographs or a video of a real space was never systematically attempted again, despite the fact that it opens up unique aesthetic possibilities not available with 3-D computer graphics (Manovich, 2001, p.260).

Researchers long before Manovich's publication in 2001 were aware of advantages of creating spaces based on photographs. *Aspen Movie Map* (1978) project was one of the first attempts to create photo-realistic navigable spaces. In the project, photographs were created every 3 metres in the American town to present the space and the user could explore this town and choose alternative routes on cross roads.

In fact, panoramic exploration of space as a continuous recording of a place has not been widely researched until the appearance of new digital cameras and fisheye lenses in 2000s. Cyclomedia² was one of the first companies that started recording digital panoramas every few metres in the Netherlands at the beginning of 2000s (Verbree, Zlatanova & Smit, 2004). Google Street View³ launched in 2007 applies similar methods and visualises worldwide locations using panoramic still imagery. However, the combination of both still and video panoramas has not been investigated to date and I propose to use them in the creation of navigable spaces which could then provide the setting for panoramic interactive films. The approach of taking panoramic images and panoramic video supports the continuity of space, which in turn helps facts to be remembered when traversing between places related to the life of a person or a locally-known event.

¹ QuickTime VR is an image file format developed by Apple in 1994 which allows viewing of photographically-captured panoramas.

² <http://www.cyclomedia.nl> (Accessed: 10.12.2009).

³ <http://www.google.co.uk/help/maps/streetview/> (Accessed: 11.12.2009).

Panoramic photography (still panoramas) as a medium for storytelling has been identified by Söke Dinkla (2002), an art historian, and Kenderdine (2007). Still panoramas apply very well to static scenes which involve no movement whereas video panoramas represent a new phenomenon and reflect the dynamism of scenes. I will explore how the merging of still panoramas used as decision points in interactive narrative and video panoramas, used to show the transition between decision points, can be a method for the preservation of cultural memory. The narratives based on such an exploration of the space are not created for pure entertainment, but their main task could be to preserve memory sites and inspirational environments.

Navigable spaces separate from providing the setting are also meant to include the interactivity paradigm. Erkii Huhtamo (2007), a media theorist, who personally experienced the first interactive film *Kinoautomat - One Man and His House*⁴ (1967) at the Montreal Expo '67 claims that 'group interaction can be both meaningful and pleasurable' which is necessary for experiencing communicative memory. Therefore, I will use the Kinoautomat paradigm to create an interactive film where the viewer can choose alternative pasts or can re-traverse the navigable space. The flexible structure of digital panoramas enables the addition of many features such as VR objects, 3D reconstruction, videos, and animations which might enhance this effect.

The idea of creating narrated navigable spaces for the purpose of preserving cultural memories is also new. To my knowledge, Jeffrey Shaw (2002; 2003), one of the pioneers of haptic digital arts and interactive cinema, explores the concept in the context of cultural heritage (*Place* installations since 1990s), but it has not been examined with reference to memory sites as the reminder of local events and inspirational environments where local artists lived. Sarah Kenderdine, Michael Naimark (media artist and researcher) and Jeffrey Shaw create panoramas of cultural heritage sites (*Be*

⁴ I will use a short title *Kinoautomat* in the rest of the thesis.

Now Here, Place-Hampi). They use the concept of painted panorama introduced by Robert Barker in 1787, and present their interactive works to large assemblages within circular architectures. These immersive arenas are the physical space of exploration which can be traversed in order to explore the narratives. The panoramas I develop for the purpose of this research are designed to tell a story that offers the opportunity to return to a particular place and recall events that happened in the past and which could be viewed on a computer screen and as well on a 360-degree screen.

The projects such as *Pentimento* (2002) or *Scenario* (2011) developed by Dennis Del Favero, the director of iCinema Centre for Interactive Cinema Research⁵, seem to follow the direction of memory works presented using immersive media. The above-mentioned projects are also displayed on panoramic immersive screens but they are using mainly VR instead of photorealistic content and refer to traumatic personal memories rather than cultural memories (Barker & Del Favero, 2011).

Although most of the features and methods I discuss in my thesis have already been known (as reflected in the literature review), I analyse them in the context in which they have not been explored so far that is the preservation of cultural memory. The thesis may also shed new light on the theory of the formulation of interactive narrative (Brown, Barker & Del Favero, 2011) which indicates space-based aspects of interactive narrative that were not indicated by Mark Meadows (2003), an American author and artist, who understands interactive storytelling as a time-based representation of a character.

⁵ iCinema - The iCinema Centre for Interactive Cinema Research (established in 2002), is a joint venture of the College of Fine Arts and Faculty of Engineering at the University of New South Wales in Sydney, Australia - <http://www.icinema.unsw.edu.au/> (Accessed: 31.12.2011)

1.3. Context for the research

It is quite difficult to establish a discipline of my research with a single designation as it covers such fields as memory, interactive narrative and immersive environments. The first thought is to classify it as a digital or visual culture study. These concepts are quite broad, however, and I tried to find a more specific category to which my research could be ranked. I came across the term *intermedia* proposed by Dick Higgins in 1966 (Kluszczyński, 2010, p.21) which seems to reflect the nature of my research. Intermedia is defined as an integral and organic combination of at least two artistic media (where each of them could also work on their own outside this relation). The examples of intermedia, according to Higgins, were visual poetry, environment and happening.

The meaning of the concept changed in the 1990s due to the evolution of computers and the appearance of new forms of information as well as the methods of articulating this information, for example, text, sound, graphics, animations, video. Intermedia ceased to mean the permanent relation between different artistic disciplines and started to designate the ability of one medium to link with any other medium. Thus, the intermedium of film and video refers to flexibility and potential in combining with other media. Ryszard Kluszczyński (2010), a Polish media communication and culture expert, makes a clear distinction between intermedia and multimedia. In the traditional understanding of multimedia, their elements are loosely and only temporarily linked, while new digital computer multimedia head for the increased coherence and durability. As multimedia are becoming more and more interactive, Kluszczyński (2010) introduces a term *hypermedia* that refers to interactive multimedia. My research projects are designed to be interactive using different media, thus it can also be classified as a project within the hypermedia field. In my view, the designation *intermedia* is more appropriate for my research as it is more flexible and presupposes the presence of non-

interactive media in the combination. My research projects are interactive but they involve both interactive elements, e.g. interactive film and the interface of the panoramic screen that enables making choices and non-interactive components such as text or video.

1.4. Structure of the thesis

This research is structured into two parts. Part 1 (chapters 2, 3 and 4) provides a literature review that leads to developing a conceptual method for this research and a definition of the research question (chapter 5), whereas part 2 explores how this model applies to actual practice-based cases (chapters 6, 7).

After this introduction, chapter 2 discusses the concepts of public and cultural memory, describes active and non-active ways of preserving memory and points to narrative as a feature that can enhance the preservation of memories.

Chapter 3 defines the concept of interactive narrative and establishes its links with memory. It also introduces spatial narrative, as facilitated by traversing, and analyses the application of interactive narrative to digital panoramas.

Chapter 4 focuses on immersive environments as image spaces for displaying panoramas. It starts from the concept of immersion to discuss the history of immersive environments. It also elaborates on methods of viewing panoramas and analyses navigable spaces. Finally, it discusses both historic and contemporary panoramic cinematographic environments in order to identify the one that would be suitable for displaying panoramas.

The analysis in the second, third and fourth chapters generates a series of research questions that were necessary to envisage the research strategy. Chapter 5

provides an explanation and justification of the methods to be used in order to carry out the practical part of the research.

Chapters 6 and 7 describe two practice-based cases. I have chosen a ruined church in Plymouth (Charles Church) for my first case study and a poet who used to live in Launceston in Cornwall (Charles Causley) as my second case study, as they refer to the memory of an event and of a person respectively, providing complementary parts of cultural memory.

Chapter 8 compares the two case studies, reflects and evaluates common features and differences, and identifies main issues. Chapter 9 condenses the work into a series of conclusive remarks, identifying the potential of panoramas on the one hand, and suggesting the need for further, more refined research on aspects such as collective immersion, evaluating audience understanding of cultural memory after the screening and simplifying the display systems in immersive arenas, on the other.

Two DVDs that are enclosed with this thesis present two case studies in the interactive form and can be watched on a personal computer without the application of a wrap-around screen.

2. Public and cultural memory

This chapter reviews the literature concerning collective memory and aims to indicate methods of preserving this memory using diverse active and non-active forms of communication technologies. Memory is what allows us to construct an image or narrative of the past and, by the same process, to develop an image and narrative of ourselves (Assmann, 2011, p.15). Memory is thus linked with identity. Thomas Luckmann (1983, p.69), a German sociologist of Slovene origin, notices that memory and identity are related with time. He claims that a human person is 'built of stuff of time'. Human memory facilitates a synthesis of time and identity. The connection between time, identity and memory operates at three levels: the inner (individual) level, the social level and cultural level giving rise to three different types of memory (Assmann, 2011, p.15). Memory at the inner level is the individual's personal memory. This type of memory was recognized as the only type of memory until the 1920s. Memory at social level is about communication and interaction. A French sociologist, Maurice Halbwachs (1877-1945), discovered that human memory depends on socialization and communication. Halbwachs followed a philosophy of his teacher – Émile Durkheim (1858-1917), who was also a prominent French sociologist and saw memory not as an individual phenomenon but as social and collective one:

It is in society that people normally acquire their memories. It is also in society that they recall, recognize, and localize their memories (Halbwachs, 1992, p.38).

Halbwachs argued that individuals cannot remember in coherent and persistent way outside of their group context. Group membership supports materials for remembering and triggers in individuals recalling of particular events and forgetting others. Groups can even produce memories of events which individuals never experienced in any direct sense.

Building on the social aspects of memory, Halbwachs introduced the notion of collective memory. The concept was mentioned for the first time in his work on *Les cadres sociaux de la mémoire* (The Social Frameworks of Memory) (1925) which was translated into English by Lewis Coser in 1992 and published as *On collective memory*. It was further elaborated on in *La mémoire collective* (1950) which was published in English as *The collective memory* in 1980.

Halbwachs in his works resisted the commonsense view of remembering, where memory has been taken to be 'purely individual' and the product of 'isolated mind' (Prager, 1998, p.59-60). Halbwachs (1992, p.39) claimed that memory is inseparable from the 'social world' where all the remembering takes place. Memory is constituted by social frameworks which facilitate arranging memories within cultural systems of meaning (Halbwachs, 1992, p.38-43). Halbwachs identified and analysed a number of such frameworks. Space and time are crucial frameworks. Memory attaches to places and landscapes and thus the space within which the memory is plotted is a social framework. It is conceptualized and organized by the group of people inhabiting it (Halbwachs, 1992, p.156). The same rule applies to the framework of time. A calendar is a type of scaffolding for situating and reconstructing memories. There are, however, as many calendars as there are groups. Each group has a calendar, which highlights dates that are important for the given group.

Halbwachs was not the only one for whom collective memory was the focal point. Psychoanalysts such as Sigmund Freud (1856-1939) and Carl Gustav Jung (1875-1961) were also working on theories of collective memory but referred to the first level, i.e. the inner, personal level. They looked for collective memory in the human psyche rather than in the dynamics of social life.

Communicative memory is connected with cultural memory, which is the third level at which the relation between memory, identity and time operates. When

Halbwachs discusses collective memory he refers to social memory and identifies public memory as a type of collective memory. Assmann (2011, p.16), on the other hand, specifies cultural memory as a type of collective memory. The following section indicates differences and similarities in the understanding of public and cultural memories.

The chapter has been organised in the following way. The first section (2.1) examines the notion of public memory. The second section (2.2) begins by looking at cultural memory. The third section (2.3) indicates features of public memory and cultural memory. Section (2.4) focuses on communication technologies that are used for transmitting memories. The last section (2.5) provides a brief overview of active and non-active methods of preserving public and cultural memory.

2.1. Public memory

A kind of collective memory that has been widely researched in literature is public memory. The concept was introduced by John Bodnar (1992, p.14), an American scholar of history and memory, who defines it as a system of beliefs and views that is produced from a political discussion that involves the fundamental issues relating to the entire existence of society: its organization, structure of power, and the very meaning of its past and present. This definition is quite controversial as it presupposes that political discussion is a necessary condition for the emergence of public memory. Public memory may concern social issues, such as the death of a popular actor or artist, which usually do not involve any political discussion. Bodnar (1994, p.74-75) must have become aware of this fact as he revised his definition of public memory two years later by providing a more general designation by which he claims that public memory is a

body of beliefs and ideas about the past that help a public or society understand both its past and its present, and, by implications, its future.

Following this line of reasoning, collective memory may be perceived as synonymous with social memory and as the umbrella concept for public and cultural memory as they both share the feature of being collective. This interpretation of different types of memories partially overlaps with the categorization of memory provided by Edward Casey (2004, p.18-20), an American scholar of philosophy, who classifies memory according to how things are remembered (the size and type of target group that recalls experiences). Casey lists four major types of human remembrance: individual memory (does not only recall what happened, but how something occurred and in what environment), social memory (refers to remembering with others, for instance with people that have close affinity), collective memory (memories that are passed on, shared and constructed by the group) and public memory (memories that help a public or a society to understand both its past and its present). It is noticeable that Casey's explanations of collective memory and public memory are parallel to Halbwachs and Bodnar definitions. However, unlike Halbwachs, Casey specifies social memory as different from collective memory.

Casey (2004, p.23) states that public memory does not occur severally, but relates to plural remembering. So, it is commonality of content rather than some kind of connection (shared place, history, experience or project) as in social memory, which is a prerequisite for public memory. Stephen Howard Browne (2010, p.18), an American public memory scholar, claims that public memory is a cultural process where 'a shared sense of the past is created from the symbolic resources of human community'. Symbolic resources include a number of objects (monuments, sculptures, paintings) that enable the understanding of the past in a meaningful way. The understanding of the past is not the only aspect of life that counts for public memory. Another important factor in

this process is the formation of identity which is perpetuated through symbolic representations of the past.

Public memory is invoked, but on the other hand there is no constant public memory. Being public does not guarantee that the memory will be the same in the future. Public memory is something that needs to be revised and reassessed from time to time. I think that public memory simply evolves and is in a state of flow, and this instability might be accelerating in contemporary times as information and knowledge travel and transform themselves so quickly and continuously. Casey (2004, p.30) confirms the changeability of public memory and claims that the principal feature of public memory is 'its formation through ongoing interchange of ideas and thoughts, opinions and beliefs'. This means, based on Browne's (2010, p.18) approach that symbolic resources and formation of identity are not constant so they might change occasionally.

Jeffrey Olick, Vered Vinitzky-Seroussi and Daniel Levy (2011, p.37), in the introduction to *The Collective Memory Reader*, claim that the new approach to understanding memory is now visible in memory studies and the memory is no longer considered as omnipresent, but is located in social frameworks (family and nation), enabled by altering multimedia technologies (e.g. the Internet, immersive technologies), challenged by cultural institutions (e.g. museums or memorials), and formed by political circumstances (catastrophes or wars). What is more, Jennifer Jordan (2006, p.2), an American scholar of sociology and urban studies, states that memory also shapes the urban landscape on the basis of day-to-day practices of creating monuments and memorials in parks, public squares etc. The concept of memory seems to be this missing link between the landscape and culture, because 'human modifications of the environment are often related to the way societies wish to sustain and efface memories' (Foote, 1997, p.33).

The cultural memory defined in the following section is thus the bond between public memory, public space and culture. Cultural memory is related to cultural artefacts, which are items *in situ* that belonged to a particular person or society and which help to cultivate intellectual or spiritual attributes of local artists or poets who are usually not well known outside the region where they lived. Public memory, in contrast, has a wider scope as it is about people and events that were prominent in the national or even world history and are cultivated through monuments located in public spaces. Cultural memory relies on intangible elements such as personal feelings; the ambience of the place where a person lived or a particular event occurred and links between someone's life and place where they lived and their work. In many cases, cultural memory needs to be supported due to a restricted access to such locations which may not be available for general public (interior of private houses, ruins, caves).

2.2. Cultural memory

Before explaining the concept of cultural memory, the word 'culture' is introduced in this section. *Keywords: A Vocabulary of Culture and Society* by Raynold Williams (1976) is an exploration of how words are used to denote such concepts as culture and society. Williams, when defining 'culture', provides a historical context and explains how the meaning of the word has changed. Williams (1976, p.80) recognises three broad categories of usage of the term 'culture': '(a) a general process of intellectual, spiritual and aesthetic development, (b) a particular way of life, whether of a people, a group, or humanity in general and (c) the works and practices of intellectual and especially artistic activity'. The second meaning referring to commonly held values which are articulated in the habits and acts of ordinary life is the most common meaning of culture in the social sciences. The third category is according to Williams relatively

late, and it associates culture with music, literature, painting and sculpture, theatre and film.

Williams mention the term 'cultivate' as a root for 'culture' in the modern sense, as in the cultivation of taste. Cultivation and caring of information might play an important role in personal development as they are involved in cultivation of intellectual or spiritual attributes (Bennett et al., 2005, p.65). Culture is not only for development of individuals but also for cultivation of ideas, which might develop their understanding of the past. The understanding of the notion of culture enhances the definition of cultural memory, which also focuses on preserving memories about particular ideas.

Cornelius Holtorf (1996, p.119-120), a Swedish scholar of archaeology, uses the notion of 'cultural memory' to indicate the collective understandings of the remote past, as they are possessed by people in a particular historical and social context. Public memory and cultural memory help people to understand the past through symbolic resources and through the unity of people in the past. Cultural memory reveals itself in the history of culture and entails rituals and ceremonies at special times such as remembrance days, and at special locations such as ancient monuments, which operate as sites of memory and time marks (Assmann, 2011, p.56-59). Cultural memory is about making significant statements about the earlier periods in a particular cultural background of the present. Mieke Bal, Leo Spitzer, Jonathan Crewe (1999, p.i), cultural theorists and critics, share this view on cultural memory as they interpret it as an 'activity occurring in the present, in which the past is continuously modified and re-described even as it continues to shape the future'. This cultural phenomenon (individual or social) links the past with the present and with the future. Public memory and cultural memory both change in the same way as the interpretations of the past (for example the ancient monuments were understood differently in the past as they are interpreted now (Holtorf, 2008)).

Preservation of cultural memory is linked to the cultivation of culture, cultural identity and public memory. Preservation is a countervail process to erosion, neglect and decay. According to Alan Jabbour (2003, p.423), an American scholar of English and folklore, preservation activities are forms of 'deep cultural impulse spurring people to take conscious actions to maintain or revitalize their cultural creations and traditions'. These cultural traditions could be for instance folklore, folk life or intangible heritage.

Cultural memory focuses on de-freezing and re-discovering memories hidden in cultural heritage and it may use objects and locations that contain frozen memories, e.g. monuments to animate memories related to a particular site. This idea was challenged by Krzysztof Wodiczko who projects video on architectural façades and monuments worldwide and thus transforms them into video screens. His installations such as Hiroshima Projection (presented in Peace Memorial Park in 1999) use a surface of a monument to give voices to victims (Saltzman, 2011, p.266-279). Moving images of the hands of people (including survivors of the atomic bomb) were projected upon a river embankment below the Dome to symbolize the event from 1945 (Figure 1).



Figure 1 *The Hiroshima Projection* (1999) by Krzysztof Wodiczko⁶. Permission to reproduce this figure has been granted by Krzysztof Wodiczko.

⁶ Source of image: <http://www.pbs.org/art21/images/krzysztof-wodiczko/the-hiroshima-projection-1999> (Accessed: 8.02.2012)

Wodiczko made a great step in de-freezing the space. Lisa Saltzman (2011, p.270), an American scholar of art history, claims that:

Wodiczko transformed the petrified historical monument into a living, speaking, utterly contemporary form, an animated memorial to present injustice. He made the monument the megaphone, turned its façade into a human face [...] he sought to give voice to that which had not been spoken, to realize in aesthetic form his founding condition and proposition, if only this monument could speak.

Mariangela Lavanga (2006), a Dutch scholar of cultural studies, agrees with Saltzman as she also notices that cultural heritage does not only need conservation and preservation, but 'it also needs a process of de-freezing [...] and re-contextualization which only contemporary creativity could trigger'. This creativity could be introduced by the application of digital and interactive art which could be performed *in situ*. But how to deal with the fact that some heritage sites are typically closed for general public or are no longer accessible?

From my point of view, it is possible to exploit the potential of endangered heritage sites for locating festivals and rituals without making interventions in their structure. It is now possible to project a set of images or videos inside a building, on its walls, which create the immersive effect for the festivals and events. The most common use of such visualisations is, however, the application of the exterior walls of buildings as they could gather more people but this process does not allow people to be *in situ*. Digital projection on a façade of a building is a developing and spectacular form of presenting narratives in public spaces. Short video presentations are also performed inside the buildings, however very often only one wall is used for such projection. I think that using existing heritage sites or monuments (preferably ones that surround the audience) for immersive all-around projection could be a method for locating festivals

or rituals in revitalized cultural heritage places. It could be also the way to preserve the cultural memory *in situ*, based on a reference to the past (e.g. a ruin).

Lavanga's (2006) perception of heritage confirms the role heritage sites may play in preserving public and cultural memory. Lavanga does not have a traditional approach to heritage in which cultural heritage is understood as monuments of the past where no action takes place. She points out that cultural heritage has being 'irrevocably lost', because of nature- and time-generated factors and also human destructions. She certainly does not take into account the UNESCO initiative. UNESCO World Heritage List contains sites with special cultural or physical significance. In 2012, 961 sites were listed: 745 cultural, 187 natural, and 29 mixed properties, in 157 countries (UNESCO World Heritage Centre, 2012) and its statistics indicate that each year new objects are added to the existing list of heritage sites. Lavanga understands cultural heritage not as buildings, gardens, parks and other material sites but refers to abstract and spiritual aspects of cultural heritage, by which she means festivals and celebrations that have not been maintained by next generations and got forgotten.

To sum up, there are a number of similarities between cultural and public memory. They both attempt to explain the past to groups of people and they may be used in the formulation of identity. However, public memory is preserved via monuments, memorials and is in most cases imposed by the institutions; whereas cultural memory is often based on cultural heritage and objects that already exist (that could have belonged to someone). It exists most often on heritage sites, it needs to be animated and uncovered and its aim is to provide continuity of cultural identity for next generations.

2.3. Features of public and cultural memory

In this section, I will analyse how public and cultural memory are perceived in order to establish the set of features that characterize them. Contemporary memory scholars hold different positions that relate to memory. Greg Dickinson, Carole Blair and Brian Ott (2010), the authors of *Places of public memory: the rhetoric of museums and memorials*, provide an overview of different approaches to memory. In their view, memory is based on the following six claims:

- 1) memory is triggered by present anxieties;
- 2) memory describes shared identities, providing senses of common identity;
- 3) memory is stimulated by affect;
- 4) memory is partisan, partial and often challenged;
- 5) memory has confidence on material and symbolic supports;
- 6) memory has a history.

I will discuss each of these positions individually and I will extend them by explaining the issues of identity (which relates to the second point), and memory and history (third point).

Firstly, memory is triggered by present concerns and it appears in discussions within groups that tell stories to themselves. Groups talk about individuals or events and they glamorize some of them. They make choices in order to present only some actions. David Lowenthal (1985, p.194), the author of *The past is a foreign country*, suggests that people 'select, distil, distort, and transform the past, accommodating things remembered to the needs of the present'. These remembered things may be communicated in the forms of narratives, plays, films and other multimedia presentations.

Secondly, memory is considered by some scholars as a narrative of common belonging. It offers people in a group the understanding of a sense of identity and belonging to the particular assemblage. This approach may be false, however as common belongings can be imposed by authorities who present one version of public memory (official memory), which is not necessarily true. Public memory is identified with national patriotism which allows groups to self-define and to determine its identity (Bodnar, 1992).

The notion of *identity* was introduced by psychoanalyst Erik Ericson in 1950s and depends on the notion of memory (Gillis, 1994, p.3). Identity is understood as the sense of sameness of the individual or a group of people who share the same time and space. Identity is linked with remembering. Nations and individuals demand identity and fight or die for it. National identity refers to a certain relationship among people that is sustained and constructed over the time. National identities can be reconstructed and focused on historical, political and economical integration. The relationship between identity and memory is related to commemorative activity which is understood as a political and social organization of group memories with the focus on public commemorations rather than personal ones (Gillis, 1994, p.4-5). Dolores Hayden (1995, p.9), an American scholar of American studies, claims that personal memories of parentage and the social or collective memories, are merged with histories of our families, co-workers, neighbours or ethnic communities.

Thirdly, public memory is animated by affect, which means that emotional affection is the reason why objects, people, events and places should be preserved (Dickinson, Blair & Ott, 2010, p.7). This type of approach tries to address the relationship and differences between memory and history.

Kendall Phillips (2004, p.2), the author of *Framing public memory*, states that 'living' memory is in contrast with fixed history and adds that societies are established

by memories and interactions and rituals can create such memories. Memory, history and relics are modes that enable the access to the past. Memory extends back to childhood, whereas history stretches to the earliest records of civilization and is open to the public. Memories determine personal identity and are personal, unless they are shared and they become public memories. Memory is the premise of knowledge. It is based on other people's accounts of the past and disappears with its owner. History can be formulated on the basis of eyewitness accounts and evidence that includes second hand memories (Lowenthal, 1985, p.212-213). It does not present details and individual fragments, but is concerned with a unitary whole. The role of historians is to establish contrasts and comparisons between a variety of diverse positions (Boyer, 1994, p.135). History and memory both focus on physical remains, which are mute, and interpretation is necessary. As Lowenthal (1985, p.xvii) agrees, these remains create bridges between then and now. What is more, these items, even when distorted due to erosion, are evidence of past events. Objects do not have to be from the antiquity, but items that belonged to a person who died also produce such bridges with the past, with the person that is no longer with us (e.g. shoes in the Auschwitz Museum). Lowenthal (1985, p.193-194) claims that the foundation of memory is the awareness of the past. People can distinguish past from present and it is confirmed that they have experienced the past through the consciousness of former events. History and memory do not create one continuous version of events, there are discontinuities in memories gathered within a group of people.

Fourthly, memory is considered as partisan, partial and contested. Barbie Zelizer (1995, p.224), an Israeli scholar of communication and memory, claims that the principle of the understanding of collective recollection is its partiality. It is important who decides what is to be remembered as it indicates which events will be preserved. Soviet Russia's influence in Polish politics between 1945 and 1989, created the image

of the Soviet army as saviours and only good aspects of the Soviet's involvement in the war were allowed to be preserved. The Katyn massacre (mass execution of Polish officers and intelligentsia carried out by the Soviet secret police in 1940) was not allowed to be mentioned at all in public before 1989. No single memory has all that we recognize, or could identify, about any event, issues or personality. Memory is selective and it turns aside other memories (Dickinson, Blair & Ott, 2010, p.9).

Fifthly, memory is reliant on symbolic supports. This symbolic support can be language, communication technologies, ritual performances, places and objects that generate the attachment to the group (Browne, 2010, p.18; Dickinson, Blair & Ott, 2010, p.10). Iwona Irwin-Zarecka (1994, p.13), a Polish scholar and specialist in the area of collective memory, claims that securing a presence for the past demands 'memory work' which may involve writing a book, filming a documentary or erecting a monument. In this way, the 'infrastructure' of public memory is created. Barbara Misztal (2003, p.6), a Polish scholar of sociology of memory, agrees that rituals, language, sites of memory and commemorative practices are factors that make the public memory. Jay Winter and Emmanuel Sivan (2000, p.6-9), American historians and memory scholars, add poetry, architecture and art to the list of symbolic supports mentioned by Irwin-Zarecka and Misztal.

Sixthly, memory has a history (Dickinson, Blair & Ott, 2010, p.10). Jacques Le Goff (1992), the French author of *History and memory*, claims that memory should be arranged around shifts in communication technologies, which also have a history of development (panorama, diorama, cinema, IMAX). Alison Landsberg (2004, p.3), an American scholar of early cinema, museums and memory, claims that 'memory is historically and culturally specific; it has meant different things to people and cultures at different times'. Technological innovations catalyzed memory practices and shifts in memory understanding. Landsberg's (2004, p.3) notion of 'prosthetic memory' relates to

mass cultural technologies. Prosthetic memories are 'divided from engagement with a mediated representation (seeing a film, visiting a museum, watching a television miniseries)'.

To sum up, public and cultural memories are selective. A single memory only contains a part of a given issue or event. We have a tendency to glamourise a part of memory and neglect, omit or simplify other parts. Memory is often based on emotional affection, thus providing senses of common understanding among those who share this affection. Memory differs from history as it is more personal and open to changes. Memory relies on symbolic representation which uses language, communicative technologies, ritual performances, places and objects to generate the attachment to the group and secure remembrance. Finally, memory has history which indicates that symbolic representations developed in time. In the past, literature and paintings were prominent symbolic representations, whereas nowadays electronic media as a form of communication technology seems to play the major role in preserving memory.

2.4. The role of communication technologies in supporting memory

Today, films, photography, music, the Internet blur boundaries of time and place which might once have seemed less navigable, to provide a constant access to memories. They often use such narrative techniques that interweave the past, present and future.

The past has become part of the present in ways simply unimaginable in earlier centuries. As a result, temporal boundaries have weakened just as the experiential dimension of space has shrunk as a result of modern means of transportation and communication (Huyssen, 2003, p.1).

It can also be argued that the information overload, and the speed at which things become available, might have exaggerated rather than reduced the gap between what is

‘past’ and what is ‘present’. As a result, very recent things and events can be perceived as ‘old’ when 100 years ago they would have been considered current.

The lesson of history could be acknowledged from traditions and urban space. Tradition shaped social and cultural life whereas urban environments provide material traces of the past which are still available in the present. According to Andreas Huyssen (2003, p.1), a German scholar of literature and culture, museums, monuments and public spaces represented traces of the past in the present and they were, and still are, the communication methods of transmitting past to the present and also to the future. It was important, for instance, in the nineteenth century to create monuments to national pasts in order to legitimize and provide meaning to the present and the future. Huyssen (2003, p.2) states, however, that a monument can no longer work as a method for communicating memories and that due to the technological development in the 21st century, we could speak of communication technologies rather than communication methods for transmitting memories.

In my view, it is debatable, however, as communication methods and communication technologies do not exclude each other. They can co-exist and co-operate in one enterprise. The difference between these two notions results from the ‘communication’ paradigm change. Communication in the past tended to be quite one-way but now it has become interactive and participatory (e.g. wikis). Communication technologies correspond to a new understanding of the communication concept and are perceived as audio-visual systems that are used to handle information and aid communication. A videophone can also be included in this definition, because it is an audio-visual device where stories and recollections are shared. However, its principal aim is not communicating memories to a wide audience but acting as a tool for conducting a dialogue between two people.

The increased relevance and weight of technology and technological development reflected in communication technologies may be considered as something that affects communication methods. Museums or monuments, which are traditional communication methods to preserve public memories, may use or may be supported by communication technologies to enrich the content they display.

In this thesis, communication methods are recognized as methods of delivering narratives and transferring memories. They are supported by communication technologies that are responsible for the visual presentation of material (e.g. painting, video projection on a screen) with the addition of sound, where this type of production is designed for the wide audience (cinema, panorama painting or television).

According to Kenderdine (2009, p.78) by 'using new technologies, many practitioners believe that it is possible to transport meanings of place to different times and locations to be recreated anew as maps or virtual renderings'. The recreation of place can be facilitated in a number of ways (television, computer visualisation techniques, film), but problems occur as to how to provide an observer with an instant view of all objects gathered in the particular environment or interior. This seems to be facilitated in medieval churches. Alison Griffiths (2008, p.19), an author of *Shivers Down Your Spine: Cinemas, Museums, and the Immersive View*, claims that medieval cathedrals were multisensory spaces. Spectators experienced their beliefs not only by looking at the paintings and by listening to organ music that was played in the church, but mainly corporeally, because they attended a particular liturgy or a ritual which was performed for ages according to cultural memories. Colourful mural paintings and decorative stained-glass windows enabled people to learn more about the past and in this way understand their religious identity (Griffiths, 2008, p.19). Sixteenth-century architectural spaces attempted to merge the architecture and the interior design seamlessly by the application of frescoes. By doing this, they 'augmented' buildings

with narratives, which reflected current cultural and social trends in terms of 'ideal' landscapes. As Oliver Grau (2003, p.39), a German art historian and media theoretician, states:

three dimensional architectural features with a real function combine with purely pictorial elements in a total effect where nothing interferes the illusion or interrupts the effect.

Later in the seventeenth century, Baroque churches with a number of paintings and frescoes invited spectators to enter an imagined space. Due to the discovery of perspective laws, it was possible to create three-dimensional representation of space and project onto a two dimensional surface. From a centre of projection (where visual axes met) it was possible to imagine depth despite also knowing that it was constructed artificially by a combination of frescoes and architectural details, aligned to guide the spectator's eye ever higher, further, towards a heavenly realm. Baroque churches were the precursors for the eighteenth century creation of an accurate wrap-around perspective - a panorama (Lister et al., 2009, p.121). Cathedrals just like panoramas enclose viewers and have a multisensory character. The panorama painting as 'the first true visual mass medium' (Oettermann, 1997, p.7) and one of the first communication technologies for mass audience made it possible to visualize new spaces surrounding the observer and provided the context for individual objects. Panorama started the evolution of visual spectacles for mass audience. Griffiths (2008, p.19) lists a panorama among immersive environments that act as communication technologies. Her repository of immersive environments also includes diorama, moving panorama, cinema and IMAX. Panorama and these environments are explored in detail in chapter 4.1.

Apart from communication technologies mentioned by Griffiths we have to pay attention to recent devices in the form of large screens. Large public screens located in large number of public spaces, have rapidly become a sign of modern urban development projects in cities.

Scott McQuire, Nikos Papastergiadis and Sean Cubitt (2008) are exploring the potential of large electronic urban screens that supply the formation of new possibilities for public agency in public space. *Public Space Broadcasting* is a British project, which has established a network of large public screens in the biggest cities in the UK since 2003. These screens are tools for enhancing social cohesion, developing the tourism industry, strengthening positions of host cities and emphasising cultural events in the region. Contemporary artists no longer see these large screens as locations to present their projects, but they use them to produce new forms of public relationship. For instance, the Bradford Grid, an organisation that supports local initiatives uses the urban screen in Bradford not only for presentation of artistic content but also to encourage the participation of local residents who live or work in the city (Allen, 2008, p.33). These screens play a significant role in creating a new public space with civic engagement. The new feature that is available in *Big Screens* across the UK is the ability of audiences to participate actively in the content presented on the rectangular surface above their heads. This participation is possible because every *Big Screen* is connected to a computer and, for instance, games based on augmented reality are possible. These activities are in the experimental stage; however, they could evolve to a new form of interaction with the assembly gathered on a public space in the near future.

Big Screens broadcast BBC content, but also display information about local cultural events. McQuire, Papastergiadis and Cubitt (2008) state that these screens 'serve as a site for the collective enactment of public rituals including collective celebration and mourning'. What is more, 'people were putting flowers at the bottom of the screen' when it presented a broadcast of a one-minute silence and a service in a cathedral after the death of a soldier. This situation occurred in Liverpool and is mentioned by McQuire, Papastergiadis and Cubitt (2008). In my view, the large urban screen may play the same role as a monument or street memorial if they are in the right

locations and display the content that is designed to invoke memories. The question that arises is what content and what narrative form is suitable for public spaces?

I am aware of the fact that screens may be detrimental to the character and existing uses of public spaces. Large screens have been harshly criticised by the Commission for Architecture and the Built Environment that accused the London Olympics organisers of plastering the country in 'digital wallpaper' and turning it into an 'outdoor Currys' after it turned out that many of the 400-inch screens would not be temporary, as originally suggested (CABE, 2011). CABE states that the screens should be installed on new buildings and in spaces where digital media play a positive role. The spaces where many of them are currently located are not suited for them. They could be physically improved and the content displayed on screens could be supervised to ensure it is of high quality. One could ask whether a single large screen is the direction for the future, or whether an alternative display technology could be explored. The following section introduces chosen communication methods for preserving memory.

2.5. Methods for preserving memory

It has been mentioned in the previous sections that public and cultural memory are not constant. They are formed through ongoing change of ideas, thoughts and opinions. Thus, they need to be revised and reassessed from time to time.

Public memory is a basis for history. It needs to be recorded in some way, as it is elusive. If it only exists among a group of people it may be distorted or forgotten as the time passes and will result in history created artificially. For this reason, public memory needs to be protected from oblivion and deformations (e.g. in the form of monuments, sculptures).

Cultural memory can be protected by preserving objects as 'references to the past' and cultural heritage sites because these artefacts or locations reassure the society about its cultural continuity. According to Holtorf (2008) souvenirs and photographs have an important place in the cultural memory discourse. Souvenirs are signs of events that exist through the creation of narrative in order to improve collective understanding of the past (Stewart, 1993, p.132-133). In my opinion, they could inspire the creation of artwork that may enhance the preservation of memory.

I will now move to a discussion of each single method of preserving memory. I will try to elaborate on them in the context of the subject they represent, their impact on society, their reception by nationals and foreigners and their duration. I will first cover techniques, which do not involve active participation of the observers (2.5.1), or people who want to commemorate a particular person or an event. I will begin by describing museums, archives and libraries, which are sites of memory and then move to commemorative objects such as monuments and statues. I will also refer to urban landscape and architecture, which constitute large city spaces with mnemonic function. Finally, I will discuss individual or collective pieces of work designed to preserve memory such as paintings, painted panorama, photography and video.

In the following part of this chapter, I will concentrate on the methods of preserving public memory, which require some sort of interaction from observers (2.5.2), or people who want to commemorate an event or a person. These methods involve street memorials, public art, the Internet, festivals and rituals.

2.5.1. Non-active forms of preserving memory

Site of memory

Museums and archives, as sites of memory, are not the only institutions where the understanding of the past occurs and memories are preserved in the form of books, audio recordings, films etc. Monuments, emblems, commemorations, symbols, rituals or mottos are also listed by Pierre Nora (1996), a French historian of Jewish descent, as locations where public memory is maintained.

Nora (1996, p.1-3) refers to a memory place as a *site of memory*. The term was created by translating the French expression *lieux de mémoire*, which was used for the first time in the non-fiction book *The Art of Memory* (Yates, 1966). Frances Yates, who is a British historian, states in this book that the art of remembering is based on memory places, *loci memoriae*. In other words, *lieux de mémoire* refers to sites which were consecrated to memories such as libraries and museums. Memories when stored and displayed by them will be remembered (Whitehead, 2009, p.143).

Nora (1996, p.3) claim that a site of memory is a significant entity, which has become a symbolic element of the memorial heritage of community places. Sites of memory are thus places where the effects of the application of various methods of preserving memory are kept.

The role of sites of memory is growing as our society seems to store data and memories in different forms (digital photos, video files, audio recordings) and tries to preserve the past that is disappearing (Savage, 2006). Uncertainty about the future causes communities to collect and preserve large number of memories, which are necessary for example for national identify or a sense of belonging to a family. Nora (1996, p.1-3) claims that modern society builds and invests into sites of memory

because these sites have replaced 'real environments of memory'. In other words, objects and artefacts collected, for example, in museums try to provide a full depiction of the environments and their origin. However, this depiction is not complete as these items are separated from the context and from their original environment.

Nora (1996) who introduced sites of memory does not list other subjects such as photography, images, books, films, new media installations, public screens or urban landscape, because these enterprises are not *lieux de mémoire* in the strict meaning. Thus, we can see that Nora attempts to distinguish sites of memory and methods of preserving memory. However, the borderline between these two categories is not often clear. If we take monuments, for example, we may easily notice that they are places where public memory is recalled through some type of symbolism they include and they are also a method of recalling public memory, especially if they are removed from their original locations and are placed in museums. Furthermore, it does not seem to be appropriate to classify emblems, commemorations, symbols, rituals or mottos as locations where public and cultural memory is preserved as they are objects or activities. I would rather refer to them as methods of preserving public memory. At this point, I have noticed an interesting aspect of these methods. They usually involve an active participation and I would say that they have social impact. These methods are typically applied by a group of people who want to commemorate the loss of someone they knew.

Another type of commemorative remembering that also highlights certain values of a person are presidential libraries, which became one of the methods of not building monumental structures, and where public memory about an individual can be still understood (Hufbauer, 2005). Truman Library, Nixon Library or Reagan Library do not provide the immediate emotional power as, for instance, Lincoln Memorial or Washington Monument but they contain exhibitions related to the particular president of

the United States and a number of documents, films, audio recordings which need further investigation and can benefit the cultural knowledge of the public.

Monument

Monuments are structures built to commemorate important events or people. The word *monument* comes from Latin *monere* which means 'to remind' (Harper, 2010). There are several key types of monument: memorials (The Unknown Warrior memorial), columns (Nelson's Column), mounds (Kosciuszko Mound), obelisks (Washington Monument), triumphal arches (Arc de Triomphe) or objects created for religious commemorative process (grave stones, monoliths, temples, cenotaphs). Monuments were often used to improve the appearance of urban landscapes and were built mainly in public places. Additionally, they have been used to communicate historical and political information. Their roles also involved strengthening the current political situation (Lenin statues in the former Soviet Union) and educating public about significant figures (Nelson's Column in London) or events from the past (Naval War Memorial in Plymouth).

The importance of preserving memory by means of monuments was noticed by Halbwachs (1992, p.40) who claimed that strategic mobilization of commemorative monuments in mnemonic landscapes reinforces officially sanctioned collective memory. Halbwachs relates to 'statuomania' which is the creation of public monuments erected to honour individuals or political concepts (Hayden, 1995, p.67). Statuomania started in 1870s and manifested politicians or military figures on horsebacks that were produced all over the Western world in order to recall national heroes and events in which they participated (Michalski, 1998, p.44-45). Michael Stocker (1996, p.41-42), in the Turner's *Dictionary of Art*, points out that statues or monuments are located in places

which are accessible to the viewer. Streets, parks or squares are preferred locations for such memorials.

Miles (2010) provides an example of a monument which can be either a public monument or a cultural memento. Its function depends on where it is located. The Berlin Wall (1961-1989) was a security system in the Cold War period and an object in the original location (*in situ*). The Berlin Wall was divided into sections after 1989 and was sold to many places in the world. One section of the Wall is located in New York and was purchased at auction. This section is an aesthetic object not located in the place of its origin, which is currently used as a piece of street furniture which interests visitors and is taken for granted by local residents (Miles, 2010, p.51). Creating a collective understanding of the past through this object is difficult because this particular segment was taken from the environment to which it belonged and was placed in a culture that does not necessarily understand its historical context. Therefore, in my view, it does not play the same role in preserving public memory. To those who know its origin and historical context behind it, it works as a victory trophy that was taken after defeating the regime. One could ask what type of objects could be used in the preservation of memory.

Monuments are not always well received: The Berlin Wall because it was a wall that divided the city of Berlin; Vietnam Veterans Memorial (VVM) that divided the community who wanted to commemorate those who died in the Vietnam War (1955-1975) or the design of the monument in Auschwitz that was finally not built. They constitute real evidence to contradict Kirk Savage's (2006) (researcher of history of art and architecture, the author of the book *Monument Wars*) opinion on the role of public monuments according to which public monuments have been 'the most prestigious forms of commemoration, because they were designed as permanent showcases of public memory, to last for the ages'.

Vietnam Veteran Memorial (VVM) was designed by Maya Lin in Washington in 1982. This monument is the example of the shift called by Wodiczko (1999, p.49) a 'humanized place of cultural relaxation', where instead of glorifying the war in Vietnam (in a 'prestigious form'), it illustrates the costs of the conflict. This was one of the reasons that divided the community of veterans in the USA. For this reason, the monument became a turning point in the understanding of public memory (Haskins, 2007, p.404). It invites participation in physical form, so visitors can search for a list of American casualties in a chronological order. VVM contains 58,175 names of those who died in service in Vietnam/South East Asia and its shape was controversial at that time. In contrast to traditional monuments, VVM's design did not contain traditional elements (heroes, inscriptions). However, this monument enables the learning of collective memories through socialization with other viewers and provides new interpretations. This monument could be treated as a storage place for information about the names of dead soldiers, but it also supplies visitors with an awareness of the cultural continuity. In my view, this monument creates a space for presenting public memory, but due to large number of details (names) does not create a meaningful message for the future generations. The cost of the war and the names of victims are petrifying features of VVM. However, I think, that visual aspects of the representation of the war are still crucial for the preserving of public memory. Visually rich monuments with a number of ornaments create interpretations and are more meaningful for their viewers. One could also ask whether visualisations on monuments created using digital projections could provide enough contexts for the understanding of monuments. Words on VVM or blank wall (one side of the Berlin Wall often included graffiti and the other side was blank) do not provide enough context particularly to those who have different cultural origins or belong to a different generation. Such monuments require interpretations and adding narratives.

People, institutions, tend to find the suitable forms of preservation for tragic events from the past and also heroes, but it is almost impossible to design or create memorial that could fit all social groups. Stefan Aloszko (2010, p.96-109), a researcher of Auschwitz, attempts to present the difficulties involved in finding 'a universal expression for the memorialisation' at Auschwitz, because a number of different ethnic groups were killed there. In some cases camp blocks were used for presentation purposes, and histories or narratives were included in these exhibitions and in this way create cultural memory at Auschwitz. The Polish state wanted to honour the victims of the German Nazi Concentration and Extermination Camp not only through exhibitions in the museum, but also aimed to create a memorial where the collective memory could be commemorated through public rituals. The authorities considered a monument from stone or bronze a more appropriate form of remembrance than narratives included in exhibitions. There was a long discussion which started in 1950s about the design of the right monument. The winning design by Oskar and Zofia Hansen, chosen from almost 500 international designs, was based on 'a road' where visitors could walk through the concentration camp and imagine what victims had experienced. The road acted as 'petrifying agent but did not memorialize the drama in any way' as it did not 'facilitate a narrative that talked of [...] suffering' of the camp prisoners and also did not answer the question 'who exactly is being memorialized' (Aloszko, 2010, p.100-103). The monument according to Hansen's idea was not created, because it was not an appropriate form of commemoration in People's Republic of Poland before 1989 where openness, sharing opinions and deciding about options were not appropriate. In its place another stone-made monument was erected in 1967 and it contains memorial plaques in several languages communicating the number of prisoners who died in the camps. The plaques provided distorted information as they overrated the number of victims to four millions which was requested by communist regime in Poland. When the regime

collapsed in 1989, the plaque was changed and included the correct information about one and a half million men, women and children who died in the camp.

After investigating the VVM and designs of monuments in Auschwitz one could also ask a question: is the memorial in the form of monument the most appropriate method of preserving memory in the 21st century? What communication technologies could not only transmit memories and transport audience to particular places, but also tell narratives of what happened in the past and evoke memories so the audience could be touched by the place itself?

Carole Blair, Marcha Jeppeson and Enrico Pucci (1991, p.263-265), scholars of rhetorical and cultural studies, interpret the VVM as a prototype of postmodern memorializing where a number of possible interpretations are possible. However, the visitors are not provided with a narrative about the war in Vietnam. In my view, the participation is not active, because most visitors probably will not read thousands of names, which are written in a chronological order. It is partially active because visitors traverse along the monument and have an opportunity to read and find soldiers' names. Similar concept of traversing along the above mentioned 'road' was proposed in the design of a monument in Auschwitz. In my opinion, it could be worth exploring whether electronic media have a potential to make the process of traversing more participatory and could include a more public presence into the commemoration process by adding narratives in a visual form that does not require using words or texts (they could be understood by all people, not only from a few countries).

The concept of traversing apart from the VVM (Figure 2A), was also applied in other monuments: for example, Jewish Museum by Daniel Libeskind in Berlin (Figure 2B) and Monument to the Victims of the State Terror by Varas Studio (VST) in Buenos Aires (Figure 2C). In the Jewish Museum the visitors traverse along the zigzag, which evokes tortures. Discontinuous walls (different than in the VVM monument) suggest

fragmentation. Jewish Museum is located under the ground and to be entered from below.



Figure 2 Three monuments based on the concept of traversing. A - Vietnam Veterans Memorial in Washington⁷; B - Jewish Museum in Berlin⁸; C - Monument to the Victims of the State Terror in Buenos Aires⁹.

In the VST monument visitors traverse a space between two lines. One line separates the monument from the past and the second line (round line) divides the space for traversing and a river. According to Huyssen (2003, p.107), this space between these two lines is a memory space which is fragile and dependent on interpretation. This is also a space of reading names located on the walls (similarly in the VVM). It encourages contemplation or perhaps prayer as visitors walk along close to the walls.

The three monuments described above have a few common features. The design of these monuments is open, minimalist and there is no ornament or monumental ambition. A question may arise, however, whether they are successful in transmitting memories, i.e. whether they convey sufficient message to be recognized as symbols of the past in the landscape. It is not an ornamental character of the monument or multiplying the number of elements of the monument or the number of monuments on one site that decide about the effective preservation of memory.

⁷ Source of image: <http://images.travelpod.com/users/leedellekaptain/1.1286647834.washington-dc-vietnam-veterans-memorial.jpg> (Accessed: 16.04.2012).

⁸ Source of image: http://farm5.staticflickr.com/4083/5159930050_17ff6ec6a7_z.jpg (Accessed: 16.04.2012).

⁹ Source of image: http://2.bp.blogspot.com/_nouYsJZli7w/TA5RXuQ3VZI/AAAAAAAAASA/QuNG5GaD12Y/s320/DSCN2141.JPG (Accessed: 16.04.2012).

The more monuments there are, the more the past becomes invisible, the easier it is to forget: redemption, thus, through forgetting (Bal, Spitzer & Crewe, 1999, p.193).

Huyssen (2003, p.109) claims that figurative sculptures on pedestals are not a suitable method for preserving memory. He finds memory sites located in the expanded field that combine sculpture, landscaping, architecture, and design and are incorporated into an urban fabric as more appealing in preserving memory.

In my opinion, however, making a monument part of the expanded memory site, is not the only condition that has to be met to make it successful in transmitting memories. I share the idea of Bal, Spitzer and Crewe (1999, p.191-192) who claim that only by wrapping a monument, can it become more visible and cease to be a kind of historical waste. The fitting material for wrapping the monument could be a narrative that conveys the message about the past. But how to construct such a narrative? What features should it include and what should it restrain from?

Some attempts have already been made in the past to wrap monuments in narrative. Monuments and memorials that were produced in the 19th century and in the beginning of the 20th century are representing 'sensational symbolism' (Haskins, 2007, p.403) whose task was to convey narratives about heroes, great values or victories. Should contemporary monuments follow the pattern of the 19th century monuments or should they expand on the monument paradigm and exploit the potential of communication technologies thus being more direct in transmitting the message about the past? I will try to find an answer to these questions by exploring different methods of preserving memories with respect how they communicate narrative to the audience.

Statue

Statues, as another non-active form of preserving memory, represent dead people (however some people had their statues before their death e.g. John Paul II) and they are carved in stone or cast in bronze. The statue depicts a body of an individual and 'alters the temporality associated with the person, bringing him into the realm of the timeless of the sacred, like an icon' (Verdery, 1999, p.5). Statues are often represented with an object or objects that symbolize the person. For instance, Figure 3 illustrates the statue of renaissance astronomer - Copernicus - who is usually represented with an armillary sphere (spherical model of objects in the sky).



Figure 3 The statue of Copernicus in Warsaw represented with an armillary sphere. Image by Karol Kwiatek.

Statues do not present the wide context of the historical epoch in which the individual lived. The inscription under the statue helps to understand this person's name, date of birth, date of death and the role the person played. People represented in statues are known for local residents, but some foreigners need to read the inscription under the statue in order to get a historical context. Statues are commonly located in public spaces, where the spectators have proper access to become familiar with the person they

embody. Durability of materials used to build statues such as stone or bronze allows them to survive hundreds of years, but the narrative included in this type of monument is limited to information in the inscription.

Statues can be used as instruments of oppression and salvation, because their symbolism is powerful and effective to influence the public memory. They provide a permanent way of preserving memory as messages they convey last as long as the material (bronze or stone) that was used to create them. However, statues as visible signs (sometimes a mask) of a regime attract the attention during a revolt which could destroy them (Miles, 2007, p.152). There are a number of examples in history where the crowd demolished a statue (Lenin statues, Stalin statues, the statue of Saddam Hussein or recently the statue of Muammar Gaddafi). The razing of statues is rare, but occurs occasionally. It might have the effect that the memory about such a person is no longer preserved in the same way as it was when the statue was standing. I remember watching on television the process of pulling down of the Lenin statue in Krakow in December 1989, only six months after first free elections in Poland. Now, the large public space is empty and no other monument was erected in this location. Figure 4 illustrates two different views of the same place (with and without the statue of Lenin). This public space could have been given a new function but it has not been found till now. For example, it could be a place of integration and public viewing of a large screen. Malcolm Miles (2007, p.155), an English scholar of cultural theory, states that in Armenia the statue of Lenin was replaced by a video screen at the main public square. Such screens magnetize people, especially young generations and I think, are more appropriate forms of monuments for the 21st century than bronze statues. One could ask why the original stone or bronze monuments were demolished and the surrounding area changed. The memory that these monuments preserved imposed a version of remembrance (e.g. propaganda) which was not necessarily true. When the old regime

collapsed, it was necessary to re-vitalize surrounding environment in order to start transmitting new memories.

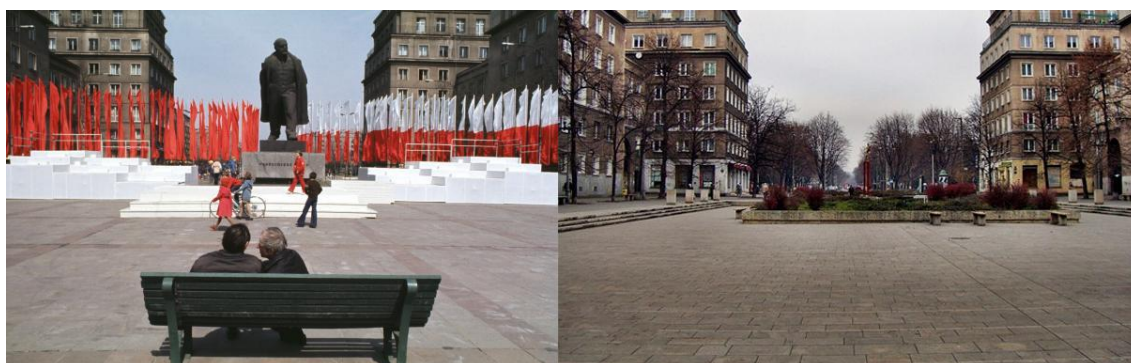


Figure 4 The statue of Lenin in Krakow-Nowa Huta (Poland) in 1970s (left)¹⁰ and the same square without a monument (2012) (right) - image by Karol Kwiatek.

Statues have not provided an opportunity to visualize alternative views of the history. They were built to portray an event (based on facts) in the past or a heroic person. Their aim was to impose the ideology and they were produced to be landmarks of places (for example, Nelson's Column (1942) which depicts English naval power became one of the most common London's views presented on postcards, so this monument is a landmark in London). Miles (1997, p.81) claims:

The history represented by statues is a closure inhibiting the imaging of alternative futures by denying the possibility of alternative pasts; but if this monument is an opening in society's received structure of values, dislocating the assumptions of an 'official' history, it is an act of resistance.

One might question the existence of alternative pasts mentioned by Miles. In my view, there is one past, unless the understanding of history was reinforced on us by, for example, a regime and people are aware of alternative pasts. Maybe alternative pasts refer to the situation that would take place if the history took a different course. In my view, communication technologies have a potential to provide an opportunity of creating alternative pasts and visualising them to the observers. I think that once the

¹⁰ Source of image: <http://www.omyguide.pl/images/stories/Lenin1.jpg> (Accessed: 10.10.2011)

statue or monument is enriched with multimedia devices (screens, sound systems) there is a chance to preserve public memory in an innovative way that could attract young people. Multimedia presentations rely on electricity supplies; which need to be provided all the time in order to make them work. The costs of such enterprises are high and devices such as large screens can be turned off accidentally and interrupt preservation memory. Nevertheless, they seem to have a greater potential in delivering meaningful interpretations of the past events and heroes than traditional monuments and statues.

Multimedia and interactivity open a new potential for commemoration and recollection. However, still very little is known about how cultural memories have been preserved using these new approaches because they need to create an environment that would immerse groups of individuals through interaction and multimedia display.

Urban landscape and architecture

Just like museums, monuments and statues, urban spaces are involved in the memory processes. Huyssen (2003, p.101) notices this fact by claiming that:

[p]ublic memory involves interventions in urban space, [...] cities remain the main battleground on which societies articulate their sense of time past and time present. [...] Cities, after all, are palimpsests of history, incarnations of time in stone, sites of memory extending both in time and space.

Urban landscape and architecture carry a load of symbols and memory so they can preserve public and cultural memory. Cultural heritage sites have the power to help citizens to identify their pasts and cultural identity. They not only trigger memories for local residents who share the same past, but are also crucial for visitors who would like to learn more about the past. One of the forms of preservation of public memory via architectural landscape is by the use of buildings that are symbols of the past events and whose shape, location or even names render associations with what they witnessed in

the past. These buildings are located on the specific streets which can also be a part of commemorative process, e.g. the Tower of London is associated with many executions ordered by Henry VIII. These forms of preserving memory are also effective, but due to the location of some structures (not in public places) they do not have impact on society. A building's main function is different.

Apart from these quite obvious methods of preserving memory, Casey (2004, p.32) stresses the importance of public places in this process. He claims that public memory happens when people assemble in one place and interact in a single scene of interaction. Public memory is not only located in a public arena or other common places but public memory is enacted there. The place embodies the remembrance itself. The place had a crucial meaning for Casey. For this reason, he formulated a concept of 'place memory' which depends on recalling social memories through urban landscape (Whitehead, 2009, p.159). The past and identity of individuals is created by asking for accounts and stories about the past. Historic places have the power to help citizens to classify their public pasts. They do not only trigger memories for local residents who share a common past, but they are also crucial for visitors who would like to learn more about the past.

Embedding memory in buildings is one of the methods of presenting the past. Ordinary architectural structures have been ignored in this process, whereas significant constructions which include the narrative of past lives, biographies and events, are fundamental for preserving memory. However, one might ask about ever changing sense of what is historical, valuable and worth preserving to fix and protect the memories the building carries, and what is not.

Painting

Paintings are another non-active form of preserving memory. They do not present the whole narrative but depict a certain moment, e.g. a battle in a war or a coronation of a queen. Unlike monuments and statues, they are multi-dimensional presentations. They have foreground, which focuses on the main theme, e.g. the queen-to-be on the throne and the background, which shows additional information, e.g. the place where coronation occurs and garment of servants that assist in the ceremony. Paintings give some hints to the observers, but they also allow lots of space for imagination so that, on the basis of traces of information found in the picture, the observer is able to recreate a wider picture of the event the image presents. The impact of the painting on society depends on the painter and, importantly, on the place of presentation of the painting. The durability of paintings is relatively low. However, if well preserved, they could last longer than the above mentioned forms of preserving memories (monuments, statues, architecture).

It is claimed that there is no work that presents the state of the mind of the artists as thoroughly as the painting. Thus, it includes emotions of the painters and their own interpretations of scenes they depict. Paintings are often memory works; which means they do not depict all the details but only those that were retained in the painter's memory. With practice this faculty will strengthen and the artist will be able to discern important factors behind commonplace experiences (Carlson, 1971, p.138).

I think that recording an artist during the creative work or at least recording the inspirational environment would be useful for analysis of a particular piece of work and would allow links to be established between the artist's work and his personal life. In this thesis, I propose to record a panoramic field of view of artist's workplaces in order

to present all items gathered in such a location that could help in the analysis of artist's inspirations.

A painted panorama¹¹ is a form of a painting that can depict 360-degree field of view and encircles observers. It does not present a state of the mind of artists, but just like a traditional painting, it provides a depiction of a moment in time with foreground and background. However, in contrast to traditional paintings, panorama consists of more than one rectangular painting. It provides a full context for the particular scene as it includes sections that proceed and follow a given scene thus providing 360-degree overview. Painted panorama is presented as a visual manifestation of the 19th century culture.

Painted panorama transported an individual to a place, especially into current hotspots of the world so the audience could witness, for example, battlefields from Waterloo and Trafalgar to Borodino or Gettysburg. Painted panorama offered a 'vehicle' that enabled the spectators to visit remote lands or cities. It offered a collective public experience of virtual voyaging where people could share their feelings and memories with other gathered inside the same rotunda (a special round construction for presenting panorama canvases) (Huhtamo, 2002, p.194). The traversing within panorama rotundas was limited and occurred in a round shape along the painting. In my opinion, panorama could be a device worth further exploration, especially because of the collective experiencing the world and the use of technological innovations (e.g. digital photography) in panoramic imaging. However, far too little attention has been paid to the exploration of preservation of memories in modern rotundas which will be discussed in section 4.5.

¹¹ More information about painted panoramas may be found in section 4.1.

Photography

Photography, as another method of preserving memory, has a number of obvious advantages such as ease of creation. Photography has a powerful facility to present the reality and can recall events or things very effectively. Nowadays, digital pictures are often edited, alternated and manipulated to create a desired effect but if this intervention is prohibited, photographs are still considered as one of the most reliable methods of presenting the world.

Catherine Keenan (1998, p.60-64), in the article titled *On The Relationship between Personal Photographs and Individual Memory*, indicates how taking pictures can emphasize the significance of remembering, both individually and collectively. She claims that images are helpful in stimulating memory and act as reminders. Traditional photography comprises 'an authoritative record of how elements are arranged from a certain perspective at a certain moment', but people who participated in the depicted event could see it from different point of view or diverse perspectives, so this aspect of photography can have an influence of what they may remember (Keenan, 1998, p.62). Every individual may remember a particular event differently. I think it might be worth investigating a method that will allow representing the world from a perspective chosen by the viewer.

Photography has the power to repeat what could never be replicated. The same feature is shared by memory. They both present past actions which could be lost forever when not remembered/photographed (Cieplak, 2010, p.140). However, Roland Barthes (2010, p.4-6), a French literary theorist, critic and philosopher, argues that to take a picture does not mean that the particular scene will be remembered. Piotr Cieplak (2010, p.138), a Polish scholar of cultural memory, documentary films and photography, claims that photographs from wars, humanitarian disasters 'acquire iconic

status and become ingrained in what can be referred to as collective consciousness and memory or particular events and groups of people'. The famous photograph of children in Vietnam escaping a napalm attack in 1972 became 'synonymous with the Vietnam War'.

I think that photographs presenting the suffering of people are more remembered than normal scenes from the life. If TV news presents tragic events such as national disasters or plane crashes, it is also watched by more people than when they broadcast peaceful events. It seems that people are attracted to the spectacles presented by the media that show suffering. One might ask what the role of emotions is in the creation of art work and in preservation of memory.

Keenan (1998, p.61) claims that due to the durability of a photograph, it can offer the opportunity of producing a permanent memory-image and on the other hand can hide original memory. The photographic image can stamp itself on memories constantly, without any decrease of its vividness. Philosophers, sociologists and film theorists (Walter Benjamin, Siegfried Kracauer, Roland Barthes) are inclined to see images implanted in memory as 'false memories' and they claim that the 'photograph is in the service of forgetting' (cited in Keenan, 1998, p.61). Barthes (1982, p.91) states that '[n]ot only is the Photograph never, in essence, a memory ... but it actually blocks memory, quickly becomes a counter-memory'. Susan Sontag (1990, p.165), an American essayist, repeats after Barthes (1982, p.91) that a photograph is 'not so much an instrument of memory as an invention of it or a replacement'. One of the objections to the photographic image is that it 'remembers' everything, whereas recall only retains what is important. Siegfried Kracauer (1993, p.424-425), a German-born film theorist, argues: 'photography grasps what is given as a spatial (or temporal) continuum; memory-images retain what is given insofar as it has significance'.

Barthes (1982, p.91) writes that his old photographic image 'remembered' experiences that the author eliminated from the memory narratives which he 'habitually tells himself about that time'. 'The photographs perform as a 'counter-memory'' because they demonstrate to Barthes that people 'incline to credit memory with a permanence and an epistemological authority that empirical studies prove it lacks' (Keenan, 1998, p.61). Photographs can be a testimony to what has not been remembered.

In my opinion, a single photograph is a subject to strong limitations on what it can 'remember'. It presents a partial fragment of a world and it does not depict views from behind the camera. A photograph is a record from a particular point of view. Ekaterina Haskins and Justin DeRose (2003, p.386), scholars of philosophy and rhetoric, state however, that photographs do not depict the surround context and position of memorial objects and their relation to each other (e.g. when located in one room but in diverse positions). This could be facilitated, however, by a panoramic photograph where the whole environment is stored on one image. Panoramic image provides an overview of individual objects within such a space and presents their mutual relation. I claim that panoramic photographs provide a more realistic depiction of the world than traditional photographs as they consist of images that were taken in all directions and then merged into one photograph and thus could be a medium for preservation of memories.

According to Keenan (1998, p.61) photographs can also function as sites of memory for a community once they are included in the present. Photographic exhibitions play the same role as exhibitions in museums as they recall public memories of a particular event. If these exhibitions use pictures that belong to different people and were created by different photographers, they additionally preserve individual memories, which taken all together constitute collective memory.

Individuals, objects or landscapes depicted on photographs cannot be easily transformed (image editing is not taken into account). Every image represents one moment in time and it is said that one image can tell thousands of words. Zelizer (2004) explores the role of images as a preferred way of maintaining shared memories from the past. Image is an effective method of replaying the previous events and a 'key vehicle of memory'. Remembering through images is much stronger than through words. Zelizer (2004, p.158) states that images 'might best tell a story by strategically catching things in the middle'. However, this process depends on the person who presses the button of a camera. Here, I think, panoramic imagery not only catches one moment depicted from the middle of the scene, but also represents context, which could visualise the mutual positions of all items, not only a particular view.

To sum up, there are two points of view: those who claim that photography allows remembering (Cieplak, Keenan and Zelizer) and those who do not agree (Barthes, Benjamin, Kracauer, Sontag). In my view, photography presents a number of details, it is likely that at least some parts of the picture will be remembered depending on the individual preferences for remembering and familiarity of the scene captured in the picture. In some cases, however, photography can interrupt or distort remembering. Nowadays, photographs can be highly controlled or edited and the image we get can be created to reinforce some type of interpretation in us that was intended by the author or modifier of the picture. Pictures modified in such a way may be conceptual or abstract which interrupts remembering. I think it is worth exploring a method that will provide an almost unlimited photo-realistic exploration of space based on traversing paths that could enable viewing a scene from multiple points of view and in a number of different sequences. This facility is supported by the technique of panoramic videography which is described below.

Videography

Videography refers the process of recording moving images on electronic media (hard drive, SSD drive). It can also refer to streaming media. The term incorporates methods of video production and post-production. It is the counterpart of cinematography, but with images captured on electronic media instead of film stock.

The narrative and video used in films render the movement of individuals in time and space. The story told in a film may take place over a long period of time and a film can present a large number of diverse scenes and characters. The form of presentation depends on the director of a film and on the techniques that are used to tell a narrative. Film is an appropriate method for education, because it tells a story about a specific issue in a concise way by the application of narrative and visual images.

The subject of film and video¹² designed to preserve memory are often political transitions and repercussions of the past. These themes may be used both in fictional films and in documentaries. Fictional films often use real-life characters as points of the departure. They may elicit memories and provoke discussion among audiences; both those who have lived through the events and those who are being exposed to them for the first time. However, they do not have evidentiary quality and immediacy of documentaries in confronting historical memory. When fictional films only evoke, documentaries can directly reproduce memories both through individual and through the use of archival footage (Blum & Blum-Ross, 2009, p.216).

Films impose some sort of reception on the audience and limit interpretation by the recipient as they usually leave little space for guesses and using imagination. In

¹² Film and video refer to moving-image media but there are fundamental differences between them. Film is created using light reflected from a scene and the special chemical processes make changes on the film emulsion. Video translates light waves into electronical signals and saves them on a magnetic tape, disk or hard drive. Digital video captures light reflected from a scene on a computer chip that is located inside a camera (Bordwell & Thompson, 2004, p.10).

contrast, books allow readers to reconstruct memories of the characters. They provide the reader time to consider different scenarios and interpret the behaviours and feeling of characters in the way that is individual to every reader. Books are also permanent and universal as their printed versions are available for later generations and can be used for various purposes (e.g. as a basis for film scripts). Films are recorded on the temporary media such as tapes, DVDs. They have peaks in popularity that occur when a new version is released, but then become gradually forgotten.

There are films that present multi-plot approach (forking path narratives) and allow the audience to watch different scenarios which I present in section 3.6. I think that one of the most important features of films is the possibility to record movement and the dynamics of the scene but the question is how to record the whole environment using one camera so everything that happens around the camera is captured simultaneously.

Panoramic videography¹³ (the term which I coined) includes the process of recording the surrounding environment with one setup equipped with multiple lenses and recording data on multiple hard drives and also the process of stitching synchronised images and creating a panoramic video (360-degree video). The term panoramic videography was not encountered in literature so far.

Panoramic videography is a type of video that is based on 360-degree images. It is not an active form of remembering, so to make this method active I am exploring application of interaction to this technique. The foreground and background are constantly changing; no details can be introduced to the audience in a traditional way as in films. A 360-degree film illustrates the whole environment, portrays the movement and the context of the scene. Panoramic films can be watched on television screens or in a cinema, but, I think that the most appropriate method of presenting a panoramic film

¹³ Panoramic videography is discussed in more detail in section 4.2.

is a special space equipped with an immersive (cylindrical) screen and surround sound. The uniqueness of 360-degree form of presentation is the quasi-spatial localization of individual objects. The observer located in the middle of the immersive space surrounded by 360-degree video can feel the illusion of being in the depicted location. What is more, a return to a particular place may provide an experience that might recall memories. The return to a meaningless decision point in the narrative can be achieved using techniques known from repeat photography and other strategies which were explored by Nitzan ben Shaul (2008, p.54-55), an Israeli scholar of film and television studies.

Repeat photography

Repeat photography (re-photography) depends on finding the position from which the historical photograph was taken and to take a new photograph from exactly the same vantage point. The method is known from 1880s when it was used to monitor glaciers in Europe. It was a cost effective technique for researchers and scientists to check the changes of the landscape (Webb, Boyer & Turner, 2010).

Mark Klett, known for his projects of re-photographing landscapes in North America, paired archival photographs of the 1906 San Francisco earthquake with his own photographs taken in the same locations one hundred years after the tragic event (Klett et al., 2006). These photographs indicate a significant process of photography, not only for documentation but also as an artistic form in the 20th century. Klett who coined the term 're-photography' has been one of the first practitioners of this genre.

Klett's work with re-photography started on the Re-photographic Survey Project which was developed for scientists (mainly geologists) who wanted to have accurate 'repeat photography' of the same region for the purpose of scientific analyses. After

some time, Klett and his team came to conclusion that such re-photography could provide more information than written documentation of the particular part of the world. They could, for instance, provide an interpretation of the culture from the photographed regions. Klett also wondered what could be re-photographed in the future and how the contemporary culture will be received by future generations:

I wonder how viewers one hundred or two hundred years from now will interpret our culture from these scenes? (Klett et al., 2006, p.6).

Klett based this statement on two projects that he conducted 110 and 130 years after Re-photographing Survey Project. These were Second View (Klett & Manchester, 1984) and Third View (Klett, 2004). Second View was a project of re-photographing American landscapes in 1970s on the basis of images from 1860s. Third Views contained images of re-photographing the same sites but in 1990s. Figure 5 presents three images from these periods.

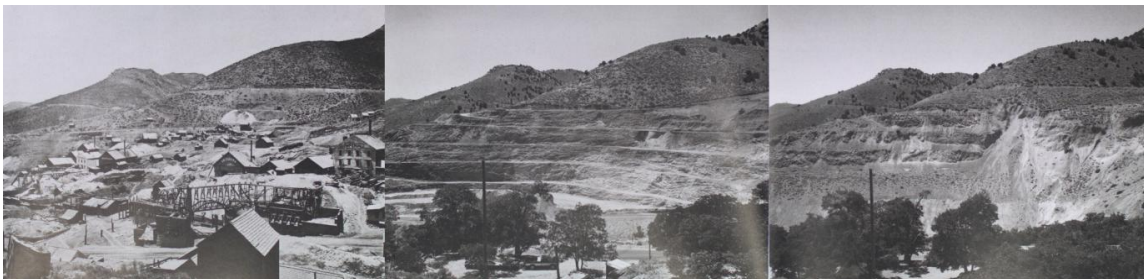


Figure 5 Three images of the same site - Comstock Mines in Nevada, USA¹⁴.

Left: 1868, Middle: 1979, Right: 1998

The permission to reproduce these images has been granted by Mark Klett.

Relying on a technique of 'repeat photography', I propose methods that I called 'repeat panoramic photography' and 'repeat panoramic videography'. They show panoramas or video panoramas respectively instead of photographs and are taken from the same vantage point (still panoramas) and along the same trajectories (video panoramas). They allow us to monitor changes so we can have interpretation of culture, customs, and even

¹⁴ Source of images: (Klett, 2004, p.97-99).

the dynamics of the city. I used these techniques to allow next generations to re-photograph my paths in the future. New research questions such as what could be different in the future and why re-photographs may be useful for storytelling could be explored.

The process of repeat panoramic photography and repeat panoramic videography enables to explore and reveal changes and also helps to understand what caused the change. In this way, the audience could be aware of the past and try to preserve memories that are disappearing. My idea, however, could not be supported with panoramic imagery from the past, so I decided to reconstruct the interior of the church in 3D modelling software and then create 'panoramas' in the reconstructed church. These computer-generated panoramas were juxtaposed with contemporary recordings of the ruin.

The potential of re-photography in recording changes has been already noticed by many photographers although in a slightly different context. Klett et al. (2006, p.6) state that re-photography allows us to 'contemplate how we understand time and our relationship to the past'. What is more, this technique is 'good at asking viewers to consider their relationship to time and change'. The time for contemplation is significant in the process of reminding past events.

Peter Moore (2010, p.262), a wildlife and landscape photographer, states that the purpose of re-photography is to record changes which is an educational and interpretive process. It helps us to reveal changes, understand the landscape and make links to human involvement in the change of the environment. If we understand what causes the change, we will become aware how to protect and preserve particular parts of the scene for the forthcoming generations. If we understand events that occurred in a specific location, and if we are aware of artefacts that might disappear or change their function, we will be able to preserve cultural memory of these events or artefacts much better.

According to Klett (2010), the process of re-photographing creates the opportunity to collect additional data and knowledge from the particular area. Klett and his team have not recorded sound or created panoramic images during the project in 1970s, because they only focused on re-photographing places and maybe did not have specialist equipment for these purposes. During the third re-photographing project, they managed to collect additional information about cultural changes of the region, but it seems that every time the re-photographing project is revived, new data can be recorded (because of the development of technology and also the awareness of people).

I think that panoramic photography and panoramic videography have a potential to become the re-photography techniques of the future as they provide the wider field of view than traditional photography and record all the details (static or/and mobile) of the scene they present. The dynamics of the scene would also be recorded.

Studies in the field of re-photography that have been discussed in literature so far have only focussed on comparing two or more images taken from the same vantage point and have not considered comparing movement through trajectories. Neither of them was concerned with the application of panoramas in re-photography. It may be caused by:

- a relatively small number of seamless panoramas from the past;
- difficulty in finding the same vantage point (a method of trials and errors is sometimes applied).

In order to activate the full potential of panoramic repeat photography and panoramic repeat videography some kind of interaction is necessary so the viewers could decide when to switch between particular states. The following section introduces active forms of preserving memory.

2.5.2. Active forms of preserving memory

Parades, festivals, battle reconstructions

When thinking of active forms of preserving memory, the first association we get are activities such as parades, performances, festivals or battle reconstructions. These activities provide the opportunity for individuals to participate and collaborate with other members of the public. The audience could preserve memory about particular events by wearing clothes from the past epochs and by participating in a number of activities. This type of activity, in contrast to the previous ones, is not related to one fixed point, but can be spread over a large area (parades, battle reconstructions).

Street memorial

Other forms of preserving memory which involve public participation are street memorials. Memorial gestures that populate streets after a tragic event were evident after September 11 in New York where a number of posters of missing people and graffiti were created and attached to walls and fences in memory of those who died in World Trade Center towers. Haskins and DeRose (2003, p.383) claim that the preservation of street memorials for example by taking pictures of them in digital form 'does not preserve the spatial context that surrounds the drama these memorials enacted for their audiences'. Even panoramic photography could not present the dynamics of the scene at that time. This can be facilitated, for example, by panoramic videography. Street memorials about the missing relatives and walls and fences became places for the expression of protest, grief and pride. These types of vernacular monuments are short-lived and could be moved to museums and displayed in the future exhibitions. Not

every street memorial is spotted by museum curators, and in this way has a chance to be preserved; but the Internet provides a chance for a preservation of such street memorials.

New media installations

Less obvious methods of preserving memory that also include engaging the audience are new media installations. 'New media' are defined by Erkki Huhtamo and Jussi Parikka (2011, p.1), scholars in media archaeology, as 'loose conglomeration of phenomena such as the Internet, digital television, interactive multimedia, virtual reality, mobile communication, video games'. The individuals can participate or interact with these enterprises. New media installations are mostly based on computer renderings and computers. They do not have to tell stories in order to attract mass audiences, but a sequence of events can increase the audience's involvement in the event. I will not discuss all types on new media defined by Huhtamo and Parikka (2011), but I will focus on the Internet-based hypermedia as it is the most participatory medium in collecting and sharing memories nowadays and on the immersive environments as they have the potential to transport the audience to the world of memories and experience them as if they were contemporary events.

Internet-based hypermedia

The development of the Internet-based hypermedia has ended the monopoly of memory institutions or sites of memory - libraries, archives, museums, and galleries over the process of preserving information from the past and in this way maintaining memory. However, there are also disadvantages of this shift in collecting public and cultural

memory items. The appearance of uncontrolled and disordered information in cyberspace was one of the factors of increasing the significance of memory institutions. Collecting information was no longer similar to analogue process exercised in memory institutions for many years, which had to adjust to this shift in digital age. Museums, archives and memorials 'promulgate official ideologies of the ruling elites' (Haskins, 2007, p.402). Haskins also claims that memory was not constructed *by* people up to 1960s, but only *for* people. Young people and women were not widely considered as the audience for public memory institutions, whereas monuments in public spaces were available for everyone. The Internet provides unlimited access for all social groups and they can maintain their memory. The worldwide network contains a collection of texts, pictures, photographs, audio recordings and videos that had a crucial impact on the development of preservation of memory before the Internet.

The Internet is an active, participatory and collaborative form of preserving memories and has been used solely by archivists in memory institutions. The monopoly of creation of information has changed over the last 20 years from 'virtual oligarchy' (Microsoft, Apple, Google) to social media in which large number of population is collaborating and participating (Caron & Brown, 2011, p.10-13). The above-mentioned companies provide comprehensive access to memory from all social sectors, because people who use *blogs* share details of their lives with others. They can do this by the application of not only a computer but also a mobile phone. The advances in computer technologies and the increase of social media websites encourage community groups to share their past with other Internet users. Interactivity and participation become crucial features of emerging nature of memories that are now also actively collected on the Internet. Internet allows people to collect stories, photographs, audio recordings and videos about a particular event. For example, Haskins (2007) provides an example of The September 11 Digital Archive which documents public involvement in

remembering the tragedy from 2001. The event became one of the most mediated disasters in history at that time (Haskins, 2007, p.408). The digital archive allowed participation to those who had been affected on that tragic day and they had a possibility to tell their stories. According to Haskins (2007, p.418) the Internet became a medium not only for private remembering but also for preserving memory. The archive preserved a number of viewpoints, stories and images which could be lost if they were published only on personal websites or were not published at all. What is more, the September 11 Digital Archive's website¹⁵ enabled common people to participate in the creation of public memory. The Internet can collect large quantities of digital past, however it requires a suitable environment to display them properly and provide a meaningful participation in the narrative.

I think that panoramic photography and panoramic videography enable objects to be presented *in situ*, which means that they are presented in their original location. *In situ* refers to a situated experience where people gathered together in real environments (e.g. urban space) are able to interact not only with 'computer-created' reconstructions or memory sites and objects but also among themselves. Following Casey (2004, p.32), I would like to reiterate that assemblage in one place and interaction help recalling.

2.6. Conclusion

The discussion of different types of memory in this chapter reveals that the concept of public memory is widely discussed in literature. However, far too little attention has been paid to the preservation of cultural memory which is more prone to be forgotten or lost as it has local dimensions and has not been preserved in the same way in the past.

¹⁵ 'The September 11 Digital Archive': <http://911digitalarchive.org/> (Accessed: 13.07.2011).

Therefore, I think, more research needs to be done on the cultivation of cultural memory using digital technologies.

Public memory uses material objects such as monuments, sculptures, paintings or architecture to remember people or events that were meaningful to the whole nation. Preservation of public memory is often imposed or reinforced by the authorities and does not correspond with actual history. In contrast to public memory, cultural memory uses active forms of preserving memory. It relies on festivals, ceremonies and commemorations that should be held regularly in order to prevent them from oblivion and to pass them to next generations. Cultural memory is not only used for preserving customs and traditions but also for remembering people who lived in a given community and events that highlight the cultural, national or religious identity of a given social group. Local people and events are not the only components that make cultural memory. This memory is also made up of places where these people lived and worked, and where events occurred. For this reason, cultural memory could ideally be preserved *in situ*.

Both public and cultural memories are transmitted to audience using various methods for preserving memory, e.g. monuments, statues, museums, books, films, photography. One of the most recognizable methods of preserving public memory are monuments that are typically located in city centres or other distinctive places. Robert Musil (1926, p.506), an Austrian writer, notes that public monuments aim to attract the public attention, but they are impregnated against attention from the outside.

Most of us show the same attitudes towards these statues. One considers them – like a tree – to be a part of the street, one would be immediately struck by their disappearance, but one does not look at them and one does not have slightest idea whom they represent (Musil, 1926, p.506).

In order to make the monuments more recognizable and meaningful, they could be supported with narrative constructed in such a way that it does not interfere with their symbolisms but explain it to those who are not familiar with it.

Taking into consideration the development of communication technologies and their role in the preservation of public and cultural memory, I believe that there are reasonable grounds for substituting traditional monuments with large urban screens, especially if the original monuments were destroyed or removed. Large screens which already exist in many British towns are not only a platform for local information, but often play a role of monuments or statues as they can show images or films that recall past events.

However, the use of public screens as monuments has huge limitations. They are commonly used for watching sport events or concerts and provide a space for socialising which does not have anything in common with preserving memories. Screens can show narrative and are flexible, but for the same reason they lack the unique symbolic weight present in statutes which may lack the narrative.

Large screens may attempt to play the role of monuments but they have a chance to be successful in this matter only if they preserve the right content that compensates for their lack of symbolism. Only then the screen will support the idea that a public space is a location for the exchange of culture and producing public sphere (Struppek, 2006, p.175).

A public screen is not treated like a tree. It is visible; it provides local orientation and identification through the cooperative experiences. It attracts the audience, especially young people. What is more, it is more easily updated or changed than a monument. Monuments are often destroyed when the regime collapses, whereas large screens can simply adjust their contents.

Monuments, thus, have common features with large screens and I need to exploit the monument paradigm in my exploration for effective methods for cultivation of cultural memory. The other aspects I need to take into account when thinking of methods for preserving memory are communication technologies that use various methods for transmitting memories. Large urban screens are numbered among these communication devices. The other communication technology – panorama along with its quasi-spatial character provides a space to locate festivals and rituals in public heritage spots. The old painted panoramas were mediums for large audience that preserved public memory about battles, religious events or political movements. They were not displayed on the original sites but they gathered a number of people and created an illusion of being in a particular (heritage) site. A 360-degree photographic panorama remembers more than a traditional picture. It provides an overview of objects and their mutual relation. It presents a wider context than a photograph and creates a feeling of immersion, which is based on the illusion of being in the place presented by panorama. Multimedia techniques used in panoramic environments provide an opportunity of creating alternative pasts, which refer to situations that would take place if the history took a different course. Multimedia techniques also support 3D computer reconstructions which can present how the site looked in the past. Recapitulating the main points, I come to the conclusion that the method of preserving cultural memory, which needs to be investigated, involves using traversing and panoramic videography which could substitute traditional commemoration services and could be located on the heritage sites. These environments will be effective in preserving cultural memory only if they provide narrative. The next chapters examine narratives and panoramic image spaces, respectively.

3. Interactive narrative as an active method of preserving memories

In the previous chapter, I defined public and cultural memory. I also explored their features and the role of communication technologies in supporting memory. I discussed various active and non-active methods of preserving memories and discovered the potential of traversing in the cultivation of memories. I determined that the preservation of memories could also be enhanced by a relevant environment that supports traversing and by the narrative, which includes memories and enables the audience to share their opinions and decide about options (alternative pasts). Now, I am proceeding to look at one aspect mentioned in the previous chapter, which is the role of interactive narratives in the preservation of cultural memory. The main issues addressed in this chapter are the exploration of the concept of narrative, especially interactive narrative, its role in preserving memory and its interaction with certain contemporary technologies such as panorama.

Chapter 3 begins by laying out the theoretical dimensions of the narratives (3.1). Then, the link between narratives and memories is explained in (3.2). By exploring the role of cultural mnemonics in remembering, the concept of spatial narratives (3.3) is brought to light. Spatial narratives require the viewers to traverse the environment in order to unveil the narrative and therefore traversing is the subject of the next section, which discusses both the origins of the concept and its application in real and virtual environments (3.4). Traversing may become the real-life experience in virtual environments if it is supplemented with interactivity which gives users some control over the system and supports communication with the system. Interactivity may also be applied to narratives leading to interactive narrative. The concept of interactive narrative and different types of interactive narratives are discussed in (3.5) whereas (3.6)

elaborates on the interactive film whose potential in preserving memories was recognised.

3.1. Theoretical foundations of the narrative

Although narrative plays a salient role in cultural life as a privileged form of information, it is very difficult to define as the concept of narrative has undergone many transformations (Bal, 1997, p.7-9). Narrative simply means telling a story. However, stories and narratives are not synonymous. David Bordwell and Kristin Thompson (2004, p.61), American film theorists and film historians, define a story as 'consisting of all the events in a narrative, both explicitly presented and inferred'. Stories are sequences of events that provide a new raw material to make other stories. Story is a representation, a mental image, whereas narrative is how the story is told, so the same story can be subjected to different narratives. Dinkla (2002, p.27) indicates that narrative forms became very heterogeneous since the late 18th century as they were developed on different stages and media. Martin Rieser (an English electronic artist and writer) and Andrea Zapp (2002, p.xxv) (a German freelance lecturer, writer, and electronic artist) claim that we have entered the age of 'narrative chaos' where traditional frameworks are being displaced by developing digital technologies for storytelling. I am aware of the fact that nowadays we have to deal with a great variety of narratives, both traditional ones, which have not died out and new ones, which emerge when new technological devices are developed but I would not call this state 'narrative chaos'. I would say that different forms of narrative co-exist and influence one another rather than interfere. Both traditional and digital narratives have their supporters and recipients

and it is not very likely that for example, traditional books will be substituted by digital ones in the nearest future.

The development of narrative forms was followed by the evolution of the concept of narrative. We may distinguish two main approaches to narratives. The first approach is supported by Ryan (2004b) and Edward Branigan (1992) - an American scholar in film studies. Ryan (2004b, p.337) defines narrative as 'a mental representation of causally connected states and events that captures a segment in the history of a world and of its members'. Branigan (1992, p.3) considers the narrative as 'a way of organising spatial and temporal data into a cause-effect chain of events with a beginning, a middle and end that embodies a judgement about the nature of events'. In both definitions, narrative is understood as the mental process that depends on organization of states and events that are casually connected.

A different approach to defining narrative is shared by Dinkla and David Black (in *Critical Dictionary of Film and Television Theory*). Dinkla (2002, p.30) and Black (2001, p.301), perceive narrative as the act of communicating events in literature, art, film and other areas of research and practice. Black considers the link between narrator and author, and takes into consideration the difference between a narrative in literature and also in film industry. Many literature texts have non-identifiable narrators and the story develops when the narrator is unknown. In film, the relationship between narrator and author is more complex than in literature. Books are mostly created by individuals, whereas films are rather collaborative mediums for presenting stories and the concept of a narrator in films is diverse. A voice-over narrator's narrative in film may not refer to a person who is talking. Silent moments in films are possible, because voice-over narrators tend to appear and disappear. The narrative continues to develop even when the narrator is not talking, because of the application of moving images, whereas this

effect would not be possible in the literature. The experience of narrated films is evident when technology itself tells a story even when human characters are not introduced.

The approach to narratives represented by Branigan (1992) and Ryan (2004b) seems to be more traditional as they mention casually connected events which occur in a linear order, whereas Dinkla (2002, p.30) and Black (2001, p.301) take into account non-linear sequence of events which has its roots in the language used by James Joyce in his novels¹⁶.

Peter Weibel (2003), an Austrian artist, curator and new media theoretician, claims that in the experiments that related to the material of projection (e.g. water, a surface of a building), to the material of recording films (e.g. scratched celluloid) and to multi-screen projections it was possible to repeat or recombine narrative elements and present them in a non-linear order (Weibel, 2003, p.117). The multiple screens, which were the beginning of immersive environments, broke up the linearity of traditional narratives. New media changed spectators into visitors, storytellers into authors and visitors have to bear consequences of their actions. Technological experiments, spectator-spectacle relations, creation and distribution strategies also provided new potential for narrative creations. New interactive methodologies have changed traditional forms of expression and presenting narratives. Artists, practitioners and researchers such as Luc Courchesne, Dennis Del Favero, Masaki Fujihata, Chris Hales, Agnes Hegedues, Errki Huhtamo, Sarah Kenderdine, George Legrady, Bernd Lintermann, Lev Manovich, Bill Seaman, Jeffrey Shaw, Eku Wand, Peter Weibel and others have attempted to find new paradigms of narrative using new technologies (Shaw, 2003, p.20). Some artists, from the above-mentioned list of people (Del Favero,

¹⁶ James Joyce's novels (e.g. *Ulysses* (1922) or *Finnegans Wake* (1939) make use of the process of perspectivisation to break up the subject so it is no longer a consistent quantity. This process of perspectivisation allowed Joyce to communicate the multi-layered nature of the character. The subject could change depending on from what perspective it is viewed. Joyce developed text strategies that can raise the reader's senses (Dinkla, 2004).

Kenderdine, Shaw, Hegedues, Lintermann), have created wrap-around display systems. These new approaches are described in *Future cinema: the cinematic imaginary after film* by Shaw and Weibel, who describe transcriptive, recombinatory, navigable, interpolated, immersive, calculated, networked and even screenless narratives (Shaw & Weibel, 2003).

To sum up this discussion of the narrative paradigm, I understand narrative as an act of communication based on entity (character or object), event and a change where an event produces an outcome that changes the entity thus advancing the story. The event influences not only a character or an object but also a user of the narrative who for instance acquires knowledge). The meaningful interpretation is not only created in the mind of the viewer where the events are causally connected, but fragmented memories also shape the creation of our understanding. Narrative is recognized as a 'mold'¹⁷ in which we shape and preserve memories' (Ryan, 2005, p.345). The concept of cultural memory is also about creating meaningful statements in order to ensure cultural continuity between generations so they can recreate their cultural identity. The narrative as an act of communication works as a link between generations and the contemporary era and aims to preserve cultural memory.

An element seldom considered by theorists is the potential to extend narrative through the creation of a spectacular visual experience. This experience is understood as a visual fullness that can grant pleasure when dealing with immersive narratives presented in this thesis. The narrative in the form of the visual spectacle, with the application of a number of new technologies, could be a successful method of transmitting memories.

The history of narrative provides evidence that due to the application of new technologies, the concept of narrative has changed and therefore it should be re-

¹⁷ 'Mould' in British English

investigated each time a new technology appears. It needs to be re-examined now as the emergence and development of digital media have affected the way in which we perceive narrative. One could ask whether the appearance of digital panoramic video cameras that are decreasing their dimensions due to technical developments could influence the creation of films and narratives in the 21st century. The other aspect worth exploring is the process of perspectivisation that could be used to present multiple natures of characters and to provide alternative narratives. The following section elaborates on the link between narratives and memories.

3.2. Narrative and memories

The link between narrative and memories was recognised by Bal, Spitzer and Crewe (1999, p.ii) who introduced a concept of 'narrative memories' as memories that are coloured and 'surrounded by an emotional aura' that makes them unforgettable. These memories may offer detailed information about the background or foreground of a sequence of events. They may remain inactive or unnoticed but it is possible to access, activate and recall them, e.g. through traversing or traumatic recall.

Marita Sturken (1999, p.231-232), an American scholar of cultural studies and visual culture, focuses on the narrative nature of memory, which helps to overcome a trauma but is also prone to manipulation. A traumatic event is typically described as wordless and static. It is not initially remembered or represented but is usually re-enacted without remembering. The narrative integration is responsible for memory of the traumatic event. Memories can tell stories of blame and guilt when they become full-blown narratives. Sturken also states that recovering memories does not happen in isolation but recovered memories emerge in a dialogue with a professional who understands how memories work and explains this phenomenon to a single person (e.g.

a patient or an audience member) or even a group of people. The process of cooperation between this therapist (or a group of therapists) generates different types of truth. Memories are culture-specific. They vary 'with period and culture' and for this reason the type of truth they generate may vary between the audience members depending on their nationality, ethnicity or religion (Sturken, 1999, p.235).

The link between narrative and memories has also been noticed by Bal (1997, p.147) in *Narratology* who states that:

memory is an act of 'vision' of the past but, as an act, situated in the present of the memory. It is often a narrative act: loose elements come to cohere into a story, so that they can be remembered and eventually told. But as it is well known, memories are unreliable - in relation to the fabula - and when put into words, they are rhetorically overworked [...], the 'story' the person remembers is not identical to the one she experienced.

Both approaches underline that single memories work as loose elements and the user's task is to construct the narrative in a group. It is evident from Bal's explanation that memory is a narrative act where, at first glance, unrelated events create a meaningful and coherent story and the relation between particular elements becomes familiar and then can be remembered. Similarly, cultural memory, in my view, is an act of communicating collective understandings of past individuals and objects that once belonged to them. Moreover, it is an act of visualising the past, where loose 'references to the past' (according to Holtorf (2008)) that are located in remote locations in a city or a building, create a meaningful narrative in order to be remembered by forthcoming generations. Bal also notices the unreliability of memories in relation to the fabula. He does not mention visualising memories, which I think, could not only make them more reliable (when recorded soon after the act of recalling) and also, when linked with visual and auditory features, could be more engaging for the audience, as in the case of memories transmitted in a verbal way.

Not only can spoken words prove the unreliability of memories but so can a written text. James Donald (2000, p.149-150), an Australian scholar of urban studies, when recalling London of his childhood, brings only past facts but does not remember how places looked which he indicates by stating: 'That is not a place I can get back to; I can only imagine recollected events taking place' (Donald, 2000, p.149). Donald started to visualise his street (in a form of a text) as described by Virginia Woolf, an English writer, who also lived at the same street and his area became narrativised. The memory has a potential to narrativise past events, even those that did not occur in particular location, but these which were described by other people. Donald concludes a description of the notion of memory in this way:

This is the city as palimpsest: a space on to which meaning is inscribed, and then obliterated as new meanings are inscribed on top of them. [...] Sedimented into the city's very fabric, these meanings can be recovered only through a symbolic archaeology; the act or art of memory (Donald, 2000, p.149).

And again, memory is a narrative act that can recover meanings of spaces but it requires symbolic objects and artefacts.

Not only do items recall memories, but also 'collections of little stories, such as family sagas, narratives of cultural memory, local history (for instance, the communal story of a village) or biography' (Ryan, 2004b, p.343). Among the examples listed by Ryan, the story of a life of a person or a community can be counted. Such stories do not aim to create a climax, but rather narratives connected with a number of self-sufficient elements and which can be read in different orders and generate new narratives and new meanings of spaces. Espen Aarseth (1997, p.94), a scholar of video game studies and electronic literature, calls this type of exploration a 'game of narration' where readers have a scrambled picture and they attempt to put back events together similarly as with fragmented memories.

When discussing the link between narrative and memory, I have to mention the role of mnemonics. The concept of mnemonics was introduced by Cicero (106 BC - 46 BC) in the first century B.C. and referred to a method of remembering that helps to recall complex and long speeches using imaginary spaces. The spatial arrangements of the interiors of particular rooms, individual buildings and objects in these spaces improve the process of telling long speeches (Lister *et al.*, 2009, p.63). Giuliana Bruno (2002, p.220), a scholar of visual and environmental studies, explains the act of memory in this way:

to remember the different parts of a discourse, one would imagine a building and implant the discourse in site as well as in sequence: that is one would walk around the building and populate each part of the space with an image; then one would mentally re-traverse the building, moving around and through the space, revisiting in turn all the rooms that had been 'decorated' with imaging. Conceived in this way, memories are motion pictures.

In this research project I will explore how mnemonics could also be applied to the process of preserving cultural memory by the application of panoramas. Panoramic images provide an aid to visualize interiors and exteriors of spaces. In order to traverse the space, motion pictures are necessary as it was indicated by Bruno (2002, p.220). It is worth asking a question whether panoramic motion pictures have a potential to visualise traversing a dynamic space and to show mutual relationships between artefacts in the same way as in mnemonics.

I assume that moving around, walking through the space and traversing could be a challenging method for remembering and re-traversing the same or similar paths could improve the process of recalling. In this project, I am proposing a method of remembering cultural memory that is linked with the process of traversing as one of the methods of preserving memories from oblivion.

To remember cultural memory recorded in the form of narrative, one is encouraged to move through a building where a particular event occurred or where an

individual used to live. The movement is also possible through the landscape where events happened or persons used to produce their works.

The preservation of cultural memory, with the help of cultural mnemonics, occurs mainly in large assemblages as it was stated earlier in this chapter (Sturken, 1999, p.235), because their collective identity reassures members of society about their unity and singularity in space and time (Assmann, 1992, p.30-34). But how to present such a traversing to a large assemblage or a number of people who have limited time and cannot move through space, because of, for instance, disabilities and lack of relevant facilities? Dziga Vertov (1896-1954), a pioneer of documentary film and cinema theorist, installed his camera in different places (on a trolley, on an automobile, or even on a train), and thus created recordings that presented journeys through paths and this process might help individuals to recognize references to the past which were not visible from one static point of view. This type of filming facilitated a virtual return to a remembered place. Bruno (2002, p.221) citing Quintilian (1920, p.221-223) describes this process as follows:

For when we return to a place after a considerable absence, we [do] not merely recognise the place itself, but [also] remember things that we did there, and recall the persons whom we met and even the unuttered thoughts which passed through our minds when we were there before.

In my view, the return to a particular location after even a short period of time is related to exploring the world in searching for changes that occurred in the past, but the immediate concerns are raised when a particular element of landscape has disappeared (e.g. a tree - already indicated by Musil (1926) in the previous chapter). Sometimes, one can notice a lack of an element, without remembering what this element actually was.

Giordano Bruno (1548-1600) introduced an architectural memory system that consists of a 'sequence of memory rooms in which images are placed according to a complex logic, based on everything from magical geometry to celestial mechanics'. The

architectural memory system designed by him in the 16th century is described by Giuliana Bruno (the author of *Atlas of Emotion*) (2002, p.222) in the following way:

One can travel through houses in different parts of the city or even in different cities, assembling disparate places as if connecting the memory sites on a journey (or experiencing a filmic process).

Bruno (2002, p.223) then adds that the architecture which surrounds the spectator through which he is moving recalls not only memories from the past, but is also a powerful aspect for transmitting different types of memories.

The traversing through buildings, cities or landscapes extends the imagination and evokes memories only in specific locations so I claim that the traversing can be a powerful aid for the process of recalling memories. The next section elaborates on the link between space and narratives by discussing spatial narratives.

3.3. Spatial narratives

The previous section indicated that narrative can be learned through traversing as moving between places evokes memories especially returning to already visited places. This feature of memory was recorded in the meaning of the word as the Greek word for narrative is '*diegesis*', which means it establishes an itinerary (it 'guides') and it passes through (it 'transgresses') (De Certeau, 1984, p.129).

The statement that narration establishes an itinerary has its roots in the history of maps. The first medieval maps had little in common with contemporary geographical sense as they marked out itineraries, which were indications of actions taken, typically of pilgrimages, and stops that were made to spend the night or to pray. Thus, to some extent, they include narratives of a journey.

The link between space and narrative was further explored by Bob Hughes (1997), an electronic media developer, who interprets a space not only as architecture but mainly as landscape. Hughes argues that narrative can be performed during the path, not only through buildings, but also in landscape. For Hughes landscape is a model for new media narratives where each trajectory maps an individual path through a narrative space.

To propose that the path is the narrative, is like proposing that the Pyg track is Snowdon, or the Pennine Way is England. Each path is chiefly a route through a particular terrain – and the terrain is the main thing... If that analogy is any good, then the way to create computer narratives is to define the features of the landscape to be explored, and let those define the path (Hughes, 1997).

Hughes (1997) understands a narrative as topographical operations performed with stories, where the terrain defines how to traverse a narrative. Michel de Certeau (1984, p.129), a French scholar of history and philosophy, adds one more paradigm of understanding a narrative - a topical one. The topical approach is based on topics and main themes that can also define a method of traversing. The above presented understandings of spatial narratives, where the imaginary 'path' determines the sequence of events in the narrative enable the reader to create a single meaningful understanding of the message. The path is only a part of a narrative, one of the plots or one of the possible versions. The trajectory can be different when re-traversing the same landscape. It depends on the type of the landscape (topography) or on questions related to the main theme. By selecting which features of the landscape we want to explore, we decide on a particular path that corresponds to a specific version of narrative. This is the beginning of creating of interactive narrative and interactive films presented later in the thesis.

Interestingly, Miller (2008, p.360) interprets the link between space and narrative quite differently. Although, just like Hughes, she refers to computer-generated

narratives, she understands spatial narrative as an interactive drama where story elements are embedded in a 3D space. The narrative path is also an invisible line but, instead of being located in a real landscape, it is placed in a computer-generated environment. The user discovers narrative elements during the exploration of the artificial and computer-created environment. Miller (2008) sees this type of narrative only as computer-generated spaces, whereas the original concept of spatial narratives starts in real spaces where the visitor has an opportunity to traverse between points of interest and not solely pressing keyboard buttons to change locations as in virtual reality environments.

I support Hughes's (1997) understanding of spatial narrative which has a potential to be applied to camera-based recordings of real scenes because the exploration occurs through the prepared paths rather than paths generated during the exploration as in Miller's (2008) approach.

The notion of spatial storytelling attempts to answer the question: how historical stories are configured and arranged in space? This research question is posed by Maoz Azaryahu and Kenneth Foote (2008, p.180), scholars of urban landscapes, memory, and society, who deal with spatial narratives presented in real environments. Historical sites provide a link to the past they recall. The linear progression of history presented in films or books corresponds to historical chronology, which needs to be reconfigured in the case of history presented in landscape. The concept of historical area is also investigated in pioneering study by Matthew Potteiger and Jamie Purington's (1998, p.15-16), American scholars of culture, who incorporate storytelling into landscape. They agree with Azaryahu and Foote (2008, p.180) that in landscape, historical chronology can be rearranged so the visitors have an opportunity to visit historical sites in the order of their occurrence. One might ask whether the chronological presentation of narrative in landscape is feasible at all.

Azaryahu and Foote (2008, p.182) claim that commemorative features might have an impact on the narrative structure and its properties. However, traversing between points with commemorative features will not generate the fully meaningful messages for forthcoming generations in order to preserve cultural memory. There must be something more that encourages audience to explore a particular place. Azaryahu and Foote (2008, p.183-184) provide four main strategies that link historical sites with storytelling. The first strategy (1), narrative positioned at a single point, is constrained temporally and spatially. It includes telling stories from marked places (e.g. roadside markers, plaques that relate death sites etc). The second approach (2) is when narrative is presented and arranged along a linear trail, path or route. Azaryahu and Foote (2008, p.183-184) introduce two subcategories in this strategy: (2a) space- and time-linked narrative arranged according to specific order of sequences in the particular event and sequential narratives which associate locations that do not share obvious chronological order. The second subcategory (2b) is a method for spatially presenting the life of a person that is related to a specific town or city, where buildings, monuments and places are not linked in a chronological sequence, but can be linked in one narrative so the visitors have an opportunity to learn about the life of a famous individual. The third strategy (3) is narrating multifaceted temporal and spatial sequences over large regions or spanning long time episodes. The last strategy (4) is a hybrid narrative that supports the combination of the three previous strategies.

I think that the existence of commemorative locations together with links between them should evoke significant events or individuals. Additionally, by providing the audience with the possibility to change the occurrence of events, the audience should become more aware of the message that is transmitted.

Again, I support the view that narrative is efficient in recalling memories when it involves traversing and when it allows viewers to see alternative scenarios (e.g. by

changing the order in which they see the events or changing the point of view). In my view, strategies (1) and (2a) cannot be useful in preserving cultural memory as they relate to a chronological presentation of narrative, mainly from one point of view. The third strategy (3) applies to large regions, which is not the case of cultural memory that has a local character. Strategy (4) is flexible and supports modifications and combination of features of strategies (1), (2) and (3) so it may be very relevant to preserving cultural memory of both events and people, whereas strategy (2b) may be used for preserving cultural memory of local artists.

Spatial narratives, apart from their huge potential in preserving cultural memory, also have their limitations. They need a space (e.g. a landscape) to enable traversing and exploring and unlimited access to locations and artefacts. Therefore, they may not be welcomed in museums and galleries. This problem could be overcome if traversing was performed not in real spaces, but in immersive environments. Such environments could be installed in museums or commemorative spaces so the audience could visit a particular location and explore the artefacts gathered in this space without actually touching them.

The next section discusses the panoramic traversing which could be applied in spatial configuration of narratives.

3.4. Panoramic traversing and inter-visibility

Bruno (2002) explores the relation of visual sites with moving images, especially the links between architecture, history, art of memory and travelling culture. A map seems to be an object that links these aspects. The process of creating maps is called cartography. Bruno (2002, p.8) also introduces a link between a film and modern

cartography as a 'haptic way of site-seeing [that] turns pictures into an architecture transforming them into a geography of lived, and living, space'. Film is a way of moving through a landscape where traces of memories are recorded (Bruno, 2002, p.11).

Traversing links film and architecture or film and landscape because it is necessary to move in order to explore the environment. Traversing is also present in the act of memory as memories are connected with narratives and traversing. The concept is also established in the history of giving and practising speeches as, by walking through differently decorated interiors (in imagination), it was possible to practise long speeches and talks, and also to develop long narratives.

The importance of traversing is also recognised by Roland Barthes (1981, p.54, cited in Dinkla (2002, p.36)), a French literary theorist and philosopher, who claims that '[t]he city of today can only be known by an activity', one can orientate oneself in a specific city by walking around, seeing and experiencing. Barthes (1981, p.54) continues:

It [the city] can only be rediscovered through the memory of the trace left behind: to visit a place for the first time therefore means beginning to write it: since the address is unwritten, it needs to create its own script.

Barthes (1981) and Bruno (2002) refer to traces of memories which could be uncovered during the movement. The observer is converted into a traveller or a visitor who structures the space through his decisions. In my view, this process relates to traversing and creating own meaningful narratives through walking and exploring new sites. Decisions are key elements in the process of creating meaningful non-linear spatial narratives. These decisions occur at decision points. Traversing between these decision points may be compared to traversing along traverse lines in open space monuments (VVM, Jewish Museum in Berlin, VST) that connect stations (correspond to decision points) in surveying. This process is described in more detail below.

Traversing in land surveying

The concept of traversing apart from narratives occurs in other fields. It is well established in land surveying, which is a science concerned with measurement and recording the details of section of land (Bannister, Raymond & Baker, 1998, p.190). I have chosen this approach as it is connected with my personal history and studies in Poland and Germany. This scientific method has not been applied to arts so far but I think its potential in the creation of non-linear narratives is worth exploring. Traversing relies on a series of stations where every station is inter-visible with neighbouring stations. It uses both linear and angular measurements.

It could be interesting to consider the link between traversing in land surveying and traversing in interactive narration. Traversing leads most often to the creation of a map where data from measurements are converted to coordinates of points and then from these points a map is generated. The process of generating non-linear narratives based on traversing also contains a series of events that occur mainly in decision points. In land surveying, the lines joining control points (stations) are called traverse lines. Similarly, in non-linear storytelling, the lines between decision points can be called narrative lines or arcs (as called by Meadows (2003)) and can be used for telling narratives when moving between decision points.

The survey of a land consists of the measurement of length of each line (between stations) and angles or azimuths between successive lines. In this way, a chain (Figure 6) with a number of additional chains attached to stations is created. The main chain links stations A-B-C, whereas additional chains can be attached to these stations (e.g. C-D and C-E). Figure 6 illustrates only a small fragment of such traversing chain, which could have multiple chains.

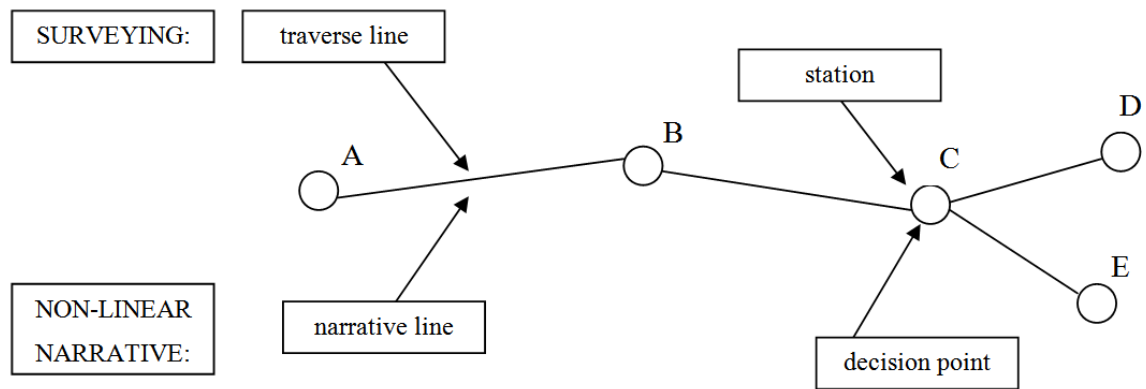


Figure 6 The traverse in land surveying and in non-linear narrative. Illustration by Karol Kwiatek.

Correspondingly, in non-linear narratives the measurement of directions to inter-visible decision points is performed in order to keep the visual continuity. What is more, instead of the measurements of lengths of lines between stations, the measurements of time of each linear narrative (between decision points) are compulsory for the design of non-linear narrative. The aim of traversing in land surveying is to establish the position and mutual location of buildings, roads, paths, trees and other objects that are then marked on a map. Traversing helps to establish co-ordinates of particular points (the centre of a tree, the edge of the path, the centre of a street) in order to create a detailed map. These points are measured from stations (main points in the traverse) and their position is calculated and estimated to determine their locations as accurate as possible. Cartography relies on the accuracy of these measurements. In order to calculate the positions of all stations, the first two stations have to be previously established. The process of traversing non-linear narrative is similar as the user is taught how to make decisions at the beginning of traversing. All rules can be presented before second decision point and when the user learns these rules, they can apply them to the rest of the branching narrative.

As Arthur Bannister, Stanley Raymond and Raymond Baker (1998, p.190), in *Surveying*, notice, surveying of stations is performed by the application of theodolite¹⁸ and/or total stations¹⁹. I think it would be worth exploring the application of panoramic camera to capture pictures at stations and panoramic video camera to record movement between these stations, where decisions are made at decision points where still panoramas are recorded and narrative sequences are presented during the movement between decision points.

The choice of stations in traversing (land surveying) is determined by the inter-visibility of stations which means that these points are often located in crossings where a number of new traverse lines can be created. New traverse chains could start at these points. Correspondingly, traversing in non-linear narrative is performed between decision points that are often located in crossings where a number of new narrative lines can be produced in different directions. The inter-visibility between decision points is achieved by the continuous linkage of decision points and narrative lines. Due to the fact that spatial narratives may contain an unlimited number of trajectories, I think it is justified to refer to traversing in land surveying as such a perspective provides a challenging background for the creation of traverses (with a number of decision points). These traverses comprise different plots in the story or different scenarios and may even contain plots viewed from different perspectives. I think it is worth exploring traversing that occurs at decision points in virtual environments, and the following paragraphs elaborate on this issue.

¹⁸ Theodolite is a precision instrument for measuring angles in the vertical and horizontal planes.

¹⁹ Total station is an electronic/optical instrument used in modern land surveying.

Traversing in virtual environments

During traversing in virtual environments the individual can choose their own path to reach some points in the computer-generated landscape and can observe all events that occur around and in which they cannot directly participate. An alternative method of viewing space was proposed by Shaw in *Legible City* (1989-1991) (Figure 7), where the viewer is situated in front of a large screen and is using a bike to travel through a virtual city. The movement is limited from both sides by three dimensional letters (represent buildings in this city) which form words along streets (Shaw, Kenderdine & Coover, 2011, p.218-219). A bike is an interface and enables an individual to move in cities of words. In an extended version of the project - *Distributed Legible City* (1998) two or more bicyclists are introduced in the virtual city and they can communicate with each other and also see each other in a virtual space (Shaw & Groeneveld, 1998). The movement, in these projects, is represented by the movement of the content on a screen and the speed of movement depends on the human's interaction. The user can control the display by pedalling the bicycle slower or faster. In this way the user is taken on a journey through the history of Amsterdam (Ryan, 2001, p.269). The user does not see a realistic city based on photographs but is exposed to virtual environment generated by computers.

The above-cited examples refer to traversing the virtual world without decision points. The observer is 'attached' to a device or a platform that determines how the narrative will be watched. In my opinion, the panoramic content displayed in the image space that surrounds the audience would endorse traversing the camera-based recordings and choosing options within a large assemblages and not using a platform or a device for a single user. In that case traversing would be not only a virtual but also a physical experience where a dialog and sharing memories occur during making choices.

Traversing the spatial narrative may become a real-life experience if the audience is able to control aspects of the narrative. Viewers thus become agents who can interact with the narrative and the narrative events have influence on them.

The concept of the interactive narrative is elaborated on in the next section.

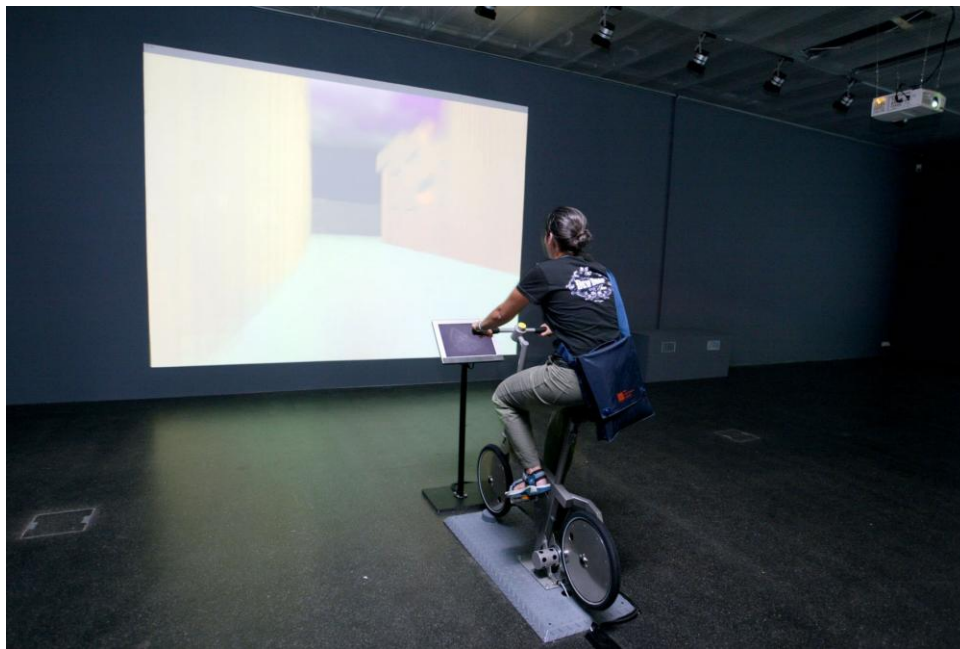


Figure 7 Legible City by Jeffrey Shaw presented at Ars Electronica 2004²⁰.
The permission to reproduce this image has been granted by Jeffrey Shaw.

3.5. Interactive narrative

The most important way in which the reader can interact with a spatial narrative is reflected in the definition of the interactive narrative by Meadows (2003) who claims that an interactive narrative is a 'time-based representation of character and action in which a reader can affect, choose, or change the plot'. The plot, as such is defined as a 'narrative of events' with 'the emphasis falling on causality' (Foster, 2005, p.86).

²⁰ Source of image: http://www.jeffrey-shaw.net/html_main/show_work.php?record_id=83 (Accessed: 14.09.2011)

Interactivity as the feature of the interactive narrative needs to be explained at this point. In the age of digital media it is understood as the user's manipulation within computer-generated environments. However, the concept of interactivity has been frequently redefined and has undergone a number of discussions since the 1990s (Aarseth, 1997; Downes & McMillan, 2000; Jensen, 1998; Rafaeli, 1988).

Interactivity

In 1990s, Peter Lunenfeld (1993, p.19), a critic and theorist of digital media, distinguished between two models of interaction. The first one is called 'extractive' and relates to hypertext navigation. The end result of hypertextual navigation is that the user constructs an individual text made of fragments. The larger the number of elements in a database the greater the chance that the user will experience a new text. The other model of interaction defined by Lunenfeld is 'immersive' which refers to navigating a space or a computer-generated 3D world to access data and information. As Lister et al. (2009, p.22) notice, these two paradigms are based on a large database which the user can experience. Immersive interaction, in contrast to extractive interaction based mostly on connecting bits of information, includes visual pleasures of spatial exploration.

Another approach to interactivity was adopted by Ryan (2001, p.67) who describes interactivity as an 'empirical feature of certain types of text' and also 'the textual mechanism that enables the reader to affect the "text" of the text as a visible display of signs'. The text is understood very broadly as it covers different types of writing, presentations or even films. Ryan (2001, p.67-68) also introduces two modes of interactivity, which include the ability to discover the environment and also the possibility to change it. However, these two modes identified by Ryan refer to the exploration of the VR world, not to the photo-realistic and camera-recorded

representation of the world. The discovery in virtual environment is possible via the exploration of unreal world prepared by graphic designers and this discovery is limited to the existing paths with multiple interactive elements which could be rotated, tilted etc. The other mode of interactivity mentioned by Ryan depends on introducing changes in the environment. In VR world, it is a straightforward process which depends for example on adding, removing, collecting and manipulating 3D objects based in multiple locations in the VR world and thus create a number of associations that help recalling. The discovery mode in camera-based recording is explored in this thesis, however implementing changes in such an environment is different.

Interactivity, just like traversing, is an activity that improves recollection. Interactivity provides the user with agency, which is the ability to control aspects of the narrative. The user can make choices and watch and enjoy their consequences. Agency is one of the unique features of digital storytelling and the integral part of the interactive work. It is crucial that interactivity is meaningful. Choices must make sense and must have consequences and the user must feel that choices that are made have a true impact on the story (Miller, 2008, p.56). The type of agency has to be determined at the beginning of the project. Although agency is a positive feature it may have undesired consequences when it gets out of control, e.g. it may lead to the mock-up of the project.

Various designations of interactivity cited above suggest that interactivity is limited to computer-generated environments, whereas Ryan (2004a, p.204) points out that interactivity is not a phenomenon that was introduced by computer technology but it is as old as oral storytelling. The interactive nature of oral storytelling is evident in the situation, where a listener, e.g. a child, asks the speaker, e.g. a father, questions about the story he tells in order to elicit explanations, to get a parent to develop or retell favourite passages of the story, to encourage the father to shorten or omit descriptions of

certain objects or to change a direction of the story if he takes a track the child does not approve of.

Interactivity is thus a feature of face-to-face communication. As it was already stated, it does not occur in isolation (Sturken, 1999, p.235), but emerges in a dialogue. Interactivity was captured by manuscripts and print-writing and later reintroduced by the electronic media into written messages such as emails, text messages, chats. When applied to narrative, it transforms into a genre called interactive narrative, where as Meadows (2003) indicates the user can interact with the plot.

The type of reader-intervention in the plot depends on the freedom granted and the degree of intentionality of the interventions by the reader. Ryan (2004a, p.204) specifies the following interactivity forms (starting from the bottom to top level):

- reactive interaction, which does not involve any deliberate action on the part of the appreciator, e.g. the art work that produces different images on the basis of the level of noise produced by visitors;
- random selection among alternatives, when the user cannot foresee the consequences of his actions, e.g. random clicking of many hypertexts;
- intended selection between alternatives, e.g. choice between two or more paths (multi-path narrative);
- productive action that leaves a durable mark on a textual world in which a user takes part by adding objects to the landscape or by writing history.

From this classification of interactivity we may see that the type of interactivity that involves user-participation is either selective or productive. In selective interactivity, the user simply chooses between available options, which lead to an end result that has been predicted and prepared by the creator of the application (there is a limited number of endings). In productive interactivity, the user creates new components of the narrative. The number of scenarios is unlimited as it is not possible to predict all types of

behaviours and inputs produced by users. Selective interactivity is used in two types of narratives that describe the stages in the evolution of the interactive narrative: hypertexts and multi-path narratives.

Classification of interactive narratives

Craig Lindley (2005, p.205), a researcher in game and interactive narrative design, claims that text-based hypertexts were in fact the first interactive narratives to be written. Hypertext was developed between 1968 and 1969 by Andries Van Dam who worked on Intermedia, a hypertext system that linked together bodies of knowledge in several disciplines, including English and biology (Sloane, 2000, p.178). In 1987, Apple Computer introduced the first hypertext that was commercially available on computers. Macintosh computers were equipped with HyperCards which held files (stacks) that were cross-referenced with one another. Texts become a hypertext in which everything in the text relates to everything else in the text. The development of hypertext on computers was followed by the advent of hypertext browsers for the Internet such as the World Wide Web that appeared in 1990s.

In the multi-path narrative the reader or audience at specific points has to choose between branching alternatives in the text (Aarseth, 2005, p.323-324). Multi-path narrative is non-linear as the viewer is exposed to different hypothetical situations and has to consider what would happen if the characters took this turn or that path. Grahame Weinbren (1995, p.15-16), a media artist and filmmaker, claims that it has the form of the story space (using Michael Joyce's terminology) opened for exploration. This story space may consist of a number of related narratives that the viewer combines or identifies links between them, or of a single narrative perceived from different

viewpoints. Thus, different preferences of combining narratives or different points of view are responsible for the creation of multi-paths.

Aarseth (2005, p.323) specifies three types of multi-path narrative: works that branch only once (often in three prongs or more), but often in a way that reflects a moral choice or dilemma, works that are solvable puzzles or games (e.g. the user has to search for one correct trajectory among many misleading ones) and the fragmented work (all paths are correct and readers lost in the labyrinth have to build narrative meaning as appropriately as they can). An example of the last type of narrative is Michael Joyce's *Afternoon, a story* (1989).

In fact, Aarseth's classification of interactive narratives is quite general when compared to other classification systems, e.g. by Mirjam Eladhari (2002), a Swedish scholar of game design and technology, or Ryan (2001). By comparing and contrasting Eladhari's and Ryan's classification of interactive narrative structures. I found out that they are very similar. In fact, they use different names for the same structures. In fact, Ryan's typology is more complete as it specifies hidden story, which is not mentioned in Eladhari's classification. In my description of interactive narrative structures I will refer to Ryan's (2001, p.246-258) typology and I will also provide Eladhari's (2002, p.141-153) names of categories in the square brackets. The overall classification of interactive narrative includes the following structures:

- a) the tree, which allows no circuits. Once a branch is chosen there is no return to the decision point and there is only one way to reach a given terminal node [exploratorium];
- b) the vector with side branches, where the text tells the whole story in a chronological order but the links enable the reader to take short stride trips to roadside attractions [nodal/dead end structure];

- c) the braided plot, which relates to the situation when the same events can be observed from different point of views and allow for switching between characters and also plot lines. In the braided plot the audience can determine the point of view from which the narrative is presented. Events that take place in the same locations are inhabited by a number of people and everyone has a different perspective to the particular event. When the event is finished, the audience can continue the plot that is developed by a different character. One event when all people meet is the opportunity to change point of view and switch to another character and see his/her story [parallel plot structure];
- d) the maze, where a user attempts to find a path from a beginning to the end through many variations provided. Not every traverse line (traversal) provides satisfaction. Narrative coherence is guaranteed because all traversals attempt to achieve a goal of the narrative [modulated labyrinth];
- e) the directed network, which prescribes an itinerary through the textual world so the user cannot run in circles or go to dead ends. Users have freedom in connecting various stages of the journey, but choices they make often keep them on a single track and decisions they make are not really significant as no matter what they choose, the ending may be the same [modulated/dynamic labyrinth];
- f) the network, where the reader's movements are neither completely free or limited to a single course and where paths can be uni- or bi-directional. Networks allow circuits, for example, the reader can traverse to a node describing the death of a character and later return to a node where the character is still alive. Narrative coherence in such a structure can be supported only on the local level within the sequence of nodes with single connections [open structure];

- g) the complete graph, where every node is linked to every other node and paths between nodes are bidirectional. The reader has freedom of navigation but is very difficult, nearly impossible to reach narrative coherence [open structure with no story arc];
- h) the hidden story, which consists of two narrative levels: at the bottom is the fixed non-linear, temporally directed story of the events to be reconstituted and, on top is a temporal network of choices that determine the reader-detective's investigation of the case. The dotted line in-between these two links episodes of discovery in the top to the discovered facts at the bottom story.

The braided plot structure reflects the other way in which the user can interact with a narrative (it was mentioned by Weinbren (1995)) and which depends on controlling the point of view. If there are a number of characters in the story, each character has its own plot line, which includes events that happen to this particular character. The user can select which character to follow and experience the narrative from the perspective of this character. It may be even possible to switch between different characters and see the narrated events from the perspective of a protagonist, antagonist and the peripheral characters. This research project explores whether such an idea could be realised on the basis of panoramas. This type of narrative seems to relate to Weinbren's expectations in 1995 when writing *In the Ocean of Streams of Story*. He introduced the possibility to change perspective as one of the approaches to interactive narrative.

The user may also be able to control how much of the scene to see. The user may want to see the narrative from the perspective of a character (1st person), near a character (2nd person), or may keep the distance from any character (3rd person).

The hidden story which was specified by Ryan (2001), but not mentioned by Eladhari is the one that cannot be easily referred to any structure mentioned by Eladhari (2002). It has some features of exploratorium as it relies on searches and discoveries but

in non-linear and has number of endings, just like a network. When we analyse narrative structures in context of building narratives that help to preserve memories, some of the structures seem to be too complex to implement. I think it may be safer to refrain from structures that may lead to circularity and limit a number of choices (alternative scenarios) to a prescribed set of possibilities. In my view, the tree structure, the directed network, the maze structure and the braided plot appear to be the ones that have potential in building narratives that help preserving memories and they could be taken into account when designing interactive narratives that could facilitate cultivating cultural memory.

Design of digital, interactive narrative

New media researchers (Dennis Del Favero, Sarah Kenderdine, Jeffrey Shaw) perceive digital narrative as mainly uni-modal, while the virtual heritage researchers (Luc Courchesne, Michael Naimark) understand narrative as a duality and a derivative of virtual reality and cultural memory (Sturken, 1999). The first interpretation flattens narrative into a one dimensional ready-made object ignoring the 'multi-dimensional dynamics involved in a narrative generated through the interchange between divergent human and machine entities' (Kenderdine, 2008, p.151-152). The second interpretation, on the other hand, lacks an understanding of the complex multi-dimensional quality of digital and cultural processes.

Shaw (2003, p.19-20), in the introduction to *Future Cinema*, introduces cinema's heritage and mentions how to develop new strategies for designing narrative techniques which could be fully embedded in the future cinema. He presents three approaches that will use interactive features of new forms of cinema. The first one is based on creating modular structures that enable a number of different possibilities for presenting the

interactive narrative. The second approach involves algorithmic design where the spectator can change the narrative sequences using, for example, body movements or touching an object (eg. mannequin). The third approach uses the notion of space inhabited by the audience, where the audience members become agents who can control narratives. These approaches are articulated in a number of publications by researchers of iCinema, and in the article by Neil Brown, Timothy Barker and Dennis Del Favero (2011), scholars and artists of digital media. They introduce the theory of the formation of interactive narrative, which presents the direction of the development of interactive narratives in the near future. They understand the notion of interactive narrative as:

formulation of old media practices - embodied by the narrative conventions [...] reapplied in the context of new media, with the user positioned as interpreting a meaningful narrative via the navigation of largely pre-scripted paths through data (Brown, Barker & Del Favero, 2011, p.213).

This definition differs from Meadows' (2003) definition, which refers to time-based representation of events, whereas this definition is more concerned with spatial representation of events. The events are no longer presented chronologically, but their order of occurrence depends on the space and taking a particular point of view.

Following Brown, Barker and Del Favero's line of reasoning, meaning is created interactively as data is presented, reassembled and recalled by viewers. In this case the creation of meaningful narrative spaces relates to the concept of remembering through storytelling and the traversing described in the previous section enables navigation through different paths or trajectories and thus provides the potential to preserve memories from oblivion. Therefore, interactive narrative 'emerges as a meta-structure that transfers meaning through the experience of interactive episodes with the data' so the experience and recalling are not created immediately after traversing along one path, but the overall experience available is important (Brown, Barker & Del Favero, 2011, p.213).

Brown, Barker and Del Favero (2011, p.214-217) introduce three interactive modalities which correspond to Shaw's (2003, p.19-20) three approaches to interactive narratives:

- a) polychronic narrative - re-sequencing narrative events;
- b) transcriptive narrative - re-assembling data (e.g. assembly of unrelated data into a narrative);
- c) co-evolutionary narrative - narrative as a shared autonomy; narrative can emerge and evolve and these processes depend on the relationship between the user and the digital agent.

All these modalities have been investigated through experimental installations at the University of New South Wales - iCinema Research Centre. Polychronic narrative is located in the context of a social space and a virtual space, which is referred to as dialogic (a concept which was introduced by Mikhail Bakhtin, the Russian philosopher, in 1984 to illustrate how fictional characters are able to speak to the authorial control of their creator) (Kenderdine, 2009, p.107). It is based on the communication between a human user and digitally generated agents. For example, by wearing VR head-mounted displays as in *Conversations* (2004), users become avatars inhabiting the virtual space. The user is able to navigate their own paths through pre-scripted events (Brown, Barker & Del Favero, 2011, p.214). Polychronic narrative encodes 'temporal structures resistant to linearization ... [and] invokes and subverts reading conventions associated with narrative as a discourse genre' (Herman, 2004, p.219). The sequence of events is not a stable and linear structure but as events are numerous the user can rearrange them and link them together in various ways. The sequencing of events encrypts the 'time-act of reading' or the 'time act of travelling', traversing and interacting (Brown, Barker & Del Favero, 2011, p.215). In the polychronic narrative, sequences are anchored in time and space. The narrative does not restrain from time and history but offers a critical

reflection upon the temporal and sequential aspects of narrative (Kenderdine, 2009, p.107). Viewers in a digitally-generated space where the polychronic narrative is shown respond both to each other and to virtual events when they emerge. They are given numerous entries and exit points and are able to generate coherent narrative content on the fly.

The next type of narrative, the transcriptive narrative, depends on the assembly of previously unrelated elements into a narrative structure (Brown, Barker & Del Favero, 2011, p.215). The user of the interactive narrative system is empowered to reorganize information from the machine's database. It means that both the organizational and relational structure can be transcribed into a new narrative structure. The example of the project in which the transcriptive narrative was applied is *T_Visionarium* (2008), which uses a 360-degree projection system called the Advanced Visualization and Interaction Environment (AVIE). The audience in this installation is surrounded by 24,000 video clips taken from Australian broadcast television (Figure 8) (Del Favero et al., 2005). The viewer uses a handheld device to dynamically select, link or re-arrange these video clips in order to create new combinations based on information taken from metadata. For example, scenes that involve 'blue' or 'love' or 'slow' could appear on one side of the immersive screens, whereas clips with the opposite metadata are displayed on the other side of the screen (Kenderdine & Shaw, 2009).

The third type of interactive narrative, the co-evolutionary narrative, relies on artificial intelligence and machine learning. It revolves or emerges on the basis of a relationship forming between a human user and a digital agent that is able to respond autonomously (Brown, Barker & Del Favero, 2011, p.217). It was applied in the *Scenario* project which just like *T_Visionarium* uses 360-degree projection space of AVIE. The movement of users in this space is sensed by a motion tracking system. The

system allows users to interact with virtual characters who respond to their movements autonomously. The agents approach viewers for assistance in developing the narrative, ask the audience for response and respond in complex unscripted behaviours. The narrative is generated on the fly both by user-agents and machine-agents.



Figure 8 *T_Visionarium* is a fully immersive interactive installation that presents televisual data so the viewers can explore and actively edit stories in a panoramic space.²¹ The permission to reproduce this image has been granted by Dennis Del Favero.

Apart from polychronic, transcriptive and co-evolutionary narrative, there are two other types of interactive narratives, which were specified by Kenderdine (2009, p.109-111). These are scenographic and co-active approaches to interactive storytelling.

Scenographic narrative is used in such installations as *Sacred Angkor* (2004) or *Double District* (2008). This type of narrative has its roots in the practice of design for performance and theatre that combines the visual, auditory and the environment in one

²¹ Source of image: http://www.icinema.unsw.edu.au/projects/t_visionarium/project-overview (Accessed: 10.05.2011)

artistic form of communication. The audience members can walk around the rotating stereographic-panoramic scenes that invoke a narrative of travelling in 3D spaces.

The co-active approach is similar to co-evolutionary narrative except that the computer-driven agents are unaware of the existence of external agents who can observe them. This type of narrative was used in the project called *UNMAKEABLELOVE* (2008). The project is based on Samuel Beckett's book *The Lost Ones* (1974). The specific behaviour of Beckett's characters has been translated into algorithms, which drive the behaviours of characters in the virtual world. Apart from Beckett's virtual characters, there are also the 'real-world' users whose interactivity depends on using torches that create torchlight beams in real time. The infrared videos of the torch users are also captured. The mixed reality created by virtual characters and real agents constitutes the co-active nature of this narrative.

Having analysed these five types of narratives, I found out that polychronic narrative has many features that may make it very useful for preserving memory. It has not been used in memory works so far and it is certainly worth exploring its potential in this field.

To summarize this discussion, interactivity is applied in many multi-media installations and audio-visual projects nowadays and is an effective tool in providing the viewers with the sense of participation in the virtual space. The problem with implementing interactivity into narrative is that it breaks its continuity and cohesiveness. Researchers who work in the field of digital media claim that interactive narrative should be based on the gaming model as it is the one that supports continuity. Greg Roch, a CEO of Hyper-Bole Studios and a designer of many games, states that games 'help knit various pieces of interactive work together' (Miller, 2008, p.63). Murray (1998) takes this idea even further and claims that games and drama are closely related and that games are a form of 'abstract storytelling'. I do recognise the potential of

games in supporting continuity but I am also aware of the fact that games are far less continuous than traditional films which support continuity of both time and space. Therefore, when devising an interactive narrative that could be used for preserving memories, it is worth considering interactive film, which relates to the traditional film in its design, but in opposition to the traditional medium, requires an active viewer during the screening process. The interactive film that has features of polychronic narrative is discussed in more detail in the following section.

3.6. Interactive film

Interactive cinema might be an important milestone in the history of cinema but it is rather neglected by the cinema industry, both by mainstream cinema and other alternatives, e.g. independent cinema, experimental cinema (Cavus & Ozcan, 2010, p.128). Bernardo Bertolucci, an Italian film director and screenwriter, claims that every film is a documentary, including fiction films, because it 'carries within it an archival record of the period, in which it was made, expressed in terms of lighting style, set design, camera work, make up and even behavioural gestures and acting techniques of the performers' (Burgoyne, 2003, p.220). However, various cinema researchers point out that electronic manipulation of images in film and interactive digital films in which endings can be changed and where scenes can be transformed according to audience tastes makes the connection between cinema and reality remote. The audience watching interactive films differs from the audience watching traditional films. They can imagine other endings and what is more, they can act to decide about further developments of this film. The interactive cinema may be compared to some extent to the theatre as the suspension of disbelief takes much longer than in traditional films. In the theatre, it is

typically decided by the actors who may play with the audience, whereas in the interactive cinema it is determined by the audience that may take as much time as they need to make their decisions. Although the audience of the interactive film knows it is not real, it may be difficult to come back to reality as the choice-making process makes the users involved in the content of the film that is displayed.

Traditional films were the way of recording the real and preserving time. They played an important role in shaping our conception of the history. Cinema which relies on morphing techniques and computer-generated visual environments thus seems to be a medium that refuses the history in the traditional sense that means origins, authenticity and documentation. Although computer-generated imagery is blamed for blurring the boundaries between reality and fiction, Louise Krasniewicz (2000, p.54), an American scholar of cinema studies, describes it as the contemporary's period most important trope. It is in line with the spirit of the current era when the boundaries of race, gender and nation are blurred and when various disciplines are merged.

Robert Rosenstone (2003, p.39), a Canadian historian and critic who works on narrative history and historical films, claims that the distinction between facts and fiction is not so crucial for preserving memories. He states that '[f]acts have not always been the primary tool for telling past. The visual history that has started to develop uses documentary images in the service of storytelling that mixes fictional, factual and speculative discourses. For future generations documentary images may not necessarily signify the facts of the past, but may be some form of the representation of the past conveyed through metaphor, analogy or irony. It is not possible to predict how the cinema will be shaped in the future but it is certainly worth exploring interactive film as it may play an important role in the evolution of cinema.

Before discussing the evolution of interactive films, it is important to highlight their major features. Manovich (2001, p.72) claims that interactive film liberates the

film structure that has been suppressed for many years by traditional film. It transforms three basic elements of conventional film: narrative construction, spatio-temporal presentation and viewer participation (Cavus & Ozcan, 2010, p.128). The major feature of traditional cinema is the principle of unification. Narrative unification refers to the fact that all story lines in a narrative are fragmented into strictly arranged events bound in a cause and effect chain (Bordwell, 1985, p.43). The viewer of the traditional film is considered an active contributor, but this contribution is on the cognitive level only (Bordwell, 1985, p.30).

In contrast to traditional films, narratives in interactive films are usually fragmented into film segments. The viewer strolls between these segments in order to watch the narrative. While traditional film has one absolute narrative line that is always finalised before screening, interactive film has alternative storylines (paths). The viewer can interact with the system by jumping from one storyline to another. Film segments are connected with a special algorithm and are collected in a database²² (Manovich, 2001). The user creates one of possible routes by selecting the film segments during the navigation. The main task is to make this experience meaningful and, therefore, the viewer may watch the film more than once. What is more, every new screening is a different experience.

Whereas traditional film can be presented graphically as a straight line, interactive films have more complex representations, e.g. tree, web, flow and matrix (Rieser, 1997, p.117-118). Interactive films provide the user with some control over

²² The role of a database in narrative was explored by Manovich (2001, p.227) who treats narrative as 'the sum of multiple trajectories through a database'. A database is a 'structured collection of data' where a user can apply a number of operations such as view, navigate, search, in order to experience the progression of events (Manovich, 2001, p.218). The Internet is considered by Manovich as the best example of this database because webpages are being constantly updated and all the above mentioned operations apply to it. Manovich (2001, p.227) also claims that the user of a narrative is 'traversing a database following links, between its records as established by the database's creator' so this designation relates both to extractive and immersive model of interactivity identified by Lunenfeld (1993, p.19). Weinbren (2003, p.260-263) has a slightly different approach to database as a method of organising data and links between them. Weinbren believes that the artist is not creating a database for the film, because he would not be an artist any more, but 'content provider'. An artist, instead of designing a database and all elements in it, should focus on creating an access to it.

narrative, which changes the balance of powers between the cinema and the audience. The amount of control may be reflected in the model of the film. In the typical branching-out model, when the story reaches a node, the system presents alternative paths and the audience is asked to choose one of these alternatives. The example of such a model was *Cause and Effect* (created in 2004 by Chris Hales, an English scholar of interactive films) that was presented to the audience in a theatrical setting. In the decision point of the narrative the audience was asked to choose one of two alternative storylines by pressing red or green buttons attached to their seats (Hales, 2005, p.54). The model of interactivity in *Cause and Effect* has been harshly criticised. Hales (2005, p.60) states that the audience treats it as a pure entertainment which confirms Weinbren's (2003, p.262) claim that too much control the audience is allowed destroys the illusion of the film. They suggest that storylines should not be presented explicitly to the viewers as it reduces the element of surprise and the excitement of the film.

Hales, Pellinen and Castren (2006, p.234-236), consider the interaction model of *Kahden Vaiheilla* (1994) as a successful interactive film project. A success for Hales (2009, p.108) means that viewers are enjoying their experience so they want to prolong it or even revisit it. In *Kahden Vaiheilla* the input of the audience is evaluated for overall reaction by the knowledge-oriented system that decides on the next jump of the story. The audience interaction is thus indirect and it preserves surprise and excitement.

Apart from these two models, it is also worth mentioning *Sonata* (1991-1993) by Weinbren (2003), where parallel storylines could be watched simultaneously on the screen split equally into vertical parts. In this screening, the viewer decided for how long the narrative fragments appear on the screen and what relations they enter into with each other.

By analysing the above-mentioned interactive films, it may be noted that continuity and coherence are more challenging in interactive cinema than in traditional

films. The nodal/decision points are moments where the narrative is broken in order to collect/retrieve inputs from the audience. What is more, in interactive films viewers need more time to create a meaningful story from independently stored film parts. By providing viewers with time and by preserving the balance of power between the narrative and the audience that will maintain the surprise element, it is possible to create a continuous and coherent narrative. It might be worth exploring whether by providing users the continuity of space the influence of a break at nodal point could be minimised.

The history of interactive films indicates that they have their roots in the crisis of storytelling and the exploration of new strategies for telling stories. The first interactive films appeared in 1950s. The US television started to provide interactive version of films which were displayed on different channels, but the interactivity was limited to the possibility of changing channels using a remote control without moving from a sofa or an armchair (Huhtamo, 2007, p.3).

The next steps towards interactivity were forking-path films which were based on a short story *The Garden of Forking Paths* written in 1941 by an Argentinean writer and poet Jorge Luis Borges (Bordwell, 2002, p.100). Borges' novel can be read in a number of ways and was in fact a first hypertext novel to be written. Readers are not trapped in the dilemma of choosing one set of information and eliminating others but may choose to unfold all possibilities. They 'create, in this way, diverse futures, diverse times which themselves also proliferate and fork' (Wardrip-Fruin & Montfort, 2003, p.33). Although the book was written before the advent of modern computers, it seems that Borges has introduced the hypertext narrative structure.

Borges' idea of forking paths was an inspiration for such films as Peter Howitt's *Sliding Doors* (1998) or Krzysztof Kieslowski's *Blind Chance* (1987). In both films, the main character is racing for the train, and in one version of the film, they manage to catch the train and in the other they fail to get on it and on this basis two different

stories (continually intercut) are presented to the viewer. It seems that the main character has only one (moral) decision as it was distinguished by Aarseth (2005, p.323) who introduced multi-path narrative based on one branch. More decisions would complicate linear approach to these types of films. *Sliding Doors*, *Blind Chance* along with such films as *Run Lola Run* (1998) and *Rashomon* (1950) are the examples of films that through the presentation of alternate narrative paths, unlock the mind to thoughts of possibility and choice. They support optional thinking²³ and recalling which can be both rewarding and stimulating. I think that speculative discourse available in these films enhances recalling of similar situations from our lives and our decisions at similar 'decision' points.

Forking-path films do not 'offer the interactor an option to change at predetermined points the course of action' and there is also no 'navigation of largely pre-scripted paths through data' in forking-path films (Ben Shaul, 2008, p.7). Viewers are static. They cannot take any actions apart from favouring a particular course of the story in their mind. No matter what (mental) choice they make, they will have to watch two versions of the story presented in the film.

There were a few significant examples of interactive films in the film history, which involved human interaction. Table 1 presents some of them.

Table 1 Examples of interactive films.

Interactive film	Type of interaction	Display technologies
<i>Kinoautomat</i> (1967) by R. Cincera	Voting on which scene to play next	Two screens
<i>I'm Your Man</i> (1992) by B. Bejan from Interfilm	Change of points of view (switching between characters)	One screen
<i>Hypnosis</i> (1998) by A.Bali	Choosing the preferred options by mouse clicking	Computer screen

²³ Ben Shaul (2012, p.2) uses the term 'optional thinking' to refer to the cognitive ability to generate, perceive or compare and assess alternative hypotheses that offer explanations of real or lifelike events.

The interactive film has made a vast step forward in the development of interactive content. *Kinoautomat* (1967) was the first interactive film. It used a representative type of democracy so a large audience could vote on the scene to be displayed as the next one using a representative. *I'm Your Man*, created in 1992 by Bejan from Interfilm, was presented in special theatres. The audience had a possibility to change points of view and switch between characters (Ryan, 2001, p.272-273). In such a film as *Hypnosis*, interactivity depends on clicking (mouse clicking) the preferred option and the narration continues. All the above-mentioned films are based on pre-scripted content.

It is also straightforward to notice that most of the films discussed so far were prepared only for a single user, who can click (mouse clicks) the preferred option to continue the narrative, while *Kinoautomat* was designed for large audience that has the right to decide what elements or scenes will be shown to them.

In my view, when devising a model of interactive film that could be used for preserving memories, one might follow the *Kinoautomat* model. It gives a large audience the right to vote on objects or scenes that will be displayed so it supports selective interaction but at the same time it does not generate immediate outputs that increase excitement. It rather supports watching alternative paths at the rate that is adjusted to users' needs and engages the audience in thinking about alternative paths and their consequences which might influence the preservation of memories. It presents a story of the fire and its consequences. The story is not real but its script was invented in such a way to facilitate making different choices and experiencing different outcomes. The *Kinoautomat* model will be discussed in more detail in the following section with the aim to examine which features of this model may be particularly useful in preserving memories.

Kinoautomat

This section focuses on *Kinoautomat*, which was demonstrated to the world for the first time in Canada in 1967 (Expo '67). This interactive film presented unstable relationships between members of a family. The film began with a flat on fire, and immediately the spectators were told that the main character is responsible for this event. The actor presented a series of flashbacks describing the highly unlikely sequence of events, which brought him through stupidity and carelessness to his conclusion. Although the spectators were allowed to determine some of his decisions in the actions with other film sequences, no matter what the spectators decided, the result was always the same - a building on fire. A number of people felt that it was a satire on democracy where everyone has a chance to vote, but public voting never changes anything (Huhtamo, 2007).

In *Kinoautomat* spectators had an opportunity to influence the storyline of the film by voting for up to two possible storylines by pressing buttons that were attached to armchairs. This early form of participation projected results of voting on the screen and the decision was announced to the viewers (the continuity of space and time was broken by long lasting decision points). It was the first time when viewers were able to change the storyline, which was the privilege of the film producers (Carpentier, 2011, p.267-268). It seems that the novelty of *Kinoautomat* was forgotten since its discovery and patenting it in 1967. According to Nico Carpentier (2011, p.277), a scholar of communication studies, who visited Prague in order to have interviews with creators of this interactive film, *Kinoautomat* was played until 1974 (in Prague in 1971 and 1972 and also in Expo 74 in Spokane, US) whereas Michael Bielicky (2003, p.101), a scholar of digital media, mentions that there were no more screenings after 1967 due to political reasons and when moved back from Expo in Canada to Czechoslovakia,

Kinoautomat was closed down in Prague because of the democratic awareness in the socialist country where such a satire on democracy was not allowed. Such a novel solution promoting choices of different paths in a film could open people's minds and encourage them to think about alternatives and ask questions which were inappropriate from the point of view of the regime. The attitude of the authorities to *Kinoautomat* maybe compared to the officially sanctioned public memory, which was prepared by authorities, where the citizen could not question historical facts presented in this way.

Raduz Cincera (1923-1999), the creator of *Kinoautomat*, describes interactive film in the following way (Carpentier, 2011, p.278):

...the substance of Kino-Automat [...] is based on the possibility of direct participation of the viewers in the story in progress. The film story stops many times during the performance and the viewers have the possibility to influence its further progress according to their own wishes. The viewers' opinion is found by an electric voting appliance run by a computer and the plain majority decides, on behalf of the main character, how the story is going to proceed. This direct participation in the story in progress substitutes the atmosphere of a theatre performance, thus, for the first time in the history of cinematography, breaking through one of the basic barriers between theatre and film.

Cincera mentions the possibility to link theatre and film in order to provide a greater interaction of the audience. In fact, the experiments of combining film projections and theatre performances undertaken in the 20th century by Jan Grossmann (1968, p.36-38), Czech theatre director and critic, had a direct influence on the creation of *Kinoautomat*.

The issue of increasing audience participation is not new but there were a number of technical limitations and difficulties that caused that this approach was forgotten for a long time. The invention of laser-disks technologies has increased the recognition of such interactive films, but only a few of them were released. The daughter of Raduz Cincera - Alena Cincerovala - mentioned in the interview with Carpentier (2011, p.280) that:

When I was producing this DVD with *Kinoautomat*, an English professor [Chris Hales] said something quite profound. "This

film was made especially for DVD". And then I realized that my father had been ahead of his time, more than 30 years before the invention of DVD, he had invented this interactive film.

*Kinoautomat*²⁴ was presented in a similar way as in a traditional cinema. Two screens were located in front of the audience showing alternatives and the audience could vote every few minutes on the next scene by pressing buttons. It should be noted that there was a stage actor (representative democracy) in *Kinoautomat* (Figure 9) who helped the audience to make choices and introduced a method of voting.



Figure 9 *Kinoautomat* - DVD (2006-2007)²⁵ - created on the basis of *Kinoautomat* (1967).
The permission to reproduce this image has been granted by Alena Cinceroва.

A number of choices provided to the viewer of *Kinoautomat* activated inner experiences in user's minds: perception of the present, hopes, guesses about the future and beliefs or fears, dreams, pains and also memories of the past. Before a particular decision was made, the viewers could use their memory to see whether they remembered similar situation and considered choosing a similar option in the past.

²⁴ *Kinoautomat* was restored and produced in 2006-2007 by Alena Cinceroва, the daughter of Raduz Cincera, the creator of interactive film in 1967. DVD was published in 2008.

²⁵ Source of image: <http://dvd freak.bloudil.cz/freak.php?p=kinoautomatclovekajehodum&dz=> (Accessed: 10.05.2011)

Despite the fact that *Kinoautomat* contributed greatly to the development of interactive films, its principles were not applied for many years to increase participation in the film experience (Carpentier, 2011, p.281). Even the introduction of laser-disk technology (CD-ROM, DVD-ROM, Blu-ray) has not increased the production of interactive films. This may be caused by the following limitations of the film:

- 1) it was difficult to create numerous pre-made segments;
- 2) the ability to generate different endings was obstructed;
- 3) stage actor interventions were strictly scripted;
- 4) voting procedure also reduced the choices of the viewers;
- 5) spectators were captive in their seats;
- 6) there was no room for extensive deliberations or dialogue as the viewers were seated and could not change their positions;
- 7) the idea was not transferable, a new type of cinema had to be built to accommodate interactive films at that time.

Kinoautomat did not allow for self-production of the storyline. It was pre-scripted and supported only selective interaction and therefore was not truly interactive:

The often-raised criticism is that making choices in an interactive narrative made from pre-made segments is hardly more sophisticated than pressing the required combination of buttons on a hot-drink vending machine (Hales, 2005, p.64).

I partially agree with Hales, but in my opinion, the creation of a difficult configuration could discourage a number of people from interacting. This system could be researched further.

Weinbren (2003, p.266) claims that *Kinoautomat* offered a closed list of choices whereas in the real life a number of choices may be unlimited.

The branching structure of the *Kinoautomat* films was more limited than it seemed to be, and at some points the voting had no effect at all. The audience was as if invited to play a new and exciting game, the outcome of which was partially genuine, partially illusory (Weinbren, 2003, p.266).

I agree with Weinbren that interaction in *Kinoautomat* was quite limited as all choices should be meaningful and should really make a difference for further developments of the story. However, unlike Hales, I find the interaction model in *Kinoautomat* much more refined than the one in a vending machine as it supported optional thinking and recalling.

In my opinion, limitations of *Kinoautomat* can be translated into features that need to be improved when designing an imagined display technology that would be efficient in the preservation of memories using interactive films. These improved features are also very relevant for designing an immersive image space for the presentation of interactive narratives; as described in the next chapter.

Table 2 presents features of *Kinoautomat* and an attempt to find alternative features, which could help to evoke memories in some type of an imagined display technology.

Table 2 Comparing *Kinoautomat* (1967) and imagined image space which could enable preserving of memory

Kinoautomat (1967)	Imagined display technology	Influence on preservation of memory
Sitting audience (captive audience)	Standing audience, freedom to change their position	Traversing within the image space
Audience does not have an opportunity to learn about their choices and see alternative decisions	Audience is invited to learn about alternatives	Presentation of results and audience's choices could introduce optional thinking
Speaking is not allowed (as during traditional film)	Speaking is welcomed	Exchanging ideas enhances recalling
Well guarded time slots for making decisions	Time for decision-making is not limited but decision points do not obstruct continuity of space	It would be a challenging project to create an interactive film where choices are created by viewers and there are no breaks as they broke the continuity of time (not the continuity of space)
Dark room	Semi-dark room	The audience could see each other and exchange start conversation

Two screens	Multiple screens	Multilayered and wrap-around format of presentation as in Memory Theater
There is no room for extensive deliberations or dialogue	There is a room for extensive deliberations or dialogue	Deliberations and discussions help to recall memories in large assemblages
The idea was not transferable, a new type of cinema had to be built to accommodate interactive films at that time	The idea is transferable to other environments	Creation of an immersive environment that could be transferred to other locations
Representative democracy as a satire of democracy; everyone votes but it does not make any difference	Deliberative democracy - based on discussion and careful consideration	Choices are meaningful and they affect further development of the story and the process of recalling in large assemblages

In my view, an imagined display technology that has a potential to be successful in preserving memories through the interaction with users would ideally be built of multiple screens placed in the semi-dark room. The audience might stand and might be encouraged to traverse in this space to watch the content presented on the screens that surround them. It would facilitate deliberative democracy so the audience members will have many opportunities to talk and discuss their decisions. There could be no time constraints for the decision making slots.

I recognise selective interactivity as the most suitable type of interaction in the interactive film and I agree with Weinbren (2003, p.262) that, when the audience had been given the opportunity to change the narrative directly, this would have damaged the effect of the interactive film and then would interfere with the preservation of memory. However, I think that all choices the audience makes could be meaningful and could make them feel that it is important to vote as they can choose what will be shown on the screen next. It is useful to keep the stage actor as this person will inform the audience about alternatives they have and will introduce them to the voting system.

Stage actor activities should not be strictly scripted as in *Kinoautomat* but this person should be allowed to intervene when their help is needed.

Although interactive films were not considered very successful as they had a number of limitations that were discussed above, there has been a new interest in the interactive film technologies at the moment as there are more and more interactive films that appear on the Internet. For example, in the interactive film entitled *Last Call* (Stiller & Schneider, 2011), the main character calls a random viewer in the cinema and asks them to make a decision which is recognized by speech recognition software and the appropriate piece of interactive film is immediately presented to the audience.

The other interactive film - *The Outbreak* (Silktricky, 2010) is an example of the pioneering approach to the display of streaming multimedia content on the Internet. This innovative film consists of 21 scenes and 10 decision points, however only two options lead to a happy end, whereas six endings lead to the death of the characters (Cohen, 2010).

I think that the imagined display technology (explored in the following chapter) could be useful in preserving memories only if the interaction with audience it supports could be re-evaluated in the light of recent technological developments. It would certainly exploit the potential of computers and the Internet in supporting interaction and in preserving memories. The design of such a display technology is subject of the next chapter devoted to interactive environments that immerse the audience.

3.7. Conclusion

Huhtamo (2007, p.11) attempts to state open questions about the interactive film:

Could such systems deliver anything else beside entertainment?
Is there any way to make them more challenging, more
rewarding and - more "cerebral"? How much complexity can be
added to the system before the bond with the audience breaks

down? [...] How can individual interactive experiences be connected with collective ones? The future of interactive media as an audience attraction may well depend on correct answers to such questions.

In my view, these questions are crucial questions to be asked when elaborating on interactive films in the context of preserving memories. The discussion of various interactive films in this chapter indicates that they have a potential for preserving cultural memory. There is no ideal model of interactive film that could be followed to preserve memories of any person or any event. In fact, interactive films also have a number of limitations that could interfere with preservation of memories. These limitations, however, could be relatively easy to overcome and an imagined display technology could be devised that would provide a better audience interaction and thus would enhance preserving memories.

Cultural memory, as we noticed in the section 2.2 is a type of collective memory. I interpret it as an act of communicating collective understandings of past individuals and objects that once belonged to them. Narrative, which has been recognized as crucial for transmitting cultural memory, is also an act of communication. Its aim is to generate coherence and meaning in the mind of the person who is watching it. This meaning could be created through polychronic narratives that enable traversing and interaction and then recalling.

Audiences, nowadays, have the power to communicate with the narrative. They can be fully immersed in the content presented on the screens that surround them and can choose further developments of the narrative. Audiences provided with the possibility to change the sequence of events become more aware of the message that is transmitted. What is more, they are encouraged to think about alternatives and to ask questions. Another factor that enhances remembering is traversing. I think that moving around or walking through the space or traversing is a challenging method for remembering (known from mnemonics) and re-traversing the same or similar paths

improves the process of recalling. Re-traversing the same path additionally enables the observer to notice changes.

I would like to reiterate that I take the concept of traversing from land surveying, where traverses are built of control points (stations) and joining lines (traverse lines) that connect them. Traversing may be topographical so the terrain defines how to traverse the interactive narrative (e.g. road signs indicate which way to take) or topical, in which case the topics or main themes define a method of traversing the interactive storytelling (e.g. if the topic of narrative is exploring a particular object we focus on this part of narrative only). Traversing involves making choices between trajectories we are going to take. I support the model of selective interactivity where all trajectories are pre-scripted in advance. The user can only select a 'path' from a closed set of possibilities. A narrative does not produce new outputs, but cultural memory that is preserved at the time of presenting branching narrative, generates new outputs only in the minds of individuals who are gathered within a collective space of immersive environment.

As for the narrative modality, I think that polychronic narrative could be the most suitable one for preserving memories because it involves retelling past events as the user activates different sections/elements by navigating their own paths through pre-scripted events. These events may not be told chronologically but their order of occurrence could depend on spatial arrangements or taking a particular point of view. The polychronic narrative is based on selective interactivity as narrative choices are constrained with options that have been provided.

Finally, when looking for a type of interactive medium that would be most suitable for transmitting cultural memory based on the polychronic model of narrative and which would support the dynamic content, I have selected interactive film following Bruno's (2002, p.220) line of reasoning who indicated motion pictures (recorded during the movement) as a medium for preserving memories. I have chosen

the Kinoautomat model as the one that may be followed when designing an interactive film as it gives a large audience the right to vote on objects or scenes that will be displayed to them. This type of interaction, in my view, is very effective in engaging the audience. I think that the simple decision-making during the film can really make the audience think about possible alternatives not only about the present but also about the past. The number of limitations recognized in *Kinoautomat* was a starting point for devising the imagined display technology that would be a model of the interactive film best suited for preserving cultural memory. The additional feature that could improve this process is the environment that supports immersion and interaction. The next chapter is devoted to this issue.

4. Immersive environment as a location of transmitting cultural memories

The previous chapters focused on the concepts of memory, narrative and methods of preserving memory; especially by using communication technologies. As communication is nowadays participatory and interactive; thanks to communication technologies, it seems that preservation of memory can follow the same trend. What is more, memory is most often perceived as the prosthetic activity, so recent digital technologies could enable ‘implantation’ of events that have not actually been experienced (Landsberg, 2004, p.3). This target may be reached by enabling the user to traverse the image space and explore objects at their own pace and according to their own preferences. If this agency additionally involves choosing routes and deciding on the order of events to be watched within the narrative, the interaction between the user and the system is expanded. Ideally, this interaction would also involve a discussion and exchange of ideas between different users and deliberate democracy in making decisions.

The memory becomes prosthetic when narration is added allowing all sorts of users to learn about its context and when memory is preserved *in situ* often using artefacts found on the particular site. As it was already indicated by Donald (2000, p.149), narrative enables recovery of meanings of space through symbolic objects. If these conditions are met, the viewer feels a part of the ‘story’ they are watching. This feeling of immersion may additionally be increased by providing the relevant image space (Griffiths, 2004, p.199-200). Medieval cathedrals and panoramic rotundas were precursory immersive environments. They encircled the viewers and at the same time they supported very little or no interaction with the story told, but they provided interaction amongst people. Current communication technology in the form of the

Internet has a potential to be very participatory and interactive. It enables collection and storage of large amounts of data but is not very efficient in presenting this multi-layered data in the way that would immerse viewers and provide infinite associations as in the case of memory theatres.

The aim of this chapter is to explore immersive environments and their potential for preserving memories. The chapter starts by discussing the concept of immersion and by presenting different types of immersive environments (4.1). It is followed by the re-evaluation of the role of panoramas (4.2). Then, the methods of viewing panoramas are presented (4.3), followed by the description of navigable spaces (4.4). Finally, the role of panoramic environments and cinematographic panoramic environments as panoramic memorials is elaborated on (4.5).

4.1. The typology of immersive environments

The general understanding of the concept of immersion is the integration of the viewer into the image space. Naimark (2003, p.244) describes immersion as 'the feeling of being inside rather than standing outside'. Shaw (2003, p.24) claims that immersion is an 'experience of physical and imaginative relocation that includes a totality of engagement in the aesthetic and dramatic construct of the work'. Björn Thuresson, a Swedish researcher of interactive narrative and interactive environments (2005, p.63-64) and Shaw et al. (1997) claim that this engagement may be facilitated by interaction with objects that are present in the world to which the user is relocated. As immersive techniques have evolved since the first image spaces were developed, our current understanding of the concept brings different associations than the one people had in the past.

Immersion has a long history. Impressive wall paintings that were found in Roman and Pompeian villas indicate that even then the observer was surrounded by realistic and life-size figures (Grau, 2003, p.13). The visual aspect and the techniques of creating such realistic objects allowed observers to be integrated in the image space. What is more, baroque churches are examples of highly illusionistic places for displaying biblical scenes for pilgrims in the way that could immerse them. The above-mentioned examples suggest that, in the past, immersion depended on surrounding the observer with stories (supported by pictures). Especially in churches, it could happen that pictures were not on their own, but all connected by a story, as its 'frames' (typically for instance, the life of Christ).

Although these environments immersed the audience by providing rich sensory experiences, they did not support creative immersion that can be reached by an active production of memory. This task was accomplished by memory theatres where 'many and various - theoretically infinite - associations between objects and memory locations could be combined and thought' (Grau, 2004). The first memory theatre was created by Giulio Camillo, the Renaissance scholar and mythologist. Camillo's memory theatre reversed the traditional workings of the theatre as the audience was standing in the centre where the stage looked out into auditorium, which rose in front of them. The spectator was thus surrounded with images that provided signs that became meaningful through the relationship with the viewer. Each viewer could interpret these signs differently as Camillo did not provide a key for their exact use and interpretation. Although, Camillo never finished his theatre his idea inspired many other thinkers. Robert Fludd, the English mystic, physician and philosopher, took up Camillo's *idea del teatro* in the early 17th century and wrote a treatise about *Theatrum Orbi*, which influenced the design of The Globe Theatre in London and many other theatres (Grobbe, 2004, p.12).

The idea of memory theatre was forgotten for a while, but was revised when new communication technologies appeared. In the meantime, panoramic painting became a prominent immersive environment in the 19th century.

Panorama painting

The first all-surrounding painting was created by Robert Barker (1739-1806) in 1787, an Irish painter working in Edinburgh (Oettermann, 1997, p.5). As Grau (2003, p.65) states, Barker's invention was a quickly-appreciated medium not only for art, education and entertainment but also for political propaganda. Nineteenth century panoramas depicted battle scenes, exotic locations or religious scenes and were prepared to be displayed in rotundas. The audience took the central place in the rotunda, similar to Camillo's theatre, and observed the painting that surrounded them. The world's first building created for the purposes of presenting panoramic canvas was built in Leicester Square in London in 1793 (Grau, 2003, p.58).

Panorama painting was enormously fashionable entertainment in the 19th century so other types of '–ramas' were produced: Cosmorama²⁶, Cyclorama²⁷ and Pleorama²⁸ (Burns, 1997). The Panorama was exceptional compared with the previous pre-cinema devices (e.g. zoetropes, praxinoscopes, kinetescopes), because it offered a similar vision as one can see in nature. This provides the sense that there are no boundaries or limitations for the eye. Painted panoramas inspired the creation of moving panoramas (1810) and dioramas (1822), which are described in the following paragraphs.

²⁶ A type of a panoramic painting that was viewed from the human's point of view, not from the viewing platform and usually presented landmarks.

²⁷ Panoramic painting designed to be viewed from the centre of the cylinder; it usually depicted historical events. According to Koller (2010, p.6) a term cyclorama was introduced because the common moving panoramas in America needed a distinction from traditional panoramas.

²⁸ A type of moving panorama where the audience was seated on a rocking boat and the images on canvas were rolled past.

Moving panorama

The fundamental principle of a moving panorama was the concept that long images (a roll) were unwinded by means of a dedicated device (Huhtamo, 2002, p.9) as in Figure 10. A musical accompaniment was added to the presentation of long canvases where progressive sections of the long panoramas were shown in front of the audience at any one time (Hyde, 1988, p.131). In comparison to panoramas in rotundas, moving panoramas were mobile, operated not by panorama companies, but by small troupes or showmen. Gabriele Koller (2010, p.5), the author of *The panorama in the old world and the new*, underlines the success of moving panoramas in the 19th century in America. A moving panorama was like a theatre performance. The large flat painting that ran along the device (ship, balloon basket), simulated the movement and created the setting for the story that was complemented by the explanations of a lecturer and an accompanied music. Experiencing a moving panorama was very different from watching a still 360-degree painting in rotunda where the audience had to move along panorama painting in order to hear the next part of the narrative.



Figure 10 Image of a moving panorama from an 1855 issue of *Scientific American*.
This image is in the public domain due to expiration of copyright²⁹.

²⁹ Source of image: http://en.citizendium.org/wiki/Image:Moving_panorama.jpg (Accessed: 12.05.2010)

Diorama

The second panoramic invention that I would like to introduce was diorama, which was invented by Louis Daguerre (1787-1851). It offered a theatrical experience for the audience that watched ten to fifteen minutes of performance. The seats (not the canvas) were then rotated on a massive turntable so the audience had an opportunity to watch another short presentation. Figure 11 indicates the relation between the audience and the presentation (left) and two viewing directions (right). Diorama featured two immense paintings, which were lit from the back and from the front and, due to the application of translucent paintings and manipulation of light, it was possible to produce a live spectacle.

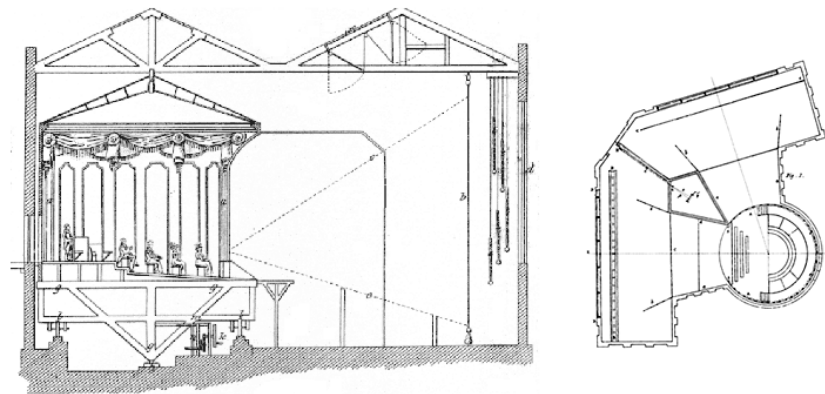


Figure 11 Example of diorama with a rotating platform for viewers. This image is in the public domain due to expiration of copyright³⁰.

This type of theatrical presentation, where the audience was looking in one direction became more common at the end of the 19th century and was applied to cinema. No longer was the creation of large rotunda buildings necessary to provide visual

³⁰ Source of image: Plate XIII of *London Journal of Arts and Sciences* (edited by William Newton), [1824-1825], Vol. IX, No. LIV. The text on Arrowsmith's Diorama Patent is on pp. 337-340. <http://en.citizendium.org/wiki/Image:Diorama.jpg> (Accessed: 4.06.2012)

presentation for large assemblages. The image projected on a rectangular screen became a method of presenting films for the following decades. Helmut Gernsheim and Alison Gernsheim (1968, p.43), historians of photography and photographers, observe that diorama was 'culturally and socially [...] forerunner for the cinema'. The panorama paintings lost their appeal with the invention of cinema in 1895, which provided new dynamic scenes, instead of static images.

Large screen environments

In fact cinema, contributed to the evolution of new immersive environments. The IMAX theatre relies on wider field of vision and uses screens far greater in size than in traditional cinemas. IMAX theatres support cinematic immersion. It enables the experience of a trip to the top of Mount Everest or to the deepest places in oceans without expensive travel (Grau, 2003, p.160-161). The fame of IMAX cinemas seems to be similar to the popularity of moving panoramas in 1850s which were becoming 'one of the most successful ingredients of realistic, spectacular staging in the 19th century theatre' (Griffiths, 2004, p.206).

While the IMAX theatre uses a huge flat screen, a planetarium, which can also be classified as immersive environment, deploys a dome-shaped screen. Griffiths (2008, p.116) claims that planetaria 'employ the principle of the panorama in the elaborate horizons constructed around the edge of the theatre'. Unlike the panorama paintings presented in rotundas, observers within the dome are seated and have an opportunity to experience usually the production about stars and planets and also their positions on the

sky in the past, present and in the future. This trend of presenting only projections about the sky is changing and more content is created to cover other topics³¹.

To sum up this discussion of immersive environments, I think that currently there are three approaches to immersion: historical approach, cinematic approach and Virtual Reality (VR) approach. The historical approach is related to historical wall paintings, illusionistic frescoes in churches or painted panoramas. The cinematic approach deals most often with stereoscopy and surround sound. It mainly relates to films presented in dark rooms where the audience is seated. The spectator is enjoying the privilege of doing nothing and is simply staring at the screen, being at the same time transported into the world presented on the screen (Huhtamo, 2007). Spectators focus on visual and aural aspects of the presentation and the immersion is created by presenting as precisely as possible the environment or the scene so that the viewer can feel as if they were there. The immersion in that case is rather physiological, based on spectator's mental identification with characters. What is more, cinematic immersion is based on photographic quality of images and film.

The historical and cinematic approaches relate to non-hermetic spaces because the recorded environment has more possible paths or locations to explore and the observer is not hermetically cut off from the real world. The image projections are most often presented on one wall where the image projection is limited to a frame. Medieval cathedrals, memory theatres and panoramas can be classified as the historic immersive environments whereas cinemas, such as IMAX and planetaria belong to cinematic immersive environments.

The third approach is based on VR, whose components are immersion, interaction and navigable space. This immersive and interactive experience is created by a computer (Ryan, 2001, p.12). In VR, the world provided for exploration is limited. It

³¹ Recent conferences, workshops and meetings related to fulldome festivals and productions note a decrease of productions about sky and stars, whereas often other art-based projects are being tested and experimented or dome-shaped screen.

does not have to be realistic so it does not have to present real and natural scale objects or be faithful to colours we know from nature. The viewer is usually hermetically sealed off from the real world by the application of, for example, Head Mounted Devices (HMD³²s). The unity of space and time can be achieved. The exploration of a VR world, especially when observed via HMDs or in CAVE³³ environments creates the impression of being inside the living environment.

When devising an imagined display technology suitable for presenting memories, I would combine certain features of the above-mentioned approaches because I am aiming for a strategy of preserving memory that will involve traversing the photo-realistic space. I would suggest using panoramic format (historical approach), camera-based recording (cinematic approach) and exploration of space (VR approach). The painted panoramas were one of the first spaces for mass audience (Oettermann, 1997, p.7). Camera-based recordings visualise the environment in a photo-realistic way whereas the exploration of the content in VR requires traversing. In the first and second cases traversing is a physical activity (that represent the static position of a painter or the movement of the camera operator), whereas in the third case it takes place within the virtual space (and can occur in multiple directions).

To sum up this discussion, it seems that immersion that is supported by recalling may be achieved when realistic content is created, typically using photographic and video cameras. The content may support the physical relocation of the viewer to the image space. The other component of immersion is exploration of space, which may be performed through traversing the space and interacting with the content presented on the screen, but also with other observers gathered in the same location as the preservation of memory is a collective process that occurs through a dialogue and exchange of ideas.

³² Head Mounted Device is a display device worn on the head or as part of a helmet.

³³ CAVE (Cave Automatic Virtual Environment) is an immersive virtual reality environment where projectors are directed to three, four, five or six of the walls of a room-sized cube.

The following section discusses immersive environments and their features, which facilitate gathering many observers, enable traversing and present multi-layered content.

This section highlights the prominent role of panoramas as immersive environments and the components of such environments. In fact, panoramas were not forgotten with the advent of cinema but only neglected for a while. The following section is devoted to the re-evaluation of the role of panoramas in the 20th and 21st century.

4.2. The re-evaluation of panoramas

Although painted panoramas were created as early as in the eighteenth century, there are still about 20 painted panoramas in the world which survived until today (Rombout, 2006, p.7). The Panorama of Raclawice³⁴ in Wroclaw, Poland, is one of the surviving panoramas. The building where it is presented has the traditional form of a rotunda and comprises such elements as a corridor and a viewing platform (Figure 12). Stephen Oettermann (1997, p.50), a German scholar of modern literature and curator, provides the cross section of such a circular building (Figure 13) which follows the traditional design of panoramic rotundas.

At the entrance (A in Figure 13), the visitor moves to the dark corridor (B) and then climbs the spiral staircase, reaching the visitor's viewing platform (C). Oettermann (1997, p.51) stresses the experience of entering the viewing platform helps to cause the memory of recent events experienced outside the building to fade and makes the viewer overwhelmed by the 360-degree view.

³⁴ This painted panorama created by Jan Styka and Wojciech Kossak in 1893–1894 presents the defeat of Russian army in 1792 in a battle with Polish army. It was designed to be exhibited in Lvov (now in Ukraine), but after the WWII was moved to Wroclaw (south-west part of Poland), because of the change of borders.



**Figure 12 The Panorama of Racławice (1893-1894) in Wrocław (Poland).
The rotunda from outside, the interior, the viewing platform and the long corridor leading to the viewing platform. Images by Karol Kwiatek.**

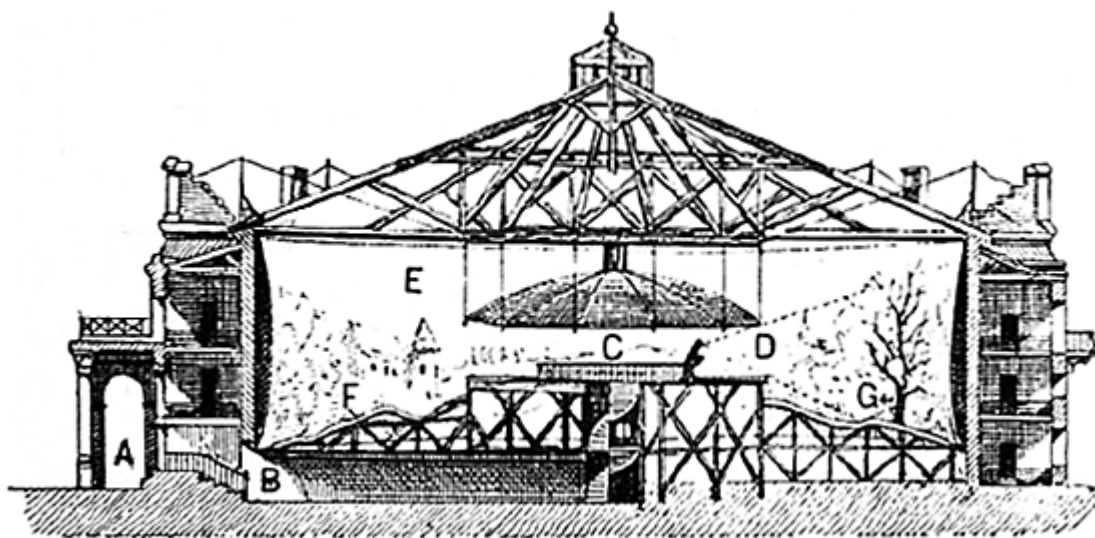


Figure 13 The cross section of panorama rotunda.³⁵ This image is in the public domain due to expiration of copyright.

Yadegar Asisi (2010, p.136), a specialist of visual culture who rediscovered the medium of the panorama at the beginning of the 1990s, promotes a unique rebirth of historical

³⁵ Source of image: (Oettermann, 1997, p.50)

(painted) panoramas displayed in rotundas, in times where digital panoramas are very common and are produced in large numbers (e.g. 360cities³⁶) and are typically presented only on computer screens. *8848Everest360°* (Asisi Visual Culture GmbH, 2009b) was Asisi's first work presented in a building called a 'gasometer'. This round building was not created specifically for the purpose of displaying this panorama, but it was used for gas storage in the past. *Rom312* (Asisi Visual Culture GmbH, 2006) was the next contemporary panorama painting created by Asisi. Figure 14 presents the scale of this enterprise with the viewing platform in the centre. The new panorama was created on the basis of historical painting and transports the visitors to the centre of Rome in 312AD. *1756 Dresden* (Asisi, 2007) was Asisi's third panoramic image. It represents the Baroque city of Dresden in Germany, which was almost completely destroyed in 1945. The city was an art metropolis in 1756 and the panorama recalls its prosperity from the past.

Asisi's panoramas exhibited in gasometers present remote and inaccessible locations such as Mount Everest (*8848Everest360°*) or Amazon jungle (*Amazonia*) (Asisi Visual Culture GmbH, 2009a) as well as reconstructions of historical sites (*Rom312* or *1756 Dresden*) so they seem to visualise almost the same themes as painted panoramas.

³⁶ The website (<http://www.360cities.net>, accessed: 4.08.2012) includes large amount of interactive panoramas from all over the world. According to Jeffrey Martin (e-mail correspondence on 28.06.2012), the creator of this portal, panoramic photographers add about 200 photographic panoramas every day.



Figure 14 Panorama of *Rom312* presented in the gasometer in Leipzig (Germany).³⁷ Permission to reproduce this figure has been granted by Yadegar Asisi. © asisi

Panoramic imographs

The term ‘imograph’ represents the role of photography in new media. According to Ron Burnett (2007, p.130), a Canadian theorist of visual studies, imographs are ‘photographs transformed through the power of software in digital environments’. Imographs can be presented by the application of computer program. They are, for example, high resolution images, which can be zoomed in or zoomed out on a computer screen. Panoramic imographs need more work from the photographer in order to be created. Individual images need to be stitched using panoramic stitching software and then can be presented on a computer screen using software called a panoramic viewer. Panoramic imographs include: medium resolution panoramic photography, gigapixel panoramas, or panoramic videography. Traditional panoramic imaging can be created using various techniques (rotating a camera with fisheye lens on a tripod and taking pictures every few degrees, automatic single line cameras or a set of multiple cameras

³⁷ Source of the image: <http://asisi.posterous.com/dinosaurier-der-massenmedien> (Accessed: 10.10.2011).

that take images at the same time). In most cases, stitching software connects all the images together and creates a single still panoramic image. The 360-degree image is wrapped in such a way in which the perspective of all objects looks correct. Using this viewing software the user can navigate all around a cylindrical or a spherical image. Panoramic photography manages to present a wide field of vision, but lacks movement and interaction. The interactivity can be programmed separately. XML coding is one of the most common methods for programming interactive imagery which result in creating panoramic imographs.

I would like to point out that gigapixel imagery could be a subcategory of panoramic photography, but it contains high resolution images, which could not be presented at once, but allow the viewer to zoom in into details of the image. Figure 15 presents the idea of gigapixel panoramas.



Figure 15 A fragment of a gigapixel panorama created by Xrez.³⁸ The interactivity of this imograph, which was created by stitching hundreds of individual photographs, allows zooming in and seeing details that are not normally visible using eyes. Permission to reproduce this image has been granted by Greg Downing.

³⁸ Source of image: <http://www.xrez.com> (Accessed: 4.06.2012)

Panoramic videography

Erik Champion (2011, p.3), a scholar of interactive history and digital culture, confirms a number of types of panoramic imographs which can enhance the viewing abilities.

360 degree panoramic images that are interactive insofar as you can spin the camera around, and zoom in and out of the panorama. Two-dimensional images and three-dimensional panoramic images available through the Internet may allow us to identify objects, but they are not likely to help us experience inhabiting that place, moving through that place, or understanding the dynamic and ever-changing relationship of people and place.

Champion (2011, p.3) claims that panoramic imographs do not support full immersion as they do not reflect the dynamism of the place, its changes in time and do not allow the observer to traverse through the place and interact with objects. Panoramic videography (360-degree video or panoramic video), as a tool for recalling and creating a continuity of space and time (according to rules in land surveying) is superior to panoramic photography as it reflects the dynamism of the scene and supports navigation. Panoramic videography can be very well explained using a description provided by Manovich (2011) who writes about media visualisation:

[W]hen you observe a physical scene directly with your eyes, you can look anywhere in any order. This allows you to quickly notice a variety of patterns, structures and relations. Imagine, for example, turning the corner on a city street and taking in the view of the open square, with passersby, cafes, cars, trees, advertizing, store windows, and all other elements. You can quickly detect and follow a multitude of dynamically changing patterns based on visual and semantic information: cars moving in parallel lines, house painted in similar colors, people who move along their own trajectories and people talking to each other, unusual faces, shop windows which stand out from the rest, etc.

Although Manovich refers to new media visualisations in general, his description is particularly relevant to panoramic videography, which allows the viewer to discover various patterns and what I would like to underline, allows changes to be noticed, in a dynamic scene due to the use of orientating functions (pan, tilt, zoom) that support

navigation. What is more, the changing of timeline is possible in panoramic videographs. It enables to skip or watch fragments again. The scene described by Manovich (2011) could not be visualised using panoramic photography. These patterns and changes could be crucial issues which are involved in recalling, similarly as it was important to notice new elements appearing on different layers in memory theatres to create new associations and then recall.

Production of panoramic videography (360-degree video) involves the process of stitching separate videos (recorded at the same time - pointing in different directions and synchronised) in order to achieve a panoramic footage. Figure 16 presents high-end cameras that enable recording 360-degree video. These cameras are available commercially and generate spherical video without additional post-processing. However, there are also other devices that, instead of creating spherical video, produce separate videos that need to be stitched and additional post processing is necessary. The example of such a device is a 360-degree rig presented in Figure 17. The quality of video recordings produced by such rigs is suitable for publication on the Internet³⁹ and for display in immersive environments.



**Figure 16 Ladybug® 2, Ladybug® 3 and Ladybug® 5 - spherical video cameras from Point Grey Research⁴⁰.
Permission to reproduce these images has been granted by Michael Jacoby (Point Grey Research).**

³⁹ The size of video panoramas still need to be reduced as it is larger than traditional video (e.g. presented on YouTube or Vimeo).

⁴⁰ Source of images: <http://www.ptgrey.com> (Accessed: 30.04.2010). Ladybug 2 and Ladybug 3 cameras were used to create 360-degree videos for the case studies. Ladybug 5 has been produced since January 2013. Ladybug4 has not been released by Point Grey Research.



Figure 17 360-degree rig with six separate HD Contour cameras. Image by Karol Kwiatek.

A number of artists who work with immersive environments (Luc Courchesne - *Where are you?* (2005), Maurice Banayoun - *World Skin* (1997), Jeffrey Shaw - *Place* (1995) or Michael Naimark - *Be Now Here* (1995)) notice that panoramas need to be re-evaluated in terms of immersion and preserving memories. Recent technological developments add a new dimension to the role of panoramas, which can be a challenging form of transporting viewers to other image worlds. Grau (2003, p.348) states that:

The idea of 360° images was a continuing phenomenon in the history of twentieth-century art and media. It is a model that maps onto the utopian idea of transporting the observer into the image, nullifies the distance to the image space, intensifies the illusion, and increases the artwork's power over the audience.

Panorama does not only provide immersion, but is also a tool for presenting the artefacts in their original environment (*in-situ*). Panorama can indicate the spatial co-existence of artefacts in the environment, which is meaningful to those who explore

their role in particular events or someone's life. Digital panoramas (panoramic imographs) require an environment in which they can be displayed. The design of such environment is described within the next section.

4.3. How to view panoramas?

Panoramas can be viewed in a few ways. The most common type of viewing is a framed format that is typically used for watching images and films. It was also initially used for viewing 360-degree images.

An alternative approach to viewing the imagery based on the all-round view was proposed by Shaw. Mark Hansen (2004, p.50-51), in *New Philosophy for New Media*, notices that 360-degree point of view appeared in Shaw's work, at first as a window and then as a whole 360-degree view. The well-established position of a 'window' viewing was caused by hardware limitations in a non-digital era. The fusion of viewing a panorama and a window appeared to be a trademark of Shaw's work where computer was applied. This idea of combining these two concepts was first introduced in 1986 in his work *Inventer la Terre* (Inventing the World) where a rotating column (Figure 18) allowed viewers to operate a 360-degree device that enabled 'body-brain activity'.



Figure 18 A rotating column in *Inverter la Terre* (1986) by J. Shaw.⁴¹ Permission to reproduce this image has been granted by Jeffrey Shaw.

The spectator was allowed to move around the rotating column and was provided with the panoramic viewing of the world which resulted in freeing the viewer from a fixed and static exploration of the film and enabled individual investigation of the 360-degree view using the window (Hansen, 2004, p.65). The viewer who was looking through the window perceived an image, which was virtually projected onto a place that surrounded the viewer. The viewer had to push two handles to rotate the column and also to control the display of images. This hybrid window panorama interface introduced in 1980s was a novel concept of viewing the world, especially due to merging the real world with virtual images. Shaw (1993) states that the computer screen works like a window through which the viewer chooses what to look at.

The Golden Calf (1994) was another Shaw's interactive art project that combined window viewing and 360-degree viewing. The viewer, holding a screen which they could manipulate, could view a calf that was only visualised on the screen and not presented on a plinth from different angles using this screen. Although the project enabled changing the perspective of viewing, it still did not allow exploration of the

⁴¹ Image source: Database of Virtual Art: <http://www.virtualart.at/database/general/work/-f62b1afe56.html> (Accessed: 29.11.2011)

environment that surrounds the viewer; which could enable recalling. The virtual calf reflected the real environment, but it was pre-designed in 3d modelling software at the time of designing the project. Figure 19 indicates the method of observing of the item, which was visible on a screen only.



Figure 19 *The Golden Calf* (1994) by J. Shaw⁴². Permission to reproduce this image has been granted by Jeffrey Shaw.

I think that the idea of looking at the world through the window is coming back in the 21st century, especially after the introduction of smartphones and tablet computers. *ConditionOne* (2011) is the exemplary frameless panoramic film that can be watched on tablet computers (Figure 20). The viewer can explore it by changing the position of a 'viewing window' (tablet computer in this case). There is no cable or rotating platform that limits the viewing and it can be watched even during physical movement. Here, the navigational world can be explored individually by traversing the real environment.



Figure 20 Watching 360-degree panoramic film using a 'window' - iPad.⁴³ Permission to reproduce this image has been granted by Rachel Zisser.

⁴² Source of image: <http://michaeljmeindl.com/Virtual%20Worlds.html> (Accessed: 4.06.2012)

⁴³ Source of image: <http://www.conditionone.com> (Accessed: 29.11.2011)

The immersive viewing is related not only to observing static environment from a fixed point of view but it also needs the ability and possibility to navigate (Thuresson, 2005, p.60). Manovich (2001, p.259) calls this feature navigability. The main difference between framed, window and immersive viewing can be likened to that between presence (being in front of a screen) and immersion (being surrounded by screens). Thuresson (2005, p.60) also indicates the feature of orientation as a strong component of presence and immersion; however only the ability to navigate is associated only with immersion.

I think that in order to explore the whole environment, not only 'navigability' and orientation from one point of view are necessary, but also the movement between stations to help uncover symbolic elements (objects, places) located between stations.

The next section focuses on image-based and VR environments and how they manage to provide immersive and cinematic viewing and interaction through navigable space.

4.4. Navigable spaces

The link between navigable spaces and narratives was indicated by Manovich (2001, p.244) in *The Language of New Media*. He discusses navigable spaces with reference to the ancient way of storytelling. The narrative was then very often related to the movement of the main character through space. Navigable spaces thus linked narrative with traversing. They could most often be found in computer games where the player has to collect, pick up items, talk to people they meet. However, they are not limited to computer games only. The concept of navigable spaces has developed through the last

decades, from computer animation rendered according to predefined path (1980s), fly-throughs (simulators of movements), cyberspace (VRML⁴⁴) in 1990s to panoramic photography in late 2000s and I think that panoramic videography could enhance this phenomenon in 2010s.

Navigable spaces are most often computer-generated. They may look realistic but they usually do not rely on actual data. However, there was a project called *Aspen Movie Map* created by a research team at MIT in USA in 1978 that was photo-realistic. This project was one of the first interactive virtual navigable spaces, where the space was not created using computers but was photographed from the top of a car every 3 metres (Brand, 1988, p.141). On the crossing a user could choose in which direction to go in order to explore the space reconstructed on the basis of photographs. Today, Google, Cyclomedia, Earthmine⁴⁵ and other companies use a similar idea from the late 1970s, but they use still panoramas, which are recorded also every few meters from the camera mounted at the top of the car. Panoramic videography still has not been used for such exploration of space and also as a medium for storytelling. Figure 21 illustrates *Aspen Movie Map* (left) and also Google Street View (right) and their interface for choosing options at crossroads.

⁴⁴ VRML - Virtual Reality Modelling Language - a standard file format for representing 3D interactive vector graphics.

⁴⁵ Earthmine is an American company that specialize in collecting, processing and managing street-level panoramas and converting them to geospatial data. <http://www.earthmine.com/index> (Accessed: 12.12.2009).



Figure 21 Aspen Movie Map (1978) - space navigation based on still photographs and Google Street View (2010) - based on still panoramas.⁴⁶ Permission to reproduce these images has been granted by Andy Lippman.

Manovich (2001, p.245-246) also mentions the potential of QuickTime VR (QTVR) imagery (VR panoramas) for creating more navigable spaces. Manovich (2001, p.246) states that photographic exploration could open unique esthetical possibilities that cannot be achieved in 3D computer graphics. The approach of taking photographic panoramic images and panoramic films to create a navigable environment has not been researched so far. I am proposing to use panoramic images and videos to generate navigable spaces. This approach combined with the interactive narrative where pre-scripted elements create narrative for the users has a potential to cultivate memory, because it presents photo-realistic visualisations of places and it enables the audience to explore the story as if they were characters in this story.

Depending on the type of environment in which the photographic content is shown the navigation of the user may be either a static or a kinaesthetic experience. If the user walks through the multiple scenes displayed on a computer screen, the experience is static as they do not relocate themselves. However, if an immersive multi-screen installation is used the spectator moves between screens to watch different parts of this installation and to explore the space. The viewer thus performs kinaesthetic

⁴⁶ Source of image: <http://www.flong.com/blog/wp-content/uploads/2009/07/aspenmoviemap-googlestreetview.jpg> (Accessed: 4.06.2012)

(bodily) activity, which in ancient times was considered as the one that supports recalling.

Diane Charleson (2011), an Australian experienced documentary filmmaker, has performed experiments with video installations where viewers can think beyond everyday life. Her video installations comprise a myriad of screens. The viewer is expected to walk between screens to explore different parts of the narrative and generate a new type of storytelling. Charleson (2011, p.20) calls this mobile viewer *flâneur* and claims that he/she is rather a participant than a spectator who can leave a space and return to it at any time. Walter Benjamin (2002, p.417), a German-Jewish literary critic and philosopher, defines a *flâneur* as a person who engages in pleasurable and aimless wandering in a city and this walking through a city helps an individual to understand urban phenomena. Nedra Reynolds (2007, p.72), an American scholar of cultural studies, adds that a *flâneur* does not only walk and observe, but can also catalogue and collect things. Kenderdine (2007, p.314) calls a *flâneur* an 'ocular gastronomer' who 'samples at will from the exotic atmosphere of the Parisian arcades'. Here, one can notice a new activity added by a *flâneur* which is sampling. Charleson (2011, p.21) adds that the act of observing is connected with storytelling: '[m]y flâneur wants to 'read' a place, become part of it and create their own story'.

I think that a *flâneur* in my research would not only walk, observe, catalogue, collect and sample but would also recall memories during traversing. Although Charleson (2011, p.21) refers to *flâneur* in the context of disperse screens. The rules applied to disperse screens can be, in my opinion, applied to immersive environments that are based on a myriad of screens (located in one environment and connected to create a complete experience). Figure 22 contrasts Charleson's understanding of *flâneur* with my own interpretation.

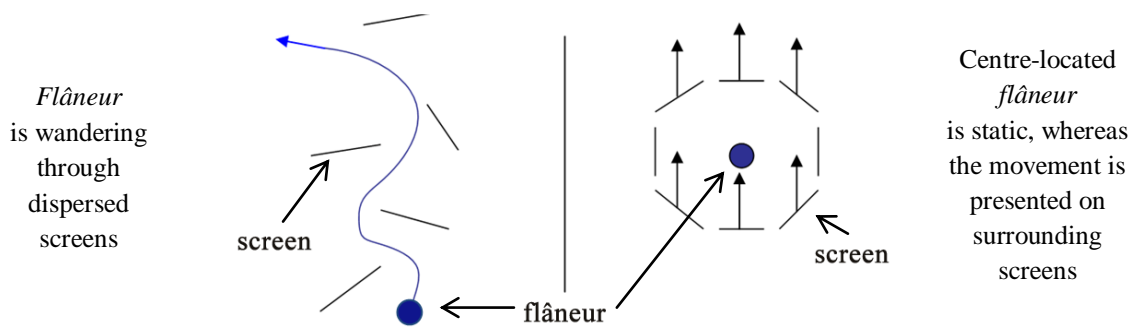


Figure 22 Charleson's understanding of a *flâneur* (dispersed screens present separate narratives) [left] and my approach (wrap-around screens which present the navigable space and single narratives) and the mobile viewer is standing in the middle and observing the movement [right]. Illustration by Karol Kwiatek.

A *flâneur* is able to recall memories and generate new stories as the viewer cannot only observe individual screens, but can also take part in the presented narrative. I think that a *flâneur* and a surrounding position of the screen encourage the dialogue and the social exchange of stories during and after the presentation.

Ryan (2001, p.73) deliberates on the movement of a *flâneur*. She states that 'the material bodies can move through space only by traversing it one point at a time'. She claims that there are two modes of travelling: a map and a tour and she compares them to French and English garden respectively. The French garden must be observed from above or from an elevated point to see its symmetrical patterns. The movement between such points is compared to jumping from one point on a map to another. It is a bit like air travel when you see places of your destinations but do not know how the route and environments between them look. The English landscape garden must be visited site by site, because every part reveals new items or different landscapes. The observation of English gardens is similar to the process of creating tours (exploring space rather than only individual places).

David Herman (2004), an American scholar of English, indicates the tour as a dynamic experience of space which is much different than the static depiction of the map. The map illustrates a disembodied 'god's eye-view' that see the entire area at once.

Tour temporalizes the understanding of space. Map is an abstract model of space, which has no direction.

I think that at this point I can compare panoramic photography, which was used to create virtual tours based on still panoramas to a map that involved jumping between multiple locations. Panoramic videography, in contrast, can be compared to a tour, as it is continuous and allows exploring all details on the ground.

The paradigm that I propose (pano-video-graphic - I coined this term) is to use panoramic videography to move between still panoramas (Figure 23A). The *flâneur* will then traverse along pre-scripted trajectories which will facilitate sampling, observing patterns and collecting items that are not often provided in VR navigable space (enables to move in any direction - (Figure 23B). Figure 24 illustrates VR navigable space where the movement between individual cylinders (panoramas) has to occur in virtual reality space.

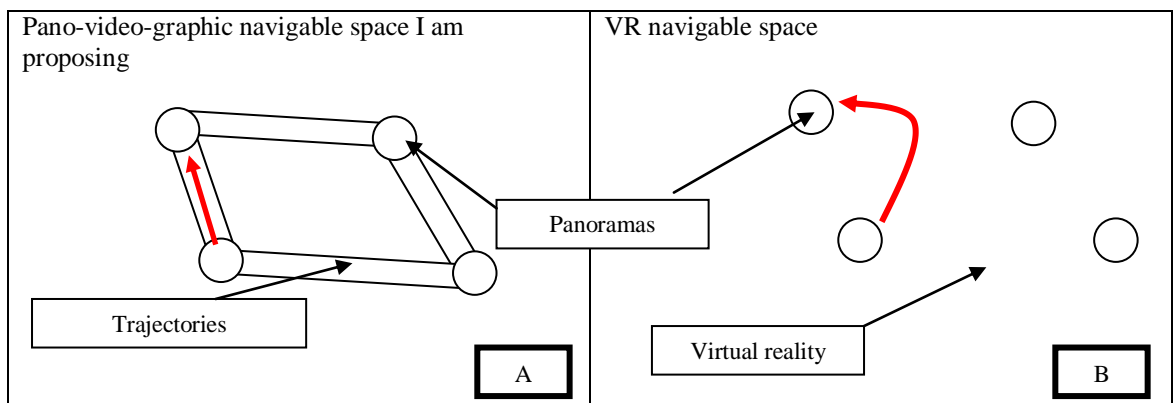


Figure 23 Pano-video-graphic navigable space (A) and VR navigable space (B). Illustration by Karol Kwiatek.



Figure 24 VR navigable space in *Place-Hampi*⁴⁷. Individual cylinders present panoramas and the space between panoramas must be traversed using methods known in Virtual Reality⁴⁸. Permission to reproduce this image has been granted by Jeffrey Shaw and Sarah Kenderdine.

Hansen (2004, p.47) claims that the movement within and between cylindrical panoramas in VR navigable space accompanied by a feeling of continuity and the difference between the real world and the image space is difficult to notice. This continuity is obstructed by merging a virtual representation of the world with the photographic one. There is a feeling of multiple gaps in the presentation of the project. I would propose to increase the continuity of space by merging the panoramic photography (represented by static cylinders) with panoramic videography (represented by the movement through virtual reality world).

The continuity of space and the design of pano-video-graphic connections may be based on rules applied in land surveying. Such exploration may not provide the same freedom of movement as in VR, but is more attuned towards recalling. In my view, my paradigm is similar to the Vietnam Veteran Memorial, where visitors are not allowed to move in every direction, but follow some paths (trajectories), which have recalling features (contemplation or time for prayer) prepared for them (e.g. plaques with names).

⁴⁷ *Place-Hampi* (2006) is presented in section 4.5.

⁴⁸ Source of image: (Kenderdine, 2009, p.58)

In my view, memories would be recalled when this continuity (equipped with symbolic elements) is well presented and also when photorealistic camera-based panoramas are displayed because, as indicated by Manovich (2001), unique esthetical possibilities can be achieved using film and video rather than VR. What is more, the already introduced panoramic photography and panoramic videography can be crucial elements for enhancing spatial and temporal continuity.

The following section explores the history and evolution of panoramic environments which support the presentation of panoramic photography and panoramic videography and I will attempt to indicate features that could support the pano-video-graphic paradigm.

4.5. Panoramic environments

Cinematographic panoramic environments

Panoramic (cylindrical) projection systems are not inventions of the 21st century. The first panoramic environments based on projected images were developed in the 1890s around the time when also cinema was born (1895). It is worth mentioning that early panoramic cinematographic projections started with the application of slide projectors, which appeared just before the invention of the cinema. To be more precise, according to Ryad Benosman and Sing B. Kang (2001, p.8), scholars of panoramic vision, Charles A. Chase introduced Stereopticon-Cyclorama in 1894 where eight slide projectors rendered sixteen slides on a wrap-around screen. This system was further developed by Raoul Grimoin-Sanson, who introduced Cinéorama in 1897. He also patented the space for projecting images on an inner wall of a rotunda. His Cinéorama was a panoramic

projection system built with ten synchronized slide projectors, a viewing platform and a canvas for image projection (Michaux, 1999, p.72) (Figure 25).

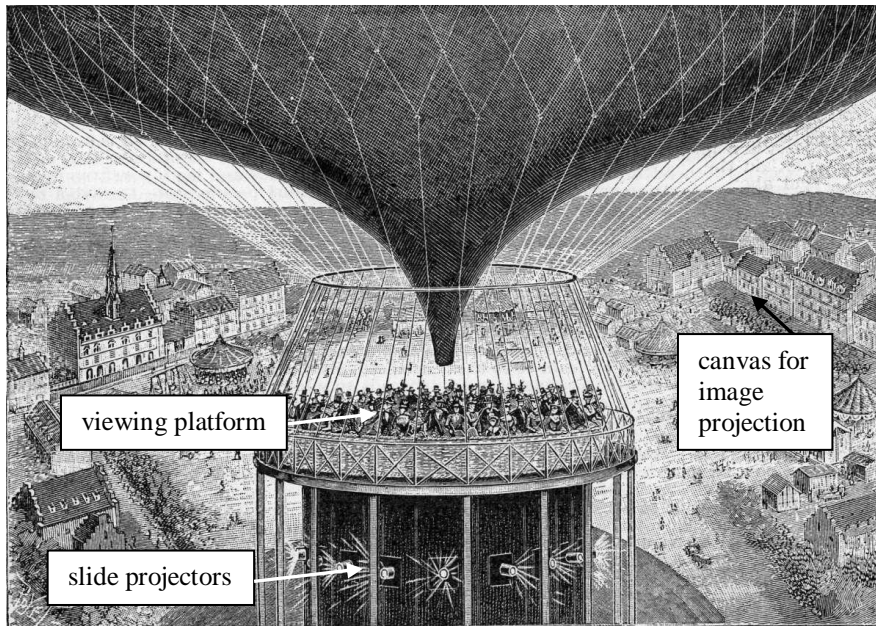


Figure 25 The illustration of the balloon simulation of the Cinéorama, 1900 Paris Exposition.⁴⁹ This image is in the public domain due to expiration of copyright.

Cinéorama was one of the first attempts to create a location in which the spectators were surrounded, not with the static image or painting, but with a projection created by means of light that changed at the desired moments. Cinéorama was received enthusiastically by the audience, but due to an accident in the projection booth, it was closed after only four days of demonstration (Oettermann, 1997, p.83). The Cinéorama structure was 30m in diameter and housed approximately 200 spectators on a journey in a balloon, creating the illusion of floating above the ground. This first demonstration of panoramic environment focused on technical advances in the camera and projection technology, rather than on the process of presenting a narrative (Piccolin, 2005).

The evolution of camera and projector techniques enabled new attempts to create immersive image spaces in the mid-1950s and Circarama was invented by Walt Disney's engineers who used 11 cameras mounted on a circular plate and recorded

⁴⁹ Source of image: 'La Nature'; no 1417, 21.07.1900

between 8 and 24 frames per second. Moreover, a 12-metre diameter building was erected to present panoramic films recorded with the multi-camera device. Figure 26 illustrates the space for presenting panoramic content (left) and also a device for such recordings (right).

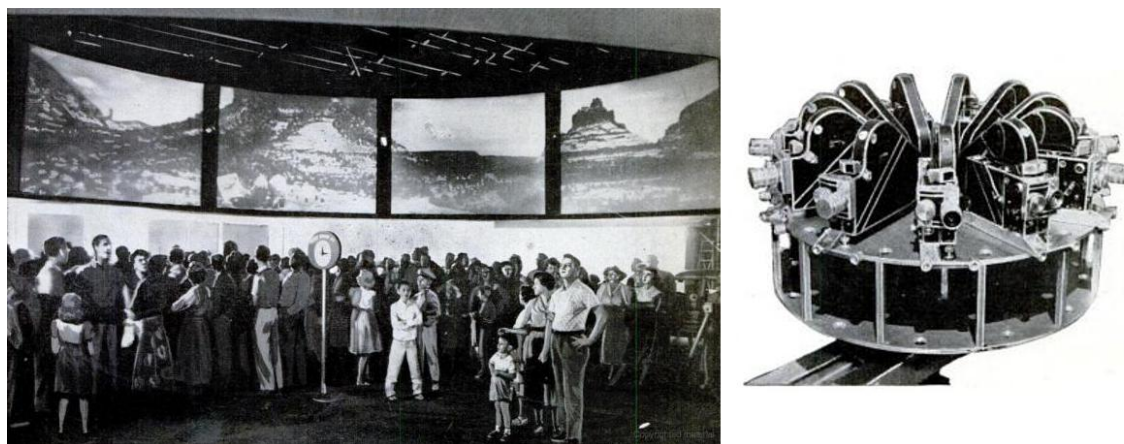


Figure 26 Circarama by W. Disney– 11-projectors 360-degree system (left) and 11-camera recording system (right)⁵⁰. This image is in the public domain due to expiration of copyright.

Circarama and Cinéorama both encircled spectators using multiple screens, but the projection was based on film projectors, not on slide projectors. The movement started to appear in such cylindrical structures in mid-1950s. Weibel (2003, p.17) states that multiple screens (not necessarily arranged in circular form) enabled the creation of non-linear narrations:

Multiple screens broke up the linearity of traditional narration. Multi-form plots, a non-linear narrative matrix, became possible. Narrative elements could be repeated, recombined, or replaced by other elements.

Experimenting with narrative and enclosing the spectator was described by Grau (2003, p.151) as the direction for the future development. Circarama was one of the most successful systems for panoramic films. The first films presented in Circarama (*A Tour To The West* (1955), *America the Beautiful* (1955)) rendered a number of landscapes in the United States (Fernstrom, 1958, p.92-93). Circarama was reconstructed in 1967 and

⁵⁰ Source of the images: ('Circarama,' 1956, p.135).

the new name of Circle Vision 360 was given to it. The number of cameras used in the process of recording changed from 11 to 9. One of the first film narratives⁵¹ displayed in Circarama system was a film titled *The Secret of Safety* (1999). It was a 12-minute linear immersive film that included a live-action and a tale, which was presented by a grandfather to his granddaughter (Yelin, 2000, p.32).

Another system which enclosed the viewers, was circular Kinopanorama developed in Moscow (USSR) in the late 1950s. It originally consisted of 22 projectors (2 rows, 11 columns) (Figure 27). The current version of Kinopanorama uses 11 cameras and projectors (Shandorovich, 2010).



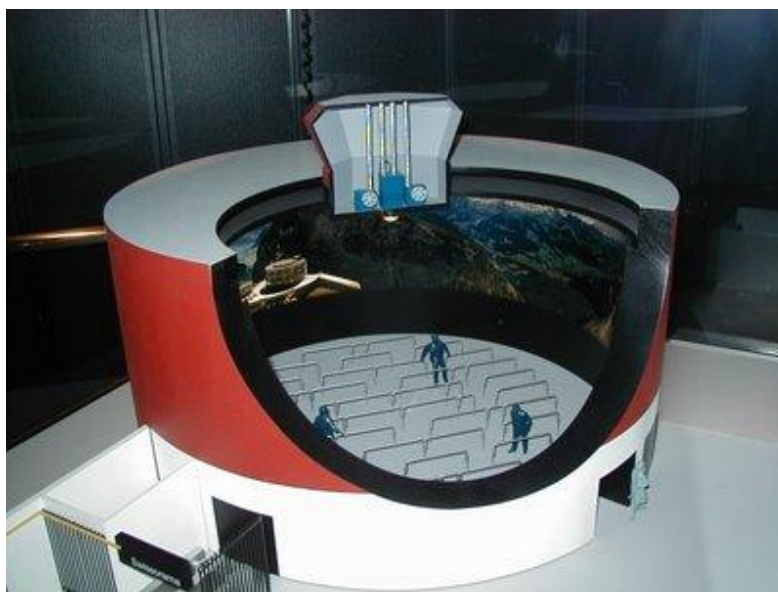
Figure 27 Circular Kinopanorama with 22 projectors in Moscow (1959)⁵² Permission to reproduce this figure has been granted by Grigorij Shandorovich.

Apart from these installations there was also Swissorama (later renamed to Imagine 360), which presented landscapes of Switzerland. It lasted between 1984 and 2001 and was visited by over 1.8 million people. Swissorama enabled housing of up to 400 people in a 20m diameter structure with a seamless projection system (Figure 28). It did

⁵¹ There are not much narratives created for Circarama, because 360-degree films have focused on presenting landscapes rather than telling stories.

⁵² Source of image: (Shandorovich, 2010)

not present narrative films (Piccolin, 2004), but it was enriched with music. According to Lucas Piccolin (2004), a researcher working on immersive films, Swissorama was a successful enterprise for a long time because it presented seamless imagery, well fitted music, and immersive viewing was used to present 360-degree imagery. High investments and maintenance costs were reasons for closing Swissorama in 2001.



**Figure 28 Swissorama Theatre. Permission to reproduce this image has been granted by Lucas Piccolin.⁵³.
Copyright: Swiss Museum of Transport and Communication**

Although panoramic environments supported a novel way of watching films, they have not displaced the traditional cinema. The first cylindrical ‘-ramas’ were not commercially successful (apart from Swissorama and Circarama) because of the high cost of maintenance. Walt Disney’s enterprises became profitable only after fifty years when the technology for these circular projections was developed.

The factor which could be responsible for this rather slow evolution of panoramic environments, is probably the limitation of the human eye. Oettermann (1997, p.90) states that the human is not able to watch 360-degree video at one time. It is easier to look at 360-degree photographic images as the spectator has time to explore them. However, when the panoramic film is presented in a 360-degree environment, the

⁵³ Source of image: (Piccolin, 2004).

viewer struggles to watch it and typically needs to watch it a couple of times to understand what it is about. The other immersive environments (iDome⁵⁴, planetaria) are in the reach of human' eye. Although the quality of their content is inferior to that in 360-degree environments (which use a number of projectors in contrast to one fisheye lens attached to one projector which is typical of planetaria⁵⁵) the content is easier to follow. The spectator needs time, training and experience to be able to watch 360-degree films.

Panoramic memorials

Panoramic immersive environments apart from cinematic function which is oriented towards providing the audience with entertainment may also be used for preserving memories acting as 'panoramic memorials'. Panoramic memorials are not monuments in the strict sense as they are only temporary structures. However, they can function as monuments when they start to present content that evokes memories. Immersive environments, which are based on wrap-around screens where photorealistic data and sometimes reconstruction of sites are presented, help to understand past cultures and people. I have identified nine such environments that are based on a 360-degree screen and which present some approaches that might be helpful in the preservation of memories (traumatic memories, memories of the past civilisation, living memories of different ethnic groups or memories of cultural heritage):

- *Be Now Here* (1995) by M. Naimark;
- *Place: A User's Manual* (1995) by J. Shaw;
- *Place-Ruhr* (2000) by J. Shaw;
- *Place-Urbanity* (2001) by J. Shaw;

⁵⁴ iDome is a three or five meter fibreglass hemisphere that stands vertically in front of the viewer and offers an immersive visualisation environment for panoramic and spherical representations. Source of information: <http://www.icinema.unsw.edu.au/technologies/idome/> (Accessed: 12.08.2012)

⁵⁵ The recently built planetaria are, however, based on multiple projectors system.

- *Place-Hampi* (2009) by J. Shaw and S. Kenderdine;
- *Pentimento* (2006) by D. Del Favero;
- *Memory Theater VR* (1997) by A. Hegedues;
- *The World Memory Theater* (2010) by P. Oldfield;
- *Scenario* (2011) by D. del Favero.

I will discuss these environments one by one and analyse their recalling functions to identify features that could enhance the process of preserving and transmitting memories.

Be Now Here by Michael Naimark is an immersive environment that was based on a large stereoscopic projection screen (Grau, 2003, p.242). The viewer explores a number of stereoscopic panoramas but only sees a small part of the whole panorama (Figure 29), similarly to the Place paradigm presented in the next paragraph. In *Be Now Here*, 360-degree photographic panoramas were produced in endangered heritage sites to document them (e.g. Dubrovnik, Jerusalem, Angkor, Timbuktu). The documentation aspect of panoramas can also be considered as their monumental function, because panoramas help to preserve heritage sites and the environment that existed at the particular moment in time and which might disappear due to e.g. earthquake, war and other disasters.



Figure 29 *Be Now Here* (1995) by Michael Naimark⁵⁶ uses a cylindrical screen and a rotating platform for presenting fragments of panoramas from endangered cultural heritage sites. Permission to reproduce this image has been granted by Michael Naimark.

Place paradigm introduced by Shaw in 1970s is based on a camera, a rotating platform and three projectors that project 120 degrees of imagery on a 360-degree screen. A user navigates a fragment of panoramic image by rotating the platform in a similar way as in *Be Now Here* installation. Their behaviour is captured by a camera whose function is described as follows:

In this apparatus the camera is made to depart from its usual function: from an instrument of appropriation and capture, it turns into the very interface that allows the platform and thus viewing window to pivot and so allows the full 360-degree computer-generated panorama to appear (Duguet, 2003, p.379).

Manipulation of the rotating platform is what makes the imagery appear on the screen. This activity provides the viewer the experience of the power, which is not available in traditional cinema, and also the experience of producing an illusion of discovering new parts of the scene. *Place* paradigm was applied to a number of Shaw's installations and I present only four of them below.

Place: A User's Manual is based on the nineteenth century concept of panorama painting introduced by Robert Barker in 1787. Instead of viewing a panorama from a platform located on an elevated point, observers exploit a central rotating platform

⁵⁶ Source of image: <http://www.naimark.net/writing/projection.html> (Accessed: 15.05.2012)

(Figure 30) which not only enables them to rotate and see particular parts of the panorama but also to move between cylindrical panoramas through virtual reality space (VR navigable space). The projected scenery consists of eleven cylinders which display landscape photographs taken in various locations - Australia, Japan, La Palma, Bali, France, Germany, etc. The work is viewed inside the screen but the projected image can also be seen on its outside surface. The visual presentation is additionally enhanced with 3D texts that travel within the projected screen. An interface in this project includes a camera and a microphone that picks up the viewer's sounds and displays the texts accordingly. Texts come from different sources and typically address the issues of place and language. They originally appear in the centre of the screen but their further location in the image space is determined by the viewer's movements. After a short time, they become more and more transparent until they disappear. They mark the viewer's presence in this installation, which, just like these texts, is only temporary and elusive. It could be lost if not shared in a conversation or recorded.

Place is Shaw's artistic paradigm that combines cinematography, photography and virtual reality. The point of view was characteristic to VR and computer games (Manovich, 2001). Shaw modified his system and presented it also in other versions:

Place-Ruhr, Place-Urbanity, Place-Hampi. Place-Ruhr 2000 is for instance:

[a] memorial to the people and culture of industrial society of a particular region but at the same time resembles so many others [people in similar situation] around the world that have been radically changed by industrialization and are today moving in new directions (Grau, 2003, p.242).

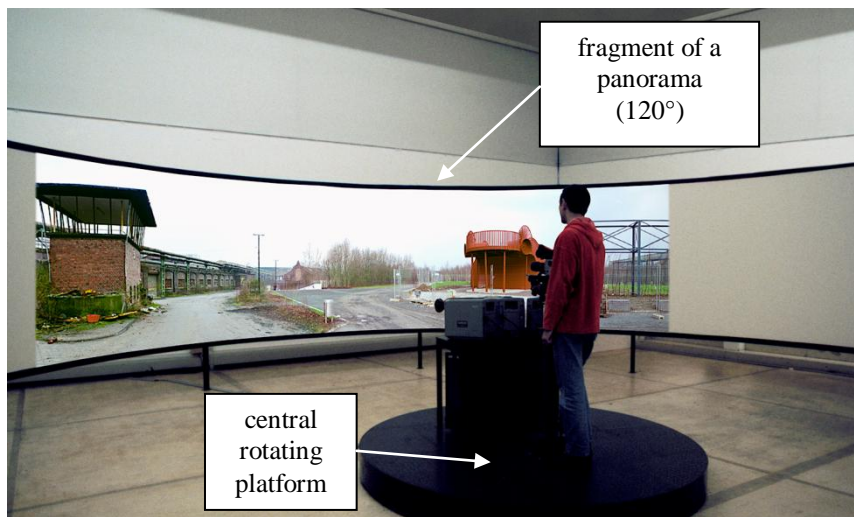


Figure 30 *Place Ruhr 2000* is a memorial to the people of industrial society. A user navigates a fragment of panoramic image using a central rotating platform.⁵⁷ Permission to reproduce this image has been granted by Jeffrey Shaw.

Place-Urbanity is another variation of the Place paradigm. It renders fifteen panoramic video recordings of various urban locations in Melbourne (Australia). Each of these locations identifies the district of a particular immigrant and/or ethnic community: Chinese, Macedonian, Greek, Italian, Jewish etc. There are parallel narrations that take place in different locations and the spectator has an opportunity to move from one panorama to another (Grau, 2011). In each of the panoramic scenes the visitor encounters a comedian, hanging upside down who tells a joke when he comes into the view (Figure 31). Each comedian represents a particular ethnic community shown in the panorama. Comedians' jokes contain critical and humorous remarks on comedian's belonging to the social and geographical Australian context. The background panoramic imagery presents places where different ethnic groups live. I think that in the future it could be considered a memorial to the multinational character of Australian city at the beginning of the twenty first century.

⁵⁷ Source of image: <http://www.medienkunstnetz.de/works/place-ruhr/images/2/> (Accessed: 9.01.2012)



Figure 31 Panoramic presentation of a comedian hanging upside down who is telling a joke or a story in *Place-Urbanity*⁵⁸. Permission to reproduce this image has been granted by Jeffrey Shaw.

As Anne-Marie Duguet (2003, p.381), a French scholar of art and technology, states, Shaw combines different interfaces (rotating rotunda, bicycle) and also unique combination of apparatus in his projects. This makes the viewpoints in his projects different from those in the traditional cinema.

PLACE-Hampi installation is a 'custom-built augmented stereoscopic panoramic interactive cultural heritage installation' (Kenderdine et al., 2008). At the same time, it is a memorial to the culture that existed in a particular location. This installation uses stereographic photographic panoramas of the World Heritage site Vijayanagara (Hampi) in South India. *Place-Hampi* was created by Kenderdine and Shaw and was produced by University of New South Wales - iCinema Research Centre in collaboration with ZKM Karlsruhe⁵⁹, Museum Victoria⁶⁰ and other institutions. It presents 360-degree stereographic still panoramas of this significant archaeological site. Eighteen high resolution panoramas are represented as cylinders and the user moves between these areas using the interface that enables steering and driving through the virtual world (VR navigable space - Figure 24). Once the user is inside a cylinder (panorama), narrative events occur through graphic characters from Hindu mythologies. The audience gathered inside the 360-degree screen only see a part of the panorama, because only one

⁵⁸ Source of image: <http://kuchelmeister.net> (Accessed: 15.05.2012)

⁵⁹ ZKM - Center for Art and Media in Karlsruhe, Germany, <http://on1.zkm.de/zkm/e/> (Accessed: 12.08.2012)

⁶⁰ Museum Victoria in Melbourne, Victoria, Australia, <http://museumvictoria.com.au/> (Accessed: 12.08.2012)

projector (two projectors to be more precise, which are used for stereographic projection) is used in this installation. The user interface allows the interactor (only one person located on a central rotating platform) to change the direction of viewing (Figure 32). In the meantime, the audience can move freely within the environment, while listening to ambisonic⁶¹ recordings (spatial audio) from the presented locations. This spatial sound has a crucial influence on creating spatio-temporal immersion⁶².

Place paradigm reminds me a representative democracy known from *Kinoautomat* where one person decided, or helped to make decisions, about what others can potentially watch. Here, they do not make choices, but choose the direction of viewing and the direction of exploration. I think that the 360-degree projection that uses the whole screen, not only a fragment of it, gives more freedom to the observers.

Place installations mentioned above are examples of cinematic approach to immersion created not only by the surround screen, but also by a movement in the dark image space. These projects link three approaches to immersion: historical - a concept of observation of traditional painted panoramas, cinematic - camera-based recordings, and VR approach - exploration of space). The movement in these projects is kinaesthetic and cinematic. The world that surrounds the observer is no longer static but begins to move (cinematic movement) and the audience gathered inside the cylindrical image space have an opportunity to change their position within the immersive environment. Spatial sound also influences recalling. All these processes help to transmit memories through the exploration of disperse objects and artefacts. These items, when presented using panoramas, could trigger memories.

⁶¹ Surround sound system.

⁶² A sense of place and an approach to transport the reader onto the scene.



Figure 32 *Place-Hampi* is a memorial to culture that existed in the past in South India⁶³. Permission to reproduce this image has been granted by Sarah Kenderdine and Jeffrey Shaw.

At this point in the discussion it is worth mentioning that the link between memory and narrative is not only involved in generating different types of truth, but also supports seeing different version of past events, i.e. alternative pasts. Barker (2006) introduces *Pentimento*, which is an installation that enables to see a multiple versions of the past events. It enables the exploration of memory, re-exploration of issues of past and present and the possibility to investigate multiple histories. The installation is described, as follows, in the abstract of the paper by Barker (2006):

[T]he narrative will never resolve in any logical sense, only in each individual viewer's mind. The viewer re-joins the disjointed circuits of past in order to construct the memory of the event which never happened to them and to answer the questions posed by the narrative. The viewer's interrelation with the content of *Pentimento* then poses the further and more interesting question as to what the interactions tell the viewer about his/her own intentionality. The viewer and the characters unfold the multi-temporal narrative together, in doing so the viewer confronts questions of their relationship to the sexual and criminal content of the work and also the way in which events such as this and our memory of them form part of who we are today.

⁶³ Source of image: (Kenderdine, 2009, p.74).

Pentimento relates to 360-degree immersive arena (Figure 33) developed by Del Favero from iCinema and its task is to change our conception of relationship between memory, past and present. It can be noticed that viewers together with characters of the narrative are responsible for it. *Pentimento* presents events leading to a discovery of decomposed and unidentified body in Sydney using a number of narrative layers and points of view. This installation indicates an attempt to create memories of events that never happened and it underlines the strong influence of wrap-around display architectures in the process of creating and presenting memories.

I think this installation provides an opportunity to visualize alternative views of the past which was not possible in the case of statues as Miles (1997, p.81) indicated.

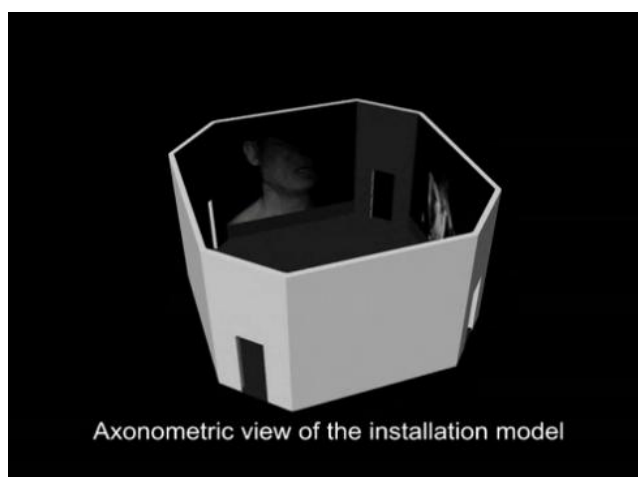


Figure 33 The narrative presented in *Pentimento* on a wrap-around screen has a potential to create memories of events that never happened.⁶⁴ Permission to reproduce this image has been granted by Dennis Del Favero.

Formulation of personal memories was also possible in Agnes Hegedues's (a contemporary Hungarian artist) *Memory Theater VR*, which was a project based on a panoramic rotunda, where the walls created a border between the real and virtual world. In the centre of the rotunda, there was a platform with a 3D mouse to navigate the content displayed on a 360-degree screen (Figure 34). Hegedues's work, just like Camillo's memory theatre, was arranged in layers. The viewer was able to create a

⁶⁴ Source of image: <http://www.icinema.unsw.edu.au/projects/pentimento/project-overview/> (Accessed: 5.07.2012)

sequence from different arrangements of layers in the foreground and the background (four layers). Hegedues' panorama formulated 'a rich array of associations', leading the spectator through the history of art and media and allows the viewer to form personal memories of the images (Grau, 2003, p.232).



Figure 34 Hegedues' *Memory Theatre VR* through multi-layered display creates stimulating visual associations which enable formulation of personal memories.⁶⁵ Permission to reproduce this image has been granted by Agnes Hegedues.

The collage created by intersection of multiple layers was a stimulating intellectual experience and also a space for active reflections. Grau (2003, p.234) notices that Hegedues presented how art (with the application of a database) can augment our memories using multiple connections of stored images and sounds.

The other example of the contemporary use of memory theatre is the idea of *The World Memory Theatre (WMT)*⁶⁶. This theatre is developed as the Internet application. According to Peter Oldfield (2010), the director of the WMT project, the interactive environment of the WMT surrounds the viewer and enables exploration of multicultural architectural complexes. A 'virtual storytelling exploratorium of parallel folk myths accessible through the cross-cultural linking of their common archetypes' is the aim of

⁶⁵ Source of images: <http://www.virtualart.at/nc/popup/work/memory-theatre-vr/img/677.html?type=323&cHash=3d37101f2ad710db5927925cc61ec598> (Accessed: 8.01.2012) and http://peter-matussek.de/Pro/F_05_Synopse/GT_Dateien/Hegedus_1997_118.html (Accessed: 8.01.2012)

⁶⁶ The World Memory Theatre: <http://www.worldmemorytheatre.org/> (Accessed: 8.01.2012)

the enterprise (Oldfield, 2010). It tries to indicate a new approach for ethnographic museums for their exhibitions, which are almost always divided by regions and cultures. The WMT attempts to present cross-cultural links in an interactive learning environment. The visitor of the WMT can explore cultural stories by following one plot. Oldfield (2010) explains the idea of WMT in the following way:

The navigation program for viewing the environment is both free-directional and fully-browsable. Each artifact becomes a visual portal to the cyber-linked database offering story choices along with each story's cultural background. Any chosen story is introduced as audio narration and accompanied by related imagery and music. At key junctures in a story the participant is offered choices to select, follow and explore the same archetype from one chosen parallel myth or folk story to another.

This project related to memories not only used multi-layered environment, but also included choices to select. One of the parts of the architectural complexes has, for instance, these elements: a sculpture from Zimbabwe, a doll from Arizona, a tapestry from Bolivia, an icon from Russia. Figure 35 indicates images that are the basis for multi-layered storytelling exploratorium.



Figure 35 The World Memory Theatre (WMT) uses images, artefacts for the creation a virtual multi-layered storytelling exploratorium. Montages by Peter Oldfield⁶⁷. Permission to reproduce these images has been granted by Peter Oldfield.

The overall intention of the WMT is to offer the public a new kind of immersive experience in an innovative and entertaining educational setting, as it deeply integrates

⁶⁷ Source of image: (Oldfield, 2010).

the imagination and the intuition with mythic sensibility. In this way the participant taps readily into the culture of a large sample of the world's people to gain perspectives that reveal humanity's common experience. This experience is available on-line on the project's website⁶⁸ and the authors are planning to build a physical exhibition, but are still looking for funding to create it in Europe or North America. Figure 36 clearly indicates the round form of the WMT with a central podium in the middle of the structure, similarly as in panoramic rotundas with a viewing platform located in the centre of the architecture (*Place, Memory Theater VR*).

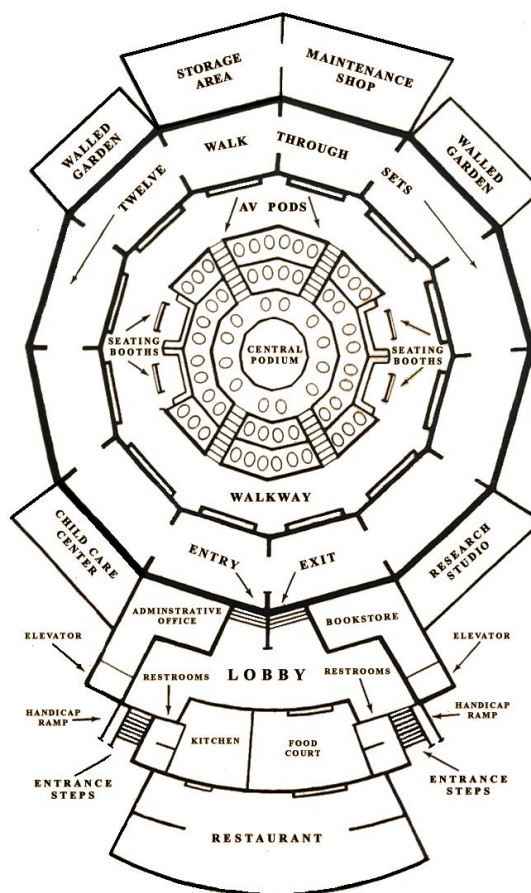


Figure 36 The design of *The World Memory Theater* (to be realised) by Peter Oldfield⁶⁹. Permission to reproduce this image has been granted by Peter Oldfield.

⁶⁸ The World Memory Theatre: <http://www.worldmemorytheatre.org/> (Accessed: 8.01.2012).

⁶⁹ Source of image: (Oldfield, 2010).

Memory theatres seem to follow a panoramic design. Just like panoramas, they aim to encircle viewers but, in contrast to traditional panoramas, they also support creative formulation of memories through their multi-layered presentation of images.

The other type of installation that supports creative interaction is *Scenario*. This is one of the latest computer-interactive installations developed at the University of New South Wales in the iCinema lab (Sydney, Australia). The narrative in this project is introduced by humanoid characters and also by the audience. Figure 37 illustrates the computer-generated humanoid character presented to an audience gathered within a 360-degree screen. Del Favero and Barker (2010) define this type of narrative as 'co-evolutionary' narrative which emerges and evolves based on an association formed between digital and real characters. This type of interaction is not selective, but productive, because new outputs are generated all the time.



Figure 37 Three scenes from *Scenario* presented on a 360-degree screen⁷⁰. Permission to reproduce these three images has been granted by Dennis Del Favero.

In *Scenario*, the 360-degree stereoscopic space surrounds the viewer who can interact with digital agents that also have a level of autonomy. This type of autonomy leads to creation of new outputs, which cannot be pre-scripted. *Scenario* is inspired by the experimental television work of Samuel Beckett and is set in an underground labyrinth with five imprisoned digital characters (Scheer & Sewell, 2011). These characters take the spectators for a journey through the labyrinth in order to discover possible reasons

⁷⁰ Source of images: <http://www.icinema.unsw.edu.au/projects/scenario/project-overview> (Accessed: 1.02.2012)

for their imprisonment and also to find a way to exit the underground structure. The project is based on a sophisticated Artificial Intelligence (AI) system, which rapidly responds to and interprets the behaviour of the spectators. Here, we have an example of fully implemented emotional immersion where real dialogues/communication occurs between characters and members of the audience. *Scenario* enables a narrative to be created that evolves in relation to the humanoids and the observers' actions and in this way a narrative evolves for the spectators. This project presents a unique approach to the creation of a narrative within a stereoscopic immersive visualization environment, where the narrative is produced based on visitors movements (motion tracking system) in the panoramic space (Scheer & Sewell, 2011). In this case, the movement generates new narrative outputs but, in the computer navigable space of humanoids, the viewer might have difficulties in recalling objects or people from the real world. The world presented on a 360-degree screen is fully generated by a computer. The creators of *Scenario* paid lots of attention to the viewers' cinematic experience and to the facility that allows users to enter a Mixed Reality⁷¹ environment inhabited by digital characters that can respond immediately to viewers' actions.

To sum up the discussion of panoramic installations, which were mostly created by iCinema (Sydney), Museum Victoria (Melbourne), ZKM (Karlsruhe) and ALIVE lab⁷² (Hong Kong), I noticed that some of these immersive architectures refer to memories but their main task is not to preserve them. Table 3 juxtaposes functions of the presented immersive installations.

⁷¹ Mixed Reality - refers to the merging of virtual and real worlds where physical and digital objects interact in real time.

⁷² Applied Laboratory of Interactive Visualization and Embodiment (ALIVE) - an interdisciplinary research initiative at the University of Hong Kong (School of Creative Media). <http://alive.scm.cityu.edu.hk/> (Accessed: 20.08.2012)

Table 3 Memorial functions of immersive installations.

<i>Be Now Here</i>	Documentation of cultural heritage sites
<i>Place - a user's manual</i>	Presentation of panoramic photographic landscapes and elusive textual memories
<i>Place-Ruhr</i>	Testimony to Ruhr's economic and social changes
<i>Place-Urbanity</i>	Presentation of immigrant communities leaving in Australia
<i>Place-Hampi</i>	Memorial to culture and past civilisation
<i>Pentimento</i>	An attempt to create memories of events that never happened within immersive installation
<i>Memory Theater VR</i>	Art and media presentation that stimulates the formulation of personal memories
<i>The World Memory Theater</i>	Presentation of cross-cultural links through the parallel rendering of folk myths
<i>Scenario</i>	Creation of co-evolutionary narratives; recall traumatic memories

The presented immersive installations play a number of roles from preserving and documenting heritage sites and being memorials to culture, to the generation of narratives that involve user's participation. They focus on cultural heritage sites and render a number of locations. However, they were not intent on preserving memory of a particular person or a particular event that were only known in a small area and whose memory is celebrated locally. What is more, the above-mentioned examples did not represent polychronic narratives which I identified earlier as a type of narrative that has a potential to recall memories.

In most of these projects the spectator moves in order to explore various scenes. Static images are used to present locations whereas videos depict actions that take place in these locations. I propose to merge panoramic photography, videography and some elements of VR to create an interactive panoramic film, which will enable the audience to formulate their own memories. In my view, such a film may be used to preserve memories of local artists and to celebrate the memory of local events.

4.6. Conclusion

This chapter studies immersion in order to examine how the immersive effect can enhance preserving memories. It also attempts to establish how to design an image space that could facilitate immersion by supporting interaction and navigation.

In my view, immersion is an intellectually stimulating state of consciousness where the observer is located in the centre of perspective and can interact both with the content displayed on the screen and with other observers gathered in the same location. Immersion involves being relocated to another world, e.g. world of images, which has references and familiar aspects for the viewer. Immersion occurs when ‘being inside’ the image space that projects images and videos from cameras and where the viewer can recognise artefacts or objects.

Viewers in this image space could be able to traverse both the digital environment – navigating between panoramas that make up interactive film, and the physical environment, by which process they are able to explore immersive space and the narrative film according to their preferences.

I have analysed a number of panoramic environments and re-evaluated the potential of panoramas for providing the memorial function. Panoramas render photorealistic content recorded with camera. They present artefacts in their original location (*in-situ*) and indicate their relationship and spatial co-existence in one place. In their evolution, panoramas borrowed some features of memory theatres, which not only enclosed viewers locating them in the central position, but also supported active formulation of memory by encouraging viewers to produce their own interpretation on the basis of multi-layer visualisations.

Panoramas have been used in various panoramic installations, both the historical ones, which rely on paintings, and recent ones which take advantage of digital

technologies. Observers, surrounded with a 360-degree screen, are encouraged to exchange their ideas and watching the content on the screen becomes a social activity. The *flâneurs* are taken on a type of a tour in the immersive environment where they can explore different places and thus recall memories.

Studying historical cinematographic and contemporary panoramic installations, I have also identified certain features that can increase immersion. These are: seamless imagery and the continuity of watching. The movement through a VR navigable space obstructs continuity which does not occur in the environment created by merging panoramic photography with panoramic videography (pano-video-graphic paradigm). The rules applied from land surveying can preserve this continuity. The other important factor is the spatial sound that can enhance the immersive effect. The length of the interactive film is also important. In my view, 360-degree projection systems encourage viewers to watch a particular 360-degree production multiple times (which enhances recalling memories), but only when the presentation is short (e.g. 5 minutes) and of very good quality.

If I had to develop a new system for immersive viewing that could be used for preserving cultural memories, my target system would have the following features:

- curved shape of the screen;
- significant height of the screen;
- large area within the image space to enable traversing to a group of viewers
- surround sound system;
- potential of interaction with the content displayed;
- ability to provide special effects (changing temperature, imitating wind or emitting smells) which are good tools for engaging the spectators;
- calibration techniques for improving the misalignments in projections;
- seamless structure (no divisions between screens).

This literature review raises a number of questions:

- Can spatial navigation, based on panoramic photography and panoramic videography (not VR-based spatial navigation), support the preservation of cultural memory?
- Can active forms of preserving memory, relying on interactive narrative, be presented on 360-degree arenas whose potential in preserving memories was recognised in chapter 4?
- Can pano-video-graphic navigable space and panoramic interactive film enriched with spatial sound enhance recalling through the creation of emotional immersion and traversing?
- How can one create a model for panoramic interactive films that could be popularised when 360-degree cameras become handheld and portable?
- How can video panoramas be recorded during movement between decision points?
- Does a model based on inter-visibility and traversing actually support continuity of space? Does repeat photography provide a continuity of time in immersive productions? Do these features help in preserving memory?
- Which of the case studies, the one based on an event or the one based on a person, provides more opportunities for creating interactive narratives?
- Can 360-degree screens replace monuments in public spaces? Or are they only temporary monuments that can be moved from one town to another, similarly to painted panoramas in the 19th century?
- How can biographies and historical events be presented in ways that would be interesting for young generations? Can panoramic imographs support interaction and participation?

- What type of interaction of users with an interactive film could be introduced?

What type of viewing would support this interaction?

Finding answers to these and many other questions generated by the literature review requires a well-designed research strategy. The next chapter introduces the methodology for this research project.

5. How to face the task

This chapter is concerned with the design of a research strategy for this project, which is developed on the strength of the questions raised in the previous three chapters of the critical review of the literature.

It is acknowledged that the review of literature generated questions which concern the link between memory, narrative and panoramas and the practical implications of this relationship. They are research questions and may be described as ‘what’, ‘how’ and ‘why’ questions depending on what it is I need to find out. For example, how the preservation of public memory can inspire the cultivation of cultural memory or how panoramas can support this preservation. When trying to answer these questions, I wonder ‘how’ to address each of them and ‘why’ to choose that method or a case study. Thus, I can say that I come across two types of questions: research questions generated by the literature review and questions about those research questions, e.g. How do I answer these questions? Why do I answer them this way?

The way I have chosen to answer these questions is by using the practice-based cases. I am considering ‘cases’ through practice in order to explore my themes. This method is ideal when someone ‘explores’. Cases can extend experience or add strength to what is already known through previous research on cultural memory. As there is little information available on the application of panoramas enhanced with narrative to the preservation of cultural memory, this research may be one of the first studies in this field.

5.1. Practice-based cases in detail

Robert Yin (2009, p.3), in *Case Study Research: Design and Methods*, defines case study research as an empirical inquiry that investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used.

The phenomenon I am investigating is the application of interactive panoramas to the preservation of cultural memory, especially those parts of memory that are still remembered and recalled by local communities. I am exploring how the preservation of this memory has changed and how it can be affected or improved by recent communication technologies. The boundaries between this memory and other types of memory (e.g. communicative memory) are not clear. What is more, the application of relevant methods of preservation may change the status of cultural memory to public memory. Although I am not using multiple sources of evidence by which Yin understands documentary research, surveying, interviews, observations, for instance, my approach has some relation with case study research as it is explorative and it uses cases.

My overall research question is: What can be the role of interactive panoramas in helping to preserve cultural memory?

I try to answer this question by illuminating a decision or set of decisions concerning the use of panoramas. I attempt to explain why they were taken, how they were implemented and with what results, which in Wilbur Schramm⁷³ (1971)'s view is what the case study approach does.

⁷³ Wilbur Schramm was the American researcher in communication studies, sometimes called 'the father of communication studies' as he influenced the development of communication studies in the USA.

I am aware of the limitations of this approach. Case study research is often criticised for the fact that it is not suited for generalisations. The main focus of case studies is particularisation, which means that a particular case study is learnt thoroughly. The case study research aims at studying everything about a few units rather than studying something about several units (Stake, 1995, p.8).

A single case study or case studies can be very reliable if carefully designed. It means that another researcher working in a similar environment can relate decision making to that described in the case study research. Other important features of this approach are that data in case study research are collected in natural settings and the researcher is free to approach the problem from any angle they desire.

These criteria were particularly relevant in my situation. I looked for local opportunities/cases to generate practice and reflect on it. As the existing literature does not provide guidelines on how to develop an approach for the preservation of cultural memory that uses interactive narrative-based panoramas, I had to develop this approach myself; on the basis of literature review and the feasibility study. If extended or modified, this approach may inform other experiences that go beyond the scope of this research.

5.2. The selection of practice-based cases

The literature review revealed that cultural memory is concerned with remembering people who lived in a given community and events that highlight the cultural, national or religious identity of a given social group. It has to be distinguished from ‘intangible heritage’, which focuses on reviving customs and traditions.

Cultural memory thus can be considered as having a dual nature. Depending on the context, it can be either the memory of events that occurred on heritage sites or the memory of local people who, through their work, became important in the local communities.

The case studies should correspond to these two designations. The identification of case studies was a challenging part of the research, as I am from abroad, and at the beginning stage of my studies I had limited knowledge of the history of Plymouth and how it was linked with British national history. The potentially interesting cases were selected by studying history books, by following the program of local commemoration ceremonies in the newspapers, by visiting local archives, consulting historians and researchers and by searching the elements of architecture which included references to the past, i.e. plaques, statues and memorials. There was no truly comprehensive repository of local events but I came across *The Encyclopaedia of Plymouth history*⁷⁴, which includes monuments and memorials in Plymouth. I explored this site and identified three distinctive locations, which had an interesting history behind them. These were: the Drake Statue on the Plymouth Hoe which commemorates the famous naval captain, Sir Francis Drake (1540-1596), who is remembered for winning the battle with the Spanish Armada, The Mayflower Steps, which mark the departure point of pilgrims to the United States on the Mayflower Ship (1620) and the ruin of Charles Church, which is a significant memorial to civilian victims of the Blitz in 1941.

The identification of initiatives concerning famous Devonians and the Cornish was slightly easier. I identified books that provide repositories of famous people in Plymouth, e.g. *A Century of Plymouth: Events, People and Places* (Fleming, 2007) and well-known people in Devon and Cornwall e.g. *Great Cornish Men and Women* (Coulson-Thomas, 1977); *Great Men of Devon* (Burton, 1956). On those grounds, I

⁷⁴ <http://www.plymouthdata.info/Memorials%20Monuments.htm> (Accessed: 17.06.2012).

have selected four potential case studies that seemed to be more viable than other cases. These were: Robert Lenkiewicz (1941-2002), Beryl Cook (1926-2008), Sir Francis Drake and Charles Causley (1917-2003).

Once I identified potentially interesting case studies, the next step was to define the unit of analysis and the case studies themselves. The unit of analysis was defined by research questions, in particular by the definition of cultural memory and by acknowledging the role of narratives and image spaces in designing interactive panoramas. The unit of analysis is a case in my research.

As it was noted earlier, two complementary case studies could be selected for this project: one that is concerned with preserving the memory of events that happened in the local area (case study 1) and the other one that focuses on a famous local person (case study 2). The heritage site would be the material manifestation of the memory of the former, whereas the artefacts that a person used would remind the latter. Cultural memory of events is typically preserved through commemorations held on anniversaries whereas cultural memory of famous people is transmitted through festivals devoted to local artists. Table 4 presents themes and their research questions and what I do and test through practice in the two case studies that have been selected as units of analysis.

Table 4 Themes and their research questions and what I do and test through practice in the two case studies that have been selected as units of analysis

Issues	Case study 1	Case study 2
Preservation of cultural memory - basics		
How cultural memory is currently protected?	Cultural memory is protected by the preservation of places where the events happened. These places could become cultural heritage sites. There is typically a plaque on the site and commemorations are held usually on anniversaries.	Cultural memory is protected by the preservation of objects that belonged to a person or pieces of work this person created.
What are the restrictions concerning the preservation of cultural memory?	The cultural heritage site may not be available to the public for viewing.	The objects are often in private collection and are rarely available to the public for viewing.
How can cultural memory be de-frozen and re-contextualized?	Through commemoration of events held on anniversaries that take place <i>in situ</i> .	Through festivals devoted to people, which are held <i>in situ</i> .
Narrative		
What features of narrative can enhance recollection (I)?	Possibility to see alternative pasts, i.e. alternative endings of the story that took place in a given location.	Possibility to travel between inspirational places and to see objects that were the basis for the art-work creation.
What technique covers these features (I)?	Selective interaction that allows for choosing different endings and creating alternative scenarios of the event.	Spatial narrative - spatially presenting the life of a person that is related to a specific town or a city (strategy 2b identified by Azaryahu and Foote (2008, p.183))
What features of narrative can enhance recollection (II)?	3D reconstruction of the place where the event happened that shows how the place looked before and after the event occurred.	Artefacts that can be selected in order to get an expanded description of the role they played in someone's life.
What technique covers these features (II)?	Repeat photography that enables to recreate the view of the place from different time periods based on existing historical pictures and on a return to an already visited place.	Selective interaction, which allows available artefacts to be presented with a detailed description at the particular position.

What features of narrative can enhance recollection (III)?	Traversing between different spots in a given place which facilitates seeing how different parts of the location changed	Traversing between different places, which depend on the route selected by the user and which in turn may be determined by the layout of the terrain or traffic laws.
What technique covers these features (III)?	Topical traversing.	Topographical traversing.
How to make the narrative, used for preserving cultural memory, interactive and participatory?	By offering choices on the further developments of the story to the audience: e.g. 'Stay' or 'Run away'. Branching interaction. The Tree structure. Changing point of view.	By providing choice of route, choice of artefacts to see and the possibility to collect items and store them in the backpack The maze structure.
How is the spatial narrative structured?	By chronological presentation of the event.	By non-chronological presentation of events from the life of a person.
The image space		
How can the panoramic environment in which the narrative is presented provide the feeling of being immersed?	Through temporal immersion, whereby users have a desire to know the ending of the narrative; traversing exists, but is limited to a rather small area. Through emotional immersion - virtual world is populated with genuine characters.	Through spatial immersion - objects recall memories - 'madeleine effect'.
What techniques facilitate immersion?	Panoramic photography and panoramic videography present photorealistic content; spatial sound which indicates the direction of observation (particular questions are played from a defined locations within the immersive environment).	Panoramic photography and panoramic videography present photorealistic content; sound (the same sound is played from all speakers).
What are the emotional aspects of immersion?	Narrative generates tension as some of the choices can lead to tragic endings of the narrative.	Users can move from one place to another, but any choice they make is not tragic.

After specifying these selection criteria, the potential case studies were juxtaposed with these criteria to examine whether they meet them and two case studies were selected (one for an event and one for a person), which are analysed in this research.

First, the potential of case studies concerning an event were examined (Table 5). The case study of Blitz meets most of the criteria and therefore it was selected out of the three case studies. It is more local than the other two case studies and easier to reconstruct using historical images available in multiple Plymouth archives. It is fairly recent compared to other initiatives so it is well documented with textual and graphical data (historical photographs) and the memory of this event is still preserved in the active way. I was given access to the private archive of Reverend David V. Evans, the co-ordinating Chaplain from the University of Plymouth and also Reverend Roger Williams from St Matthias Church in Plymouth, where I found a few of the historical images of the interior of the Charles Church. This allowed the reconstruction of the church and the creation of a setting in which the narrative could be embodied.

The second case study to be elaborated on in this research was selected using a similar approach. Table 6 presents possible case studies concerning famous people and the criteria they are supposed to meet.

Table 5 Selection criteria for the potential case study concerning an event.

	Blitz in 1941	The departure of Mayflower ship	The victory with Spanish Armada
Cultural memory is protected by preserving places where the events happened	+	+	+/- (not the actual place but the nearest location on land)
There is typically a plaque on the site with information of what happened there	+	+	+
The commemorations of events take place <i>in situ</i>	+	+	+/-
There is limited access to a cultural memory site and therefore panoramas may be used to improve this access	+	-	-
Narrative can enable seeing alternative scenarios	+	+/- (it is possible but it would be very complicated to create events from the 17 th century)	+/- (it is possible but it would be very complicated to create events from the 16 th century)
Narrative can be based on 3D reconstruction of the place where the event happened	+	+	- (events occurring mainly at sea)
Narrative is supported with traversing between different spots	+	- (events could be observed from one point of view)	- (one point of view on the land)
Narrative can be participatory and interactive	+	+	+
Narrative can generate emotional immersion	+	+	+
Total +	9	7	6

Table 6 Selection criteria for the potential case study of a locally-known person.

	Beryl Cook	Charles Causley	Sir Francis Drake	Robert Lenkiewicz
Cultural memory is protected by preserving objects that belonged to a person or pieces of work this person created	+	+	+(Buckland Abbey which was Drake's house)	+/- (the mural in Plymouth deteriorates and no one is concerned about it)
Objects and artefacts are available for public viewing	-	-	+	-
Cultural memory is de-frozen by festivals or celebrations devoted to this person (active preservation of memory)	-	+(Charles Causley Festival)	-	-
Spatial narrative allows the audience to travel between inspirational places and to see objects that provided an inspiration	-	+(inspirational locations available in the whole town of Launceston)	-(Drake was not an artist, so his case contradicts definition of cultural memory)	-
Artefacts in an interactive narrative provide an extended information on their role in someone's life, they can be played with	-	+	+	-
Narrative is enhanced with traversing between different locations in the inspirational environment	+/- (Cornwall)	+(Launceston)	-(Drake travelled all over the world)	+/- (Plymouth)
Narrative can be participatory and interactive – choice of routes	+	+	+(too hard to accomplish)	+
Narrative facilitates spatial immersion – objects recall memories	+/-	+	+	+/-
Total +	4	7	5	4

Out of four potential case studies, the case study of Sir Francis Drake turned out to be not ideal from the very beginning as Drake was not an artist; which is against the definition that describes cultural memory as the memory concerned with preserving inspirational environments of artists, writers or poets. What is more, Drake spent his life travelling all over the world and it would be difficult to create a narrative of his life that points out links between objects and their role in the sea captain's life. The issue with Lenkiewicz and Cook is that their memory is not preserved in any active form at the moment, e.g. through festivals in the Plymouth community, whereas festivals are run annually to commemorate Charles Causley. Causley was also much more popular, e.g. through programmes on radio, than the others. Like Cook he used an accessible language, but unlike Cook it was neither stereotyped nor it used very informal language. Causley was the only one to take a popular language to a higher level.

Additionally, during my stay in Plymouth, I was not able to get access to houses and artefacts of either Lenkiewicz or Cook and therefore I would not be able to record their inspirational environments using panoramas. Although various criteria specified in Table 6 could hypothetically be met in their cases, the lack of access to objects and sites excluded these two case studies. The case study of Charles Causley, did not only meet the criteria that have been set, but was also viable thanks to professor Dafydd Moore, from Plymouth University who put me in contact with Charles Causley Trust, who provided me with the access to Causley's house and his artefacts and supported me in the creation of the interactive narrative.

The case studies selected for the analysis were complementary. They focus on different sides of cultural memory, which is further reflected in the fact that they are supported with different narrative techniques and different design of the image space. Case study 1 relies on topical narrative. Charles Church is reconstructed in 3D modelling software to provide the environment for exploring the history of the Blitz in a

chronological order. Case study 2 is based on topographical narrative, where the landscape dictates how to traverse the town and learn about artist's life. The interactivity is selective in both cases: in case study 1, it means deciding on further developments of story whereas in case study 2, it refers to the selection of route to follow or object to watch. The image space in the first case is designed to provide temporal and emotional immersion as the viewers want to learn how the story will end and feel the anxiety, grief or sympathy for the characters. In the second case study, immersion is spatial as various objects invoke memories.

The choice of complementary case studies generated a series of potential benefits and problems. The memory of the Blitz that affected Charles Church is commemorated through the ruin of the church, which was not rebuilt after the Second World War as the authorities wanted it to become a memorial to those that were killed in the Blitz. There are various opinions concerning the ruin nowadays. Some people consider it as truly meaningful while others think it spoils the modern architecture of this part of the town and is a visual distraction for drivers. The environment where Charles Causley lived is properly preserved with objects kept in the same position as when Causley used them. The memory of the poet is additionally preserved through his poems and ballads that describe his environment and objects he used.

The analysis of differences and similarities between these case studies enables the working out of the model for preserving memory for various alternatives. Case studies inform each other and observations from them provide hints of what to change in preserving cultural memory of similar case studies.

The fact that I am a Polish resident in England, when working on these case studies enables comparisons to be made with the Polish system for preserving memories, which results in the fact that the methodology developed in these particular

case studies is then applied to the case studies concerning Polish initiatives, e.g. Czeslaw Milosz (Polish poet).

The potential problem in constructing the case studies depends on cultural differences, which are reflected in the language. The way in which we perceive the world and classify its items is country- or culture-specific. For this reason, there is often no one-to-one correspondence between words in two languages, e.g. English and Polish. Some words have more than one equivalent in the target language, while others do not have any. I am not a native speaker of English, but worked on those case studies in English only. However, it was possible that the case studies could be affected by Polish cultural frameworks. Being aware of this fact, I co-operated with other students from the Plymouth University, the University of Exeter, members of Charles Causley Society and other local historians (e.g. Chris Robinson from Plymouth) to ensure that the case studies would follow the English frameworks; and that the researcher understood all the cultural issues correctly.

5.3. Conclusions

This chapter has set the research strategy that addresses questions raised in the critical literature review. As these questions seek explanations concerning practical aspects of preserving cultural memory through the application of panoramic techniques, it seemed reasonable to employ practical-based cases to find answers. Obviously, it would be useful to carry out more than two case studies, as they would provide different combinations of features of cultural memory and methods of its preservation. However, in practice, due to time constraints and limited resources, it would be unmanageable to analyse all these case studies in-depth. Nevertheless, the methodology that has been

adopted for these two case studies can be adapted and used for similar case studies to explore whether they can be used for preserving cultural memory.

I expect that these cases will help me improve my understanding of the process of preserving cultural memory through the application of interactive narratives. I will use practical findings from these cases and the intellectual findings from the literature to produce the synthesis over the whole as final critical reflections.

Chapters 6 and 7 will describe what the results of designing the two case studies and chapter 8 will integrate these results to provide general conclusions, recommendations and reflections.

6. If only this monument could speak

The previous chapters were designed to explore the role of panoramic immersive environments and interactive narratives in preservation of memory. It was noted that panoramas might be effective in cultivating memory if they include narrative. The narrative ought to be interactive and participatory, as the environment in which panoramas are rendered should immerse the audience and provide a place for sharing collective memory. It was hypothesised that there are two approaches to cultivate memory. The first one focuses on the preservation of cultural heritage sites that are connected with historical events, whereas the second one is concerned with preserving memory of a person by protecting objects and artefacts that belonged to this person. Traditional methods for preserving memory typically rely on commemorations held on anniversaries to cultivate the memory of the former and festivals to commemorate the latter. All these enterprises are performed *in situ*. Panoramas offer a new dimension to these approaches, which I will explore using practice-based cases selected from the local area of Plymouth.

For a case study that illustrates the first approach, I selected Charles Church in Plymouth. The body of the church, which is currently a ruin, acts as a memorial of the Blitz⁷⁵, which left it bombarded. Interestingly, one day after the bombardment the last wedding ceremony was held in the church. The ruin of the church provides the intersection of personal memories, memories of place among a wider social group, and monuments made to narrate memory by the people of the city, who subsequently are denied access to it. I decided to create the initiative that would improve access to the

⁷⁵ The Blitz was the sustained bombing of Britain and Northern Ireland by Nazi Germany in 1940 and 1941. Cities such as Belfast, Birmingham, Bristol, Cardiff, Coventry, Glasgow, Kingston upon Hull, Manchester, Plymouth and many more were targeted. The Plymouth Blitz was a series of bombing, where the heaviest bombing attacks were in March 1941 that destroyed the city (Lambourne, 2001, p.46-47).

site and which would use the personal and social symbolism of the place. I embedded personal memories of the couple that was married in the church in the memory of the Blitz as real characters and emotional aspects enhance preservation of memory.

In this chapter I will explore whether cultural memory of the Blitz that affected Charles Church can be preserved using panoramas. I will start by describing the history of Charles Church and the story of the couple that was married in this church after the bombardment (6.1). I will then move to discussing the role of the ruins in preserving memories (6.2). Following that, I will concentrate on the creation of narrative; elaborating on its structure and the techniques that enable developing this narrative (6.3). Finally, I will evaluate the efficiency of panoramas in the preservation of memory of Charles Church (6.4).

6.1. The history of Charles Church

Charles Church was built under an Act of 1641 (signed by Charles I (1600-1649)) and it was decided that the church should bear the name of the king of England. The church should have been consecrated the name of 'Charles King and Martyr' but 'Plymouth had suffered too much at the hands of Charles I to accept the Bishop's estimation of the late King, and the Mayor refused to allow a Consecration in those terms to proceed' (*Historic Charles. Bazaar and Pageant*, 1920, p.5). The body of the church was completed in 1657. The Bishop approved the name 'Charles Church' in 1665. The tower was finalised in 1708 and the wooden spire was replaced by a stone one in 1766.

Charles Church was the second largest church in Plymouth at that time and was designed on the basis of St. Andrew's Church (from the early 15th century) which was the largest and the oldest church in Plymouth (Richards & Summerson, 1942, p.103).

Power (1977, p.17), states that Charles Church was regarded as 'one of the finest post-Reformation Gothic churches in the Kingdom' where various alterations were carried out in the 19th century (addition of the vestry, removal of galleries etc.). Charles Church was destroyed by incendiary bombs⁷⁶ and burnt out on the night of 20th and 21st March 1941 during the Blitz. St. Andrew's Church was also badly damaged. Although, St. Andrew's Church was restored in 1957, Charles Church has never been rebuilt and remains a ruin.

The pre-war Plymouth suffered from traffic congestion caused by narrow, irregular streets so, when it was destroyed during the war, the authorities decided to build the town from scratch. They appointed Sir Patrick Abercrombie (1879-1957), the town-planning consultant, who designed a Plan for Plymouth. The redevelopment of the town required the whole central part to work in and for this reason many buildings have never been rebuilt nor regained their functionality. Today, Charles Church is situated in the middle of a busy roundabout (Figure 38A) whereas in the past there was a completely different street layout and the graveyard surrounded the building (Figure 38B).



Figure 38 A: Charles Church in Plymouth located in the middle of a roundabout without an easy access to the site⁷⁷. B: Historical image of Charles Church in 1930s⁷⁸. Permission to reproduce these images has been granted by Plymouth Library Services.

⁷⁶ Incendiary bombs are bombs designed to start fires.

⁷⁷ Source of image: <http://www.flickr.com/photos/chasingparades/3995996228/> (Accessed: 7.03.2012)

⁷⁸ Source of image: Plymouth Library Services - No. 19410 J.V.

There were plans to remove the ruined Charles Church from the site just after the war and to leave only the tower and spire in the centre of a roundabout as they were fairly well preserved (Copeland, 1949, p.271). What is more, when the discussion about the future of the ruined building took place, the city authorities considered two options: (1) to consolidate the ruins or (2) to re-roof the church and use the building again, if not as a place of worship, then for some other useful purpose.

Finally, the church became a memorial to the 1,250 citizens of Plymouth who were killed in air-raids on the city in the World War II (Robinson, 1991, p.32). The City, in co-operation with the Ministry of Work had the church partially restored in 1957 (e.g. brickwork, removal of loose elements such as fragments of roof etc.). The restoration was sponsored by the Old Plymouth Society and the church was officially dedicated as a memorial during a service conducted in 1958 by the vicar of the parish. On this occasion, two commemorative plaques were affixed inside the church. They provided the history of the church from the date of its erection to the date of its destruction. They were replaced by new stone plaques in 1984. Plaques provide the history of the church in brief (Figure 39):

The church was illuminated in 2006 when the Drake Circus Shopping Centre was built. In fact, the construction of the Drake Circus Shopping Centre renewed a debate about the church. Many survivors of the Blitz believed that the surrounding of the church would be overpowered by the shopping centre (Prince, 2006, p.15). Defenders of the church started a campaign to restore the church by providing glazed roofing and claimed that it could be transformed into the Blitz museum. These targets have never been accomplished, however. The council, instead, planned to fence the church in 2009 to ensure that public would not enter the grounds. The authorities felt that fencing would not only preserve the memorial but would also keep the public safe. This plan was withdrawn after the objection was raised by the public (Kelway, 2009).

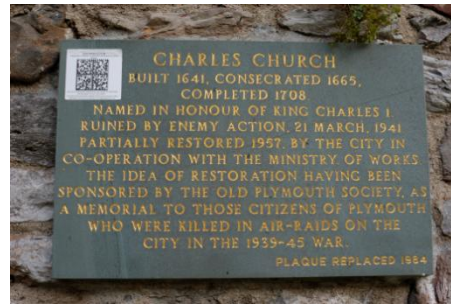


Figure 39 One of the plaques inside Charles Church. Image by Karol Kwiatek.

*Charles Church
Built 1641, Consecrated 1665,
Completed 1708.
Named in honour of King Charles I.
Ruined by enemy action, 21 March 1941.
Partially restored 1957, by the City in
co-operation with the Ministry of Works.
The idea of restoration having been
sponsored by the Old Plymouth society, as
a memorial to those citizens of Plymouth
who were killed in air-raids on the
city in the 1939-45 War.*

Currently, the ruins of the church are administered by the current Vicar of St Matthias Church in Plymouth. Items from Charles Church that survived (the churchwarden's chest, communion vessel, Royal Coat of Arms from Charles Church) were relocated to St Matthias Church. Roger Williams (2007), who was the Vicar of this church calls these items 'Relics of Charles Church' and states that they are all kept in the Charles Church corner in St. Matthias church (Figure 40).



Figure 40 Charles Church corner in St. Matthias church⁷⁹. Permission to reproduce these images has been granted by Plymouth Library Services.

The church is occasionally used for services of remembrance. There were a few memorial services in the 1960s but now this form of commemoration inside Charles Church is quite rare. Figure 41 illustrates one of the memorial services in 1964. The modern use of the church is for the University carol concerts and for services of special importance, e.g. a reconciliation service between Germany and Plymouth that was held in the church in 2001 with the German ambassador present. Lack of access to the site meant that the ruin could not be used as a memorial so the members of Ford Park Cemetery Trust and citizens of Plymouth arranged a new memorial in the form of 22 plaques with the Blitz victims' names in the wall of the chapel in Ford Park Cemetery. This memorial can be reached easily and disabled people may get special assistance from volunteers of the Trust.

⁷⁹ Source of image: Plymouth Library Services P000101283 - Interior of Charles-with-St Matthias Church: showing 'Old Charles corner', 1964.



Figure 41 The Memorial Service in Charles Church in 1964. ⁸⁰ Permission to reproduce these images has been granted by Plymouth Library Services.

The last ceremony to be held in the church was the wedding of Ken and Phyllis Beer who were married in the ruins of Charles Church on 22nd March 1941, just one day after the Blitz. Incendiary bombs dropped during the Blitz not only left the church in ruin but also destroyed the location of the Beers' reception. The vicar conducting the wedding ceremony decided that it would occur as planned despite further threats of bombs.

There were only 20-25 guests invited to the wedding and the reception was moved to another location. Some people failed to attend for fear of further bombing. Ken is 99 years old and Phyllis Beer is 93 at the time of writing this chapter in 2012. In 2011 they were celebrating their 70th wedding anniversary. The Beers have 6 children, 16 grandchildren, 21 great-grandchildren and 1 great-great grandchild. Ken Beer fervently believes that the ruin of Charles Church should never be destroyed (Rees, 2010).

⁸⁰ Source of image: Plymouth Library Services - P000089101 - All Saints Day service at Charles Church, 1.11.1964.

I decided to use the wedding story of Ken and Phyllis as their personal memories are very appealing and may be one of few existing reminiscences of that time. They comprise a memory of the Blitz that was experienced by Charles Church and also by the whole city. Their emotional character as well as the fact that they are told by actual survivors of the Blitz may contribute to the cultivation of memory.

The memories of the wedding were recorded in the audio form (a script in written form is in Appendix 1) and were used in the construction of narrative that was added to the interactive film designed on the basis of panoramas. Panoramas create the setting for the film and rely heavily on the appearance of the ruin of the church. The next section addresses the role of the ruin in preserving memories.

6.2. Ruins as reminders

According to James Richards and John Summerson (1942, p.2), who explored the condition of historical buildings in the UK during World War II, '[t]he buildings destroyed by bombs, ruins, are living architecture reduced to memories and legends'. They 'lose much from their spectacular view due to the process of tidying-up and they will eventually become only memories' and 'represent the apotheosis of the past - the intense experience of these active days crystallized into architectural shape' (Richards & Summerson, 1942, p.2). These memories of the locally-known events could dissolve if not transmitted.

A slightly different approach is represented by Rebecca Solnit (2006), in her essay *The Ruins of Memory*. Solnit sees ruins not as living architecture but as indicators of physical destruction. When describing ruins of San Francisco after the 1906 earthquake, she states that:

ruins represent the physical decay of what preceded them, but their removal erases meaning and memory. Ruins are monuments, but while intentional monuments articulate desire for permanence, even immortality, ruins memorialize the fleeting nature of all things and the limited powers of humankind (Solnit, 2006, p.18).

Solnit considers ruins as monuments as they help to recall the past. However, she also notices that ruins are more prone to destruction than traditional monuments. She agrees with Richards and Summerson on the issue that ruins may one day disappear and will become only memories.

Buildings fall into ruin for a number of reasons. One of them is war. However, wars along with eagerness of people who want to keep reminders of the tragic past preserve wartime ruins. Hiroshima's Peace Dome is a famous monument that acts as a reminder of the dropping of an atomic bomb and the building is more meaningful now than before the tragic event from 1945. Ruins often arise when political or religious powers change. For example, there are a number of ruins in the UK created by the dissolution of the monasteries (e.g. Fountains Abbey). Ruins support the understanding of the structure of the ruined building. The destroyed building uncovers the bricks or other building materials, normally invisible to visitors of buildings that are well maintained. Broken windows, scorched walls, holed roofs and even scarred stonework are evocative of past events and should provide the will to understand the reason for the destruction. Ruins thus 'stand as witnesses, as public monuments, unavoidable parts of the shared terrain of everyday life, the presence of the past' (Solnit, 2006, p.29).

Plymouth Council did not decide to dismantle the church as it would erase the memory not only about that particular site, but also about the whole series of events that occurred there. These events, sometimes only known locally, could be lost forever if the building no longer existed.

Ruins stand as reminders. Memory is always incomplete, always imperfect, always falling into ruin; but material ruins themselves, like other traces, are treasures: our links to what came before, our guide to situating ourselves in a landscape of time. To erase the ruins is to erase the visible public triggers of memory; a city without ruins and traces of age is like a mind without memories (Solnit, 2006, p.20).

I can pose the question, whether a ruin, especially Charles Church situated in the middle of a roundabout, could be a trigger of memory, especially of cultural memory and whether the city of Plymouth without Charles Church could be like a mind without memories? First of all, this ruin helps us to understand the past, present and see implications for the future. In contrast to activities used to cultivate cultural memory such as remembrance days, festivals, celebrations or rituals, which show directly what the object of commemoration is, this ruin is less explicit; it could be animated and the events that it witnessed, could be uncovered in order to be effective in the preservation of cultural memory. This process is, however, difficult to realise in a locked and inaccessible site such as Charles Church.

I could ask whether cultural memory about the Blitz is going to be forgotten by the forthcoming generations in the near future when there are no longer regular memorial services that commemorate the Blitz in Charles Church. Graham Naylor (2012, p.110), a senior librarian from the Plymouth Central Library, states that the church 'will continue to stand and serve as a memorial to our ancestors who loved and worshipped in Charles Church and to the memories of those civilians who perished in Plymouth's dark days of 1939-1945'. Many local people are concerned with the fact that the ruin will lose its symbolic power: 'I know the shattered building is a permanent reminder to those who know about the Blitz, but not to the younger generation, who do not know about the war other than what they have been told or read' (Smith, 2003, p.8).

I acknowledge the problems resulting from the lack of access and declining symbolism of the site but, in my view, they may be overcome. I consider ruins as

monuments of the past, which, if animated by the application of communication technologies, could be used to preserve memory in similar way to commemorations. 3D computer reconstruction enhanced with a narrative could help to show the history of the building so that viewers could understand what happened with it and why. What is more, if the ruin is no longer accessible, such enterprises could be presented to the audience in immersive environments preferably located close to the presented site (*in situ*).

The following section discusses the creation of the narrative considering the role of the ruin in this process.

6.3. Creation of the narrative

This section seeks to address the following question: what type of narrative could help to preserve cultural memory of the Blitz? Bearing in mind the importance of emotional aspects for preserving memories, I decided to present the Blitz through an event that occurred in the ruined building at that time. Although the event may be very much linked to personal memories of those who experienced it, it can also act as a device to tell a wider and more generally interesting story of the Blitz. I selected the story of a wedding of Ken and Phyllis Beer and decided to build on this story to preserve cultural memory of the Blitz of Charles Church. This section addresses how the narrative built on this event is structured.

Structure of the narrative

The narrative structure for this project needs to be determined by considering the type of data that is available as well as the fact that narrative is supposed to be interactive, participatory and immersive in order to assure the preservation of cultural memory.

The axis of the narrative is a wedding of Ken and Phyllis Beer who married in the ruins of Charles Church on 22nd March 1941. The original marriage occurred on the day after the bombing of Plymouth, but I decided to move this event in time to create a dramatic atmosphere (emotional immersion) and to focus on the Blitz rather than on the accuracy of the wedding. The story starts two days earlier, when there is a threat of bombs rather than when the building had already been destroyed, which was a future that the couple and guests were not aware of at the time. By making such a change, I was able to create alternative endings of this story (alternative pasts) and show what might have happened to the couple. As the narrative was designed to be interactive, users could be able to select different scenarios which may enhance their recollection of cultural memory of the Blitz.

I used memories of the Beers to create an interactive film of their marriage. My friends acted as characters in the film. The film sequences were recorded in the green screen studio at the University of Plymouth in order to place characters in a virtually generated panoramic film where the background imagery could change according to the scene. I used two time perspectives in this project: past and present. When the past perspective is chosen, the story occurs in 1941 and the computer-reconstructed view of the church is presented as the background scenery, whereas the present perspective demonstrates the contemporary, ruined appearance of the church.

For the purpose of the past time perspective, the appearance of the church was recreated using 3D modelling software. By so doing, I provided the viewers with an

idea of how the church had looked before it was destroyed to enhance their recollection of past events that took place in this church.

Viewers of the film determine the scenario of the film they want to watch by traversing within the church and selecting one of two options available at decision points. They not only move spatially and change their position inside the church, but also move in time to see the same event from a different perspective. The type of narrative used in this project is a polychronic narrative, where the sequencing of events encrypts traversing through the ruin both in the present and in the past time perspective. The interactive narrative applied in this case study does not only follow an approach that uses time-based series of events (Meadows, 2003) but also relates to spatial traversing as introduced in the theory of the formulation of interactive narrative (Brown, Barker & Del Favero, 2011). The amount of traversing in this project is, however, limited to the movement between decision points located in different parts of the church.

The narrative of the Blitz has been designed as an interactive multipath panoramic film presenting the wedding of Ken and Phyllis Beer with different scenarios of this ceremony determined by the viewers. This interactive film consists of many panoramic linear films played between decision points (stations) where the audience determine the further development of the story by selecting one of two choices offered. DVD No. 1 presents this panoramic interactive film presented in the form of panoramic imograph, where the software presents fragments of the film. The generation of this panoramic imograph is described in section 7.3.

The script of this interactive film is presented graphically in Figure 42 and the complete text of the script is in Appendix 2. Grey squares with numbers are parts of the script that describes actions, red circles are decision points, capital letters are options the audience may choose at decision points and light blue squares are end points in the film.

Yellow ovals that link with yellow squares with numbers (e.g. S1 or S2) indicate a particular film sequence that groups a few events and may include one decision point. There are eight sequences which can be watched on DVD No. 1. Some sequences are in more than one place, because the same fragments can be used multiple times in this panoramic interactive film.

The two time perspectives (1941 and 2010) are separated by a dotted line (Figure 42), which marks the border between the story occurring in 1941 (past) and 2010 (recall in the present). This visualisation presents the temporal configuration of individual elements of panoramic films, but it does not present spatial configuration of traversing, decision points and end points. Figure 43 indicates these spatial relations, which help to identify differences between every fragment of the panoramic interactive film. In addition, it presents the movements within the site, but does not indicate temporal changes. The two graphs must then be read together. For example, the decision point (2) that is located in the centre of the church has two options (A and B) which lead to other decision points (5) and (9). The traversing between decision points (2) and (5) needs two panoramic linear elements in order to move out from the church, and the temporal change occurs outside the building. Another example indicates ending points (II) and (III) that finish in the present and spatial configuration (Figure 43) indicates their possible location. The following paragraphs explain the interactive narrative in more detail. The square brackets in the description of the film are used to indicate where the action takes place (spatial configuration according to Figure 43).

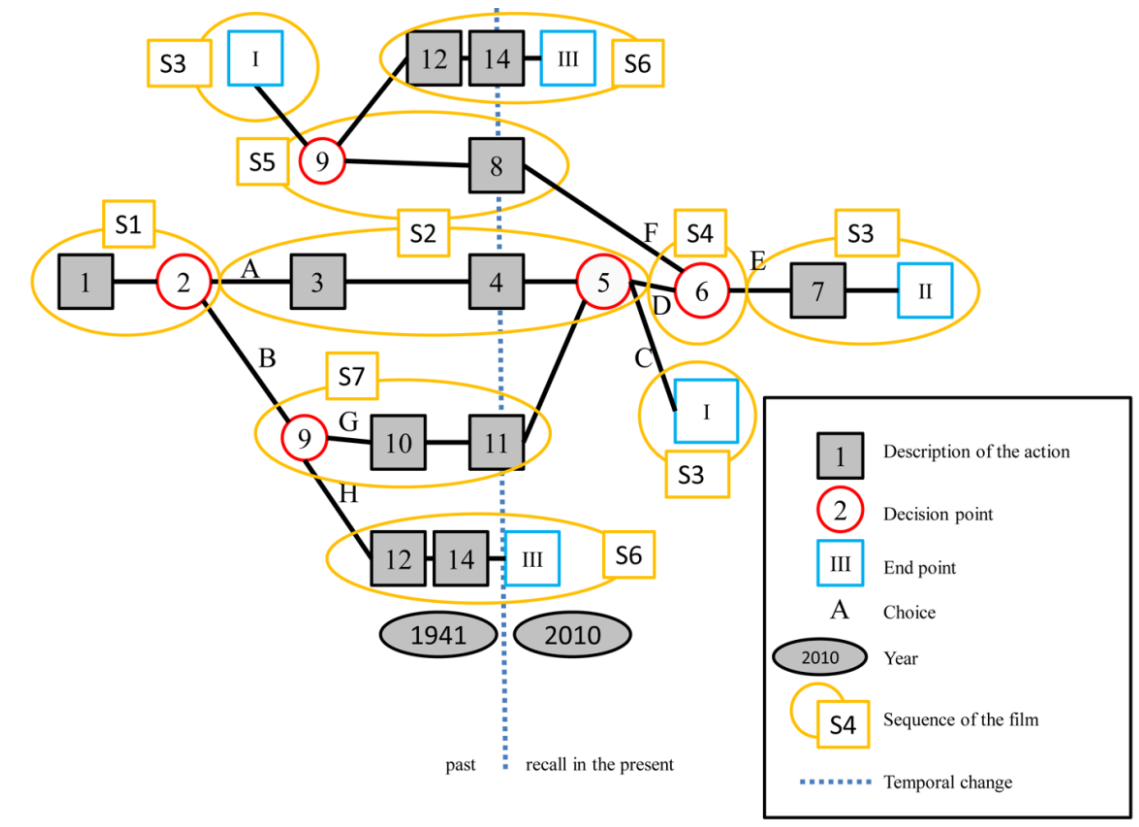


Figure 42 The temporal visualisation of the interactive narrative. Illustration by Karol Kwiatek.

Due to the complexity of the graph depicted in Figure 43, I developed a simplified graph following Ryan's tree graph⁸¹. My graph (Figure 44) differs from Ryan's graph in that it enables changes in the path (from decision point 9 to 5), whereas, in her graphs, such a choice are not available. The flexibility of my structure results from the fact that spatial branching in my project is based on the movement within a ruined site.

⁸¹ See section 3.5.

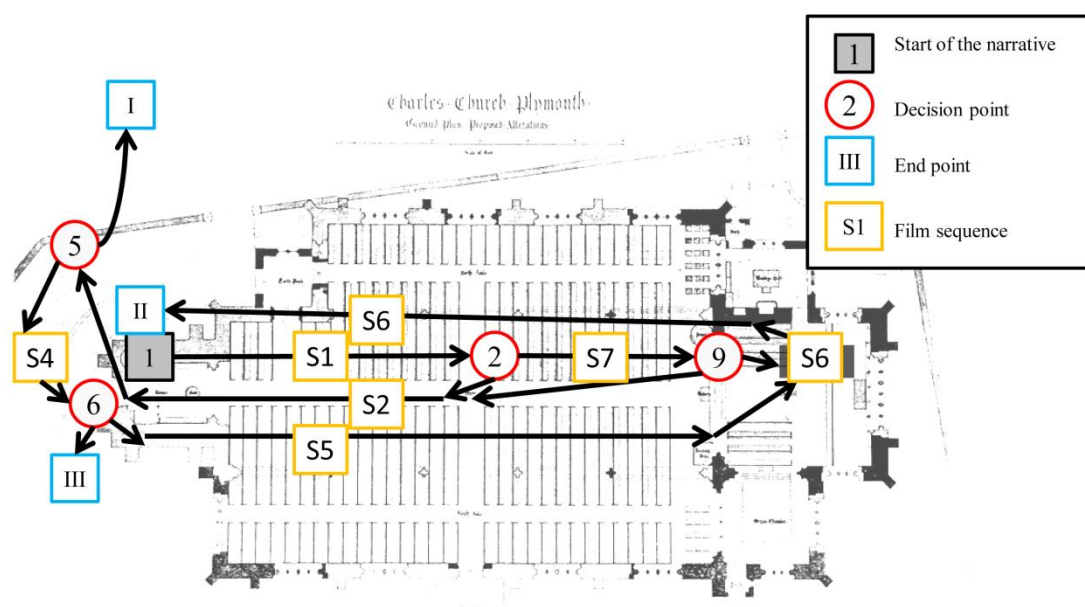


Figure 43 The spatial visualisation of the interactive narrative drawn on the historical map of Charles Church⁸². Illustration by Karol Kwiatek.

The differences between temporal and spatial visualisation of the interactive narrative are summarised in Table 7. The temporal visualisation (Figure 42) indicates choices available and subsequent end points, however it does not present the spatial position of every episode, decision point and end point. The first type of graph (Figure 42) illustrates that there are three changes in time, whereas the other graph indicates the position of final points (not all points end in the same location). The spatial visualisation of interactive narrative that I propose in this thesis does not have space for indicating options. Future research could involve designing the graph that could indicate spatial and temporal visualisations on one graph instead of two.

Table 7 The comparison between temporal and spatial visualisation of interactive narrative.

	The temporal visualisation	The spatial visualisation
Options	Visible	Not visible
Temporal change	Yes	No
Spatial configuration	No	Yes
Check of endpoint	We can check whether they finish in the past or in the present	We can check where the narratives end

⁸² Source of the map in the background: The map of Charles Church from 1915 (in the background) is from Plymouth & West Devon Record Office (no 258/1/114).

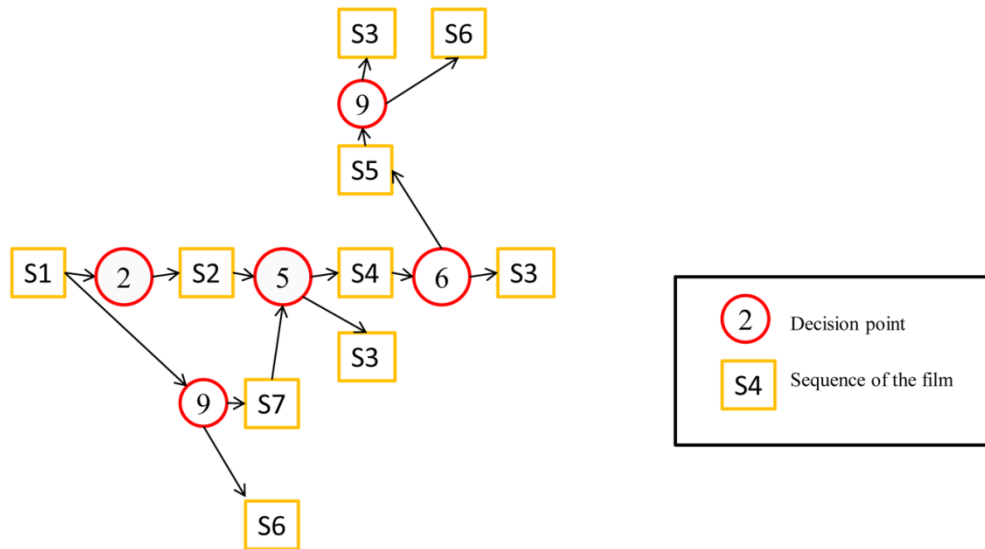


Figure 44 A simplified graph of the interactive narrative described in this chapter.
Illustration by Karol Kwiatek.

As the major features of the film are two time perspectives, I will refer to the temporal visualisation to describe the film structure. The film starts with an introduction (1), which describes how Ken and Phyllis met. It also provides information about the date of their wedding and instructs the audience about choices they will have in the process of watching this film. [The bride is approaching slowly the altar].

The first video panorama showing Phyllis in the door of the church is displayed. The wedding music is played inside the church and after a while sirens are heard warning the citizens of Plymouth of an impending air raid. [Phyllis has reached only the centre of the church]. This is also the first decision point (2)⁸³ when viewers are offered two choices⁸⁴:

A: 'Run away'

B: 'Continue the ceremony'.

If the viewer selects option A, Phyllis runs away from the church (3). [Now, outside the church]. In the background, the sounds of airplanes dropping bombs may be heard. The viewer then proceeds automatically to the point (4) [Still outside], where they are

⁸³ See Figure 42.

⁸⁴ It is presented spatially in Figure 43.

provided with the following description of what happened after Phyllis happily escaped from the bombarded site: 'That day, incendiary bombs left the church a smouldering ruin and a high explosive bomb destroyed Goodbody's Café, where the reception should take place. The wedding was postponed to the next week in other place. All guests survived. Phyllis' wedding was the last to be held in Charles Church in which the bride was traditionally dressed in white'.

At point (4), the time perspective changes to the year 2010, when Phyllis (91 years old) visits the ruin of the church with one of her grandsons. In this point (5), which is a decision point outside the church⁸⁵, the grandson asks a question: 'Grandma, do you want to enter Charles Church?' Again, two choices are available:

C: 'No' [They both go home]

D: 'Yes' [They start exploring the ruined site]

Selecting C, leads to the end point where the film terminates (I). This path might be chosen by some audience members, who do not want to go back to the church because of traumatic memories. Selecting option D leads to point (6) (another decision point - just before the entrance to the church - see Figure 43), when the panorama with the present view of the church is displayed. While Phyllis starts sharing the memories of this day with her grandson, the panorama changes to the one that shows how the church looked before the Blitz – as illustrated in Figure 45. This temporal change is visualised using repeat panoramic videography. This technique as it was indicated in chapter 2 could allow viewers to notice changes, make links to the past and ask what caused the change.

⁸⁵ See Figure 43.

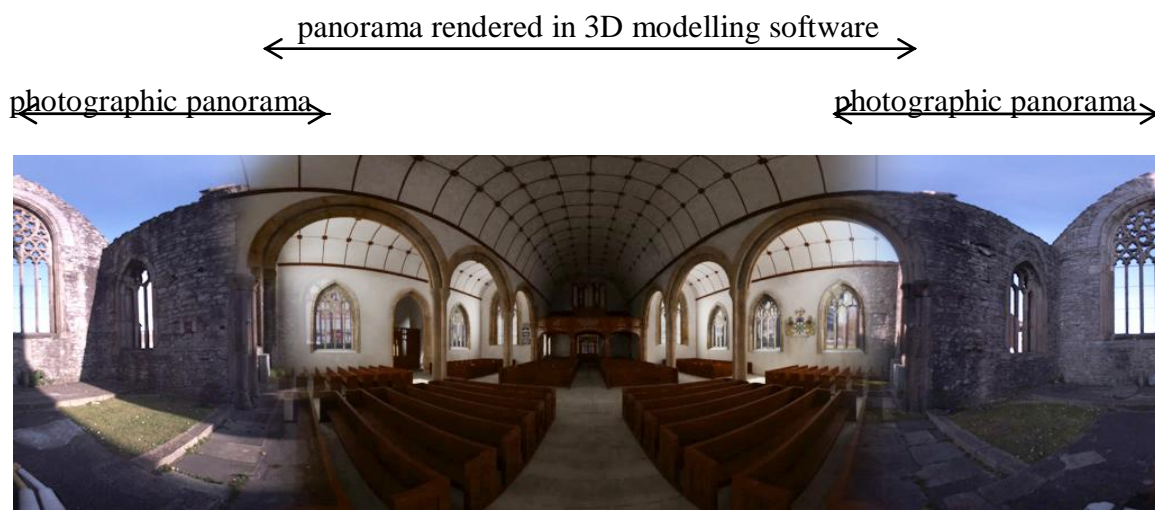


Figure 45 A frame from panoramic videography created in 3D modelling software merged with a frame from panoramic videography recorded on the site to present the change between Phyllis' real visit and her memories. Illustration by Karol Kwiatek.

The grandson is concerned whether reminiscing about the events of that day were not too painful to his grandma and asks her whether she is happy to tell him about everything that happened on that day: 'Grandma, do you want to tell me more about what happened in this church in 1941?' This is a decision point when the audience may prefer not to hear the whole story and will select E: 'No', which leads to point (7) [they are not entering the church], when Phyllis and her grandson leave the church and when the film terminates (II) [outside the church]. If they agree to learn what happened on that day by selecting F: 'Yes', they are presented a panoramic video (8) of a wedding with reverse temporal change from 2010 to 1941 and after that the film ends (III) [inside the church].

I constructed such an effect to illustrate the path from the past. The story begins in the past but sometimes ends in the present – so there is a need for such a change in time. I applied gradual slow motion change of panoramic videography because, in immersive films, such a change cannot be seen immediately as in traditional films or documentaries. A change of space or a change of time needs to be gradual rather than immediate. The audience need to be relocated temporally whilst still in the same location.

Selecting option B at the decision point (2) provides a different scenario of the story. The viewer is taken to point (9) [near the altar]. Phyllis is approaching the altar where Ken, his parents and priest are waiting for her. Wedding music continues. Sirens and alarms can be heard outside the church. More bombs are dropped near the church. It is a decision point at which the audience has two choices:

G: someone from the outside calls 'You are in danger' and encourages the couple to leave the church; [the voice is heard from the back of the church];

H: the priest asks the 'voice' 'Please do not interrupt us' and persuades the couple to continue the ceremony; [the voice is heard from the front of the church].

This situation should create and heighten emotions as the bride and groom hear the sounds of bombing outside and get a warning that they are in danger. If the first option is selected, the audience is moved to point (10), where the couple managed to run out of the church. Then one of the bombs destroys the church. Ken's parents die in the ruins of the church. Ken and Phyllis survive the fire. The wedding is postponed to another year after the Blitz.

Ken and Phyllis live happily. They have 6 children, 16 grandchildren, 21 great-grandchildren and 1 great-great-grandchild on the way. In 2010, Ken and Phyllis celebrated 69th anniversary of their wedding. Phyllis decides to visit the ruin of Charles Church after 69 years. From this point the audience moves to point (5) and there is a question whether they want to visit Charles Church. Here, I use the same decision point that was offered on another path. In this way, I am able to limit a number of panoramic films that need to be rendered.

If the option (H) is chosen, the audience move through video panorama (12). The wedding ceremony continues. The priest thanks everyone for coming and Ken and Phyllis exchange their wedding vows. Towards the end of the ceremony, the priest

blessees the young couple and they leave the church. The audience meets Ken and Phyllis again in 2010 when they celebrate the 69th anniversary of their wedding (14). Phyllis asks Ken if he wants to join her and visit the church. Ken may decide not to join Phyllis which leads to the end point (III) where the film terminates.

End-points of the interactive film are located in different parts of the church, which may be seen in the spatial visualisation of the interactive narrative. This layout of end-points enables viewers to see different parts of the church (or reconstructed church) while they following the selected plot line or playing with alternative scenarios.

Two time perspectives in Charles Church

The narrative of Charles Church includes two time perspectives: the past and the present. By consulting the book series *Plymouth then and now* by Chris Robinson (2004; 2006; 2009), a local historian, broadcaster and artist, I came across the technique of repeat photography (re-photography) which may apply very well for creating these perspectives. The repeat photography technique mentioned by Klett (2004) and Solnit (2006) was used to present past and present images of various places in order to notice changes that were taken from the same position. The concept of repeat photography inspired me to use panoramas, not single images, in the creation of two time perspectives in the interactive narrative.

As there are no panoramic recordings of that church from the past, the applied repeat photography technique was based on 3D computer reconstruction of Charles Church. I searched the Plymouth archives (Local and Naval Studies Library – department of Plymouth City Library, South West Image Bank and SWFTA - South West Film & Television Archives) for historical images that could be used to reconstruct Charles Church. There were a limited number of such images of Charles

Church in the archives. I managed to find some pre-war photographs in Plymouth City Library. Plymouth and West Devon Record Office provided me with historical ground plans of Charles Church, which turned out to be useful for the spatial visualisation of the interactive narrative. Figure 46 presents historical photographs of Charles Church found in Plymouth archives.



Figure 46 Historical images of Charles Church from 1930s⁸⁶. Permission to reproduce these figures has been granted by Plymouth Library Services.

I decided to focus on historical images of the interior, which were then used in the process of computer reconstruction of the ruin. Historical imagery was then merged with contemporary images and with contemporary panoramas.

I took spherical images presenting the current state of the church in five points, which were necessary for the spatial movement through the church (Figure 47). I also recorded panoramic video in between these spots (1-2, 1-5, 1-3, 1-4) and used them in the process of creating panoramic interactive films as trajectories of movement of the characters. For example, the trajectory between points 5 and 1 in Figure 47 corresponds to film sequence S1 that is represented as an arrow in Figure 43 whereas the trajectory between points 1 and 2 refers to the film sequence S7 (Figure 43).

⁸⁶ Source of images: Plymouth Library Services - P000187101 - The interior of Church Church, 1930s.
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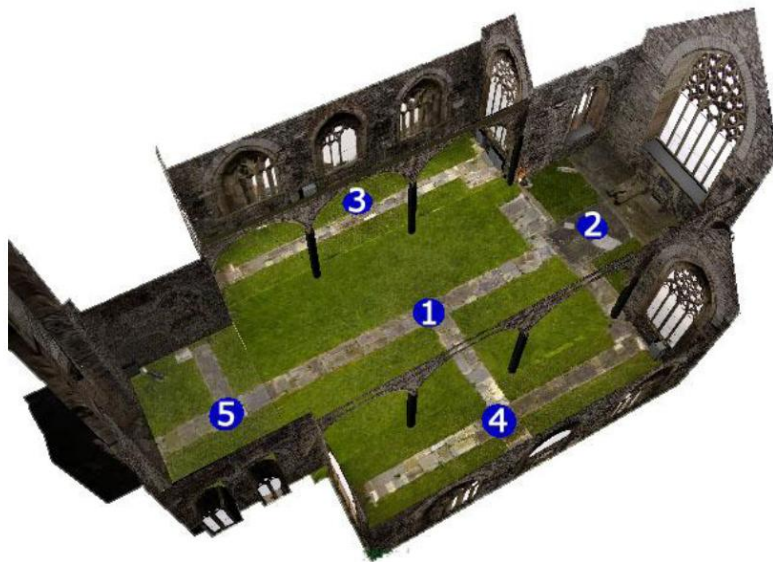


Figure 47 Locations of five spherical panoramas. The bird's eye view was rendered in 3D modelling software.
Illustration by Karol Kwiatek.

The next section focuses on the process of computer reconstruction of the site and explores the application of panoramic photography and videography for this purpose as well as adding the narrative elements that tell the story that happened in this church.

3D computer reconstruction

3D computer reconstruction (CG⁸⁷ reconstruction) most often represents something that has never existed. Kenderdine (2009, p.116) compares such a reconstruction to a painting which can represent an artistic skill. 3D computer reconstruction can also be marked by hands of an artist. 3D models of buildings do not capture a moment-in-time as photography, but they exist outside-of-time. In my case, the 3D computer reconstruction of the church is based on an existing site (a ruin) and the artist⁸⁸ re-created the condition of the church as it looked at the beginning of 1940s.

Spherical panoramas were used both to show the current state of the church and also to generate the 3D reconstruction of the site as panoramas included information

⁸⁷ Computer graphics.

⁸⁸ Special thanks go to Klaudiusz Wesołowski, an MA student of the Warsaw Academy of Fine Arts, who computer-reconstructed the site in 3DstudioMax.

about the structure of the church (e.g. windows, arches, etc). The process of image-based reconstruction⁸⁹ was supported with historical images of Charles Church and current images of St. Andrew's Church in Plymouth, which is similar in structure to Charles Church.

The computer reconstruction of the church was divided into the following steps (a detailed process that I tested and investigated is described in (Kwiatek, 2011)⁹⁰):

- creation of images with fisheye lens inside the ruin;
- stitching images into panoramas using stitching software;
- importing panoramas into image-modelling software;
- generation of a 3D model;
- 3D modelling of details on the basis of historical images.

Actors recorded in the green screen studio were then added to the output (panoramic film) from 3D modelling software and different film scenarios were created for the interactive panoramic film about the Blitz of Charles Church. Figure 48 illustrates my approach to the generation of panoramic films.

⁸⁹ In computer vision and computer graphics, image-based reconstruction is the process of capturing the shape and appearance of real objects using photographs.

⁹⁰ See Chapter 11.

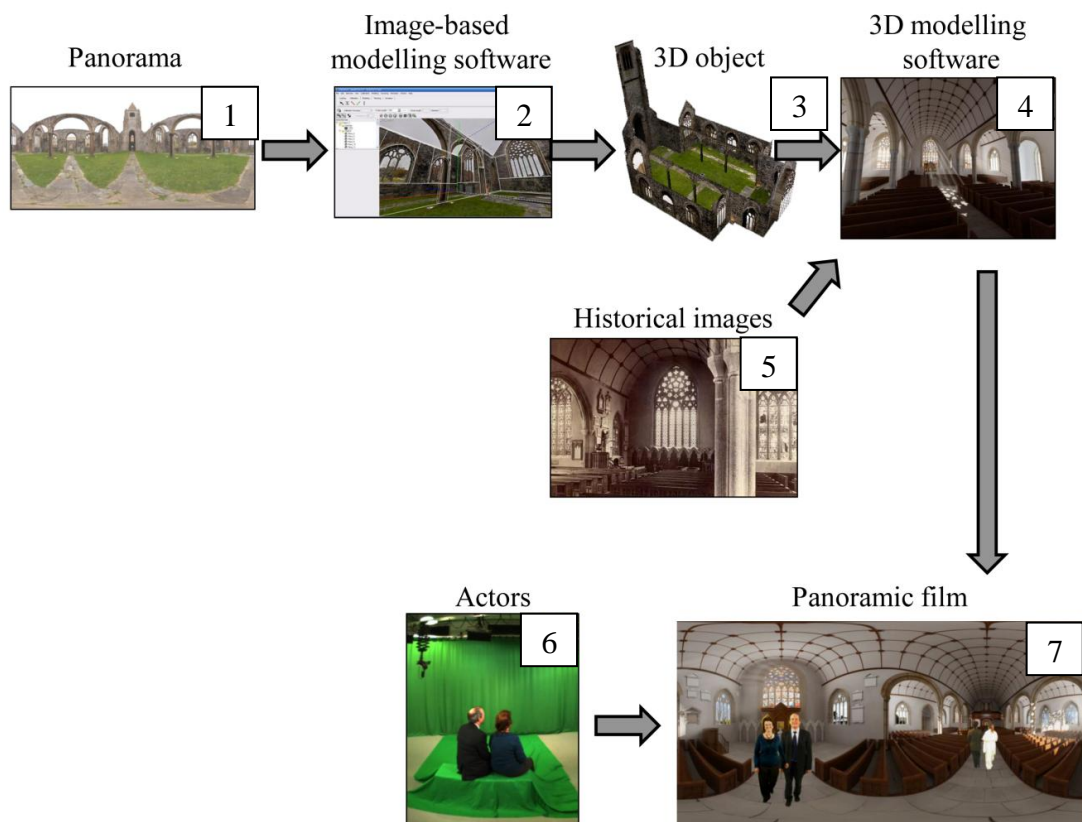


Figure 48 The workflow of 3D computer reconstruction and the creation of a panoramic film. Illustration by Karol Kwiatek.

The first step of creating 5 photographic panoramas (point (1) in Figure 48) was performed by using Nikon D50 (DSLR camera), which was equipped with Nikkor 10.5mm fisheye lens and panoramic head⁹¹ (Figure 49).



Figure 49 A camera with a fisheye lens is mounted on a panoramic head. Image by Karol Kwiatek.

⁹¹ The correct panorama can be created only when the nodal point of the lens is located over the centre of rotation of the tripod. Such a setup is facilitated by the use of the panoramic head.

Six triplets⁹² and additional two triplets of images were taken to cover the nadir⁹³ and zenith⁹⁴ in order to cover full 180-degree vertical field of view. Then separate images were stitched into one spherical panorama (*equirectangular* panorama) using PTGUI software. The process of selecting images and the process of stitching images in panoramic stitching software is presented in Figure 50. The result of these processes (a stitched panoramic image) is presented in Figure 51.

In the next step of creating computer reconstruction (2), I decided to reconstruct the church using new (at that time) software - Realviz VTOUR 1.1 (now known as Autodesk Image Modeler), which enabled me to recreate spatial dimensions from singular images and individual spherical panoramas. By using this software I could recreate a scene in three dimensions and I did not need a stereo pair of images.

The technical aspects of image-based modelling using panoramas are still being examined (Fangi, 2007; Pisa, Zeppa & Fangi, 2010) and this technology has not been so commonly accepted as methods of recreating a scene from stereo images. The main advantage of the modelling based on is that a single operator can recreate the building and build a narrative on its basis. The process of importing panoramas and creating three-dimensional objects in image-based modelling software consists of the following steps:

- a definition of a coordinate system;
- a definition of straight lines and flat planes;
- a construction of more difficult shapes (columns, arcs etc.).

⁹² I used HDR (high dynamic range imaging) technique which allows achieving a greater dynamic range between the darkest and the lightest areas of an image.

⁹³ Nadir image is an image looking down where a tripod is removed before taking an image

⁹⁴ Zenith is an image looking up, most often the image of the sky.

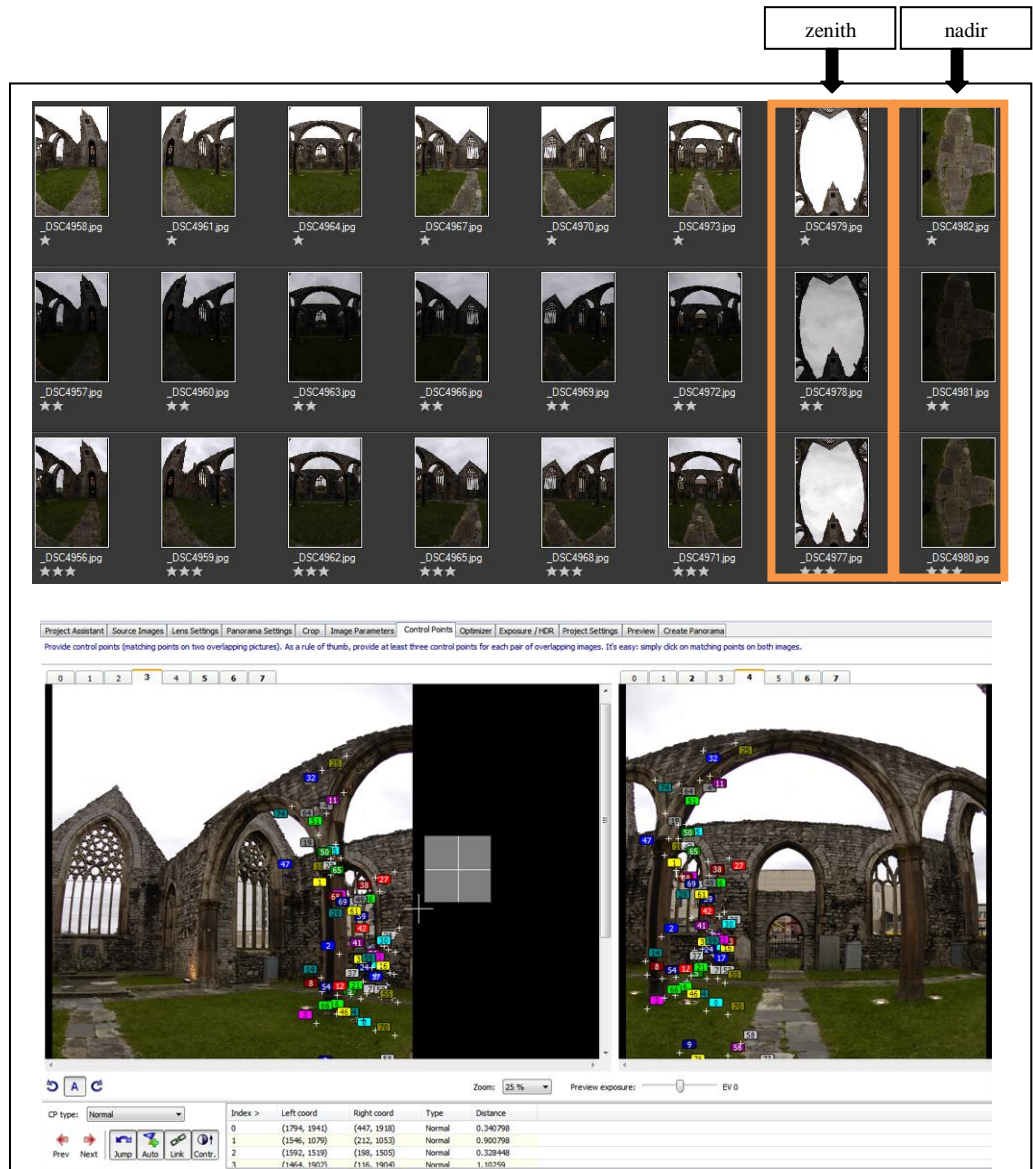


Figure 50 The process of selecting eight triplets of images (and stitching them in PTGUI). Illustration by Karol Kwiatek.



Figure 51 The result of the stitching process - a spherical panorama that was created at the centre of the ruin. Image by Karol Kwiatek.

Figure 52 illustrates the process of converting two-dimensional spherical panorama into a three dimensional object where textures for every part of the ruin are taken from the panorama.

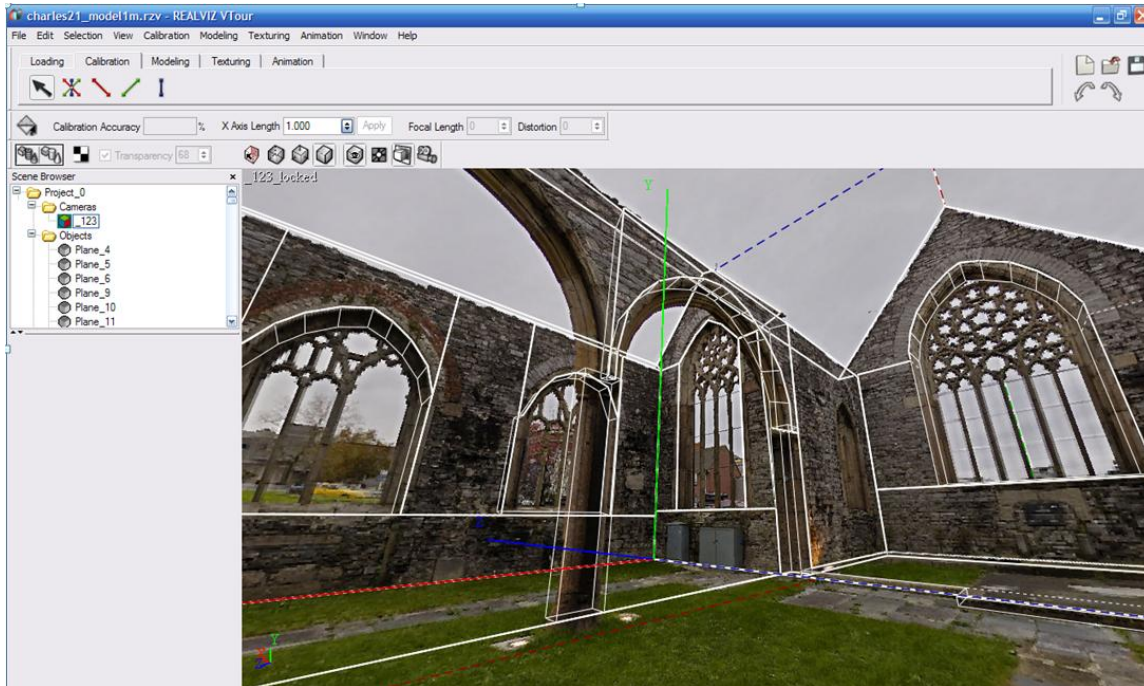


Figure 52 A panorama-based modelling of Charles Church in Realviz Vtour software. Illustration by Karol Kwiatek.

Image-based modelling software allowed me to create a basic 3D model (3) of Charles Church, which was then 3D computer-reconstructed using 3D modelling software (4) (Autodesk 3DSmax) on the basis of historical images (5) from the period before 1941.

Figure 53 indicates the process of merging a historical image (the left image in Figure 46) found in one of the archives with a panoramic photograph (Figure 51), where the position of the overlaid black and white image was placed interactively in a panoramic viewer using XML programming. The prepared function allows turning the overlaid image on and off.



Figure 53 A historical photograph of the altar merged with a fragment of panoramic image. Illustration by Karol Kwiatek.

The beginning of a 3D computer reconstruction started from rendering the altar, organs (located in the back of the church) and pews. Figure 54 illustrates the process of computer overlying the historical (non-existing) elements onto a photographic panorama of the ruin. The creation of the ceiling was more difficult because there are no complete images of that part of the church. Here, St. Andrew's Church in Plymouth was of great help because it was rebuilt after the war and has a roof whose structure can be transferred and applied to Charles Church.



Figure 54 360-degree overlay of historical parts of the church on the current view (see altar, organs and pews) which no longer exist in the ruin. This figure can be compared with Figure 51. The panorama was created by Klaudiusz Wesolowski and Karol Kwiatek.

The next step in the creation of a panoramic interactive film after preparing the background (computer-reconstructed church) was to record actors (6). I recorded actors in the green screen studio available at the University of Plymouth in order to place them in a virtually generated panoramic film where the background imagery could change according to the scene⁹⁵. As there were a number of different scenarios to consider and a video camera can only record one scene at a time, I decided to use a *chroma keying* technique to merge actors with multiple alternatives instead of recording a number of scenes on the inaccessible site. The *chroma keying*⁹⁶ technique enabled me to use the same recording of people walking (Figure 55) in a number of stages in the narrative. The actors are then added to panoramic videography (Figure 56).

⁹⁵ Actors were recorded in the green screen studio using Ladybug 2 panoramic video camera because: the distortion of the actors that were walking in the direction of the camera corresponds to the distortion that appears in equirectangular⁹⁵ images (aspect ratio of 2:1) which are then cropped to panoramic format (aspect ratio of approx. 8:1); the recording could not have been done with a traditional camcorder. Actors walked towards the camera and stopped very close to it.

⁹⁶ Chroma key compositing (chroma keying) is a special post-production technique for layering video streams together based on colour hues. It has been used in many fields (e.g. weather forecast) to remove background.



Figure 55 The process of recording actors in the green screen studio using Ladybug®2.
Image by Karol Kwiatek.



Figure 56 One frame from the video panorama presenting the wedding within the 3D computer reconstructed Charles Church in Plymouth. Illustration by Karol Kwiatek.

The selective interaction that I propose in this research project follows a tree structure. However, in this project the user could control the direction of viewing (panoramic environment) and also consider choices available. In the future, this interactive narrative could contain such choices as selecting the character, the possibility to switch between characters, and select the path with the pre-determined settings (night, rainy or sunny weather, level of emotions, level of entertainment etc.).

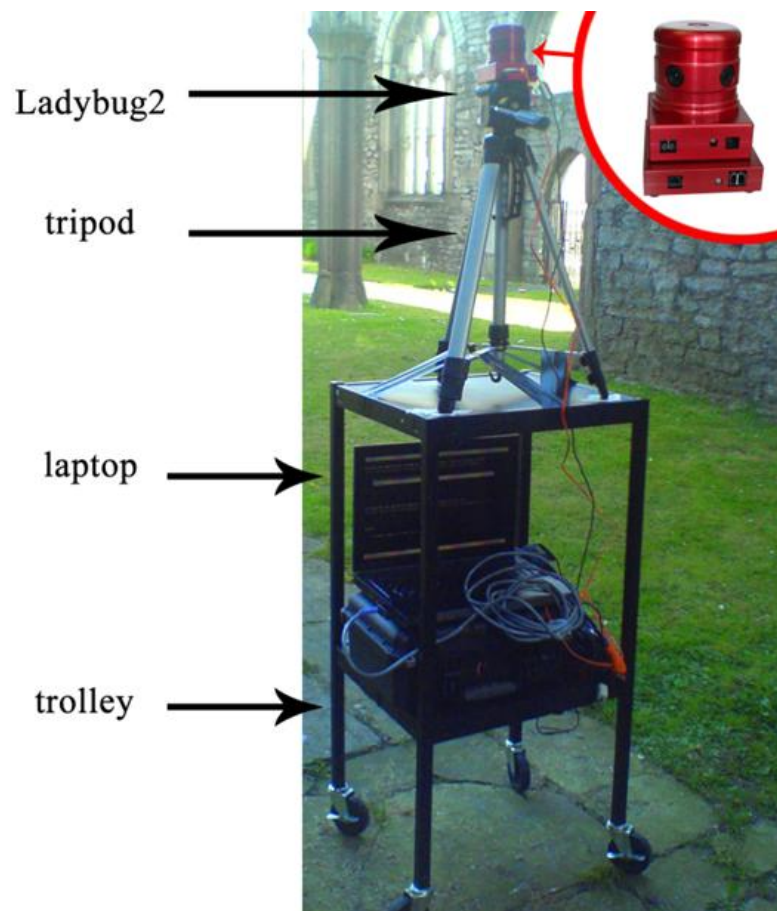
The process of recording the narrative

To generate the narrative that occurs in 2010 (when the character is back in the church), a number of panoramas, showing the current state of the church, were recorded on the site. The transition from 1941 to 2010 does not occur immediately. This is a temporal transformation that is indicated in Figure 45. Panoramic films, in my view, should not only keep the continuity of space (this is done by panoramic videography and inter-visibility of stations - decision points) but also the continuity of time, which can be achieved through gradual temporal transformations. It means that any user that missed a few seconds of the film would still be able to follow it. The pace of the immersive film should be slow.

According to Dan Neafus (2011), the co-founder of IMERSA (Immersive Media Entertainment, Research, Science and Arts), which is a 'professional association founded to advance and promote the art and science of large-scale digital immersive media, full dome, and immersive group experiences in digital planetariums, mobile domes, themed entertainment and giant screen theaters' (IMERSA, 2012)), a sharp scene change presented on a large 360-degree screen would not be effective. I think that the audience could lose the track and would not understand why, instead of a computer reconstructed church, they see a ruin. I think that the application of the gradient change, which lasts for about 20-30 seconds, will provide the audience with time to relocate from the past to the present and this might be also a method for presenting memories in the present.

Traversing between decision points is another aspect that is worth introducing in the case of recording panoramic videography inside the ruin of Charles Church. I decided to use a trolley (Figure 57) on four wheels, which is a stable construction for recording panoramic video using Ladybug® 2 camera. I did not want to utilise a tripod dolly because the ground was not flat inside the ruin of the church. A tripod dolly is

more suitable for recording in the office or in the studio. A mobility scooter (described in more detail in the next chapter) could not be used either. The entrance to the church was too narrow for the scooter to get in and only the tripod dolly and the trolley could get inside. The panoramic video camera mounted on a tripod located on the trolley was connected to a laptop with a compressor. These were hidden on the shelf under the tripod so that they would not be captured by the camera.



**Figure 57 Ladybug@2 camera inside the ruin of Charles Church.
The application of a trolley for a moving camera approach. Illustration by Karol Kwiatek.**

The whole system was moved by one camera operator who pushed the trolley and who were leaning out of shot all the time so that camera did not record them. The trolley enabled recording mobile and static video panoramas. I took the inspiration for such a mobile setup from Vertov's films, especially *Man with the Movie Camera* (1929) where

the camera⁹⁷ was exposed and recorded in a number of possible situations. (e.g. on top of the car, in front of a train, etc.).

One more technique that I applied to Charles Church project was the 'wait and see' strategy mentioned by ben Shaul (2008, p.54), which is a strategy for developing dramatic succession (closure) and which could, in my view, evoke memories. The cumulative interactor 'wait and see' creates narrative suspense by returning to a meaningless decision (Ben Shaul, 2008, p.54-55), e.g. the wedding act near the altar in 1941. The panoramic interactive film applied to a locally known event that occurred in a ruined building, is based on multiple alternatives. Some of them seem meaningless to the viewer but might prove to be significant in the future. The panoramic format provides an opportunity to indicate symbolic objects available in the presented environment but some of them might be meaningful only to a particular group of people.

This 'return' to an identical place seems to be a method for triggering memories and for making the interactors aware that they could have chosen a different option at this decision point and completely diverse narrative could have been experienced. In this project, the audience not only 'return' spatially to the same location, but also temporally, because they are experiencing the same event again, but from the perspective of a number of decades which have passed.

The Charles Church project could be additionally enhanced with selection of characters' perspectives. The project is designed in such a way that the audience watches past events in the way Ken and Phyllis remember them, as they are the only witnesses of this event who are still alive. If I had the priest or Ken's parent's recollection of this day, it would be also possible to add them to this film and the audience could select whose plot they want to follow. If the audience was provided with

⁹⁷ The cameras were not very portable at that time, similarly as panoramic video cameras nowadays. They need to be powered from a heavy battery and connected to a powerful laptop.

such choices, they could identify themselves with characters in the film and they could switch between character's perspectives. Then the structure might look like 'The Braided Plot' structure identified by Ryan (2001) where storylines could mix with perspectives of the characters. In my view, multiple screens might be appropriate for such a multiple plot presentation as they have the potential to present immersive films and render collective memory for large assemblages.

360-degree screen

I managed to display Charles Church project in an immersive environment where spatial sound was applied to create emotions and dramatic atmosphere. This type of effect is not recognizable in a single user panoramic viewer. Generally, surrounding screens were equipped with a number of speakers. Speaker 1 and Speaker 2, located on opposite sides of the arena and close to the action occurring on the screen (Figure 58) played two alternative questions in decision points according to the narrative, one after another, so the audience could use these questions as indications that helped them decide about further development of the narrative. For instance, options G and H indicated in Figure 42 relate to such a situation where two questions from opposite sites are played. It remains an open question whether they shall choose option G (played from speaker 1) or option H (speaker 2) at one of the decision points.

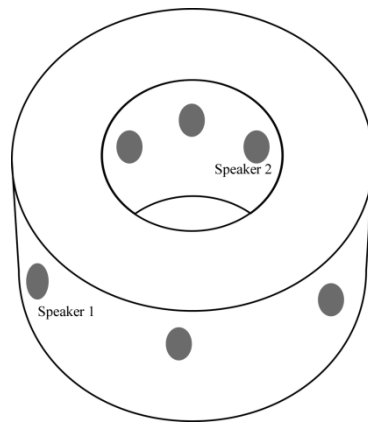


Figure 58 The concept of a 360-degree screen with 6 speakers where two highlighted speakers play two alternatives.⁹⁸ Illustration by Karol Kwiatek.

Figure 59 presents the projection of Charles Church project to the audience gathered inside a 12.5m 360-degree Cinemax⁹⁹ in February 2010. According to my personal observations, most of the audience were standing in a central position whereas one or two people were walking around and exploring the space and this new form of watching films. Chairs and tables were not provided on this occasion, but they were present during the ICCI360 Festival¹⁰⁰ when my case studies were presented for the second time in 21m 360-degree Cinemax in September 2010. The ICCI360 Festival had a number of concerts and workshops where these tables and chairs were used, and it was difficult to remove them from the arena only for one or two displays. They were removed only from the central position of the arena and positioned near the edge of the screen. The audience was not instructed about the freedom of movement so they decided to sit as in traditional cinema. I noticed that the audience could have been instructed to stand in the middle in order to explore the immersive space. The audio played from opposite sides was not heard properly and emotions and atmosphere were not generated. Furthermore, there was no sharing of information or dialogue between people sitting by different

⁹⁸ Source of the image of a 360-degree screen: Igloo Vision Ltd.

⁹⁹ 12.5m and 21m 360-degree Cinemax are 360-degree screens provided by Igloo Vision Ltd. (<http://www.igloovision.com/page.php?Plv=2&P1=2&P2=30&P3=&LvL=2&id=30> (Accessed: 12.08.2012)).

¹⁰⁰ This festival was organised by the University of Plymouth and Institute of Creative and Cultural Industries.

tables. Figure 60 illustrates the projection of the panoramic interactive film during the event in September 2010. The architecture of the 21m screen enabled interaction of the audience with interactive films, whereas 12.5m 360-degree Cinemax provided a possibility to present linear films only.



Figure 59 The presentation of the project about Charles Church on the 12.5m 360-degree screen Cinemax. Image by Karol Kwiatek

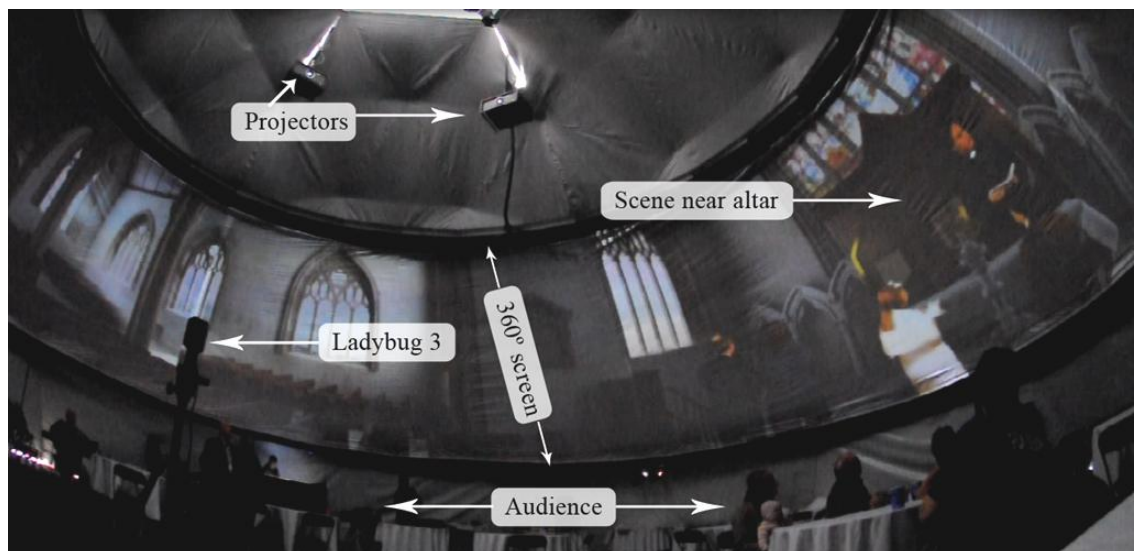


Figure 60 The presentation of the scene near the altar from the wedding of Mr and Mrs Beer in the computer reconstructed Charles Church (21m 360-degree Cinemax). Image by Karol Kwiatek.

The topical narrative introduced in the case study of Charles Church project is based on questions presented to the audience gathered inside an immersive architecture. Figure 61 illustrates one of the options available to the spectators when watching the reconstruction of the wedding from 1941.



Figure 61 One of two choices available (marked with a white circle) to the audience inside panoramic immersive 21m 360-degree arena. This is a panoramic frame from 360-degree film recorded by Ladybug®3 camera located in the centre of the arena. Image by Karol Kwiatek.

Due to technical limitations of the projection system and time constraints, only a simplified model of the tree type of interactivity could be implemented on these two immersive screens.

In order to create a clear model of interaction for the 360-degree screens, I had to merge some films that appear one after another without a decision point in between. This process allowed me to create 8 unique panoramic films, which could be explored on DVD No. 1. This DVD also contains a recording of the audience inside 21m 360-degree Cinemax who watched panoramic films on 15th September 2010 .

6.4. Summary

The intention of this project was to explore whether memory of the Blitz of Charles Church in Plymouth may be preserved effectively using panoramas. Panoramic photography and panoramic videography recorded and generated in 3D modelling

software have many applications in this project: they are used to create the background for the topical narrative, to record characters and the story that took place in the church and also to provide a return to a decision point that seemed meaningless in the past, but occurred to be significant. The interactive panoramic film presenting the history of the couple that got married in the church at the time of the Blitz has a number of features that enhance preservation of cultural memory. Branching interaction used in this film allows audience to select one of two options at each decision point. Audience can do it by choosing one of the two answers offered to the question asked at each decision point. This selective interaction enables them to choose different endings of the story they are watching. This interaction is limited, however, as the viewers can only choose between pre-scripted choices. There are two possibilities at each decision point and even if the user is able to think of other possibilities, they are not included in the scenario. Physical interaction is selective only, as the user does not generate any new outputs. The audience may interpret the story they are watching in a number of ways, thus the mental interaction is a kind of a productive process.

The interactive film about Charles Church (*Wartime wedding*) includes present and past perspective and a number of alternative scenarios, which makes the audience aware of alternative pasts that could have occurred if the characters in this story would have made different choices or if circumstances were slightly different. At the beginning of this project I intended to support different points of view so that the audience could learn the story from the perspective of different characters. However, I only managed to provide the Ken and Phyllis Beer's perspective. I could not find recollections of other people who attended the ceremony. If they had been available, I would certainly have added them to the narrative. It is important to note, however, that it would make the narrative structure even more complex.

Panoramas supported by the techniques of repeat photography and repeat videography and 3D computer reconstruction enable the recreation of the appearance of the church before the war and set the narrative on the reconstructed site, which also enhances recollection of memories.

Panoramas improve access to the site, which is currently not available for public viewing. The two time perspectives imply even more than real, physical access. As the place has never been reconstructed, the viewers can access the past site virtually and see artefacts from Charles Church in situ. They can also compare how the present appearance of the church differs from what it was in the past. In order to create the past and present time perspectives I had to develop temporal and spatial visualisation of the narrative elements.

Virtual access limits the audience's possibility to traverse within the contemporary church when compared to physical access. The type of traversing used in this project is topical as viewers move in the church to find further clues and to continue watching the film. They have to follow the routes that have been pre-defined but they may decide which parts of the church they want to watch in detail and how long it will take.

This project confirms Dinkla's (2002, p.28-30) hypothesis that panoramas can be integrated with the narrative, which is a crucial aspect for preserving memories. Events in the film are presented in a chronological order with present and past perspective offered to viewers. The film immerses viewers both temporally, as they have a desire to learn how it ended and see how the church looked in the past, and emotionally, as the virtual world is populated with real characters, their voices and feelings. The spatial sound, which indicates direction of observation, adds to the feeling of immersion. The type of narrative created in this project generates tension, as some of the choices are tragic. Panoramic films support continuity of space and time. They use gradual

transition between scenes and provide the audience with time to explore or navigate the site. They also enable the return to meaningless decision points. Despite this contribution to immersive viewing, panoramic films are not easy to watch. The audience could be trained how to watch the film and how to use the device which allows them to decide on further developments of the story. Very often viewers need to watch the film more than once to understand it. This reception may change in the future as people become more used to interactive devices and non-conventional forms of viewing.

I have established that the preservation of cultural memory needs to be interactive and participatory. The interactive panoramic film *Wartime wedding* in my view meets this target. It does not, however, answer all the questions about preserving cultural memory using panoramas. It focuses on one aspect of cultural memory, which is the memory of the event based on personal memories of people who witnessed it and participated in it, where one of the main elements of recollection – the fabric of the church is no longer complete. In my view, it is worth investigating a complementary example, which would focus on the preservation of cultural memory of a person through this person's work as well as objects and artefacts that belonged to this person. The life of Charles Causley, a poet from Launceston who died in 2003, seems to be a relevant subject for the complementary case study. The house where Causley lived and objects that he used in his life are still well preserved in his hometown and there are many local people who knew him and still remember him. The audience may learn about his life by traversing between multiple places in Launceston and by watching film about different objects that he described in his poems.

7. Inspirational locations and artefacts of a Twentieth Century poet

This chapter examines the preservation of memory of a person through panoramas in the second practice-based case. It is divided into three parts. Section 7.1 introduces Charles Causley and his biography, describes his topographical poetry and its relations with his hometown of Launceston and his house. Section 7.2 elaborates on the role of artefacts in preserving Causley's memory. The process of creating an interactive narrative based on panoramic photography and panoramic videography is elaborated in section 7.3. Section 7.4 summarizes the project in terms of its efficiency in preserving memory.

7.1. Charles Causley, his town and his poetry

Charles Causley (1917-2003), 'one of England's most popular twentieth-century poets' (Hanke, 2011, p.5), was born in Launceston. Causley's career as a poet started during service in the Navy during the World War II. After the war, he became a schoolteacher in a primary school in Launceston. He was a dramatist, a writer of short stories, an essayist, a reviewer and a broadcaster. In 1967, he was awarded the Queen's Gold Medal for Poetry and in 1986 he was made CBE (Commander of the Order of the British Empire). Michael Hanke (2011, p.5), who was Causley's secretary in the 1980s, states that 'at least a dozen of his poems have become firmly lodged in the cultural memory of present-day readers'. What does Hanke mean by cultural memory? Is it the same cultural memory as the one that was introduced at the beginning of the thesis?

For instance, *Timothy Winters* is a poem that 'has been known throughout the UK' since its publication in 1957 (Jarfe, 2011, p.152) and may be lodged in memory of contemporary readers in various ways.

Timothy Winters comes to school
With eyes as wide as a football pool,
Ears like bombs and teeth like splinters:
A blitz of a boy is Timothy Winters.
--first verse

So come one angel, come on ten:
Timothy Winters says "Amen
Amen amen amen amen."
Timothy Winters, Lord. Amen.
--last verse
(Causley, 2000, p.65-66)

Susan Hill, who wrote about Causley, called this poem 'Causley's best-known, most anthologised poem about, and for, someone young' (2003, p.37). Although some of Causley's poems are well known to the British readers, many readers know very little about their author. Sometimes they acknowledge that he is a Cornish poet or can recall his name. Although verses from Causley's poems are deeply rooted in readers' memories, memory of the author needs to be cultivated so that the readers can understand links between Causley's poetry and his life.

According to Ronald Tamplin (2011, p.46), an English literary scholar and trustee of the Charles Causley Trust¹⁰¹, after finishing his job as a teacher, Causley became a full time poet and managed to travel to a number of locations over the world (Eastern Europe, USA, Canada, Australia). Apart from these short travels, Causley spent his entire life in Launceston, which influenced his works greatly. For instance, the house, where he was born, the church in which he was baptised and the graveyard in which he was buried are situated in the same street. Causley describes all these places in

¹⁰¹ The Charles Causley Trust was established to promote and protect the legacy of Charles Causley's writing for future generations in the United Kingdom and beyond.

his poems along with many other locations in Launceston. His poems also refer to local stories and legends and use various objects both in his house and in the town, e.g. paintings on the walls of his house or sculptures of eagles in the gate of the Eagle House Hotel and Zig Zag stairways.

I have selected Charles Causley's life and work as the subject of my second case study exploring the preservation of cultural memory for a number of reasons. First of all, there are many references that link Causley's poetry to objects and locations that can be uncovered in his town and in his house. Secondly, through the re-discovery of his native town in ballads and poems, the audience can explore both the town itself and artefacts that were the inspiration for his poetry. Thirdly, topographical poetry, based on the Launceston area, linked with topographical non-linear narrative can be explored. Finally, this project can investigate the application of panoramic photography and panoramic videography as visualisation techniques, not only for documentation of the current state of architecture or landscape, but also for showing the position and mutual relation of artefacts in the space.

Characteristics of Causley's poetry

Though Charles Causley did not regard himself as primarily a children's poet, he is widely admired and loved for the large number of verses he wrote for children in the second half of his career. Adult audiences commend the poetic skill and variety of his poems. Causley himself did not believe in a distinction between poetry for children and for adults as issues described in his poems may be analysed and interpreted from both perspectives. His poems might seem easy to understand (which is good for young readers and sometimes foreigners, like me), but, because of this deep simplicity in rhymes, narrative poems and ballads, Causley was admired by his readers irrespective

of their age (Colquhoun & Wroe, 2008, p.58-59). According to Neil Philip (2011, p.254), an English writer and poet, Causley successfully attempted to 'get on the same wavelength as the children'. Causley managed to find a way to communicate with a young audience, which was also a skill acquired in his teaching. Morag Styles (1998, p.248), a professor of children's literature, claims that Causley 'understands children well and their taste in poetry'. Causley's works are often compared to Ted Hughes. They are both recognised as 'two of the most significant poets for the young in the second half of the twentieth century' (Styles, 1998, p.248). Hughes (2003, p.57-58) himself believes it is Causley's poetry that may be the most appreciated by readers:

[a]mong the English poetry of the last half century, Charles Causley's could well turn out to be the best loved and most needed.

According to Anita Tarr and Richard Flynn (2002, p.2-3), who study children's literature and poetry, Causley's work has many features which facilitate understanding, such as imagery, rhyme and humour. They help discipline memory and prepare young people for reading and speaking.

Cleve Wilmer (1991, p.52), in an interview with Causley, confirms that most of his poems have the form of a song. The form Causley most often used in his poetic work was a ballad. Ballad is a form of poetry that has regular metres, linear narrative and accessible style. Imke Neumann (2011, p.65), a freelance writer, teacher and translator, lists characteristics of a ballad form:

- it has a tradition of oral transmittance;
- it has been sung;
- it has been collected and passed on in a written form;
- it has travelled from generation to generation;
- it can link the world of children and adults by the application of a nursery rhyme.

Causley, in an interview with Wilmer (1991, p.54), compares ballads to films: 'the ballad is like a film. Each stanza should be like a frame and it jumps from one to the other' and then explains that poem needs to have a musical line in order to be remembered. Music, as previously stated, helps recall. Music in a poem plays a similar role to music in a film as it builds tension. Causley is 'a *maker* of songs [...] most of his poems, even if not actually meant to be sung, are in the song form: they are ballads, chants, carols, riddles, shanties and nursery rhymes' (Styles, 1998, p.248).

I learnt that the musical nature of Causley's poems helps them to be remembered. The song form seems to be directed towards children who, along with foreigners, may be a target group for this project whose aim is to explore the preservation of cultural memory of the poet. Simplicity of Causley's poems makes them easy to visualise and present during the traversing between decision points.



In the following paragraphs I describe Causley's inspirational environments (his town, his house) which need to be traversed in order to be uncovered.

Launceston in Cornwall

Launceston is a Cornish town where Causley spent most of his life. This town (approx. 7000 inhabitants) must have had a large influence on Causley's oeuvre because there are a number of references to it in his poems (Causley, Graham & Fenn, 2003; Charles Causley Society, 2008). However, to date, not much attention has been paid to the visualisation and documentation of the architecture and landscape in this changing Cornish town, just after the death of the poet. The artefacts, items and objects that relate to Causley's poetry are not only located in his house, but they are also spread all over the town, and in Cornwall. Table 8 provides a detailed description of two poems and locations to which they refer, whereas

Table 9 provides a brief summary of other Causley's poems and their links with locations in Launceston.

Table 8 References that link Causley's poems to locations in Launceston (Charles Causley Society, 2008)

 <p>Relief of St Mary Magdalene on the east wall of St Mary Magdalene church in Launceston</p>	<p>'Mary, Mary Magdalene Lying on the wall I throw a pebble on your back Will it lie or fall?' From <i>Mary, Mary Magdalene</i> (Causley, 2000, p.228)</p> <p>'This relief is to be found on the east wall of St Mary Magdalene church. It is said that a stone lodged on her back will bring good luck' (Charles Causley Society, 2008) The source of this poem can be found in the local belief that a stone placed on the back of the statue will bring luck.</p>
 <p>The ZigZag footpath in Launceston</p>	<p>'As I went down Zig Zag The clock striking one, I saw a man cooking An egg in the sun.' From <i>As I went down Zig Zag</i> (Causley, 2009, p.150)</p> <p>'Zig Zag is the name of a steep footpath in Launceston. It linked the town to the railway stations' (Charles Causley Society, 2008)</p>

Heinz Kosok (2011, p.125), an American scholar of English and American literature, states that Causley's literary career focused on Launceston:

A number of Causley's poems take their settings from localities in Launceston, sources not always recognizable to the outsider.

For example, *By St Thomas Water*, one of a topographical poem, refers to the tiny pond created by the river Kensey outside the 15th church of St Thomas and the ruins of the Augustinian priory.

Table 9 Other references between poems and locations in Launceston

Poem	Location in Launceston
<i>A True Ballad of Sir Henry Trecarell</i> (Causley, 2000, p.60)	St Mary Magdalene Church
<i>Eagle one, eagle two</i> (Causley, 2000, p.211-212)	Eagle House Hotel
<i>On Launceston Castle</i> (Causley, 2000, p.286)	Launceston Castle
<i>Mr Pennycomequick</i> (Causley, 2009, p.353)	Castle area
<i>Pepper and Salt</i> (Causley, 2009, p.35)	National School
<i>Quarter-Jacks</i> (Causley, 2009, p.20)	Guildhall and Town Hall
<i>I saw Charlie Chaplin</i> (Causley, 2009, p.8)	Launceston Square
<i>By St. Thomas Water</i> (Causley, 1999, p.75-76)	Near Kensey river

Topographical poetry

I have indicated that there are a number of poems that refer to specific locations and also objects that can be found in Launceston. Causley was a 'poet of place'. Place plays a very strong role in Causley's poetry, his whole life and work were linked mainly with this single place and this is the reason why panoramas work very well in this project. It is possible to apply panoramas to other poets but it may be much more complex if they lived and wrote in many different places or if their poetry relates to issues that did not have a direct connection with their life. In the second case, the role of panoramas would not be preserving the cultural memory of these poets but simply visualising themes covered by their poems.

Wendy Trewin (2003), in the article in *The Guardian*, when writing about Causley notes that '[i]n a very real sense, each poem [...] is a "Launceston poem"'. Neil Philip (2011, p.258), states that Causley's autobiography is encoded in his poems, as his emotional and mental landscape. Jenny Stringer (1996, p.672), an author of *The Oxford Companion to Twentieth-Century Literature in English*, lists Causley as a poet who uses

a topographical approach to poetry. Similar poets are: Ted Hughes (1930-1998), Norman MacCaig (1910-1996), Norman Nicholson (1914-1987) and A.L. Rowse (1903-1997).

Topographical (loco-descriptive) poetry is defined as a genre of poetry that tells, and often praises, a place or a landscape (Guillory, 1991, p.3). Topographical poetry was an eighteenth century phenomenon that started with poems such as *Grongar Hill* (1726) by John Dyer or *The Seasons* (1726-1730) by James Thomson where the local description of a landscape imagery is a key part of the poem (Stringer, 1996, p.672). Initially, topographical poets were scientific observers describing aspects of the city such as buildings, rivers and parks, but in the romantic period they not only moved away from cities to provinces, but also rejected the scientific and informative approach. Topographical poems became a 'venue for personal, historical and meditative thought' (Guillory, 1991, p.3).

Topographical poetry is usually unknown for someone who is coming as a tourist to explore the town. This type of poetry could be uncovered through spatial narratives examined by Hughes (1997) who understands landscape as a model for new media narratives, along with the cultural memory it represents. Traversing through the town and uncovering hidden objects/memorabilia recalls memories, but this recall needs to be performed, for example, by reading poems on the site; as it happens regularly during Causley Walk.

Causley Walk is a walk during which visitors have an opportunity to follow a guide reciting a collection of Causley's poems about objects and sculptures in various locations in Launceston. The poet's memory becomes uncovered as the guide explains connections between these items and locations in which they are found. I took part in one of such events where Jane Nancarrow from the Charles Causley Society led a walk around the town reading some Charles Causley's poems at appropriate points. Starting

with *Eagle one, eagle two* outside the Eagle House Hotel, a group of 50 followers moved on to St Mary Magdalene Church to hear *Mary, Mary Magdalene* (Figure 62). The group also visited Causley's grave as well as the National School building where he taught for many years. Through participation in this walk, I learnt that reading poetry *in situ* could be an effective method of preserving cultural memory.



Figure 62 Jane Nancarrow is reading the poem *Mary, Mary Magdalene* near the sculpture of Mary Magdalene (marked with an arrow) during Causley Walk. Illustration and images by Karol Kwiatek.

Causley's Walk is now a part of the Charles Causley Festival¹⁰², which was established in 2010. The program of the festival includes literature, music, art and a variety of other activities. The main theme of the festival is poetry with the special focus on promoting Causley's poetry through exhibitions, workshops and evenings of poetry. However, the festival also includes other creative enterprises such as local artists' exhibitions, meetings with writers and poets and music played by local bands.

¹⁰² <http://charlescausleyfestival.co.uk> (Accessed: 2.04.2012).

Although Causley's Walk and the Charles Causley Festival aim to make the links between his life and his poetry explicit, they do not enable the audience to see the interior of Causley's house and artefacts that are located there. Causley's house is not available for public viewing at the moment and it is not very likely that it will change in the near future. I had an opportunity to photograph it in 2009 and I have a documentary recording of the building a few years after Causley's death.

The question that arises at this point is how to preserve memories about Causley within a gallery space or within a museum. A plan to create a Causley's Museum in his house is still waiting for realisation (Charles Causley Trust, 2009). A panoramic presentation could be presented in his house or in any other place in Launceston to provide visitors with the possibility to see a number of locations in the town, in an interactive way, through the use of technology that is not dependant on weather conditions and where visitors could work together during the exploration. The Charles Causley Trust still hopes to gather funds for an interactive display arena 'at the external location in Launceston, where tours can begin and visitors can learn about Charles Causley's life and work before setting off on a journey through the poet's Launceston, finishing at the house itself' (Charles Causley Trust, 2009). If this arena had a portable construction, it could be moved to other towns in Cornwall and in the UK to make inhabitants of other cities familiar with Causley's life and work.

Panoramas presented in a panoramic immersive environment can transport viewers to inspirational locations. They may also be used to document the lives of painters, writers or artists who travelled a lot and lived in different places; even though this task is more expensive and challenging. One might ask about the influence of not only locations but artefacts. The next section explores the role of artefacts in preserving

cultural memory of Causley and his writings. The inspirational environments are further explored in my publication (Kwiatek, 2012)¹⁰³.

7.2. The role of artefacts in preserving Causley's memory

Artefacts and objects provided some of the inspiration for Causley's artistic works. They are not only located in Launceston, but also in his house. The location of these items and meaning they convey are only known to Causley's friends and those who asked him personal questions. This is a type of memory that might be lost if not visualised and documented properly. Arthur Wills, who was Causley's watchmaker and also his friend, and who now specializes in Launceston's history, mentioned in a radio interview (*Adventures in Poetry - Timothy Winters*, 2006) that Causley played a piano very well (which must have influenced the choice of ballad forms for his poems) and there was also a piano in his study room. Wills who is in his 80s also helped me to indicate other objects and artefacts, both in Causley's house and also in Launceston. The memories he shared with me are visualised using panoramic photography and panoramic videography in this research project.

Causley's house, which is briefly described in his poem *Sibard's Well*, is known as Cyprus Well. Michael Schiffer and Andrea Miller (1999, p.12), in *The Material Life of Human Beings*, state that:

people spend their lives immersed in the material medium,
mostly engaging with innumerable kinds of artifacts and with
other people who have been combined with, or modified by,
artifacts.

A house is a shared and protected place for storing a number of artefacts that immerse people. For example, Dylan Thomas's house, Charles Dickens's birthplaces are

¹⁰³ See Chapter 11.

protected and enable visitors to learn more about them. Many of Causley's well-known poems were written in No. 2 Cyprus Well. The Charles Causley Trust policy is to maintain the house with as little change as possible to the original layout. The house has been unoccupied for almost 10 years (Causley died in 2003). It could become a 'time capsule that tells the story of a Twentieth Century poet, his way of life and the people and places that were special to his work' (Charles Causley Trust, 2009).

Cyprus Well is still full of artefacts that belonged to Causley. A number of items remained untouched after Causley's death in 2003. I was able to record the condition of the house, where most of the objects remained in their original position. Panoramic photography has a strong quasi-spatial character and can also document the mutual positions of artefacts in such an environment. After my work of creating still panoramas, some items were relocated (e.g. Causley's desk and other items were moved to the Lawrence House Museum to remind visitors about Launceston's famous inhabitant). Cyprus Well remains closed for an ordinary visitor or a tourist. Items that remained in the house are voiceless. Just like objects in museums, they cannot tell stories. The difference between items in a museum and in a closed poet's house is that the former remain visible (if not kept in storage) and are observed by visitors. Panoramic photography, when enriched with interactive narrative, could transpose a set of voiceless items into an environment that could explain their relationship to the individual. Panoramic videography could present both the mutual positions of items or artefacts and the dynamics between them. I have not applied panoramic videography inside the house because the house is not used and there is no action in it but I used it to document life and traffic in Launceston.

The significance of objects in human life has often been disregarded by theories of communication. Schiffer and Miller (1999) state that artefacts are involved in all modes of human interaction and communication. These items are visual, auditory and

tactile. They may be unrecognised but if represented they will become visible and will preserve cultural memory. It is helpful to exploit this potential of artefacts in preserving cultural memory of a person who used them and for whom they were important.

Don Ihde (2005), a philosopher of science and technology, developed a theory of visual hermeneutics, which can be used to uncover the meaning of artefacts in panoramas. Visual hermeneutics comes from traditional hermeneutics, which is the study of interpretation of written texts. The objects of material hermeneutics are not written texts, however, but the relationships between embodiment and representation of the material. Visual hermeneutics is a hermeneutics which 'gives things voices where there had been silence, and brings to sight that which was invisible' (Ihde, 2005). It uses instrumental magnification techniques such as telescopes and microscopes to enable perception to go where it had not gone before. Visual hermeneutics is applied in many fields of science, e.g. its role in archaeology is to understand and interpret material on the basis of possible meaning and social use.




Kenderdine (2010, p.412) supports the use of visual hermeneutics in archaeology. The meaning behind objects cannot be learned for sure but archaeologists are able to provide their modern interpretation. Kenderdine compares imaging practices proposed by Ihde to immersive architectures, which also promote the visualization of the material. Kenderdine's understanding of visual hermeneutics proves that it may be applied to the Charles Causley project where objects, encountered by participants of the interactive narrative during their tour through the town, have hidden meanings and the user's task is to uncover them and to bring them to sight.

In my opinion this instrumental magnification enables items to be visible in a new way. In panoramas, this magnification is achieved through interactive functions of and the possibility to rotate objects. These facilities have been implemented in the

Charles Causley project (presented as panoramic imographs) to increase the perception of artefacts.

I will now indicate a few items and artefacts that were visualised using panoramic photography in Cyprus Well. There are more references to objects located in Causley's house in his poetry, but I will focus on these three examples (Table 10).

Table 10 References between artefacts in Causley's house and his poetry

Poem	Object in Causley's house	Image of the object
<i>Rocco</i> (Causley, 2000, p.309)	A painting in his study room	
<i>My mother saw a Dancing Bear</i> (Causley, 2000, p.230)	A small figure of a bear	
<i>Ballad of the Bread Man</i> (Causley, 2000, p.154-156)	A painting in his study room	

In *Rocco* there is a reference to the image situated on the wall of his study room.

I am St. Roche's dog. We stand
Together on the painted wall
(Causley, 2000, p.309).

My Mother Saw a Dancing Bear is another poem inspired by the object located in Causley's house. This poem presents the cruelty of taking an animal out of the natural environment. It relates to a small figure of a bear in Causley's house:

My mother saw a dancing bear
By the schoolyard, a day in June.
The keeper stood with chain and bar
And whistle-pipe, and played a tune.
(Causley, 2000, p.230).

Ballad of the Bread Man is one of the most famous Christian poems produced by Causley. Causley himself claimed that it is about rejection. The poem is illustrated by a painting in his study that presents a preacher standing on a cabbage-green background with no one listening.

The above-mentioned references were not listed on the Charles Causley Society's website (Charles Causley Society, 2008). The items they refer to cannot be seen in Causley's house, as it is not available for public viewing. The memorabilia in hidden locations have their stories but when the site is not visited and the stories are not told to the audience, they can be easily forgotten.

In addition, the items in Causley's house could change their positions after a restoration so panoramic photography can help document how they were located in relation to one another and also be used as a reference for analysis of poetry.

In order to uncover hidden cultural memories encapsulated in artefacts I propose to use interactive narrative based on topographical traversing which is described in the following section.

7.3. Creation of the narrative

This section focuses on attempts to identify the type of narrative that is most suitable for preserving cultural memory of a well-known person within his local area and whose memory may be cultivated through objects and artefacts that belonged to him, or were used as inspiration for his work. The inspirational environment in which this person lived and worked is also the subject of this preservation. The starting point for the construction of the narrative about Charles Causley comprises his poems that provide references to artefacts and locations that were important to him.

This section starts by discussing the structure of the narrative. Then it moves to describing the recording of panoramas and video panoramas and the software aspects in the creation of the interactive film.

Structure of the narrative

As Causley's poems are topographical, I decided to adopt a topographical approach to narrative. This approach is based on paths that determine sequences of actions or events (Hughes, 1997). Topographical narrative is a part of spatial narrative or strategies to spatially present the life of a person proposed by Azaryahu and Foote (2008). These approaches were already described in section 3.3.

Spatial presentation of biography allows the reader of a narrative to watch someone's life by following one of the paths or trajectories that have been prepared by the author of the installation. Such a presentation, however, has a few limitations in relation to preserving memories:

- it is difficult to record all possible paths in large cities;
- it is a challenging task to record trajectories in many different countries.

I fully acknowledge these limitations. They justify selecting Causley's life as an ideal case study as Causley spent most of his life in Launceston and his poetry is closely linked with this place.

The number of trajectories in Causley's project was generated by recording still panoramas on the stations (decision points) located most often in the middle of cross roads where all traversing lines from all available directions meet up (according to traversing in land surveying), with video panoramas between these stations to indicate the transitions between stations. All trajectories that have been generated comprise the network of connections in Launceston. This network was based on the topography of

the terrain of Launceston as the trajectories follow main travelling routes. The network of such connections is presented in Figure 63, which uses the map of Launceston as a background that shows the location of decision points in the town. The positions of decision points are determined by inter-visibility and the layout of streets and roads.

The map plays a crucial role in this case study. It indicates locations of decision points and links them to loco-descriptive poems spread over the area. Digital interactive maps, created in this project, have additional features; they, as Champion (2011, p.108), reminds us, 'help orient, navigate and recollect past episodes along a journey'.

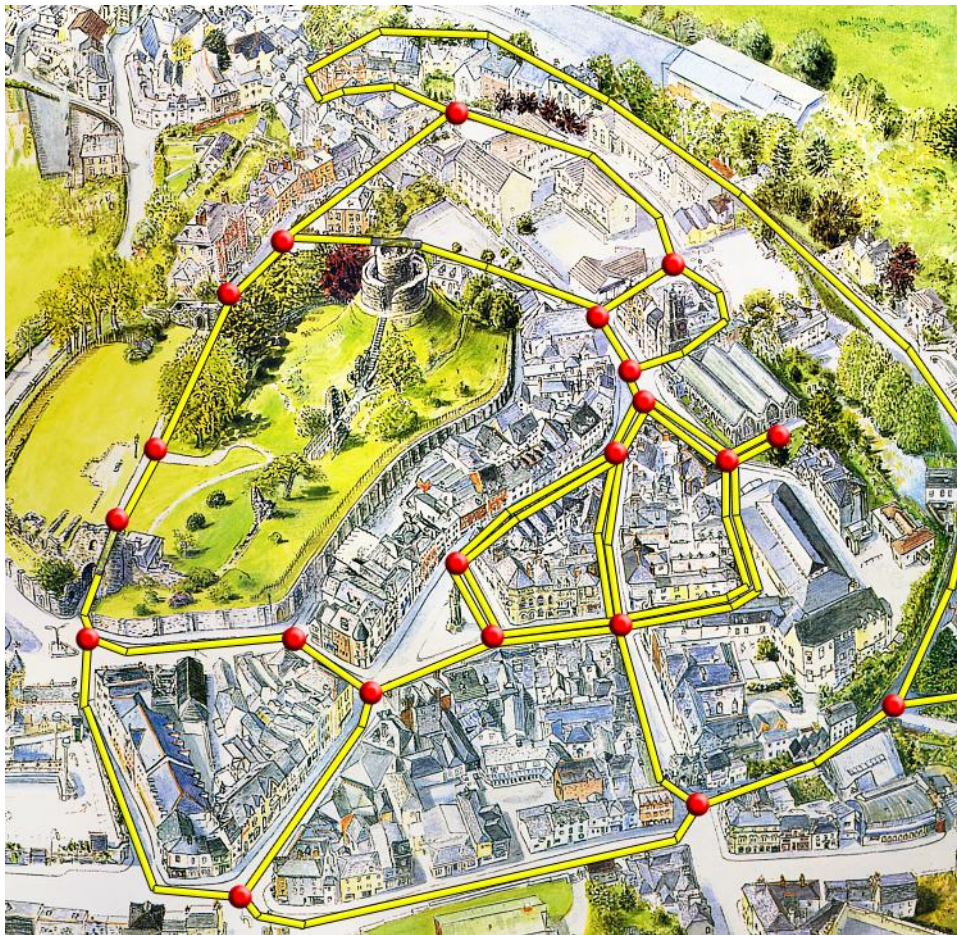


Figure 63 The spatial configuration of decision points (red dots) and traversing lines (yellow lines) overlaid on a map of Launceston. The map of Launceston (here as a background) was produced by John Fenn. Permission to reproduce this figure has been granted by Charles Causley Trust.

The recollection of past events as Calvino (1985, p.124) states does not have to follow the chronological order in which these events occurred, but a map helps to find them their way in the town:

A person's life consists of a collection of events, the last of which could also change the meaning of the whole, not because it counts more than the previous ones but because once they are included in a life, events are arranged in order that is not chronological but, rather, corresponds to an inner architecture.

Here, I follow strategy of spatial narrative (2b) introduced by Azaryahu and Foote (2008) which is described in detail in Chapter 3. This strategy relates to the spatial presentation of the life of a person where particular stations are not linked in a chronological sequence.

The map allows us to move between points/events in the inner architecture of memory. This inner architecture is an individual's preference for remembering and evoking. There are some points in our memory, which we access easily, and some which are hard to find. We create a kind of mind map in our memory, which allows us to recollect these events based on some associations but this recollection is not chronological. The recollection is fragmented.

The exploration of Causley's life in this project is not chronological either but based on the idea of such a map to keep the continuity of space that is necessary for the exploration. The *flâneur* travels from one station to another making decisions on further developments of the interactive narrative and watching objects and locations on the way, which enable them to explore Causley's life and his poetry.

Figure 64 presents the map of Launceston (and Cyprus Well) that links poems to specific locations. Symbols used on this map have the following meaning:

- Red dot – a still panorama, which works as a decision point;
- Single yellow line – a video panorama recorded in one direction marked with the black arrow;

- Double yellow line – video panoramas recorded in both directions;
- Black arrow – the direction of a video panorama;
- Number in a rectangle – numerical record of the still panoramas;
- Title of a poem in the rectangle – refers to a specific location in Launceston.

This case study was designed as an interactive film with different trajectories directed mainly at young audience. Its role is both to entertain and educate. It includes a number of animated graphical elements to attract the young audience. Causley's poetry provides clues to encourage further investigation.

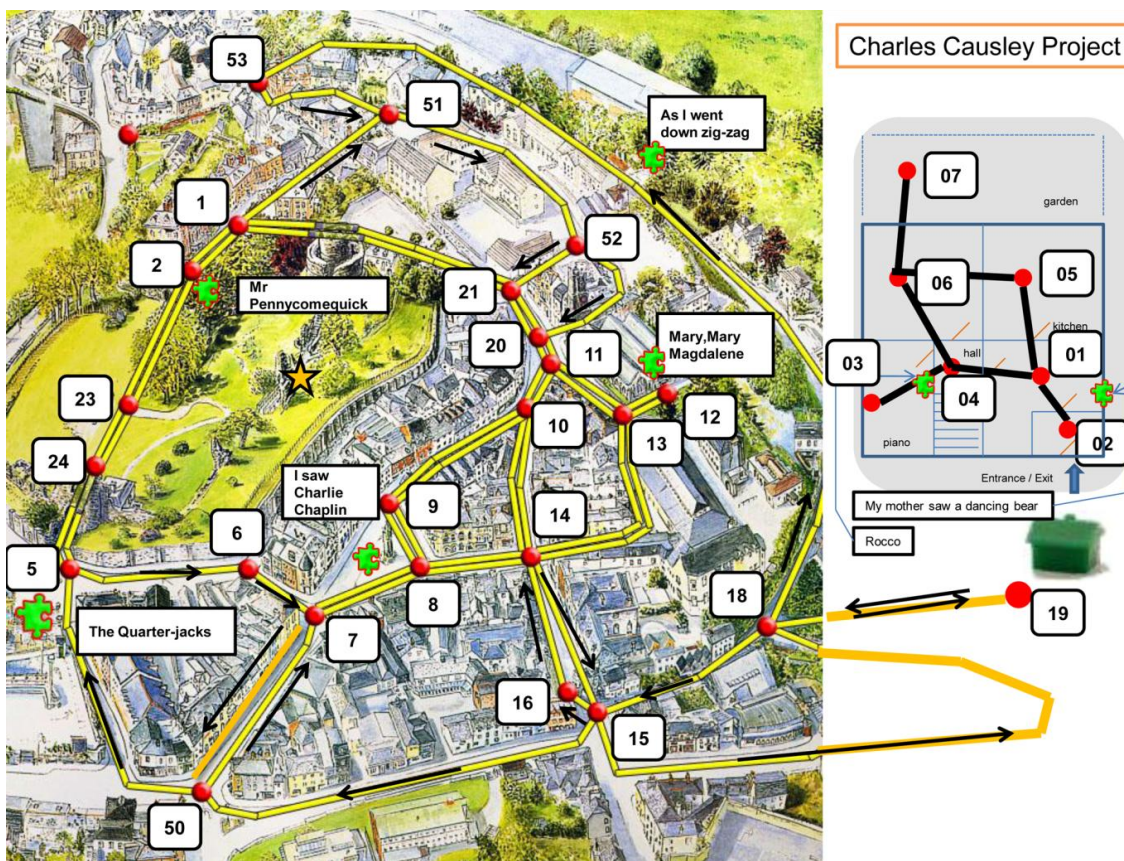


Figure 64 The map of Launceston (left) and Cyprus Well (right) with marked poems related to specific locations in the town - based on the map produced by John Fenn. Permission to reproduce this figure has been granted by Charles Causley Trust. This figure includes only 5 poems in the town and 2 inside the house.

The interaction begins at Causley's house where the user is offered (number 01 in Figure 64) to visit other rooms in the house. The clues located in the house guide the user to exit Cyprus Well. Once the user of the panoramic application is outside the house (number 19 in Figure 64), they are introduced to panoramic videography for the first time. Consequently, exploration of the interactive narrative starts here. While the viewer is travelling between decision points marked as rounded squares (with numbers), illustrated characters from Causley's poetry emerge to supply the textual content displayed during the presentation. Here, emotional immersion occurs when the world prepared for exploration is gradually populated with genuine characters (from Causley's poetry). When the 'reader' of this interactive narrative uncovers poems related to a specific location (loco-descriptive poetry), they have an opportunity to collect objects (one of the functions of a *flâneur*) that are offered by characters and place them in a virtual backpack, the content of which might be printed out at the end of the exploration. For example, the first part of the poem *My neighbour Mr Normanton* (Causley, 1996, p.354-356), located just in front of Cyprus Well (decision point 19 in Figure 64), contains one object ('Cypher book' mentioned in the poem) that is transferable to the virtual backpack that the user carries with them throughout their exploration (Figure 65).

I decided to add this function of collecting objects because, according to Quintinian (1920), we recall things that we did in a particular place. When printed, these objects could provide the young audience with ideas or themes to write new poems related to Causley that might be submitted, for example, for the Charles Causley Poetry Competition or used during school poetry workshops. Thus, the type of interactivity used in the project is both selective and has productive features, as users are encouraged to create new poems. In the future, a new poem created by a young person on the basis of a print-out (with collected items) from the backpack, could also appear in the on-line

version of the application and could be attached to a specific location in Launceston and would be available for other users. New functions of adding/tagging new information to the existing still and video panoramas may be implemented, but this issue needs further investigation and collaboration with other researchers.



Figure 65 A scene that occurs in a panoramic virtual environment in front of Causley's house where a poem *My neighbour Mr Normanton* is presented with a task to find Mr Normanton – Causley's neighbour when found - a Cypher book can be collected and put into the virtual backpack.
Illustration by Ben Phelps and Karol Kwiatek.

The overall aim of the interactive narrative is to find the 'Paradise' that Causley describes in one of his poems:

We called it Paradise: a plat of grass,
[...]
See you in Paradise, we'd say. For here
Was entrance to another land
(Causley, 2000, p.397)

From the above-mentioned poem, it appears that we will meet the author of these poems in 'Paradise', and this location exists in Launceston. 'Paradise' is a place where Causley

and his friends used to play as children. That was also their meeting place (Hurst, 2011, p.26). Once we reach this point, we will already have some knowledge about the poet. It does not need to be the final destination. We will be able to explore the town further using panoramic films that link decision points.

Illustrated and sometimes animated characters from Causley's poetry (for example Charlie Chaplin, Man-frying-egg, Quarter-jacks, Mr Pennycomequick and Mr Normanton - Figure 66) are located in different places within the town. Table 11 explains their position in Launceston. Once the user meets them, they provide hints about the possible position of 'Paradise' and also about other loco-descriptive poems in the town. Therefore, these characters, as well as numerous voiceless objects, are gateways to other stories, sometimes with additional clues. One more character – Lucy – plays the role of a reporter and her task is to help the user to find interactive elements within still and video panoramas (Figure 67).

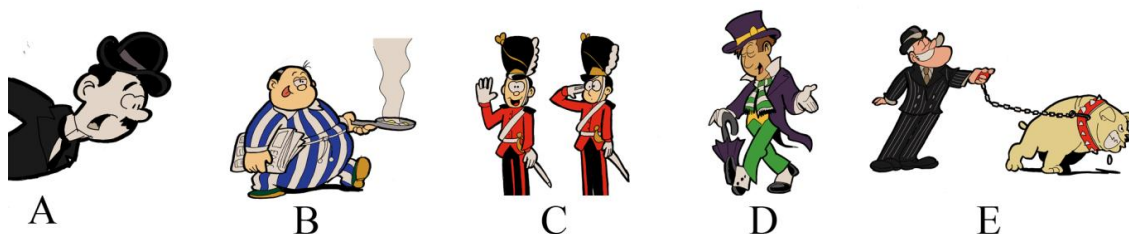


Figure 66 Characters from Causley's poetry: (A) Charlie Chaplin from *I saw Charlie Chaplin*; (B) Man-frying-egg from *As I went down Zig Zag*; (C) Quarter-Jacks from *Quarter-Jacks*; (D) Mr Hector Pennycommequick from *Mr Pennycommequick*; (E) Mr Normanton from *My neighbour Mr Normanton*.

Illustrations by Ben Phelps.

Once the user reaches a decision point in a branching narrative, a voice-over is played with a part of the poem to enable the user to find the animated character. As the user clicks the character, they will be provided with a clue that will help them to decide where to go in a branching narrative in order to find 'Paradise'.

Table 11 Locations at which characters (from Causley's poetry) appear in Launceston.

Poem	Character from Causley's poetry	Location in Launceston
<i>I saw Charlie Chaplin</i> (Causley, 1996, p.8)	Charlie Chaplin (A)	Launceston Square
<i>As I went down Zig Zag</i> (Causley, 1970, p.24)	Man-frying-egg (B)	Zig Zag staircase
<i>Quarter-Jacks</i> (Causley, 1996, p.176)	Quarter-Jacks (C)	Guildhall and Townhall
<i>Mr Pennycommequick</i> (Causley, 1996, p.307)	Mr Hector Pennycommequick (D)	Castle area
<i>My neighbour Mr Normanton</i> (Causley, 1996, p.354-356)	Mr Normanton (E)	In front of Cyprus Well (Causley's house)

Animated characters are not the only feature of the narrative. I would emphasise the use of video files within still panoramas (Figure 67). I had recorded some of Causley's poems, as read by Nancarrow, during the Charles Causley Festival in 2010 and embedded them in still panoramas presenting places/objects to which they refer.

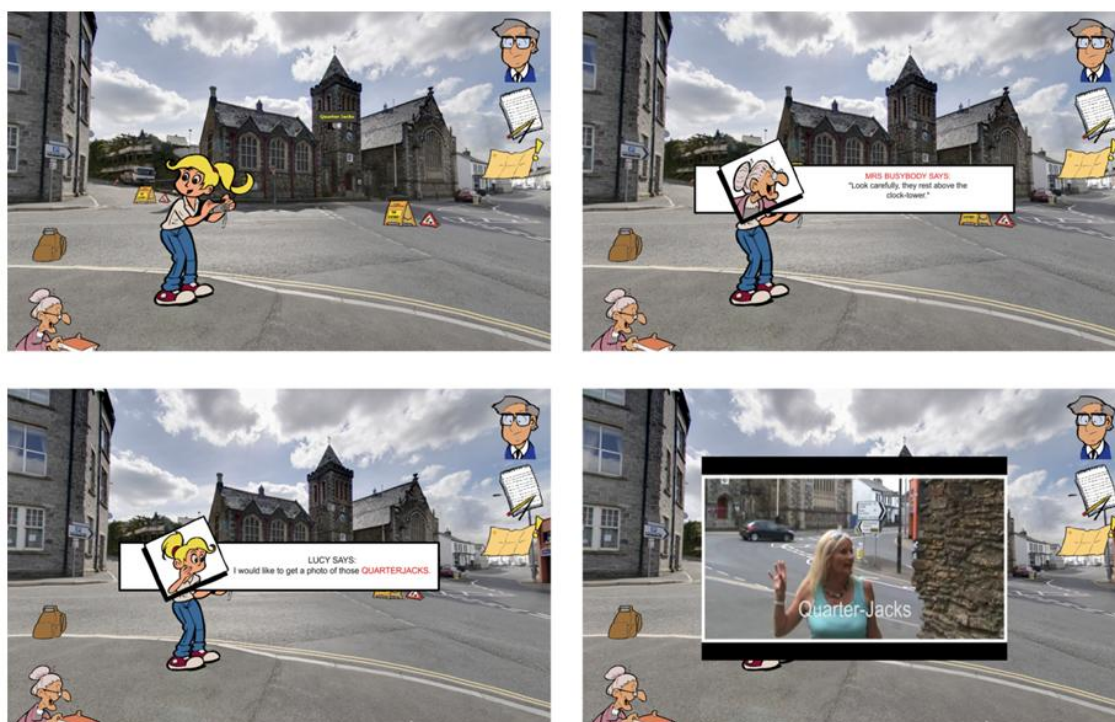


Figure 67 A fragment of a panoramic scene near the Town Hall in Launceston where the poem *Quarter-Jacks* is read and this process is presented in the form of film. Film recorded by K. Kwiatek. Illustration by Karol Kwiatek and B. Phelps.

Panoramic interactive films can also include 3D objects which are very noticeable and may be touched virtually by viewers in search of clues that are hidden in, under or behind 3D objects (Figure 68) and artefacts. Animated characters embedded video recordings and 3D objects are spread over the space of exploration. It is the user's task to uncover these hidden elements. They are not presented sequentially as in panoramic rotundas in the 19th century, but appear interactively on multiple layers.



Figure 68 3D objects which can be interactively rotated are used to present hidden messages about poems.
Illustration by Karol Kwiatek.

All data presented in the application are photographic, excluding the illustrations of characters from Causley's poetry and a few graphics located in the interface. This interface includes graphical icons which are interactive in a panoramic virtual environment and which could be applied to panoramic immersive environment. Files (360-degree still and video panoramas) are stored in folders, where an XML file controls the appearance of individual parts of the interactive narrative.

The structure of the narrative used in this project is reminiscent of the maze¹⁰⁴. It does not allow circularity, the number of choices is limited and there are no dead ends. Such a combination of features is needed for smooth spatial exploration.

The process of recording the narrative

¹⁰⁴ See section 3.5.

Prior commencing the practical part of the project related to Launceston, I spent a lot of time in the office testing Ladybug® 2 spherical video camera that I planned to use in mobile recordings in the second case study. This camera was designed for office use only, but I wanted to use it outside the buildings as a part of a mobile setup, which was necessary for recording traversing lines in spatial narrative in Launceston. Tests in the office included:

- finding the most convenient recording options for the camera (blending between lenses, vignetting parameters, stitching options);
- finding hardware and software for recording with Ladybug® 2;
- exploring the methods of powering a laptop, a camera in a mobile setup;
- exploring the methods of moving a laptop, a compressor and the spherical video camera (a tripod dolly, a trolley, a backpack, a welding helmet on an operator's head, a mobility scooter).

I started to use the 360-degree video camera in the mobile setup because I had explored methods of recording navigational spaces. Manovich (2001), states that photographic exploration of sites provides unique aesthetical possibilities that are not available in 3D. Cyclomedia, Google (product known as StreetView) and Earthmine are some of the companies that use panoramas for presenting the surrounding world, but their panoramas present visual and scientific data that may be useful for customers and do not focus on creating branching narratives. Moreover, they use cars for mobile recordings whereas in this case study I needed a device that could record video panoramas on public roads and also on pavements.

The panoramic camera was purchased in October 2008 and it took me about 6 months to learn how it works and to adjust it for filming in Launceston. Table 12 provides an overview of subsequent stages in the realisation and display of Charles Causley project on a 360-degree screen.

Table 12 Realisation and display on 360-degree screens of Charles Causley project (2008-2010).

Stages of the realisation of the case study	Date
Purchase of Ladybug® 2	October 2008
Recording on a tripod dolly	November 2008
Recording with a backpack	March 2009
Recordings with a mobility scooter in Launceston	28 th -29 th March 2009
First tests of displaying the panoramic film on cyclorama in Montreal, Canada	August 2009 (1 month)
1-year rental of the mobility scooter in Plymouth	September 2009 - September 2010
Recording of the audience in a 12.5 metre 360-degree Cinemax	February 2010
Purchase of Ladybug® 3	April 2010
Recording of the audience in a 21 metre 360-degree Cinemax	September 2010

The first recordings with Ladybug® 2 were performed at the campus of the university on a tripod dolly. Their aim was to explore how to arrange a mobile setup for the camera. The next step in testing the camera involved an introduction of mobile operators carrying a backpack with batteries and holding a laptop and camera in their hands. After these initial trials, I decided that the mobility scooter would be a more stable construction and might be more effective in recording a large area such as Launceston. I rented a mobility scooter from a mobility shop in Launceston for two days (Saturday and Sunday). Then, I had to connect all cables used to build mobile setup. They had to be mounted on the mobility scooter at the beginning of recording and dismounted on the next day. The setup for the video camera consisted of the following elements (Figure 69):

- a mobility scooter that could drive on public roads;
- a welding helmet with a prepared attachment for the camera;
- a compressor which attaches to the welding helmet;
- Firewire800 cable;
- ExpressCard with Firewire800 slots (PC laptop used in the testing was not equipped with Firewire800 output);

- a laptop (not equipped with RAID0 hard drive configuration; RAID0 increase the speed of transferring data (1GB/minute) coming from the camera);
- a 12V battery and power cable (to power the spherical video camera);
- antistatic gloves (they were necessary in the contact with the camera, because the electric impulses in the office damaged some chips in the camera twice during the testing period);
- a cover for the camera and the laptop (my setup was not water-proof);
- software: Ladybug®CapPro from Point Grey Research;
- two 1TB additional hard drives (for back-up of recordings);
- a battery charger for the mobility scooter (for charging batteries at night);
- a battery charger for 12V battery;
- a battery charger for the laptop - the battery in my laptop lasted only for 1.5-hour recording - during that time, I managed to fill up all free hard drive space, then the laptop was charged (approx. 1 - 1.5h). During the charging of a laptop battery I transferred files from the hard drive in the laptop to external hard drives.



Figure 69 The application of a mobility scooter and a welding helmet in the first approach of creating a mobile camera system. Images by Karol Kwiatek.

Due to the fact that I did not have access to the mobility scooter at the university in the first period of my tests, I prepared a setup for camera based on a helmet, which does not modify the construction of the mobile device. My task as an operator of the mobility

scooter was to drive it and also to control what was recorded on a laptop located on my laps. The laptop was opened in order to have a direct control of recordings. It was a very common issue in the case of Ladybug® 2 that the recording stopped and the process of recording was interrupted and had to be repeated. Ladybug® 3, the successor of Ladybug® 2, eliminated a large number of issues that had been problematic for Ladybug® 2.

When driving on public streets I tried to follow traffic regulations. However, these regulations sometimes interfered with the process of recording the interactive narrative, e.g. in a few cases I had to drive towards traffic as I needed to record paths in both directions or I had to drive on the pavement as cars were moving quickly on some streets and I did not want to be the roadblock.

The recording process took place over days on a weekend and, thanks to the low traffic, I managed to record most of the streets in Launceston I planned to include in the project. The recording process would be much faster if I had the most recent spherical camera (Ladybug® 5) and a workstation laptop that could use power from the mobility scooter's battery.

I managed to record approximately 20 public streets in both directions and 2 paths (through the castle area and the path at the back of St. Mary Magdalene church). I did not record short distances between red decision points as shown in Figure 64, but I focused on driving along as many streets as possible, because I wanted to eliminate the time of holding the camera on my head (the weight of the helmet with camera was about 1.5kg (3.3 pounds)). Short breaks every 15 minutes were necessary to remove the camera from my head and to plan another trajectory (e.g. from Eagle House Hotel to Cyprus Well and then from Cyprus Well to Guildhall). I also created a number of recordings in the part of Launceston where Causley was born and where he is buried (close to Kensey river), but I decided to focus on the upper part of the town where more

topographical poems can be found. The long recordings were then cut into short video panoramas (e.g. the distance between Eagle House Hotel (21) and Cyprus Well (19) can be divided as follows: 21-20, 20-11, 11-10, 10-14, 14-15, 15-18, 18-19; the numbers indicate decision points indicated in Figure 64). There are 38 short video panoramas created in this interactive project.

By recording a number of streets in Launceston I could create a network of connections between stations. When the batteries in the mobility scooter and in the laptop were charging, I had time to create still panoramas in the decision points, (indicated as red points in Figure 64). Figure 70 illustrates three still panoramas created in particular decision points.



Figure 70 Three chosen still panoramas from Launceston:
A - Cyprus Well (Causley's house) - 19¹⁰⁵; B - Launceston Castle - 23; C - Guildhall - 5.
Images by Karol Kwiatek.

¹⁰⁵ Numbers refer to decision points indicated in Figure 64.

It was necessary to take still panoramas at the same time of the day as the video panoramas were recorded and to have the same weather conditions so the continuity of time is preserved. The locations of the stations were determined in advance according to the land surveying rules for designing a triangulation network, where inter-visibility between stations is kept. 25 still panoramas were produced during two days of recording and 125 gigabytes of raw video panoramas were generated.

Once the recordings were completed, it took me another 6 months to find a specific method of compressing video panoramas that could be tested and presented in panoramic virtual environment (Lucid Viewer); which is discussed in the following section. The script of the narrative is available in Appendix 3.

During the Charles Causley project, I learnt that locating a camera on a head of an operator was not a recommended choice because the head movements are visible on the large screen of the immersive environment, used for displaying panoramas. For this reason, I decided to replace a welding helmet installed on an operator's head with the construction presented in Figure 71 (a pole at the back of the mobility scooter and a shelf for a laptop in the front was attached and welded to the mobility scooter). The scooter was rented for one year from More than Mobility Company in Plymouth, who gave permission for these elements to be added. This setup was used in many other panoramic projects created in the final months of my PhD/MPhil course. However, due to transport restrictions, it was not used to record new footage in Launceston.

The other thing that I found out is that the whole project needs to be tested in a panoramic virtual environment (e.g. Lucid Viewer) on a computer screen before presenting it to large audience who can watch it in a panoramic immersive environment (360° screen). DVD No. 2 presents interactive project which could be explored on a computer screen and also includes the recording of the audience watching the content on a 360° screen.



**Figure 71 A motorised scooter adjusted to be used with Ladybug@2 camera and a laptop (July 2010).
Image by Karol Kwiatek**

If I could record this project again, I would choose either a Ladybug® 3 or a Ladybug® 5 (Point Grey Research has not produced Ladybug® 4) spherical video camera, a MAC laptop, USB 3.0 connection and a mobility scooter with a professional stabilization system. It seems that in order to achieve full quality of recordings and the stabilization of the image, various equipment and techniques used in the film industry could be applied.

I think I would perform this project differently. First of all, I would get more operators involved. One operator could be responsible for driving the mobile device, whereas the others could transfer data, edit footage, check whether video panoramas are correctly recorded and still panoramas rendered in the specific decision points. In addition, if the project is created only for a 360-degree cylindrical screen, the application of Ladybug® cameras is not necessary, as they do not provide sufficient

resolution for such panoramic immersive environment. I would rather use a rig that has 6-8 cameras (HD quality). Furthermore, instead of a mobility scooter, I would use a small electric car with a pole over it, which could be driven along many routes. Alternatively, a flying device would capture a completely new image of the town – the one that is not normally available for the inhabitants but this perspective would not provide as many memory triggers as the land perspective that enables to recreate human's head movements. This is a possible direction for the development of immersive films, similar to the case of panoramic films in 1950s and 1960s, which provided recordings from familiar but inaccessible locations. Finally, I would get actors who could be located in different spots in the town and would perform multiple tasks when the camera approached them.

Lucid Viewer

In order to test the project on a computer screen, the Charles Causley project was prepared in Lucid Viewer¹⁰⁶, which is a Flash-based application developed by Jason Villmer. Interactivity such as: adding actions to buttons, arrows, interface icons, rotating 3D objects and navigating spherical still and video panoramas can be achieved through XML coding. I created 1083 lines of XML code¹⁰⁷, which allows displaying the following items in the panoramic virtual environment:

- 38 video panoramas¹⁰⁸ (created between decision points);
- 25 still panoramas of Launceston¹⁰⁹ (created in decision points);
- 8 still panoramas of Causley's house¹¹⁰;

¹⁰⁶ <http://www.lucid.it> (Accessed: 10.08.2012)

¹⁰⁷ See project1.xml file on DVD No. 2 (in 'if' folder).

¹⁰⁸ See files on DVD No. 2 ('if/media/360video' folder).

¹⁰⁹ See files on DVD No. 2 ('if/media/pano' folder).

¹¹⁰ See files on DVD No. 2 ('if/media/pano_house' folder).

- 9 interface icons;
- 4 videos of reading poems¹¹¹;
- 3 collectable objects;
- 1 map;
- 1 three-dimensional object.

A number of items from the list above are visible in four screen shots in Figure 72.

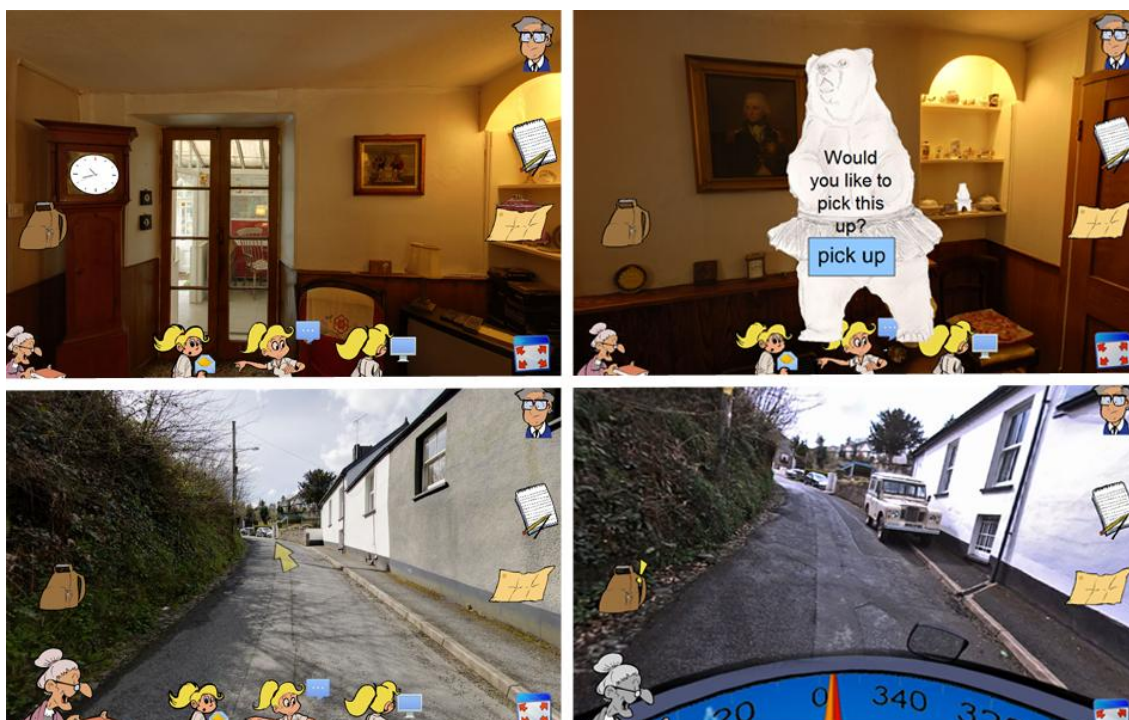


Figure 72 Fragments of the panoramic virtual environment designed in Lucid Viewer.
Illustration by Karol Kwiatek.

I have chosen Lucid Viewer to preview my projects over other viewers such as KrPano¹¹² and Pano2VR¹¹³ because it was one the first panoramic viewers that enabled viewing spherical video on a computer screen. I needed to preview Charles Causley project on a computer screen before showing it on 360-degree screen because the

¹¹¹ See files on DVD No. 2 ('if/media/video' folder).

¹¹² KrPano Panorama Viewer, <http://www.krpano.com> (Accessed: 22.03.2011).

¹¹³ Pano2VR is application to convert spherical or cylindrical panoramic images into Flash, HTML5 or QuickTime VR files, <http://www.pano2vr.com> (Accessed: 23.04.2011).

project included a number of different options that had to be linked and tested before presenting the project in the panoramic immersive environment.

360-degree screen

Selective interaction in the version of the project prepared for a computer screen differs from the one designed for the immersive panoramic environment. At decision point the viewer has to choose one of the options (described with numbers) in order to continue the narrative (Figure 73).

While there are often three or more options to try on the computer screen, for the purpose of simplicity, I decided to limit the number of options available in the panoramic immersive environment to two. I was then able to use the same template for the touch screen as the one that was applied for the first case study. Only one slide was used with '1' and '2' options (Figure 74). These options, which refer to the choice of routes, were visible on a 360-degree screen. Figure 75, which is a 360-degree image from the interior of the 21m 360-degree Cinemax arena, shows white circles that indicate two options displayed on the panoramic immersive screen.



Figure 73 The path for traversing can be chosen using numbers. Illustration by Karol Kwiatek.

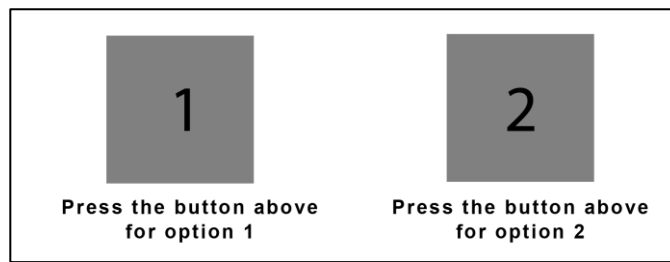


Figure 74 Two options available on a touch screen for Charles Causley project. Illustration by Karol Kwiatek.

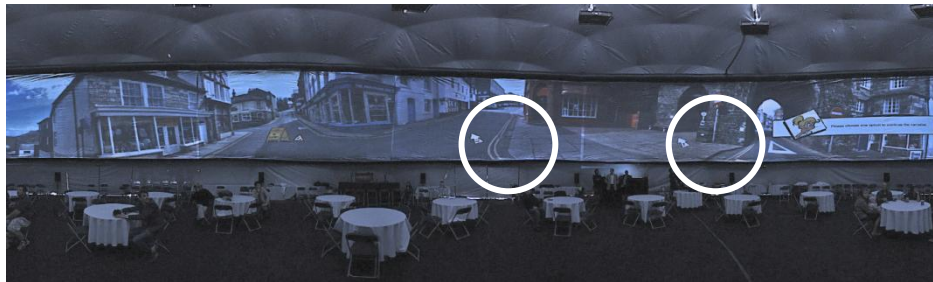


Figure 75 One of two choices available to the spectators during the presentation of Charles Causley project on a 21m Cinemax screen. This is a panoramic image from the centre of the immersive arena. Illustration by Karol Kwiatek.

The interactive film (*Where is Paradise*) based on topographical exploration of Launceston presented on a 360-degree screen need to be simplified in many aspects (mainly with respect to interactivity), but the visual part could be rendered in higher resolution. Animated characters and objects, which appear in various parts of the film to provide clues about possible options and further development of the story, support the surprise element.

7.4. Summary

This chapter has given an account of, and reasons for, investigating cultural memory of a Twentieth Century poet who used to live in one town. This case study explores how panoramas based on artefacts and places could contribute to the preservation of his cultural memory. Artefacts and inspirational environments are often unavailable for

public viewing, just like in Causley's case. I propose to use panoramas to provide a digital access to such sites and objects. Panoramic photography is well-suited for recording static spaces (interiors of buildings) and panoramic videography applies to dynamic and ever-changing environments.

There is probably no better way to learn about artists' lives than by approaching their work. Life provided a sort of inspiration for their work, which is reflected in the artistic output. My intention, however, was not to create Causley's biography as the poet himself has not left an autobiography: 'I don't think I'll write an autobiography because it's all in the poems,' he once said (Gove, 1992). He pointed out that his life could be studied from his poems, as they include all links and references.

In my project, I did not want to simply provide the collection of poems created by Causley or a list of places in Launceston related to Causley, but my aim was to create a meaningful space (visualised using still and video panoramas) where traversing helps to recall and determine how facts from his life are reflected in his poetry and how they refer to locations in Launceston. This may be achieved by spatial narrative generated by enhancing panoramas with a narrative. Spatial narrative describes links between a person and a space that follows paths along which a person travelled. This exploration consists of events and facts from someone's life that are not presented in a chronological way, but appear in a random order, which depends on user's traversing. The user finds causal links between these events in their own interpretation of the poet's biography.

What is more, in order to preserve cultural memory, I proposed to use polychronic narrative based on a fragmented work (all paths can be correct – the modified the maze structure), which consists of decision points and traversing lines. The locations of decision points are determined by the layout of the terrain or traffic laws so stations occur mainly in crossroads, where two or more traversing lines meet in one

point. I called this type of narrative topographical narrative. The user interacts with the narrative by defining the route along which they would travel and by choosing objects they want to see during the movement between decision points. This type of interaction is selective. However, the user is also provided with the possibility to collect objects while traversing and store them in the backpack. These objects may comprise the motifs of new poems they are encouraged to write. Thus, the project also supports productive interactivity.

The evidence from this case study suggests that the role of place and artefacts seems quite crucial in this panoramic approach to preserving cultural memory of artists and poets, as it imposes a particular way of ‘reading’ and framing memory. The method described in this chapter might be applied to other individuals (Dylan Thomas, Charles Dickens, Czeslaw Milosz, Sigmund Freud etc.) who used to create their work (poems, books, paintings) mainly in one town that was an inspiration to them. I think that my approach is more applicable to case studies of people who died recently because the environment and artefacts that they left may still be well preserved. The lives of Czeslaw Milosz (1980 Polish Noble Prize winner in literature) who died in 2004 in Krakow, Poland or Wislawa Szymborska (1996 Polish Noble Prize winner also in literature) who died in 2012 (also in Krakow), provide a large potential for applying my methods to preserve their cultural memories inscribed in Krakow. Both Milosz and Szymborska created poems inspired by artefacts and very often places.

The current study has only examined one individual who spent nearly most of his life in one town and does not apply to preserving cultural memory of a person who used to change their homes very often. The project *The Milosz Compass*¹¹⁴ which is

¹¹⁴ *The Milosz Compass*, <http://www.themiloszcompass.com> (Accessed: 20.05.2012). This project presents locations related to Czeslaw Milosz and it involves the creation of panoramic virtual environment based on XML coding. Cultural memory of Milosz could be preserved by presenting places that he visited and which inspired him. The creation of panoramas in private flats or houses after the death of a well-known individual would not only provide a material for further literature analysis but could also

realised on the basis of the concepts presented in this chapter might demonstrate that it is possible to use panoramas to preserve cultural memory of a person who travelled extensively and lived in many places. This aspect needs to be further investigated but it requires a large budget for travels to all places where a person lived and worked.

The main limit of this research is that I am exploring one of the possible approaches to preserving cultural memory where I decide to give a place and artefacts a central role. Artefacts and locations are tangible, they may be observed or visited and thus their links with poetry or prose are fairly easy to establish. The task of preserving memory using the panoramic approach may get complicated when it uses music or abstract paintings; which are less explicit.

Further work needs to be done to establish whether cultural memory of an individual presented on a 360-degree immersive environment can be preserved and what factors can help such cultivation.

8. What can be learnt from cases

This chapter compares and cross-references reflections from the two previous chapters in order to recognise some common results within the main themes of the cases, and identify differences between them. It then attempts to explain them.

The findings from the two practice-based cases provide some new insights regarding the role of panoramas in helping to preserve cultural memory. They indicate that it is worth re-evaluating the role of panoramas in the light of recent technological advances as digital panoramas can be explored individually on a computer screen and also, collectively, in large cylindrical architectures. It may be possible to view them *in situ* using for example tablet computers. The interactive panoramic film is re-thought in this thesis, particularly in the context of providing multi-person activity and ‘optional thinking’, which involves thinking about possible and viable alternatives. This research also explores the possibility that the feeling of immersion can be increased by enabling multiple perspectives of viewing and yet provides reasons to reflect that the main issue that still needs to be investigated is how to support collective experience in such circumstances.

These new insights generate questions for further research; for example, whether users make choices on moral code or on what they want to see. Such questions could be examined in new applied research. I will identify these questions within the following sections while discussing the new insights regarding panoramas (8.1), interaction (8.2) and image spaces (8.3). The strategies for future preservation of cultural memory are recognised in (8.4). The issues discussed within these sections are linked with the main research questions as determined by the literature review and presented in chapter 5 (methodology). Questions such as:

- How can the preservation of the public memory inspire the cultivation of cultural memory?
- What is the role of interactive panoramas in the preservation of cultural memory?

8.1. Insights about panoramas

The literature review indicates that cultural memory needs ‘de-freezing’ and re-contextualization which only further research, both imaginative and technological, can trigger¹¹⁵. The case studies that have explored the huge potential of digital panoramas that can be enriched by and merged with various technologies (3D reconstructions, interactive narrative, photorealistic content, animations, videos and elements of video games), confirm this. Recent advances in communication technologies, that also affected panoramas, enable cultural memories to be shown in more interactive and participatory ways, which is currently expected - especially by the younger audience¹¹⁶.

Memories captured by panoramas in some instances may be more complete than those presented in films and traditional images. Panoramas present a 360-degree view of the environment and enable the arrangement of how objects were located in relation to one another to be established. When merged with other techniques, they may be useful in recreating the appearance of structures that were destroyed or are not available for public viewing. 3D panoramic reconstruction of Charles Church¹¹⁷ shows how the church appeared before the war, thus providing the audience with a unique experience of viewing the complete structure of the church once more. Panoramic visualisation of Charles Causley’s house¹¹⁸ allows viewers to see objects that provided inspirations for his poems in their natural environment. One can claim that a similar effect may be

¹¹⁵ This issue is discussed broadly in 2.2.

¹¹⁶ It is discussed more broadly in 2.5.2.

¹¹⁷ See section 6.3.

¹¹⁸ See section 7.3.

reached with traditional pictures or films. It is true to some extent. However, traditional pictures and films do not provide an instant view of all objects in a given area and thus may obstruct identification of relationships between objects. In case of panoramas, the viewers decide how they want to watch the presentation. The whole visualisation of environment is presented and the viewer watches fragments of it according to own preferences. This helps in establishing relations between objects in the environment.

In some cases, the panoramic view may obstruct remembering, however. If the time for viewing the panoramic picture is limited or if the scenes in the panoramic film change too quickly, the audience may not be able to see the complete picture/film. In such circumstances, their memories can be fragmentary. While the audience is used to traditional photography and cinema, it might be expected that they will have problems following panoramic presentations.

The two case studies also suggest that panoramic photography and panoramic videography can be used very effectively to create navigable spaces¹¹⁹. Static spaces can be documented with still panoramas whereas video panoramas could be suitable for recording the movement between different locations. Navigating these spaces remains a problematic phenomenon, however. While viewers are familiar with single-user navigation on the computer screen introduced by VR¹²⁰, it may be anticipated that navigating the immersive environment in the way that is designed as a group activity may turn out to be much more complex¹²¹. It raises questions about the choice of an agent who interacts with the system on the basis of group decisions, the mechanism of decision-making and different interacting and viewing competences of members of the group. These questions are still open and may be a starting point for new research.

¹¹⁹ See section 4.4.

¹²⁰ See 'VR navigational space' in section 4.4.

¹²¹ See 'pano-video-graphic navigable space' in section 4.4.

Repeat photography¹²², which I came across in the literature, and repeat videography which I discovered by analogy to repeat photography, apply well to monitor changes within a particular area. For example, they help to see how Charles Church has changed and they help to understand the reason of this change. Thus, they may support traditional methods for documenting sites and buildings, provided they become recognized by specialists in the relevant fields.

Panoramas enable access to sites that may be unavailable for public viewing such as Charles Church and Charles Causley's house. Panoramas replace the physical access by a digital one that may be granted to all types of users, including the disabled, irrelevant of the season, time of day and weather conditions. Panoramas displayed in the panoramic virtual environment on a computer screen (panoramic imographs) by the application of the Internet¹²³ can be seen by the audience in different locations around the world. This digital access is often easier to provide than physical access. The Charles Causley Society and the Charles Causley Trust involved in preserving Causley's memory have already recognised advantages of digital access¹²⁴. Both organizations are interested in granting visitor access to the poet's house but a limited budget makes it impossible at the moment. They consider interactive panoramas as means of providing access to Charles Causley's house at least before they manage to provide physical access in the future. As the location and the layout of the house offer very little chance for providing the disabled access, panoramas offering a virtual visit to all rooms in the house may be the only possible way of visiting the site for the disabled.

However, it may be argued than the physical presence in a place is more meaningful for remembering than even the most refined digital access. My personal visit to the Auschwitz-Birkenau State Museum provided me with far better

¹²² See section 2.5.1.

¹²³ For example using Lucid Viewer which is introduced in section 7.3

¹²⁴ Interactive panoramas of Charles Causley's house are available on the Charles Causley's Trust website: <http://www.thecharlescausleytrust.org/media.html> (Accessed: 14.08.2012)

understanding of this place and the destiny of people who were sent to die there than a number of history lessons I attended at school and historical films I watched¹²⁵. A guided tour makes it possible to understand this place more fully, however it requires at least three and a half hours.

As digital panoramas can be enriched with other data (narratives, 3D objects, surround sound), they improve access to information as well. Memory sites play mainly a symbolic function and stand as visual reminders of the past events. Although viewers may associate them with particular events, only locals are familiar with the wider historical context that memory sites represent. This is the case with Charles Church. Most of visitors who come to the city, and who do not originate from the Plymouth area, know very little about the events that made the church a ruin. Two plaques in Charles Church provide a short summary on what happened during the Blitz. A wider description may be found in historical books or on the Internet sites about the Blitz, but not on the memory site itself. Panoramas enhanced by narrative may be more explicit than the memory site itself. They will not be as symbolic as the site, however, even when most carefully designed. The ideal situation would be building a panoramic immersive installation on the memory site or very close to it as it would facilitate combining symbolism of the place with features of panoramas. This, however, is often obstructed, just like in the two case studies, by the lack of physical access to the site.

¹²⁵ The exhibits in the museum in the form of thousands of shoes, artificial limbs or children's toys that were taken in huge glass cases that represent one day's collection at the peak of the gassings made me aware what the scale of the holocaust was per day. Looking at the group pictures of prisoners who were taken to the camp and dates when they arrived there and died, I became aware that the maximum time they could survive there was three months. I considered it as a great achievement when the guide took my group to Birkenau and showed us fragile barracks with very thin walls, big cracks in the walls and roofs, no insulation, heating and sanitary conditions where the prisoners had to live being provided with very small portions of often rotten food that made them sick.

8.2. Insights about interaction

The review of literature points out that interactive film based on the Kinoautomat model¹²⁶ may be the relevant medium for communicating the narrative to the audience through the medium of panoramas.

The narrative created in the first case study is topical. Users can determine sequences of events by deciding what should happen next. They can see the events that occurred inside the church from two time perspectives: present and past. I designed the effect of changing from past to the present and from present to the past in the panoramic format. The story begins in the past but sometimes ends in the present. I applied gradual slow motion change (during the movement) because in the interactive immersive film, such a change cannot be as immediate as in a traditional film or documentary¹²⁷. I discovered that the continuity of space (created using panoramic videography) and continuity of time as gradual temporal transformation enhance orientation in the depicted environment that was recorded using cameras. The change of time perspectives supports optional thinking and recalling as users become aware of different possible scenarios of the story.

My intention in the first case study was to create multiple points of view so that the narrated event could be viewed from the perspectives of different participants of the story. However, due to various limitations discussed earlier, I have not managed to accomplish this task. The change of personal perspectives could be a subject of further research. It generates questions about the structure of the interactive narrative, about the users' interaction with films that include multiple personal perspectives, as well as

¹²⁶ See section 3.6.

¹²⁷ See Figure 45.

questions related to efficiency of such films in preserving memories; to mention just a few.

The second case study was based on topographical narrative. The interactivity model in this project enables users to choose routes they want to follow or objects they want to study in more detail. Whereas the case study of Charles Church allows selective interaction only, the Charles Causley project includes selective and productive interaction as users are encouraged to collect objects in the virtual backpack and create poems on their basis so the exploration of the life and poetry of the poet could be continued after the presentation. The act of collection stimulates a productive process of creating new poems and has the potential to enrich the interactive narrative.

The questions that arise from these two practice-based cases concern agency. Choices that the users have in both films have been pre-scripted. Can we call these films truly interactive then? How can an interactive film be designed to allow unlimited choices using photorealistic content recorded by cameras? Can it be achieved using contemporary technologies or is it a dream of the future? How can surprise and excitement be maintained in the interactive films based on historical events and people who were famous in local communities? How can more engaging interactive films than those I developed be created? The basic question that derives from the set of question posed here is what type of agency we need. In my view, the pre-scripted number of choices works well for the narrative whose aim is to preserve memory. Simple decision-making used in my projects makes the audience think about the possible alternatives. It is not the number of options, in my view, but the awareness of the audience that history could have taken a different course that is crucial for preserving memories. In my experience of creating and using these choices, the suggestion emerges that if users were provided with a greater number of choices, they would be more prone to losing track of the story. If they had been given too much agency, i.e. if choices had not been

pre-scripted in advance, and their own scenarios had been created, agency could get out of their control. This would cause undesired consequences, and may violate the preservation of memories. I am aware of the fact that there may be possibilities that I have not predicted, and which the viewer could explore, to see even more alternative scenarios. It could be a good idea to store all possible trajectories or scenarios (recorded by cameras) in a large database. The system should only present these choices to the users that would not lead to the distortion of the story. From the technological point of view it is possible to design such a system. It may be a bit complicated at the moment, as immersive screens are still evolving, but it should become much easier in due course.

I also think that more research needs to be done on how people make choices in the interactive films. In both case studies viewers are asked to vote on the option they want to see next, but it is the choice of the majority rather than individual choices that determines how the story develops. Although some people may have different preferences, they have to watch what the group selects. This issue is a relatively straightforward in VR which supports single person interactivity. Users may have their own versions of the interactive film at home or on a table computer and choices can be made according to their preferences. In the case of these research projects, we deal with the group interactivity executed by a selected member of the group who interacts with the system. The advantage of interactive films is the possibility to watch them as many times as the audience wishes to as these films are typically quite short which enables different scenarios to be explored. In my view, it is also worth exploring whether people decide by a moral code or on what they want to see. This issue is very relevant in Charles Church where emotional immersion is generated. Do viewers want to save the characters from death and make decisions that allow them to avoid the risk of bombs or are they simply curious about what might happen next or simply wish to see different parts of the church and not care how their decisions may 'affect' characters in the story?

8.3. Insights about image spaces

The two practice-based cases suggest that interactive immersion can be increased by providing the relevant image space. The panoramic immersive environment in the form of a cylindrical screen has been considered outstanding compared to the panoramic virtual environment comprised by a computer screen. I learnt that interactive films need to be tested on a computer screen in a panoramic virtual environment¹²⁸ before they can be shown on a cylindrical screen (panoramic immersive environment), but it is the latter that is immersive as it encircles the audience and makes them feel as they were relocated to the world of images.

However, the two case studies also indicated limitations of current technologies used in building circular screens. The number of options users had (at decision points) in immersive environments that were used in this research was limited to two as the projection system used in circular installations could not cope with other alternatives. Programming the user's interface for more options was a difficult task and could only be accomplished with ample time and unlimited access to such screens¹²⁹. This limitation may be overcome in the future when more advanced systems are developed or when systems for panoramic virtual and panoramic immersive environments become standardised. I think that research could be done on specification and language format that will allow artists to present both linear films and non-linear productions on a wrap-around screen in such a way that they do not need to know the programming languages.

As both Charles Church and Charles Causley's house are not available for public viewing, it would not be possible to install digital immersive arenas on these

¹²⁸ Panoramic virtual (non-immersive) environment is available on a computer screen or iPad screen while panoramic immersive environment is a 360-degree screen

¹²⁹ 360-degree screens (12m Cinemax and 21m Cinemax) that I used in my research project were available for the University of Plymouth for the period of two weeks in total.

sites. Instead of building an arena that is fixed to a particular place in Plymouth or Launceston, a kind of portable construction could be used. It could be easily dismantled and moved to other locations. Thus, it could be used to spread the memory of local artists and events to wider groups and communities in a similar way to showmen spreading news about battles and historical events using painted panoramas, moving panoramas and dioramas in the 19th century.

One could ask whether projecting case studies in immersive environments contributes to the preservation of memory. Evaluating the success of immersive arenas could be an aspiration towards further research. Hales (2010) suggests the analysis of audience behaviour during the screening as it informs whether they enjoyed the screening or not and gives some hints on what the audience could learn from it. Hales has been recording the audience of his interactive films but he has not analysed these recordings yet. I also managed to record the audience using a 360-degree camera¹³⁰. The recordings from the panoramic video camera are available on DVD No. 1 (case study 1) and DVD No. 2 (case study 2). Appendix 4 and Appendix 5 include instructions how to view and interact with panoramic interactive films about Charles Church and Charles Causley respectively. The panoramic recordings show where the audience was located in the immersive environment, what positions they took (standing or sitting), how they moved and viewed an interactive film. Analysis of such recordings would provide points of departure for the new research that would focus on the reception of the panoramic interactive film and would provide some suggestions on the most effective ways of viewing such films. It might also point out how to use tablet computers, HMDs or VR glasses (that will present camera-based recordings) for viewing locative panoramic interactive films¹³¹ and whether viewers can contribute to the immersive

¹³⁰ Figure 59 and Figure 75 present two panoramic views from the centre of 360-degree arena.

¹³¹ This type of film would enable viewers to explore and navigate sequences of video panoramas in locations where they were recorded.

viewing and recalling by adding tags (in the form of comments, films, images) to still and video panoramas.

8.4. Physical vs digital preservation. What is the strategy of the future?

Memory of Charles Church is cultivated by those who experienced the Blitz personally, whereas memory of Charles Causley is preserved by friends and acquaintances of Charles Causley. People cultivate personal memories if they were there or have family mementoes like photographs. That translates to a social scale through group activities such as memorial services, memory walks, festivals and commemorations and into a culture through artefacts such as panoramas. These people are aware, however that, when they pass away, the memory of the events that affected their lives and people they knew may not be preserved with such a force and commitment as it is nowadays. Young generations who are exposed to cultural memory nowadays may be interested in maintaining traditions celebrated by their parents and grandparents in the future but, because they will no longer have a direct link to the past in the form of their ancestors who remember it, the process of preservation memory may not be quite the same. In addition, the fact that people travel a lot and move to places all over the world in search for jobs, makes this process is even more complicated. Current generation are aware of the potential digital technologies may have in preserving memories. Advances in computer technologies and the increase of social media websites encourage community groups to share their memories with other Internet users who may live far away from each other. The users, who are far away from the site, may access it digitally through the Internet-distributed panoramas. They may not immerse them to the same extent as

the immersive environments, but they enable them to see objects and artefacts *in situ* and offer similar type of interaction.

The two case studies suggest that digital panoramas may help young generations to maintain and cultivate memories of their previous generations. Panoramas have a large ‘capacity’ enabling personal recollections, remarks and suggestions to be stored. They offer wide possibilities as they may be enriched with videos, 3D reconstructions, narratives, repeat photography techniques and surround sound. Panoramas distributed on the Internet may be tagged and pictures, videos or notes could be added by individuals to particular locations presented on panoramas. Video panoramas provide continuous recordings along the routes which supports tagging all possible elements which would not be possible in traditional films recorded in one direction only.

Panoramas can be updated by each new generation involved in preserving memories without losing any content. However, the richness of information in panoramas may overwhelm the audience and may lead to the loss of the main message. The fact that panoramas document interiors so well by providing 360-degree views may be a temptation to the Charles Causley Society and Trust to change the rooms in Causley’s house or move artefacts; as it would be relatively easy to re-create the original appearance or layout. Another disadvantage of panoramas is the fact that they are not metrical, i.e. there are no coordinates of base stations at which panoramas were taken so it may be difficult in the future to carry out repeat photography and repeat videography at exactly the same points. Thus, panoramas may only be used as visual materials not as reference data. Panoramic equipment could be enhanced with GPS receivers to determine the location of base stations but this feature may be a subject to a new research project. In addition, changing weather conditions may make it difficult to provide continuity of time when recording panoramas. It is not very likely that weather will be the same when repeat panoramas and repeat video panoramas are taken.

Technologies for displaying panoramas change very quickly and become outdated in the course of a decade or two. Today, the Internet and the 360-degree screen are typical environments where they can be displayed. 360-degree screens have the potential to become a tourist attraction in town centres as they offer visitors a quick tour along the sites of cultural memory. The disadvantages of the projector-based display systems are frequent operational problems, which require specialised service and high maintenance costs. This technology, however, seems to be only temporary as it may be soon replaced by tablet computers that conquer markets of digital devices.

8.5. Conclusions

The analysis and comparison of the two initiatives of preserving cultural memory led to a series of reflections about the process of preservation of cultural memory.

I aimed both to examine how the expected targets can be achieved using available technology, but mainly how ideological limitations of the current methods of preservation of memories could be overcome by interactive panoramas. These limitations include limited access to memory sites, presenting artefacts not *in situ*, and fragmented narratives on the memory sites, which only help the site to play the symbolic function so that the whole history behind it is not uncovered.

The two practice-based cases indicate that interactive panoramas enable these limitations to be overcome as they present artefacts and activities *in situ* and provide digital access to the locations that are not available for public viewing. They enable interactive narratives to be embedded in them, which makes the symbolism of the place more explicit to the audience.

Whether cultural memory will benefit from interactive panoramas depends largely on the attitude of organizations that are responsible for preserving memory and

audiences. Both case studies identify opportunities for providing digital access to the memory site and cultural memories. However, due to a varying interest in the initiative and different degree of support from bodies responsible for preserving memories, the two case studies evolved differently. While Charles Church remained mainly a research project that explores the role of interactive panoramas in enhancing the memory of the Blitz, the potential of interactive panoramas created for Charles Causley project was fully acknowledged by the Charles Causley Trust that published some panoramas on their website and, if the relevant funds were acquired by the Trust, it would be interested in building a panoramic immersive interactive screen in the Lawrence Museum or in the town of Launceston; possibly during future Charles Causley Festivals.

The potential of interactive panoramas was also appreciated by the organizers of 2nd Czeslaw Milosz Festival in Krakow (Poland) who had the panoramic immersive screen presenting the inspirational environments of Czeslaw Milosz (1911-2004), a Polish poet and writer (a Nobel Prize winner for literature in 1980). The installation¹³² was available for viewing for a period of one week in May 2011 (Figure 76). It became a successful enterprise as it attracted large number of young audience, who were engrossed in the interactive exploration of Milosz' poetry. Some of them were not attracted by poetry as such but rather by the interactive part of the presentation. They wanted to play with panoramic films displayed on the 360-degree screen. They also had a possibility to take part in a competition to create immersive art presentations of Milosz' poetry in the panoramic format.

The auspicious reception of panoramas does not only depend on the agency of organisations that want to use them and promote them, but it is also up to users, who may use or ignore what is on offer, and creators of panoramas who can make them more

¹³² Video documentary of this event is available in the form of the film: <http://vimeo.com/41233227> (Accessed: 12.07.2012)

or less likely to attract users. Furthermore, location of a 360-degree arena in the centre of the town might be crucial as town centres attract tourists. Many of them will probably not visit all sites related to cultural memory as they do not have enough time but they could benefit from the visit if they could digitally explore inspirational environments presenting different sites that preserve cultural memory.



Figure 76 Immersive 360-degree screen presents Czeslaw Milosz's poetry during 2nd Czeslaw Milosz Festival in May 2011 in Krakow, Poland¹³³. Images by Michal Lepecki. © Agancja Gazeta.

Panoramic interactive films displayed in panoramic immersive and panoramic virtual environments have the potential for preserving memories but there are still many aspects of both panoramic films and the image spaces that need further exploration in order to answer questions posed by this research project.

Examples of these questions are:

- How pano-video-graphic navigable space is experienced on a panoramic immersive screen and in panoramic virtual environment?
- How panoramic interactive films can be experienced by groups that change during the presentation (arena is open and everyone can enter it or exit at any moment)?

¹³³ Sources of images: <http://kultura.gazeta.pl/kultura/51,114628,9567758.html?i=1> (Accessed: 9.05.2012) and <http://kultura.gazeta.pl/kultura/51,114628,9567758.html?i=12> (Accessed: 9.05.2012)

- Can immersive screens be used by museums successfully or should they rather be placed in town centres?
- How do panoramic imographs (panoramas shown on a computer screen) work for the preservation of memory?
- Does the combination of still and video panoramas as a method of traversing may be considered as a method equivalent to mnemonics?

These and many other questions may be addressed by future research in the field of interactive panoramic films and panoramic environments.

9. Conclusion

The rapid development of computers and the Internet in the 1990s opened up new possibilities for various organisations and institutions, which increased their efficiency through digital means. They could collect and store large amounts of data in digital archives and exchange it easily through the Internet. This potential was also recognised by ‘memory institutions’ (museums, libraries) that often arrange digital kiosks with 3D computer reconstructions and virtual tours of presented artefacts as part of their exhibitions. Many had websites designed to publish information on their collections. However, the interactive side of digital technologies was not fully appreciated in the field of cultural heritage. It is only recently that researchers in digital media such as Timothy Barker, Dennis Del Favero, Agnes Hegedues, Peter Oldfield, Jeffrey Shaw started to popularize digital interactive works for the purpose of presenting memories. The application of interactive digital technologies in the preservation of memory, in particular of cultural memory, is even less common.

This study has examined the role of one of the less popularised digital methods of preserving memories: interactive panoramas. The main aim of this research is the exploration of the application of these panoramas in ordinary situations. For this purpose, the research uses practice-based cases as the analytical tools. It examines how the developed conceptual model of the preservation of memory, created by linking of panoramas with an interactive film and an immersive arena, can be used for cultivating the memory of two local cases and what further reflections its implementation raises. The first case refers to the memory of the Blitz in Plymouth, whose constant reminder is the ruin of Charles Church standing in the middle of a busy roundabout. The second case is about the memory of Charles Causley, a Cornish poet, who spent most of his life in Launceston. The two cases studies are examples of cultural memory which is

gradually converted from communicative memory that is still alive among local communities into the more permanent form. This transformation may be supported not only by memory sites and commemorations but also by digital panoramas.

These case studies provided insights about panoramas, interaction and image spaces. A critical analysis and comparison of the two cases generated ideas and reflections which could contribute to the critical review on the preservation of memories. It will deepen awareness of practitioners working with digital media, who could look beyond the often obvious set of their applications and could improve their efficiency in the fields that have not been considered so far.

The purpose of this chapter is to present my findings (9.1) and explain why they matter; as well as to indicate further research (9.2) that needs to be done in order to explore various aspects of preserving memory by means of interactive panoramas. I wish to, summarise what has been contributed to knowledge, and to suggest possible ideas of improving the process of preserving memories through interactive panoramas, in the light of findings of this research.

9.1. Findings

My findings may be divided into three categories: intellectual findings from the literature, practical findings from the cases and synthesis over the whole as final critical reflections.

Findings from the literature

The literature review provides a number of interesting findings that influence my understanding of memory, memory institutions and memory works. The discussion of

public and cultural memory contrasts institutions, which represent public memory with everyday memory (cultural memory). That can be linked back to Williams (1976) who suggests that cultural memory has a potentially democratic aspect. Anything using expensive technology or requiring access to sites is constrained by other sorts of institutions. This indicates the potential of digital panoramas displayed in the 360-degree image spaces as they enable deliberative democracy and provide access to sites that are unavailable for public viewing. 360-degree spaces may be a bit expensive at the moment but they are portable so they can be moved to different locations and used for a number of projects concerning the preservation of memories. What is more, the technology of building them is developing so it is likely that their costs will be reduced in due course.

The findings from literature review also make the thesis contribute to different understandings of memory works than these previously available. Following Irwin-Zarecka (1994), I understand memory-works as works whose aim is securing a presence from the past. This can be achieved, for example, by writing a book, filming a documentary, erecting a monument and also by creating a panoramic interactive film based on photo-realistic content.

Referring back to the idea of mnemonics where kinaesthetic activity helped in remembering long speeches, the thesis suggests that physical traversing (based on recordings from cameras) that takes place in the 360-degree image space may support remembering and may enhance the interactive experience which is facilitated by moving between episodes in the interactive film. The study also points out that the pace of the immersive film should be slow as otherwise the contrary effect to remembering will be achieved. If the viewers are not able to follow the film, the message they get is fragmentary and the film itself confuses them rather than supporting the remembering process.

The research introduces a pano-video-graphic paradigm that supports spatial and temporal continuity by the slow movement between static scenes (decision points) documented with panoramic images and dynamic scenes recorded by panoramic video camera.

Practical findings from the cases

The two case studies generated a number of findings regarding the process of preservation of memory. The first case study highlights the role of a memory site in this process. This site is mostly unavailable for ordinary tourists but may be captured on panoramas. The scenery for the interactive narrative in the first case study comprises the building of the church – both its current ruined view as well as a 3D computer reconstruction from before the war. The techniques of repeat panoramic photography and repeat panoramic videography which were used in the creation of panoramic interactive films enable the same places to be revisited after many years and subsequent changes may then be observed. Traversing the same trajectories many times does not only recall memories but also preserves them.

The crucial part of the narrative is comprised of memories of the couple who survived the Blitz and who were married in this church after bombardment. Present and past pictures of the church, in addition to narrative based on personal memories of the Blitz witnesses, provided me with the idea of implementing alternative versions of the wedding ceremony. For the purpose of emotional immersion, I moved the wedding ceremony in time to the day of the Blitz. Viewers of the interactive film can select the scene they want to see next (selective interaction) and may choose between the past and present time perspective. They are allowed to watch the panoramic films as many times as they wish and they are free to make different choices every time. The fact that they

can find themselves at the same decision points a number of times while watching these films is quite important as they can experience the same event many times; which triggers memories. They come across different scenarios, which make them aware of alternatives for the past that is recorded in history and about its implications for the present. These alternatives are not presented in the case of static monuments, statues, urban architecture (non-active forms of preserving public memory explored in chapter 2.5.1).

Apart from creating alternative pasts, I also wanted to introduce alternative points of view by compiling the recollections of different people who attended the wedding ceremony. However, due to technical difficulties this issue could not be explored.

The panoramic interactive film should ideally be watched in the immersive arena as it is a space not for an individual but a space for collective experience where conversations could begin. The audience could be encouraged to stand in the middle or to traverse as it encourages them towards the exploration of narrative. My experience of preparing this case study and displaying it on the 360-degree screen suggests that the surround sound played from loudspeakers at the front and back of the arena may additionally influence choices undertaken by audience as it may generate emotions.

The second case study analysed in this research relies on the dominant role of artefacts and locations in the process of preserving memories. The house where Causley lived is still maintained and little has been changed inside since his death. Causley wrote topographical poetry, as objects in his house and various locations in Launceston are often themes of his poems. I used the idea of topographical poetry to create spatial interactive narrative about the poet. The users can travel virtually in Launceston and learn about links between the role of objects and locations and Causley's work through poems they hear at relevant locations and objects they can interact with. The interactive

film supports both selective interaction (choice of route to take or an object to play with) and productive interaction (not available in Kinoautomat paradigm), as it encourages viewers to create new poems based on virtual objects from Causley's poems they come across during their exploration.

The practical part of the research also allowed me to make some findings about the equipment used for recording panoramas. I explored various setups for a panoramic video camera: a welding helmet, a trolley and a mobility scooter and established in which circumstances each of them is most applicable. I installed a pole for the camera and a shelf for the laptop on the mobility scooter and found this structure particularly useful when recording the movement between decision points; which are arranged in the space according to inter-visibility rules applied from traversing in land surveying. The principle of inter-visibility enables points on the map to be identified that may become decision points and to establish in which direction to drive the scooter. The mobility scooter used in the process of recording panoramas supports the creation of the continuity of space which is reflected in the panoramic film, where the transition between scenes is gradual and 'jumps' known from panoramic virtual tours do not occur. This continuity of space helps the users to orientate themselves in the space and is a crucial aspect of recalling.

I also learned how to hide the 360-degree video camera operator during the recording process so that the image of the operator is not visible in films. I also found out how to construct a mobile setup for a camera designed for office use only, how to link panoramic films with such elements as 3D models or animations technically, and how to display them in panoramic virtual environments and panoramic immersive environments.

Synthesis over the whole as final critical reflections

This research project combines theory on memory, narrative and image spaces with the practice-based cases to explore the role of interactive panoramic narratives in the preservation of cultural memory. It provides findings that relate both to theoretical and practical aspects of memory cultivation. The thesis generates a new understanding of an interactive film, where choices are not made in front of a traditional screen (representative democracy in Kinoautomat paradigm) but in 360-degree arena which provides a potential for deliberative democracy. These choices are based both on sound experiences (viewers turn their heads in the direction from which they hear the questions) and on visual experiences (the audience decides where they want to go or on moral code).

The research also contributes to the process of creating of immersive films where temporal and spatial visualisations can be made by the application of repeat panoramic photography and repeat panoramic videography techniques which enable a spatial return to places that were once visited and temporal return to an apparently meaningless decision in the past which might trigger memories when revisited.

My experience of recording panoramas suggests that video panoramas should be captured during the movement to show transition between decision points (pano-videographic navigable space). The process of recording video panoramas required adjusting a mobility scooter for mobile recording as well as finding methods to power the equipment designed for office use only.

I also learnt that it would be very helpful to develop an interface for the panoramic interactive films that could be presented effectively both on a computer screen and on a 360-degree screen. Such a design could enable testing interactive films on a computer screen before showing them on the panoramic screen; as well as making

the panoramic films accessible through the Internet to audiences who cannot view them on panoramic screens.

Finally, the research generates new research questions which could not be introduced before conducting practice-based cases.

9.2. The need for further research

This research answers some of the initial research questions by filling some of the gaps in knowledge on the subject that has not been widely examined so far. However, the need for better understanding of the role of interactive panoramas in preserving memory remains far from being exhausted.

The research produces results, answers, suggestions and reflections to various issues, but it also generates new questions and challenges that need to be explored in order to further expand knowledge in this field. As the theory and practice of preserving memories changes with new methods and technologies being introduced, it is necessary to test and validate hypotheses that were introduced in this thesis constantly to keep the research up-to-date.

The idea discussed in this thesis is little developed and researched and therefore more research would be needed - with possible refining of methods to conduct the research. A few areas can be identified for a possible future work. First of them is evaluating the success of interactive panoramas in preserving memories by evaluating audience reception. One way to approach this task is to examine the audience behaviour that was recorded during the screening as Hales (2009; 2010) suggested. This idea was briefly mentioned in the thesis but more research needs to be done on methods used to conduct this process and the requirements that should be followed in addition to the analysis of the results. An alternative method of evaluating audience reception may be

the development of a questionnaire, in co-operation with social science specialists, which the audience would be asked to complete after watching the interactive film. Kenderdine, Shaw and Kocsis (2009) provide some insights about designing a museum-based immersive architecture, but they do not focus on testing immersive films in panoramic immersive and virtual environments. The questionnaire could include questions about different aspects of the presentation, e.g. length and pace of the film, position of the audience, interaction, the ambience inside the arena, etc.

The second area that could be examined more thoroughly, probably by getting psychologists involved, is the mechanism of making choices. This research has not revealed whether the audience decides on moral choices, wanting to avoid watching dramatic scenes, or whether this is unimportant and their decisions being made by the attraction of visual elements of films such as; flashing animation buttons they want to press to watch the animation. The audience could be asked specific questions about their choices at the decision points during the interactive film and their responses could be evaluated by the psychologist in order to determine a decision-making model.

The last aspect that needs to be examined more thoroughly refers to technical limitations of immersive arenas that only enabled two options to be shown out of three or four that have been prepared in advance and tested on a computer screen. This technological limitation is a challenge at the moment with more work needed on the integration of the display systems in virtual and panoramic environments. If this limitation is overcome at some point and more choices will be allowed, a new research could follow regarding how people decide if they have a greater number of choices.

Apart from the above-mentioned constraints, there are also limitations caused by time restrictions and availability of resources. The scope of the analysis is limited to two case studies that give the prominent role to memory sites (Charles Church project) and to artefacts and location (Charles Causley project). It does not consider situations where

the intangible elements (e.g. music), were to be used in the preservation as the major component of the narrative. Furthermore, the second case study examines the life of a person who spent most of his life in one place, whereas little is known how this model of preservation would apply to documenting the life of someone who travelled extensively and worked in different locations. Additional case studies would have enriched the arguments, issues and recommendations developed in this research. They could provide new insights that would either reinforce or contradict the findings made through this research.

It would be also particularly useful if cooperation could be established between academic researchers and ‘memory institutions’ so that the research guidelines established through the research could be applied to real world experiences. Thus, findings and recommendations that memory researchers arrive at through their projects could be tested in real environments on the actual audience; also providing a new source of data for academics.

As mentioned previously, digital technologies keep evolving and findings of this research will need to be validated each time interactive panoramas can be enhanced with new features. However, still panoramas, especially video panoramas, mark an important point in the evolution of digital technologies and just like painted panoramas, they will continue. Therefore, most of the reflections of this thesis will be relevant and useful for further investigations on how the process of preservation of memory evolves in the future.

10. Appendices

Appendix 1 (case study I): The script of the interview with Ken and Phyllis Beer

How long have Mr. and Mrs Beer stayed in Plymouth?

Ken (born 1913) has spent all his life in Plymouth apart from his naval service during the war. Phyllis, although born in Plymouth in, spent the first 15 years of her life in Canada before returning with her parents around 1934.

How do you feel about Plymouth?

A proud Devonian. Ken loves Plymouth, its uniqueness – the Hoe, historical Dockyard, the Navy and its environs like Dartmoor.

How did you two meet?

They met at work. Ken was an upholsterer and Phyllis joined the company about 1936.

When did you get married?

22nd March 1941, during the Plymouth Blitz. Arranged by special licence (because of the war), having seen the vicar only a few days before the 22nd.

Why did you choose to get marry in the Charles Cross Church? Any special reason?

Phyllis lived with her parents within the Charles Church Parish. [Generally, in the UK, couples traditionally marry in the parish of the bride.]

Can you describe your wedding? What happened?

The plan was to marry mid-day on Saturday March 22nd and hold a reception at Goodbody's Café [well known city-centre café] afterwards. Photographs were to be taken at a studio at the western end of the city.

On the night of 20th/21st March the Plymouth Blitz began. An incendiary bomb came through the roof of Phyllis' parents' house and the resulting fire-fight resulted in her wedding dress being ruined. She managed to borrow a dress from the sister of a sister-in-law, though somewhat oversized!

The next day, Friday, Phyllis checked out that the church was still standing – all systems go and cake delivered to Goodbody's.

During the night of 21st/22nd, incendiary bombs left the church a smouldering ruin and a high explosive bomb destroyed Goodbody's Café.

The wedding party arrived at the ruins on the 22nd but couldn't gain access to the ruined church, the gates of the south porch being locked. Instead, they walked around to the north east vestry and the vicar (Rev Frank Green) married them within the its confines amidst glowing embers.

After the ceremony they were eventually taken by a taxi to the photographer by an emergency route worked out earlier by the best man. Along the way people cheered!

How many guests were there in your wedding? What did they do? How did they feel / react?

Originally, because of wartime restrictions, there were to be about 20-25 people at the reception. In the event there were much less than this due to the chaos and possible fear of further bombing.

How did you feel in your wedding?

Grateful that it had taken place given all the circumstances.

Can you share some happy moments of you two?

Ken was posted abroad for two years (with the Royal Navy) very shortly after his wedding. When he returned it was to greet the first of his 6 daughters, Sandra, as a toddler.

Their 6 children have produced 16 grandchildren, 21 great-grandchildren and 1 great-great grandchild on the way.

They have just celebrated their 68th anniversary.

When you see the Charles Cross Church now, how do you feel?

It is vital to the history of Plymouth, a unique memorial that should never be pulled down.

Any pics of your wedding? or the old days?

I have an image of the wedding group, bride, groom, best man, bridesmaids. [Not sure which pc its filed on!]

Appendix 2 (case study II): The complete script of the interactive film

1

INTRODUCTION¹³⁴

S1

Title: *Wartime Wedding - the interactive narrative*

Wartime Wedding is a story about the couple who met in Plymouth in 1937 and wedded in 1941 during the war in Charles Church which is now known as a bombed church. This is a panoramic interactive narrative of that story where you as an audience make choices so please be prepared to respond to the questions.

The date is 20th March 1941. It is late afternoon and the wedding is about to start so please be seated.'

2

VIDEO PANORAMA (26sec) – Phyllis is entering the church

- Wedding music (0-20sec)
- 21sec: alarms / sirens
- 22sec: 1st voice: 'Run away, quickly' (from outside)
- 24sec: 2nd voice: 'Please, come to us. Let's continue the ceremony' (priest)
- 26sec: END

OPTIONS:

A: 'Run away'

B: 'Continue the ceremony'



¹³⁴ Numbers refers to Figure 42 and Figure 43 in Chapter 6.

3

Phyllis is running away from the church.

Music: running away, threat of bombs, airplanes dropping bombs

4

'That night, incendiary bombs left the church a smouldering ruin and a high explosive bomb destroyed Goodbody's Café, where the reception was to take place.

The wedding was postponed due to the Blitz. This wedding was the last to be held in Charles Church in which the bride was traditionally dressed in white.'

5

'Year 2010. Phyllis Beer is 91 years old. She is back in front of the church with her grandson.'

Question: "Grandma, do you want to enter Charles Church?"

OPTIONS:

C: No

D: Yes



I

Phyllis and her grandson are leaving the church area.

6

'My grandson, I remember when this ruin was a church. My wedding was planned to be there on the day when the Plymouth Blitz happened. I remember it so well. It happened 20th March 1941. 69 years ago.'

Question: 'Do you want to tell me more what happened in 1941 in this church?'

OPTIONS:

E: Do not tell me more

F: Tell me more



S4

7

Phyllis and her grandson are leaving the ruin.

II

The end.

S3

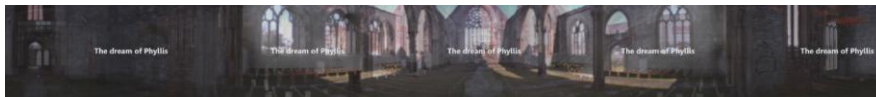
8

'The wedding music was playing in the background and I was entering the church....'

S5

S8

Three figures below present the temporal change during the movement¹³⁵:



Wedding music.

The animation of the wedding takes place.

9

Phyllis is going to the altar where Ken, the priest and Ken's parents are waiting. Wedding music continues. At the end sirens and alarm can be heard again. More airplanes and more bombs are dropped around the church.

¹³⁵ Here, there is an application of panoramic repeat videography. 'The dream of Phyllis' should be replaced to 'The memories of Phyllis'.

VIDEO PANORAMA – Phyllis is going from the centre
of the church to the altar

S8

- Wedding music (0-48sec)
- 48sec: alarms / sirens
- 52sec: 1st voice: 'You are in danger' (from outside) Postpone the wedding?
- 54sec: 2nd voice: 'Please do not interrupt us' (priest) Continue the wedding?
- 1min 04sec: The end

OPTIONS:

G: Postpone the wedding

H: Continue the wedding

12

Priest: "Thank you for coming to this ceremony."

Ken:

'I, Ken, take you Phyllis, to be my wife, to have and to hold from this day forward, for better or for worse.'

Phyllis:

'I, Phyllis, take you Ken, to be my husband, to have and to hold from this day forward, for better or for worse.'

Priest: 'Thank you for the wedding. I wish you good luck and safe journey home.'

(blessing)

They are both leaving the church

Wedding music again

S6

'Their 6 children have produced 16 grandchildren, 21 great-grandchildren and 1 great-great grandchild on the way.

In 2010 Ken and Phyllis celebrated their 69th wedding anniversary.

Ken is a proud Devonian who loves Plymouth. He loves the uniqueness of the Hoe, historical Dockyard, Royal Navy and nearby Dartmoor – and maintains that the heart of old Plymouth was destroyed in the Blitz. He believes that the ruin of Charles Church is a fitting war memorial to all those people who died for Plymouth, is thus is an important part of Plymouth's history and

should never be pulled down.'

The end.

Appendix 3: Script of the interactive narrative about Charles Causley

Underlined numbers refer to numbers (decision points or traversing lines) in Figure 64.

01-01c means 1st still panorama in Causley's house.

07-19 means 19th still panorama (07 is a number of a scene)

08-19-18 (time: 1:08) means video panorama between decision points 19 and 18 (08 is a number of a scene) (time provided in minutes:seconds)

CAUSLEY'S HOUSE

01-01c:

Charles Causley was born in 1917 in Launceston. He spent most of his life here writing poetry and teaching at a local school, until 2003 when he died at the age of 86.

One of the items in this room has a hidden message for you. This is the title of a poem hidden in this room.

Arrow to exit: If you want to go out, you have to find a key. It is hidden somewhere in this house.

Grandfather clock: Click here to go out from Causley's house.

03-03c:

Charles Causley wrote for both adults and children but believed that no good poem could be enjoyed exclusively by children, as an adult can still appreciate childhood experiences.

His poetry was influenced by folk songs, hymns and ballads - possibly as a result of having played the piano as a young man in a dance band.

Can you find his piano?

05-05c:

Charles Causley was inspired by his hometown and his life as a teacher, and wrote many poems about the people and places here.

Can you find his school desk?

04-06o:

Charles Causley received a Queens Gold Medal for Poetry, and in 1986 he was rewarded a CBE for services to Poetry.

You've found a key for the main door.

Now you have learnt much about Charles Causley and it is time to leave his house and explore the town. Please click the (grandfather) clock in the (main) room.

LAUNCESTON

07-19:

(Mr Normanton's panorama)

Arrow before we enter video panorama for the first time: You are about to enter a video panorama. You will encounter many of these as you journey through Launceston, listen out for some brief instructions.

08-19-18 (time: 1:08)

This is a video panorama within Launceston. Please take the time look around and take full advantage of the 360 degree. As you travel through Launceston you will encounter many more video panoramas, some of which may describe elements of Causley's life or the town of Launceston itself.

Soon you will reach the end of this video and be presented with another still panorama.

At this point you will be provided with a number of different options allowing you to proceed through the town in different ways.

Have a look around and choose your route carefully.

09-18:

You have reached the first decision point. Please click one of the arrows.

Arrow1: Towards the castle

Arrow2: Towards the plaza in the centre of the town

Sign: Under construction. No entry.

Arrow3: Towards the church

Arrow4: Do you really want to go out?

Arrow5: Are you sure?

Arrow6: Click here.

12-18-51 (time: 2:09 – the longest 360video)

Also 20-15-50 (1:16)

Also 67-14-13 (1:03)

On this journey you will hear excerpts from one of Charles Causley's more famous poems, Timothy Winters.

Timothy Winters [1, 5, 7, 8] – I have this recording (Poetry Archive)

--end of 1:03.

--continue for 12-18-51:

This is Dockacre Road. We are close to another hidden poem: ‘**As I went down Zig Zag**’. Listen to this poem and try to find a place that Causley is describing in his poem.

“As I went down Zig Zag” (verses 1 - 5 - 13)

*As I went down the Zig Zag
The clock striking one,
I saw a man cooking
An egg in the sun.*

*As i went down the Zig Zag
The clock striking five,
I caught a man keeping
A hog in a hive.*

*So if you'd keep your senses,
The point of my rhyme
Is don't go down the Zig Zag
When the clocks start to chime.*

--end of 2:09

10-18-15 (time 0:35)

Launceston is situated just over one mile (1.6 km) west of the River Tamar which marks the border between Cornwall and Devon and is often referred to as the "gateway to Cornwall". Launceston is approximately 42 miles (67 km) west of Exeter, 26 miles (42 km) north of Plymouth and 21 miles (34 km) east of Bodmin.

18-15-14 (time: 0:50)

Over his career Charles Causley authored at least twenty five published works, ranging from short stories to plays, and of course plenty of poetry. One of his most acclaimed collections of poetry for children was released in 1996 and was titled 'I had A Little Cat'.

Have you seen a cat on your journey?

12-51-52 (time: 0:43)

Launceston has a lot of history, much of which is exhibited at the nearby Lawrence House Museum.

One of the more gruesome factoids, is that the Roman Catholic martyr Cuthbert Mayne was executed here

16-52-20 (time: 0:20)

You will notice St. Mary Magdalene Church. This Tudor church was built by Sir Henry Trecarrel in the early fifteen hundreds, though the tower predates the rest of the building by a further two centuries.

38-21-01 (time: 0:33)

In the panorama you are about to reach, you may choose to head back towards the church, or proceed towards the castle where the grass grows tall.

44-02-23 (time 0:37)

Also 25-05-24 (time 0:19)

Launceston Castle, which you are now approaching, was built around the year ten seventy AD by Robert de Mortain, following a typical Norman design. Its presence dominated the surrounding area.

46-14-08 (time: 0:18)

Also 63-08-14

Above hangs an old boot. This used to be part of the local shoemaker's which has long since closed down.

40-01-51 (time 0:54)

On your left is Lawrence House Museum. Part of the National Trust, this museum has three floors worth of exhibitions dedicated to local history, including one for Charles Causley.

34-11-20 (time: 0:22)

The Tudor church you are passing was built by Sir Henry Trecarrel, though the tower predates the rest of the building by two centuries.

22-50-05 (time 0:50)

In the panorama you are about to reach, you can choose to head back towards the town plaza, or proceed towards the castle where the grass grows tall.

50-07-50 (time: 0:38)

If you continue in this direction, the next video panorama you enter will give you a clue for the location of paradise. Listen carefully.

30-14-10 (time: 0:32)

You are currently passing through the centre of Launceston, keep an eye out for the main plaza, the church, and the castle.

Appendix 4: Manual for the DVD No. 1 (Case study I)

- 1) For smooth display, I suggest copying the content of the DVD on your hard drive.
- 2) To start watching, click icon: lucid.exe (PC) or lucid.app (MAC) (Figure 77).

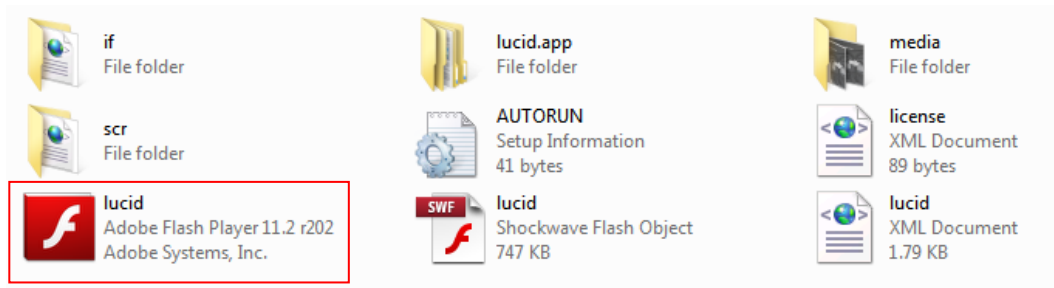


Figure 77 Position of Lucid application on DVD No. 1. Illustration by Karol Kwiatek.

- 3) The round icons constitute the menu for the DVD (Figure 78) and contain:
 - 1 - Panoramic interactive film prepared for the 360-degree screen and presented in Lucid Viewer (panoramic viewer).
 - 2 - Recording of the screening of the panoramic interactive film on the 360-degree screen
 - ? - Help button - information how to view the panoramic image.

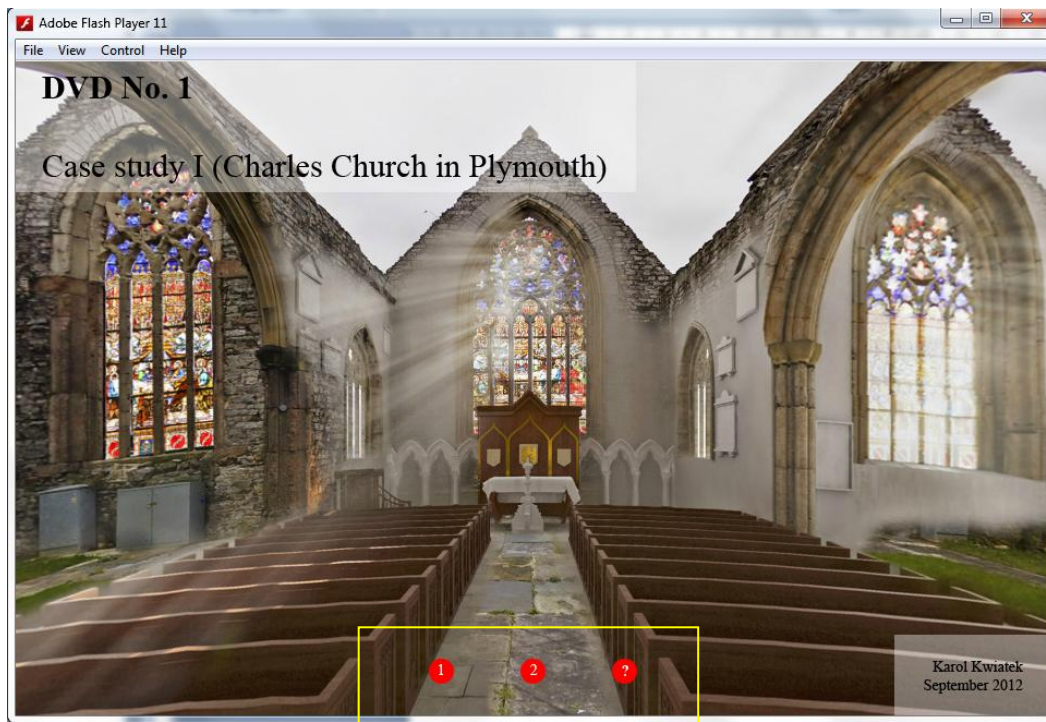


Figure 78 The menu on DVD No. 1. Illustration by Karol Kwiatek.

4) After choosing **1** the display of the first film sequence starts and can be controlled using a timeline in the bar marked on Figure 79.

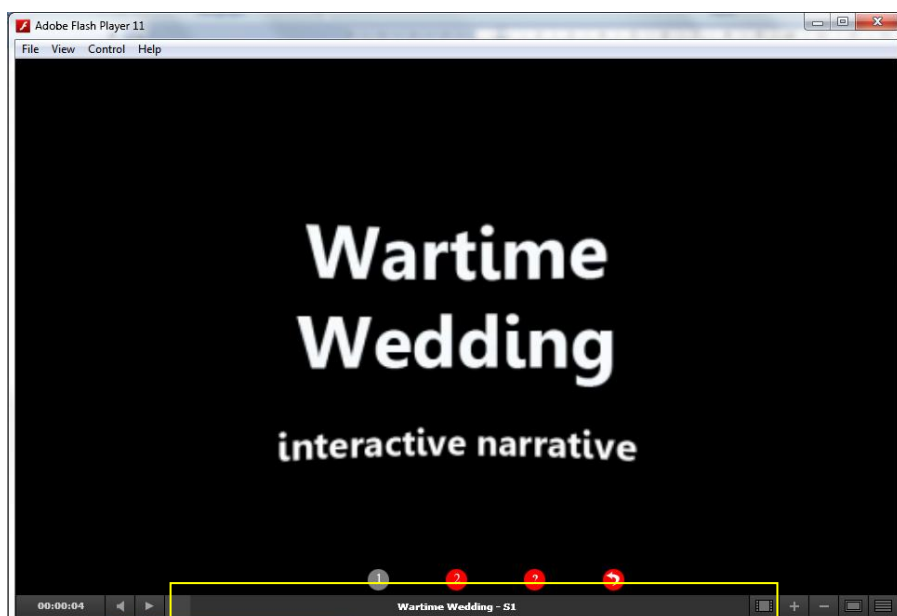




Figure 79 Wartime Wedding presented in a panoramic viewer. Illustration by Karol Kwiatek.

A new round button appears in the menu  and it enables the viewer to return to the screen indicated in Figure 78.

5) To find options that are available the user needs to click and drag panoramas (as indicated in Figure 80) on the screen. As the project is prepared for 360-degree screen the options (marked with squares ) are located at opposite sides of the screen. It places them far away from each other when watched on a computer screen.

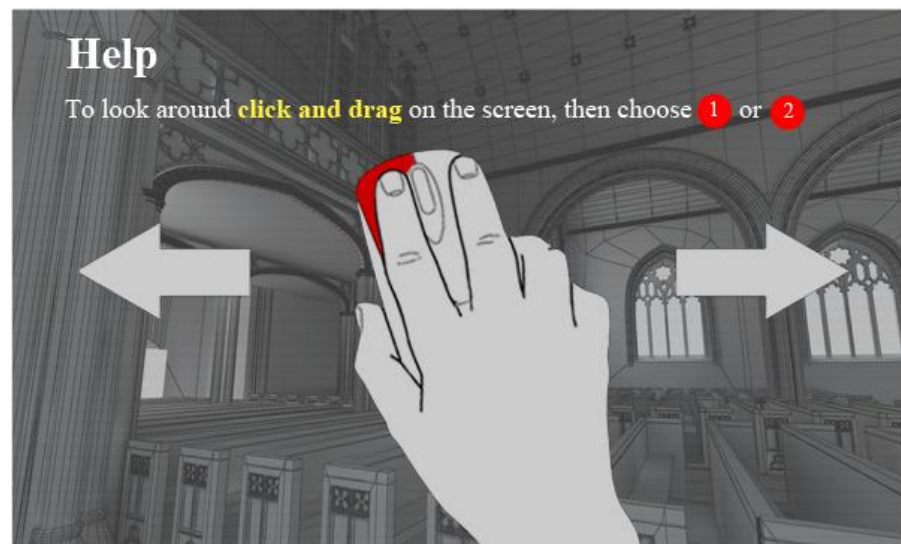



Figure 80 Information how to navigate and choose options in the panoramic interactive film. Illustration by Karol Kwiatek.

6) After choosing  the recording inside 360-degree screen is presented (Figure 81).

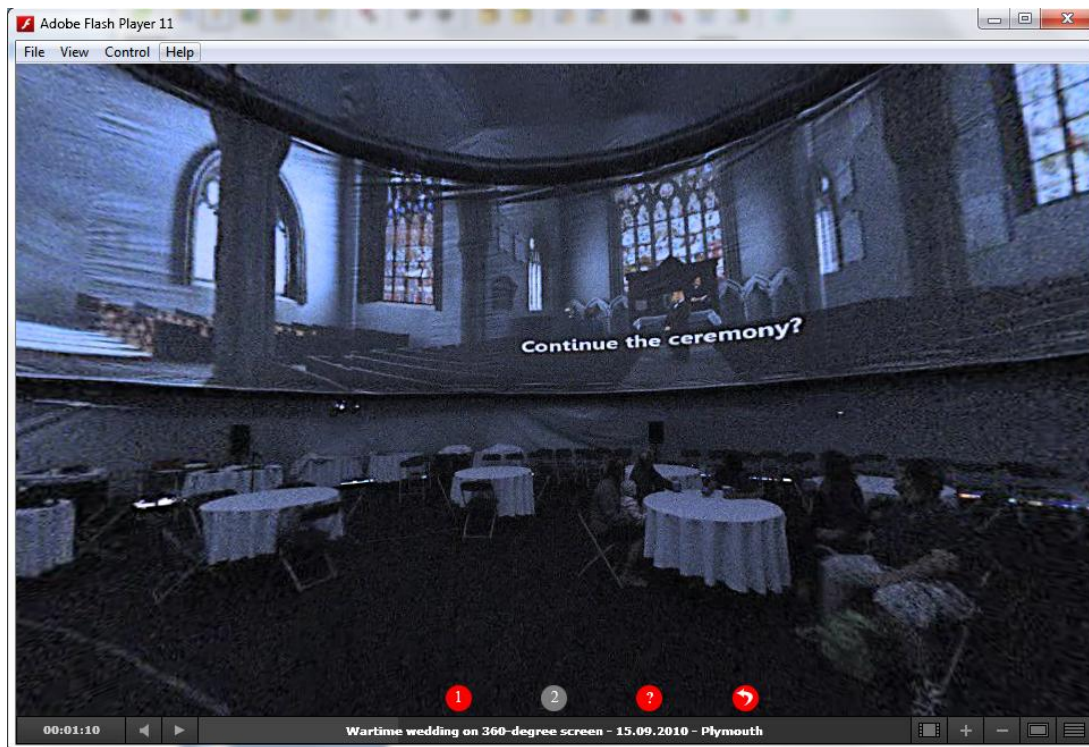


Figure 81 The recording inside the 360-degree screen in a panoramic viewer.
Illustration by Karol Kwiatek.

7) To exit the application, close the window.

Appendix 5: Manual for the DVD No. 2 (Case study II)

- 1) For smooth display I suggest copying the content of the DVD on your hard drive.
- 2) To start watching, click icon: lucid.exe (PC) or lucid.app (MAC) (Figure 82).

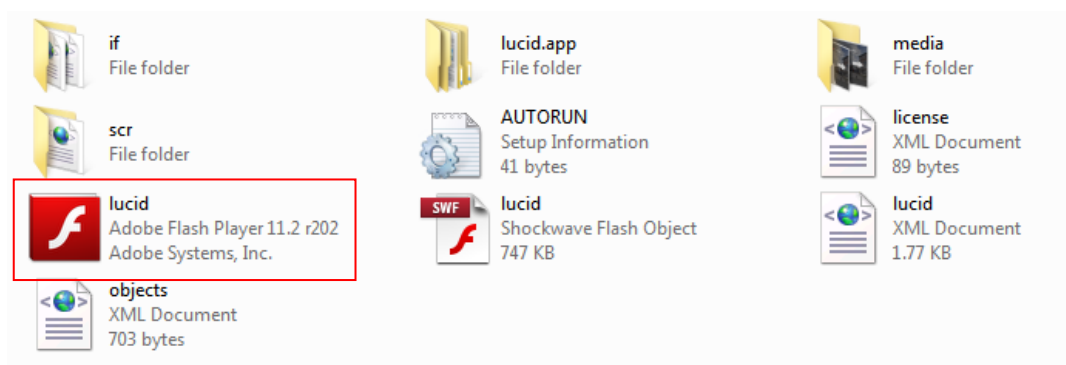


Figure 82 Position of Lucid application on DVD No. 2. Illustration by Karol Kwiatek.

- 3) The round icons constitute the menu for the DVD (Figure 83) and contain:
 - 1 - Panoramic interactive film prepared for the 360-degree screen and presented in Lucid Viewer (panoramic viewer).
 - 2 - Recording of the screening of the panoramic interactive film on the 360-degree screen
 - ? - Help button - information how to view the panoramic image.

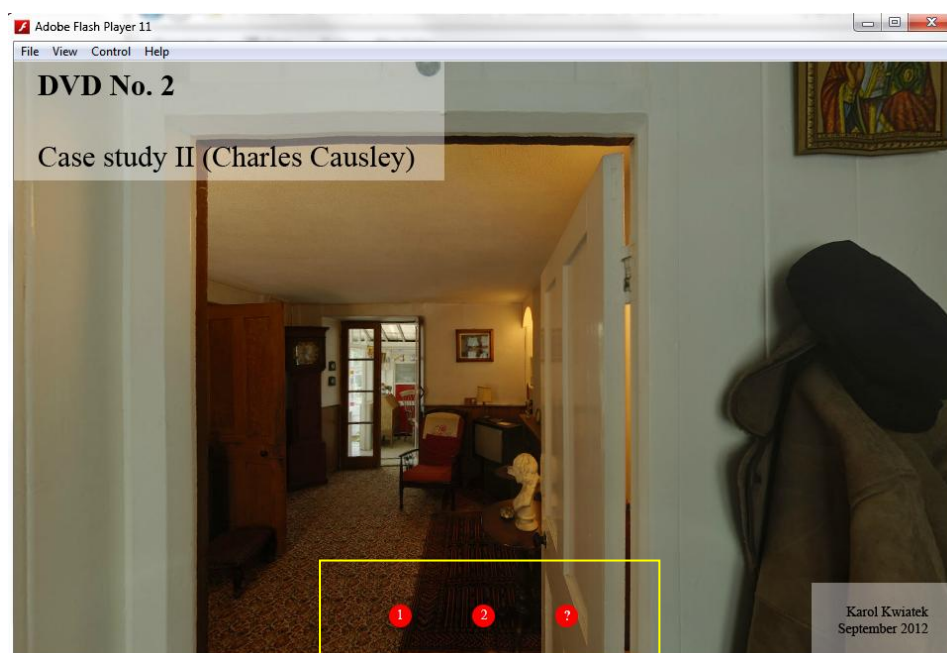


Figure 83 The menu on DVD No. 2. Illustration by Karol Kwiatek.

4) After choosing¹³⁶ **1** the display of the interactive application about Charles Causley starts and new icons in the interface appear (Figure 84).



Figure 84 The interface of the interactive application. Illustration by Karol Kwiatek.

¹³⁶ The second option (2) is described in point 18.

Main menu that enables switching between two projects is moved to the top left corner of the application (Figure 85).



Figure 85 A position of main menu of the DVD No. 2. Illustration by Karol Kwiatek.






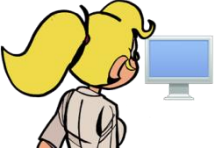

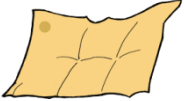



A new round button appears in the menu  and it facilitates the return to the screen indicated in Figure 83.

Table 13 explains the icons that are displayed in the project.

Table 13 Explanation of icons in the project.

	A backpack that facilitates collecting items from Causley's poetry. It enables to print off the list of items collected during the traversing in Launceston.
	Mrs Busybody works as a help button. This lady was described by Causley in one of his poems. <i>Mrs Bessie Busybody, I declare, Knows all the news, And some to spare.</i> (Causley, 1996, p.320)
	Click this icon to read the instruction that appears in the middle of the screen.
	Click this icon to listen to the instruction.

	<p>Click this icon to view the instruction in a video format that appears in the middle of the screen.</p>
	<p>Toggles full screen mode.</p>
	<p>A map that indicates places already visited during the traversing.</p>
	<p>A notepad with a few poems from Causley's poetry.</p>
	<p>Click this icon to learn about the authors of this application.</p>

5) To find options that are available the user needs to click and drag panoramas (as indicated in Figure 86) on the screen and search for arrows  that are located sometimes at opposite sides when watched on a computer screen.

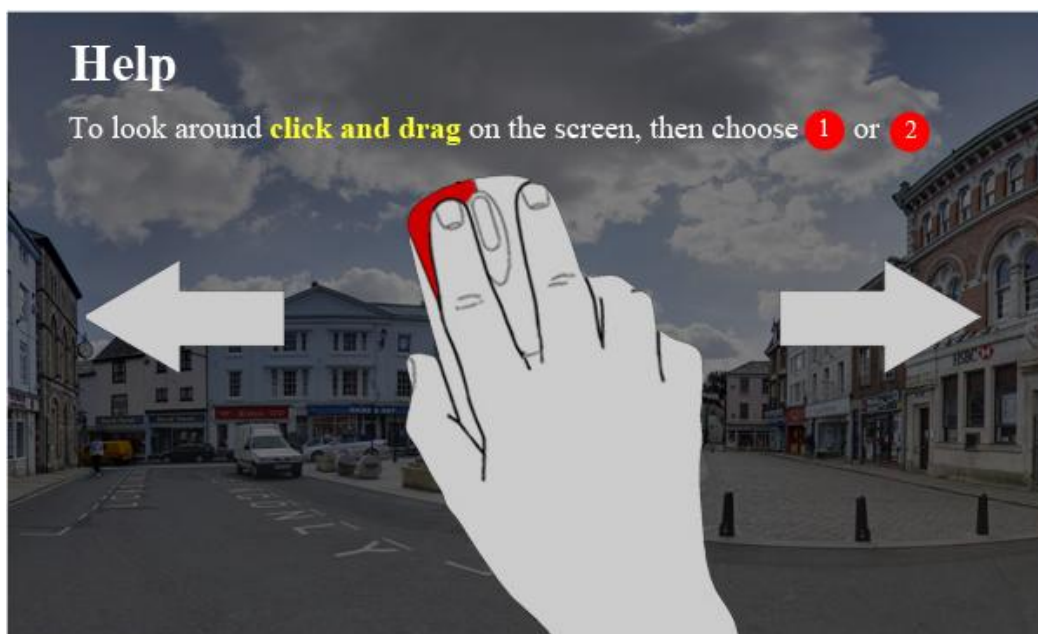




Figure 86 Information how to navigate and choose options in the panoramic interactive film. Illustration by Karol Kwiatek.

6) I recommend the viewer to switch to full screen mode  and listen to

the introduction  .

7) Try to click one of the arrows located on the floor (Figure 87).



Figure 87 A position of one of the arrows. Illustration by Karol Kwiatek.

8) Listen to the introduction in the kitchen.

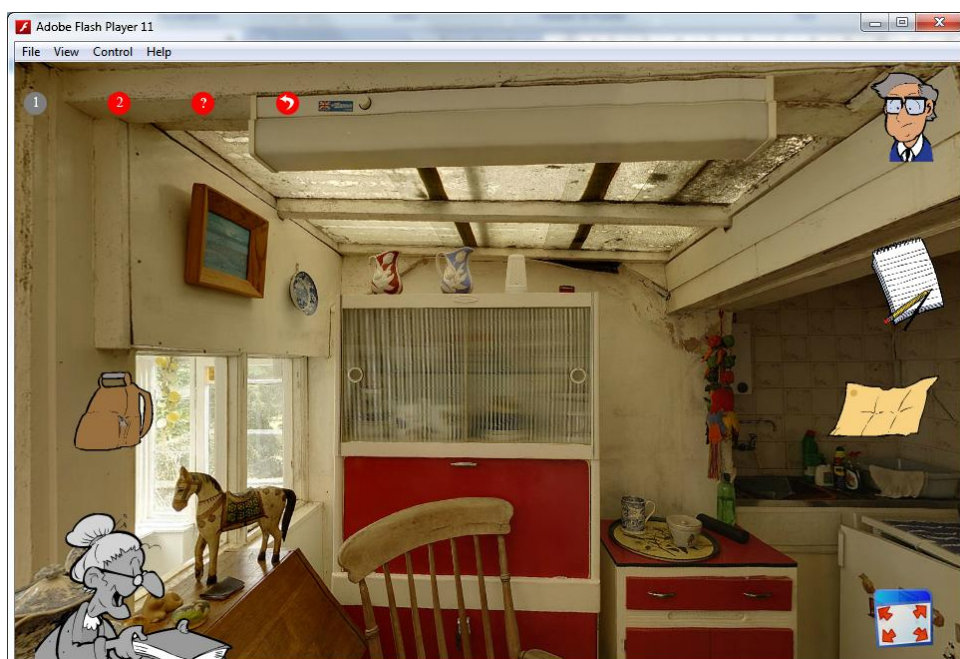



Figure 88 The kitchen in Causley's house. Illustration by Karol Kwiatek.

9) Click and drag a panorama to find arrows  which enable you to traverse between rooms. In the study room try to locate Causley's piano and listen to the music that was prepared by Causley for one of his poems.

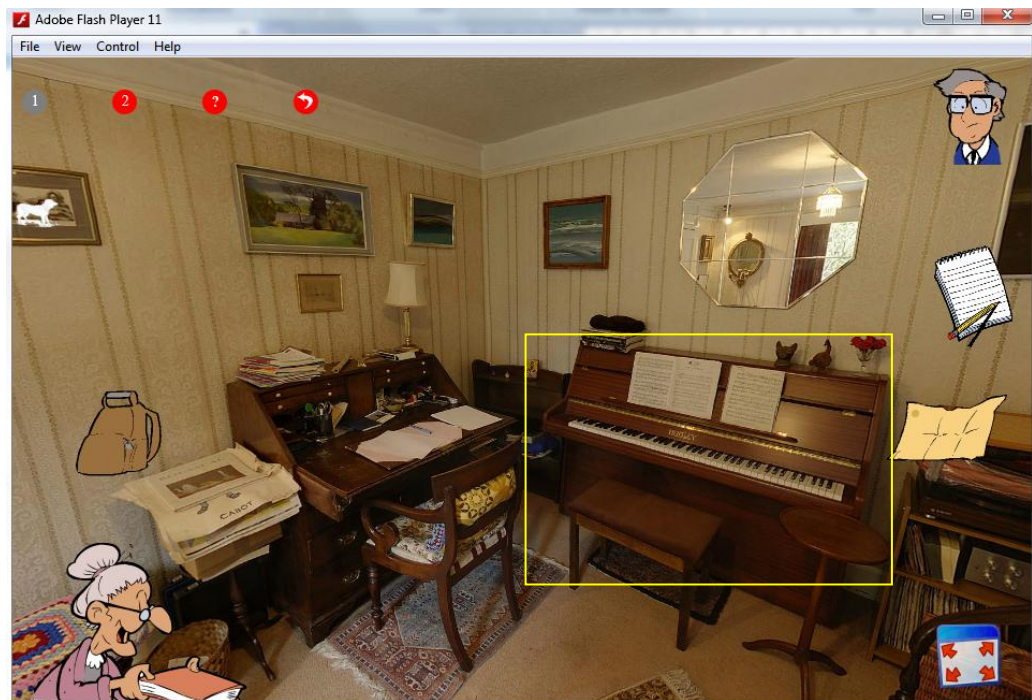


Figure 89 The position of Causley's piano in his study room. Illustration by Karol Kwiatek.

10) Go back to the room indicated in Figure 84. Click Mrs Busybody for help to identify Causley's poem hidden in this room (Figure 90).

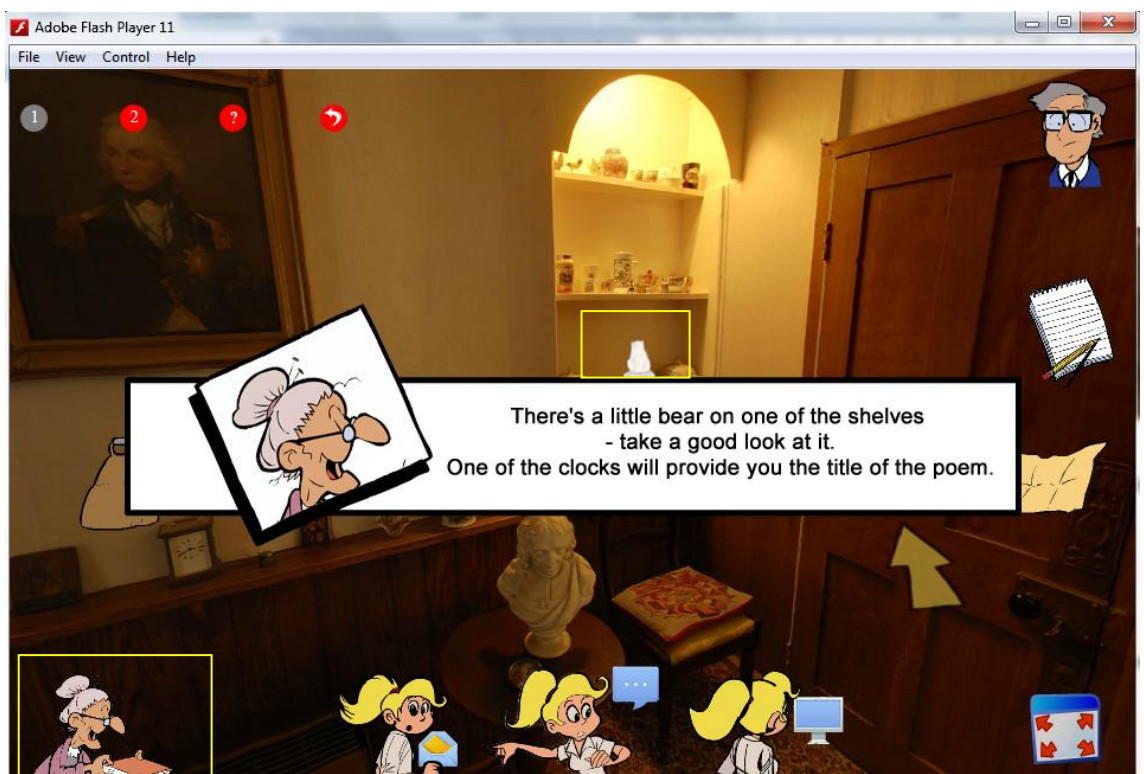


Figure 90 Mrs Busybody helps you to find an item from a poem. Click this item and it will go to your backpack. Illustration by Karol Kwiatek.

11) After clicking the item, it goes to a virtual backpack. Click 'pick up' button and then check the content of the backpack (Figure 91).

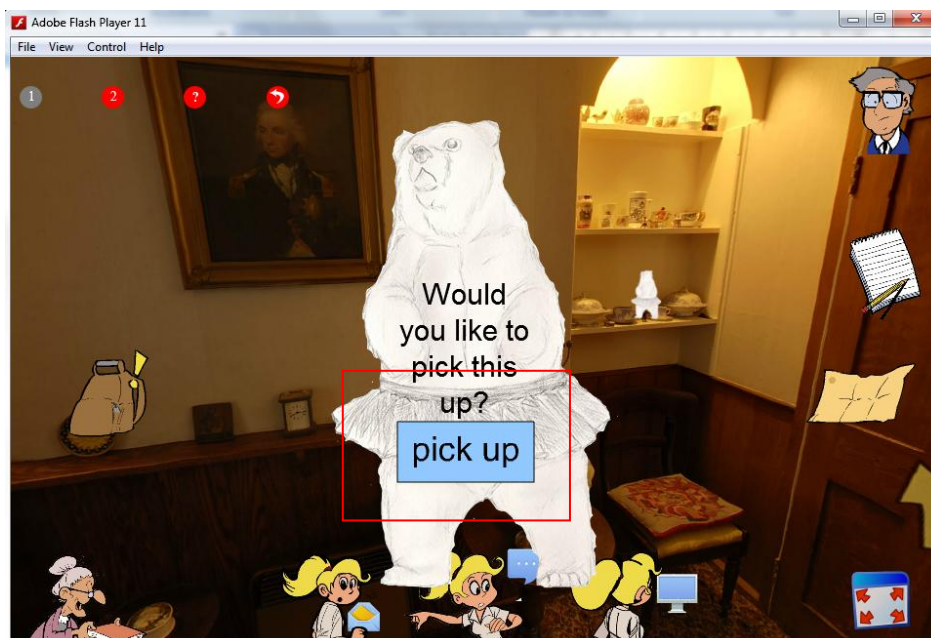


Figure 91 Collecting items related to Causley's poetry. Illustration by Karol Kwiatek.

12) It is time to leave Causley's house and explore Launceston. There are 6 panoramas in Causley's house. Click the arrow indicated in Figure 92.

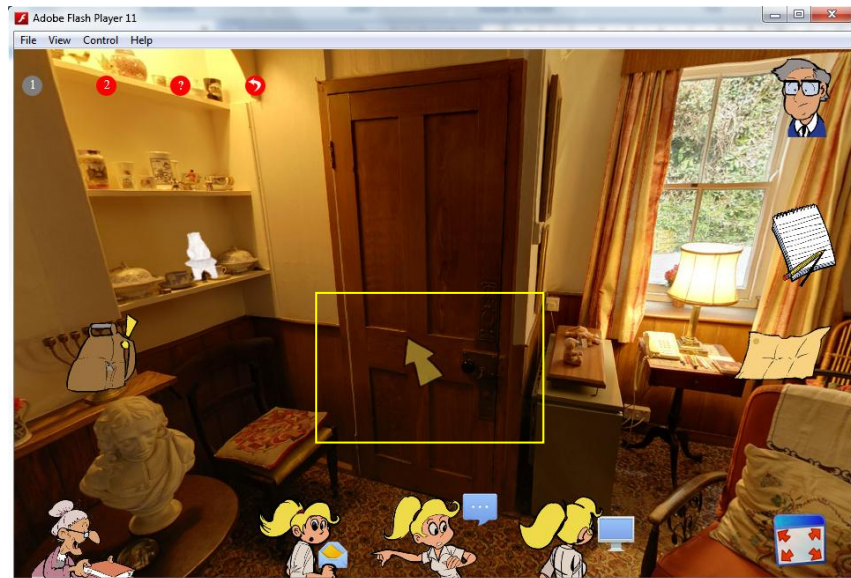


Figure 92 This arrow allows you to go out from Causley's house but you need to find a secret doorway in this house. Illustration by Karol Kwiatek.

13) The door is locked so to unlock it, click a secret doorway (a clock) located in the same room.

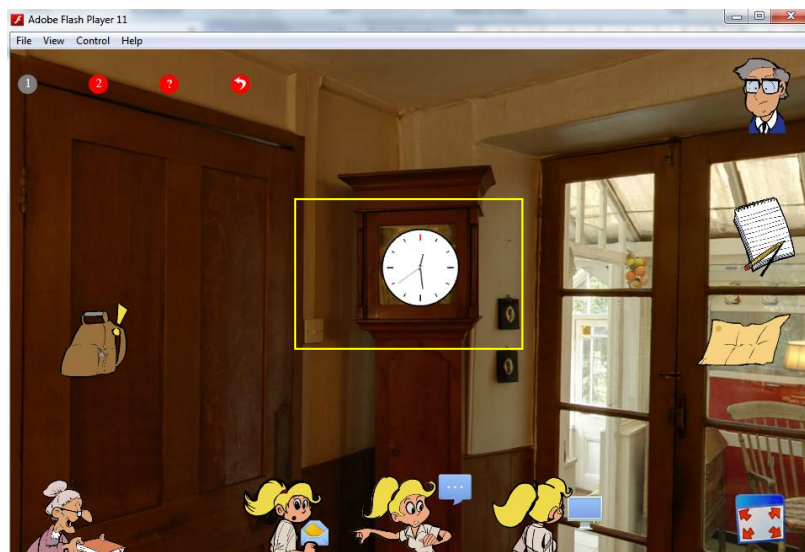


Figure 93 A secret doorway (a clock) allows to unlock the main door. Illustration by Karol Kwiatek.

Now you can click the arrow  as indicated in Figure 92.

14) You are outside Causley's house.

Click these icons to get more information on what to do now. You need to find Mr Normanton - a character from Causley's poem.

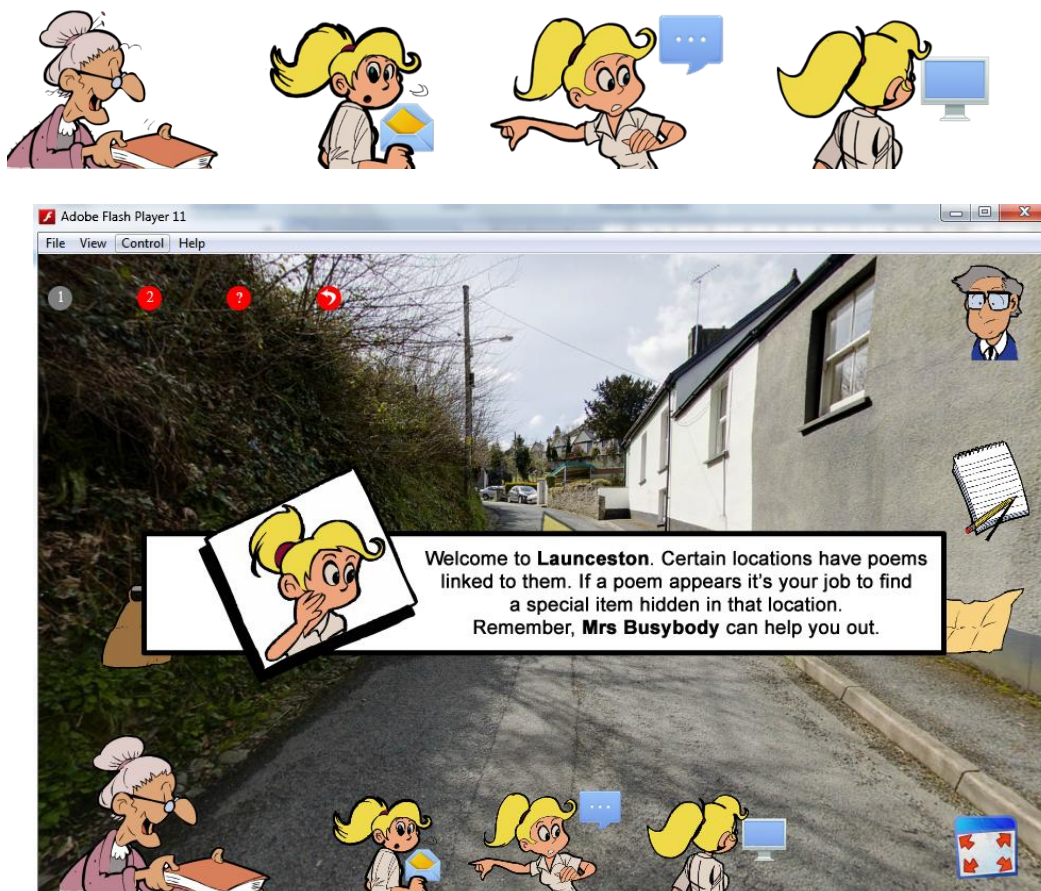


Figure 94 A fragment of a panorama outside Causley's house. Mrs Busybody provides a hint about the position of Mr Normanton. Illustration by Karol Kwiatek.




15) Click an arrow  to traverse up the hill in Launceston. The first video panorama is displayed (Figure 95) with a brief introduction how to navigate it.



Figure 95 A fragment of a video panorama that allows you to traverse in Launceston. Illustration by Karol Kwiatek.

16) Once you reach the first crossing, two options are available (towards a castle and towards a church). Please choose one of them to continue the panoramic interactive film. Click an arrow  to continue.

17) There are 29 panoramas in Launceston and 38 video panoramas that link to still panoramas. To exit the application, press ESC.

18) After choosing  (as indicated in Figure 85) the recording inside 360-degree screen is presented (Figure 96).

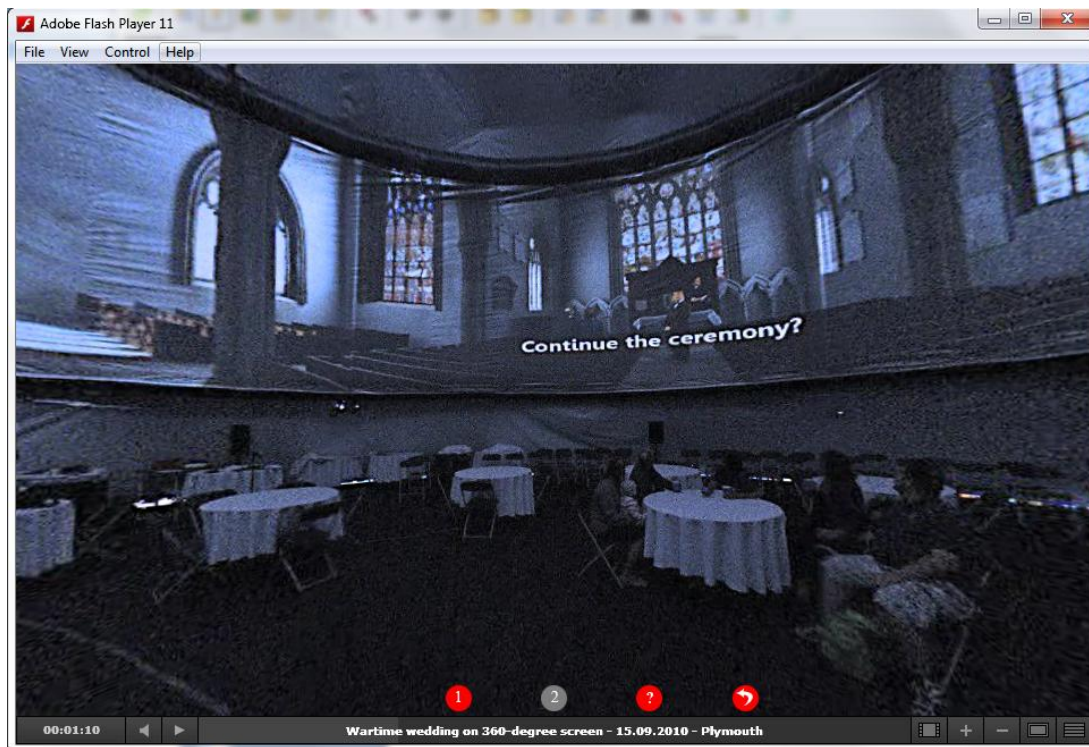


Figure 96 The recording inside 360-degree screen in a panoramic viewer. Illustration by Karol Kwiatek.

19) To exit the application, close the window.

11. Selected publications

Kwiatek, K. (2012) 'How to preserve inspirational environments that once surrounded a poet? Immersive 360° video and the cultural memory of Charles Causley's poetry'. 17th International Conference on Virtual Systems and Multimedia - VSMM2012. Milan, Italy: 2-5 September, p. 243-250.

How to preserve inspirational environments that once surrounded a poet?

Immersive 360° video and the cultural memory of Charles Causley's poetry

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Abstract—*Cultural memory of local artists and poets is typically cultivated through festivals devoted to these people usually by way of commemorations on the anniversaries of their deaths, and are held in places in which they lived and worked. These methods, however, are intangible and if not passed to next generations may be lost or forgotten. What is more, they do not help to protect from oblivion the environment which once surrounded an artist and was a source of inspiration for their work. This paper uses a case study of Charles Causley, a Cornish poet, to propose a new method for preserving his memory, as well as his hometown of Launceston where he spent most of his life. As poems written by Causley were loco-descriptive (topographical) and described various objects and places in Launceston, the approach proposed in this research relies on this paradigm. Loco-descriptive poems provide a basis for the spatial exploration of the town with interactive narratives based on traversing multiple trajectories. Causley's inspirational environment was recreated by 360° images taken in his home and in various locations in the town and also 360° videos were recorded between these locations to allow movement along paths which the poet walked on a daily basis. The approach adopted in this project borrows the concept of traversing from surveying and applies it to the movement between different locations in loco-descriptive narrative that has its roots in polychronic narrative and uses Kinoautomat paradigm when presented in the panoramic immersive environment (360° screen). The project described in this paper was presented on multiple screens for a large audience and is also available on-line for a single user (panoramic virtual environment).*

Keywords—*panorama; video panorama; 360° video; cultural memory; Kinoautomat; Charles Causley; immersive video; topographical poetry; immersion; panoramic immersive environment; panoramic virtual environment.*

I. INTRODUCTION

This paper explores methods of preserving memories related to specific environments that inspired poets and artists. The approach that is presented in the following sections allows the public to contemplate on the space that once surrounded a poet and to understand why these environments were significant to an artist.

A number of studies have been conducted on the preservation, documentation and reconstruction of cultural heritage sites through the application of digital tools such as close range photogrammetry [1], 3D digital survey techniques and total stations (a combined electronic and optical survey instrument) [2], mid- and close-range laser scanning [3], 3D image-based techniques [4] or panoramic photography [5], [6]. These techniques facilitate capturing the current condition of cultural heritage sites. The preservation and documentation of such protected places is a worldwide practice. The above mentioned digital tools provide continuing access for scholars and non-specialists to sites that are under threat. 3D computer reconstructions, animations and films about cultural heritage sites can tell stories that have potential to present the extraordinary wealth of these sites.

The preservation of cultural memory works in-between the cultivation of heritage architecture and cultivation of objects or artifacts. Cultural artifacts, which most often are private items *in situ* that belonged to a particular person or society, are often inaccessible. Museums and monuments cultivate the past using particular buildings or collections of items, but they do not preserve cultural memory which needs to be uncovered in order to be preserved. The author propose the application of loco-descriptive narrative and 360° video to preserve cultural memory of one of the poets - Charles Causley.

Charles Causley (1917-2003) was a Cornish poet from Launceston, UK. Causley was chosen as an example of a 20th century artist who was inspired by the surrounding environment and also items or artifacts that were located within them. He managed to embed these inspirations in his poems (especially ballads). The application of spatial narrative presented using mobile panoramic visualizations (i.e. panoramic immersive video) provides an access to these hidden objects and artifacts *in situ*.

Following the introduction, the second section is devoted to Charles Causley, the place where he lived and worked and also his topographical poetry. The third section begins by looking at cultural memory and methods which are used to preserve these memories. Section IV introduces loco-descriptive narrative and

its topographical approach. The fifth section presents the practical project that is available on-line [7] and was displayed to the audience in Plymouth, UK on a 360° immersive screen. The last section summarizes the project and seeks an answer to the question whether the presented methods could be applied to other 20th century poets.

II. CHARLES CAUSLEY - A POET OF PLACE

A. A poet of place

Causley, apart from short travels, spent his entire life in Launceston, which influenced his works greatly. A number of his poems refer to local buildings and also legends and use various objects both in his house and in the town [8-10], e.g. paintings on the walls of his house, sculptures of eagles in the gate of the Eagle House Hotel (poem: 'Eagle one, eagle two') (Figure 1) or a relief located on a façade of St. Mary Magdalene church in Launceston (poem: 'Mary, Mary Magdalene') (Figure 2) [11].

*Mary, Mary Magdalene
Lying on the wall
I throw a pebble on your back
Will it lie or fall?*

This fragment of 'Mary, Mary Magdalene' poem describes a local belief that a stone lodged on the relief's back will bring good luck [8].



Figure 1 Two sculptures of eagles in the gate of the Eagle House Hotel.



Figure 2 A relief of St. Mary Magdalene located on a façade of St. Mary Magdalene church in Launceston.

This paper does not focus on critical interpretation or analysis of the poetry but presents rather a new approach to the understanding of the elusive character of inspirational environments. It also attempts to seek methods that enable the preservation of places that once surrounded a poet. Through the

re-discovery of Causley's native town (Launceston) in ballads and poems, the audience can explore not only the town but also artifacts which were the inspiration for his poetry. Topographical poetry linked with spatial non-linear narrative enhances preservation of cultural memory.

B. Loco-descriptive poetry

Causley was a "poet of place" and Trewin [12], notes that "[i]n a very real sense, each poem [...] is a 'Launceston poem' ". Philip [13] specifies that Causley's autobiography is encoded in his poems, as his emotional and mental landscape.

The loco-descriptive (topographical) poetry is a genre of poetry that tells, and often praises, a place or a landscape. Stringer [14], who lists Causley as a poet who uses this type of approach to poetry, defines loco-descriptive poetry as "a species of composition [...] of which the fundamental subject is some particular landscape". Initially, topographical poets were scientific observers describing aspects of the city such as buildings, rivers and parks, but in the romantic period they not only moved away from cities to provinces but also rejected the scientific and informative approach. Topographical poems became a "venue for personal, historical and meditative thought" [15]. In this project, loco-descriptive poetry is hidden in different spots of the town and on this basis a number of trajectories are created to uncover them.

Topographical poetry is usually unknown for someone who is coming as a tourist to explore the town. This type of poetry can be uncovered, along with cultural memory it represents. Traversing through the town and uncovering hidden object/memorabilia recalls poems, but this recall can be performed e.g. by reading poems *in situ* as it happens regularly during The Causley Way [10] or The Charles Causley Festival [16], or is visualized on the site using audio and visual devices. The Causley Way is a path along Launceston which visitors have an opportunity to follow. A guide is reciting a collection of Causley's poems about objects and sculptures in various locations in Launceston (Figure 3). However, these events occur very rarely and there is a question of how to support such exploration and how to make the poems available for the international audience.



Figure 3 A guide is reciting 'Mary, Magdalene poem' near the relief of St. Mary Magdalene (indicated by a red arrow).

The loco-descriptive artistic work and spatial exploration of the town with interactive narratives, based on traversing multiple trajectories, determine the sequence of events. The proposed approach differs from the spatial strategy of

following the life of a person indicated by Azaryahu and Foote [17] because there are no choices available and one route of exploration is proposed. The question which arises at this point is how to preserve such spatial environments which surrounded a poet when they got the inspiration for writing a poem, and how to transport the audience to these sites in order to experience a similar discovery and perception of the world. The following section focuses on methods used in preservation of cultural memory, especially those which could transport them to the inspirational environments.

III. PRESERVATION OF CULTURAL MEMORY

A. Cultural memory

Cultural memory is a form of collective memory in that a number of people share cultural memory and in that it conveys to them a collective identity [18]. Following this line of reasoning and the preservation of public memory (monuments, sculptures) which is visible for all people gathered in a public space, it is necessary to find such a space for the preservation of cultural memory which can be shaped by a group, for example, from a particular region. Cultural memory usually has a local dimension as it is about regional artists and activities and can relate to inaccessible locations which are not available for the general public (interior of private houses, ruins, caves) in that area.

Cultural memory reveals itself in history culture and entails rituals and ceremonies at special times such as remembrance days, and at special locations such as ancient monuments, which operate as sites of memory and time marks [19]. Cultural memory is about making significant statements about the earlier periods in a particular cultural background of the present.

The elusive and partisan character of memories needs to be recorded to preserve them from oblivion. The common communication methods (photography, film, television) can only partially visualize locations which evoke memories. They do not present the whole environment, but only a limited field of view that is chosen by a director of a film or an author of a photograph. Panoramic photography and panoramic videography (360° immersive video or 360° video) seem to be the methods that can omit the limitation of the field of view and enable the transportation of the group of people to inspirational environments. They are explored in the following subsections, because they have documentary character and also record dynamics and mutual locations of individual objects in such environment.

B. 360° photography

Photography presents a limited fragment of a world and it does not depict views from behind the camera. Haskins and DeRose [20] notice, however, that photographs do not depict the surrounding context and position of artifacts and their relation to each other (e.g. when located in one room but in diverse positions). What is more, traditional panoramic imaging can be created using various techniques (rotating a camera with fisheye lens on a tripod and taking pictures every few degrees, automatic single line cameras, multiple cameras that take images at the same time). In most cases, the stitching software connects all images together and creates a single

panoramic image. When viewing such an image on a computer screen, special software called a panoramic viewer is necessary. The 360° image is wrapped in such a way in which the perspective of all objects looks correct. Using this viewing software the user can navigate all around a cylindrical or a spherical image. This type of navigation is similar to 'window viewing' proposed by Jeffrey Shaw, the pioneer of media art, in a few of his installations in the 1980s (e.g. 'Inverter la Terre') [21]. Here, instead of a rotating platform, a static computer monitor and panoramic viewer enable to explore 360° image and 360° video. This type of environment will be called a panoramic virtual environment, in contrast to a panoramic immersive environment which relates to immersive architecture that surrounds a viewer.

C. 360° videography (360° video)

Champion [22] notices the limitations of 360° panoramic imagery as he claims: "panoramic images available through the Internet may allow us to identify objects, but they are not likely to help us experience inhabiting that place, moving through that place, or understanding the dynamic and ever-changing relationship of people and place". Panoramic videography allows the observer to experience the space and recognize its dynamics. The production of 360° video involves the process of stitching separate videos (pointing in different directions and synchronized). 360° digital filming is still in the experimental stage as the language of immersive film production still has not been established [23].

The traditional methods of filming usually hide some details of the environment or a studio, so the material recorded could be manipulated and directed in a way that does not present some views. However, there are limits on how far the idea of traditional filming can be transformed to 360° film creation, because the 360° camera records all the reality that happens all around it (even the camera operator is recorded) so it is complicated to eliminate some parts of the recording. 360° filming seems to be a more realistic and less manipulated type of recording the world than using a traditional camera.

Two above mentioned approaches to the preservation of cultural memory (panoramic photography and panoramic videography) are used to visualize artifacts in inspirational environments and the movement between these places (traversing). The following subsections indicate the importance of artifacts and traversing in the visualized using panoramas environments.

D. Artifacts in the inspirational surrounding

Schiffer and Miller [24] state that "people spend their lives immersed in the material medium, mostly engaging with innumerable kinds of artifacts and with other people who have been combined with, or modified by, artifacts". A house is a shared and protected place with major cultural significance. Many of Causley's well known poems were written in his house. The Charles Causley Trust policy is to maintain the house with as little change as possible to the original layout. The house has been unoccupied for almost 10 years (Causley died in 2003). The house could become a "time capsule that tells the story of a Twentieth Century poet, his way of life and the people and places that were special to his work" [25].

The panoramic record of the condition of the house, where most of the objects remained in their original position is a starting point for exploration of cultural memory of the poet in the project. Figure 4 illustrates 360° images from the interior of Causley's house and presents mutual positions of artifacts.



Figure 4 360° images of Causley's house indicate the mutual positions of artifacts.

Cyprus Well, the name of Causley's house, remains closed for an ordinary visitor or a tourist. Items that remain in the house are voiceless. Just like objects in museums, they cannot tell stories. The difference between items in a museum and in a closed poet's house is that the former remain visible (if not kept in a store) and are often admired by visitors. But how to make visible a large amount of items that are hidden in a locked building and, for instance, once belonged to an individual who was immersed by this 'material medium'? How to preserve inspirational environments which were used by artists?

Theories of communication have often disregarded the significance of objects in human life. Schiffer and Miller [24] state that artifacts are involved in all modes of human interaction and communication. These items are visual, auditory and tactile. They may be unrecognized but if represented they will become visible and will preserve cultural memory. It is helpful to exploit this potential of artifacts in preserving cultural memory of a person who used them and for whom they were important.

The mutual positions of these objects in Causley's house was presented using panoramic photography which was enriched with interactive elements to convert a set of voiceless items to an environment that could explain their relationship to the individual and also indicate potential sources of inspiration for a poet.

The intention of this project was not to create a bibliographic film or an adventurous game of the artists but to generate an interactive and immersive application with trajectories where the user becomes familiar with key biographical data in Causley's life, and with various places and artifacts that guide him to learn about Causley's poems and encourage them to produce their own poems (inspired through the translocation to the presented places). Every viewer of this project can pursue their own exploration of the life of the poet.

This exploration is available through traversing which has its roots in surveying.

E. Traversing

The concept of traversing is well established in surveying as a science concerned with measurement and recording the details of section of land [26]. The rules of surveying have not been applied to the process of creating narratives and this paper introduces this new approach. Traversing uses various methods of measurements, e.g. linear measurements, angular measurements. Traversing is one of the methods of control surveying that relies on a series of stations where every point is inter-visible with neighboring stations. The process of generating loco-descriptive narratives (proposed in this paper and presented in the next section) based on traversing also contains a series of events which can be chosen in decision points. In surveying, the lines joining control points (stations) are called traverse lines (Figure 5). Similarly, in loco-descriptive storytelling, the lines between decision points are called narrative lines and are used for telling narratives when moving between decision points. The process of surveying occurs at stations and is performed using specialist geodesic equipment (e.g. a total station or a laser scanner). The survey consists of the measurement of length of each line (between stations) and angles or azimuths between successive lines. In this way, a chain with a number of additional chains attached to stations is created. Correspondingly, in loco-descriptive narratives the measurement of directions to inter-visible decision points is performed. What is more, instead of the measurements of lengths of lines between stations, the measurements of time of each linear narrative (between decision points) are compulsory for the design of a non-linear narrative.

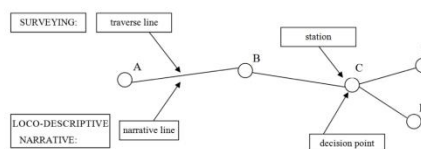


Figure 5 The traverse in surveying and in loco-descriptive narrative. Stations A, B, C, D, E are linked with narrative lines AB, BC, CD, CE.

The aim of traversing in surveying is to establish the position and mutual location of buildings, roads, paths, trees and other objects that are marked on a map. Traversing helps to establish co-ordinates of particular points (the centre of a tree, the edge of the path, the centre of a street) in order to create a detailed map. These points are measured from stations (main points in the traverse) and their positions are determined as accurately as possible. Cartography, which is the process of map creation, relies on the accuracy of these measurements. In order to calculate the positions of all stations, the first two stations have to be previously established. This process may be similar in traversing in loco-descriptive storytelling where the user who is traversing through this type of narrative is taught how to make decisions at the beginning of the traversing. All rules can be presented before the second decision point and

when the user learns these rules, they can apply them to the rest of the narrative.

As Bannister, Raymond and Baker [26] notice, surveying of stations is performed by the application of theodolite (to measure angles) and/or total-stations (to measure lengths of traverse lines). In the case of this project where the panorama is the main tool for the creation of narratives, a panoramic camera and a panoramic video camera is used not for measurements but for spatio-visual recording of space (stations/decision points) and movement between stations (traverse lines).

One of the key aspects in surveying and in loco-descriptive narrative is the choice of stations which are determined by the inter-visibility principle and these points are often located in crossings where a number of new traverse lines can be created. Correspondingly, in traversing, decision points are also located in crossings where a number of new narrative lines can be produced in different directions. The visibility between decision points is achieved by the continuous linkage of decision points and narrative lines. In the case of traversing through Launceston, the town defines positions of particular narrative lines and stations. The narrative design is based on topography of the town. The inter-visibility is assured by the application of the panoramic video camera where the observer or the spectator always has a continuity of the space. The layout of the town most often predefines the positions of decision points.

The preservation of memories and especially of cultural memory occurs when there is a connection between narratives and traversing. The audience of the immersive project decides about further narrative lines and gets an idea about the presented subject without gathering all of the details. The cultural memory is actively constructed in the minds of individuals and depends on their social and mental conditions.

The narrative used for preserving memory has some productive character as apart from the physical pre-scripted choices, users are able to create their own meaningful interpretations. The recollection process is productive as each of the users can produce their own 'picture' of the story based on data provided and choices offered. Thus, in line with Brown, Barker and Del Favero's [27] reasoning my narrative is polychronic. The following section focuses on loco-descriptive (topographical) narrative which is introduced in this paper on the basis of the existing theories of interactive narratives.

IV. LOCO-DESCRIPTIVE NARRATIVE

Loco-descriptive narrative has not been earlier defined in literature, however by analogy to loco-descriptive poetry it can be defined as a type of interactive narrative that presents the narrative during the traversing between decision points (stations). The latest definition of interactive narrative is delineated as a "formulation of old media practices - embodied by the narrative conventions [...] reapplied in the context of new media, with the user positioned as interpreting a meaningful narrative via the navigation of largely pre-scripted paths through data" [27]. Shaw [28] in 'Future Cinema' formulated three interactive modalities that refer to new media practices. Shaw's distinction has been renamed and

reformulated in [27]. These are a) polychronic narrative - re-sequencing narrative events; b) transcriptive narrative - re-assembling data (e.g. assembly of unrelated data into a narrative); c) co-evolutionary narrative - narrative as a shared autonomy. Narrative can emerge and evolve and these processes depend on the relationship between the user and the digital agent. The polychronic narrative is discussed in more detail because it has not been applied for panoramic virtual and panoramic immersive environment whereas transcriptive ('T_Visionarium' [29]) and co-evolutionary ('Scenario' [30]) narratives have been presented on panoramic immersive screens.

A. Polychronic narrative

The above mentioned modalities have been investigated through experimental installations at the University of New South Wales - iCinema Research Centre in Sydney and ALiVE lab at the City University of Hong Kong. Polychronic narrative is located in the context of a social space and a virtual space, which is referred to as dialogic (a concept which was introduced by Mikhail Bakhtin in 1984 to illustrate how fictional characters are able to speak to the authorial control of their creator) [31]. It is based on the communication between a human user and digitally generated agents (by wearing VR head-mounted displays). The user is able to navigate their own path through prescribed events [27]. Polychronic narrative encodes "temporal structures resistant to linearization ... [and] invokes and subverts reading conventions associated with narrative as a discourse genre" [32]. The sequence of events is not a stable and linear structure but as events are numerous the user can rearrange them and link them together in various ways [27]. The sequencing of events encrypts the 'time-act of reading' or the 'time act of travelling', traversing and interacting. In the polychronic narrative, sequences are anchored in time and space. The narrative does not restrain from time and history but offers a critical reflection upon the temporal and sequential aspects of narrative [31].

In the case of this project, the loco-descriptive narrative which is a sub type of polychronic narrative is a suitable modality of storytelling for this research project about a poet where events of the narrative are told when the user activates different elements (i.e. artifacts) from the sequence of a narrative. As the sequence of events are encrypted by traversing and can change at nodal points, according to the rules applied in surveying, Kinoautomat paradigm as a model for selective interaction is prescribed in the following subsection.

The number of trajectories in Charles Causley's town is generated by recording still panoramas on the stations (decision points) located most often in the middle of cross roads where all traversing lines from all directions meet up, and video panoramas between these stations indicate the transitions between stations. The process of recording video panoramas using a mobility scooter was described in [33, 34]. All trajectories that have been generated comprise the network of connections in Launceston. This network was based on the topography of the terrain of Launceston as trajectories follow main travelling routes. The network of such connections is presented in Figure 6, which uses the map of Launceston as a

used. For example, 'The Outbreak' [37] streaming multimedia content is presented on the Internet.

This section indicated the application of loco-descriptive narrative and Kinoautomat paradigm in the process of creating interactive films for a large audience. The issue of presenting the project in a panoramic viewer and in panoramic immersive architecture is presented in the following section.

V. PANORAMIC ENVIRONMENTS

A. Panoramic virtual environment

The project was prepared in the interactive form in Lucid Viewer [38] which is a Flash-based application. Interactivity such as: adding actions to buttons, arrows, interface icons, rotating 3D objects and navigating spherical still and video panoramas can be achieved through XML coding which allows the display of the following items in the panoramic virtual environment: 38 video panoramas (created between decision points); 25 still panoramas of Launceston (created in decision points); 8 still panoramas of Causley's house; 9 interface icons; 4 videos of reading poems; 3 collectable objects and 1 three dimensional object (Figure 8).

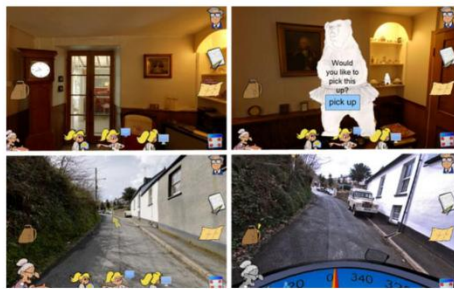


Figure 8 Panoramic virtual environment designed in Lucid Viewer.

This project is available on-line [7] but it is rather an application for a single user. The author plan to develop this project in HTML5 format so it could be viewed on the site using tablet computers to allow recalling memories. Following Halbwachs' [39] line of reasoning that being in a group supports remembering, a 21m in diameter panoramic immersive environment was applied to explore the discussed methods in the preservation of cultural memory.

B. Panoramic immersive environment

This project was firstly tested in a panoramic viewer and then a number of interactive features were transferred to the panoramic screen. The screening of the project occurred in September 2010 in Plymouth. Limited access to the 360-degree screen, affected the number of features of the immersive interactive films that could be successfully implemented on the screen. However, the audience had the possibility to choose routes they wanted to follow and an appropriate video panorama in cylindrical format was displayed (Figure 9). During the traversing there was a possibility to change a position within the immersive screen, but almost all viewers

stayed in the same position during the screening. This is because of the viewer's attachment to a chair and a rectangular screen that is common in cinemas.

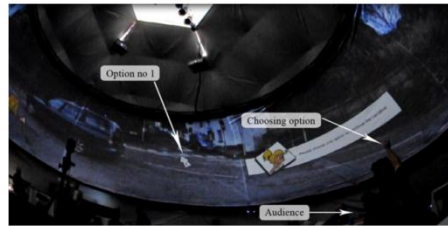


Figure 9 Inside panoramic immersive environment which presents video panorama from Launceston. The audience can choose the next fragment of the loco-descriptive narrative. Option no. 2 is not visible on the presented part of the 360° screen.

The further research should focus on reception of the audience and examination of how they evaluate immersion and interaction and also whether the project can preserve cultural memory of Charles Causley.

VI. SUMMARY

The evidence from this case study suggests that the panoramic approach to preserve cultural memory is worth further investigation, especially in terms of preserving the memory of individuals (artists, poets, writers) who died recently as their objects and artifacts are often still located *in situ*. The method described in this chapter might be applied to other individuals (Dylan Thomas, Charles Dickens, Sigmund Freud etc.) who used to create their work in one location which provided an inspiration for them. I think that my approach is more applicable to case studies of people who are still alive or who died recently because the environment and artifacts that they left could still be recorded using 360° cameras and might be explored in the future using tablet computers in the future. The lives of Czeslaw Milosz (1980 Polish Noble Prize winner in literature) who died in 2006 in Krakow (Poland) or Wislawa Szymborska (1996 Polish Noble Prize winner also in literature) who died in 2012, also in Krakow provide a potential for applying the above presented methods to preserve their cultural memories inscribed in the Polish city. Both Milosz and Szymborska created poems inspired by artifacts, and very often, places. The recent project 'The Milosz Compass' [40] uses some concepts that were described in this paper and presents places of Milosz not only from one town, but from a number of cities in different countries (Poland, Lithuania, France, USA).

Further work needs to be done to establish whether the inspirational environments that once surrounded poets and artists can be preserved efficiently. Tablet computers could provide a new potential for re-discovery of these environments in the future, but they need to be recorded now (when poets are alive or when they died recently) using panoramic video cameras.

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360° FILM BRINGS BOMBED CHURCH TO LIFE

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KEY WORDS: 360° video, panoramic video, church, 3D reconstruction, 360° screen, panoramic screen, immersive environment

ABSTRACT:

This paper explores how a computer-generated reconstruction of a church can be adapted to create a panoramic film that is presented in a panoramic viewer and also on a wrap-around projection system. It focuses on the fundamental principles of creating 360° films, not only in 3D modelling software, but also presents how to record 360° video using panoramic cameras inside the heritage site. These issues are explored in a case study of Charles Church in Plymouth, UK that was bombed in 1941 and has never been rebuilt. The generation of a 3D model of the bombed church started from the creation of five spherical panoramas and through the use of Autodesk ImageModeler software. The processed files were imported and merged together in Autodesk 3ds Max where a visualisation of the ruin was produced. A number of historical images were found and this collection enabled the process of a virtual reconstruction of the site. The aspect of merging two still or two video panoramas (one from 3D modelling software, the other one recorded on the site) from the same locations or with the same trajectories is also discussed. The prototype of 360° non-linear film tells a narrative of a wartime wedding that occurred in this church. The film was presented on two 360° screens where members of the audience could make decisions on whether to continue the ceremony or whether to run away when the bombing of the church starts. 3D modelling software made this possible to render a number of different alternatives (360° images and 360° video). Immersive environments empower the visitor to imagine the building before it was destroyed.

1. INTRODUCTION

1.1 Panoramic photography and cinematography

In the last decade there has been a growth in the use of panoramas for visualisation and documentation of complex architectures (Fang, 2007, 2009) (Pisa et al., 2010), but these projects were prepared for scientific analysis, rather than for cinematography. (Gruen et al., 2005) computer-reconstructed the Great Buddha which was used in a 90-minute movie "The Giant Buddhas" (Frei, 2006). This 3D reconstruction was a part of the film, whereas the researcher proposes a method where the computer-reconstructed heritage site is presented using still and video panoramas with a 360° field of view, not with a limited field of view as in the cinema or television. Panoramas have been used in cinematography and in 3D modelling (Bienias, 2008), but this project focuses on 360° imagery and 360° video as a crucial method of presenting not only the interior of buildings from the past, but mainly narratives. Autodesk Image Modeler enables the generation of 3D models of buildings from panoramas (Downing, 2008) without the knowledge of close-

filmmakers. This paper presents a new approach for the documentation of heritage sites via 360° narratives that presents an artistic visualisation of the site which is necessary for the creation of 360° films. This visualisation was based on historical photographs, but due to the fact that there are no panoramas from the past, only limited areas of the ruin were 3D reconstructed (Figure 1). The views for the purpose of a 360° film were rendered in Autodesk 3ds Max and also recorded using spherical video cameras that generate 360° video.

1.2 360° video and 360° camera as the basis for 360° film

Panoramas improved the visualisation of interiors of the world and they became a part of our lives (Huang et al., 2008), however the advances in computer technology, larger broadband and the improvements in digital camera technology led to the creation of panoramic video (360° video) which is a sequence of 360° images displayed as a film (for example 30 panoramas per second). They are becoming widely accessible through the use of spherical and panoramic video cameras: Ladybug (Point Grey Research Inc, 2008), Kogeto (Glasse,



Figure 1 A montage of 360° panorama of the ruined church and computer-reconstruction created on the basis of historical images.

(Immersive Media, 2009). This research paper examines the use of Ladybug cameras (Figure 2) within a heritage site that enable the creation of 360° narratives.



Figure 2 Ladybug 2 (left) and Ladybug 3 (right) – spherical video cameras. Images from: www.ptgrey.com

1.3 360° stories

The concept of 360° stories (Kwiatek, 2011) relates to the early stage of creation of feature 360° film stories by the application of the same or similar techniques of presenting narratives as in the early cinema. They characterise the following features:

- the application of commentary of a lecturer;
- creation of travel genre movies;
- a lack of advanced video editing;
- a lack of actors;
- a lack of dialogues.

360° narratives may not only become a technological innovation, but also a new form of art, similarly to what had happened with the early cinema at the beginning of the 20th century by the inventions of Georges Méliès who changed the way of thinking about the cinema. Méliès enabled the creation of first stories by using a number of visual effects in order to present first narratives (Popple and Kember, 2004). No longer was the documentary film the main attraction in the cinema. Correspondingly, 360° narratives attempt to find a method of presenting narratives using 360° imagery and video.

1.4 Motivation

Finding an appropriate method of telling narratives via the use of panoramas was of the challenge that the researcher faced when creating panoramic publications on CDs and DVDs. 360cities.net (360cities, 2009) or Google StreetView (Google, 2009) have collected thousands of spherical panoramas that are presented in interactive form in Internet browsers, but they still do not tell narratives. The invention of panorama paintings at the end of 18th century and a method of presenting all-surrounding images in rotundas provided an inspiration for the researcher to create an illusion of reality using today's digital 360° panoramic environments. 360° video is a new form of visualisation of the world and when displayed on a 360° screen can be a powerful method for presenting narratives, especially when merged with a panoramic video of the same site, but reconstructed in 3D modelling software. 360° film discussed in this paper brings a bombed church to life in a "cinema 360°" (Michaux, 1999). Sarah Kenderdine states that such environment "can help people to better appreciate these often fragile heritage sites" (Gaffney, 2006). The researcher's aim is to provide a new type of experience for viewers within 360°

screen where the audience would feel totally immersed and engaged with the narrative projected on a wrap-around screen.

1.5 Overview of the paper

The next section discusses the history of Charles Church and describes the location of the building. The third part of this paper focuses on a 3D reconstruction of the ruined church, whereas the forth part illustrates the creation of still and video panorama on the site and in 3D modelling software. The process of creation of 360° films is discussed in Section V. Section VI is focussed on the displaying of 360° films to a large audience gathered within panoramic environments. Finally, the last part (Section VII) summarises the project and presents the potential development of 360° films in the future.

2. CHARLES CHURCH IN PLYMOUTH

2.1 The ruined church

Charles Church in Plymouth (Figure 3) is the object of interest in this paper. The researcher's photographic panoramic experiments were conveyed inside the ruined church. It also became the location where the story of a wedding from 1941 is virtually embedded.

2.2 The history of Charles Church

The building of Charles Church was finished in 1657 and it was consecrated by the Bishop of Exeter in 1665. Charles Church was destroyed by incendiary bombs and burnt out on the night of 20th and 21st March 1941. (Moseley, 2010) suggests that this church was regarded as "one of the last Gothic churches to be built, before the style disappeared". Today, the church is situated in the middle of a busy roundabout (Figure 4). There is no access for visitors because it remains a memorial ruin after the Blitz of 1941. The church is locked and there is no crossing available on the roundabout which could help visitors to access the site. The church was dedicated to King Charles I and not to be confused with Charles the Martyr (Robinson, 1991).



Figure 3 A ruin of Charles Church in Plymouth.



Figure 4 Aerial pictures of Charles Church located in the middle of a roundabout. Source of images: <http://www.bing.com/maps> (accessed 19.11.2010)

2.3 Panoramas of the church

This site was chosen by the researcher to attempt the development of an interactive 360° story. A number of photographic experiments are described in more detail on the researcher's website (Kwiatk, 2009) where interactive panoramas (Figure 5) from the interior are also published. The church was visualised using panoramas and then reconstructed in 3D modelling software. Panoramas created in 3ds Max (Figure 6) present the possible views of the interior as it looked before the bombing in 1941. They are located in the same spots as the 360° images recorded using a DSLR camera and fisheye lens. The next section describes the process of a 3D reconstruction of the ruined church.



Figure 5 Panorama created in the middle of the ruin.



Figure 6 Reconstruction of the church presented from the same location as the panorama in Figure 5.

3. 3D RECONSTRUCTION

3.1 3D reconstruction for 360° film

The site discussed in this paper is a ruin in the city centre and has the potential for panoramic applications related to cultural heritage. The pertinent church enables the researcher to present narratives about the event that took place in the past. To create the story-based panoramic interactive narrative based on Charles Church, the researcher needed to reconstruct the site. This type of narrative was defined in (Kwiatk and Woolner, 2010).

3.2 Approach to 3D reconstruction

The 3D reconstruction was not based on photogrammetrical methods (scientific approach) described by D'Annibale and Fangi (2009) as the researcher had planned at the beginning of the project, but a photorealistic visualisation was performed instead. The aim of the project was to create a 360° film based on a 3D reconstructed site and the existing ruin. A measurable 3D model of the building was not necessary for this purpose. A number of historical images were applied in this process, but due to the limited number of images of the interior being available, some parts of the church are visualised according to

other resources. The purpose of this 3D reconstruction was the generation of 360° films from a 3D modelling application in the way that the rendered files are matched to recordings with panoramic cameras on the site in order to move the viewer to the past during 360° story. The next paragraph presents the method of 3D reconstruction from panoramas.

3.3 Procedure of 3D reconstruction

This project attempts to present a method of rendering content of photographic quality in 3D modelling software in order to apply it to storytelling in 360° environments. The 3D reconstruction was performed according to the following procedure:

- Pictures were taken using Nikon D90 (DSLR camera), Nikkor 10.5mm fisheye lens and Manfrotto panoramic head to create five spherical panoramas of the interior of the church (Figure 7); PTGUI software was used to stitch images.
- Each panorama was imported to ImageModeler to generate 3D models of the locations presented on each panorama; this process is divided as follows:
 - defining a coordinate system;
 - defining straight lines and flat planes;
 - constructing more difficult shapes (columns, arcs etc.) (Figure 8)
- Each of the five spaces were exported and merged in 3ds Max.
- 3D reconstruction based on historical images was performed in 3ds Max using V-ray render engine (Figure 9, Figure 10, Figure 11 and Figure 12).



Figure 7 Locations of five spherical panoramas.



Figure 8 Modelling of windows of the ruin in ImageModeler.



Figure 9 3D model overlaid with panoramic picture.



Figure 10 A wireframe model of the reconstructed church.

3.4 Historical images of the church

A number of historical images were found in various Plymouth archives (Local and Naval Studies Library – department of Public Library, South West Image Bank and SWFTA) and this collection enabled the process of virtually reconstructing Charles Church. The reconstruction started by combining the historical pictures with the contemporary views, and SPi-V panoramic viewer (Hoebe, 2009) enabled the fitting of historical images to the right location in the panorama (Figure 11) using XML programming. 3D reconstruction started from importing historical images to 3ds Max environment (Figure 12). Once the 3D reconstruction was ready (Figure 13), the generation of single panoramas within 3ds Max was performed in the same locations as these 5 spherical panoramas (defined in Figure 7). The accurate position of these 360° images was necessary in the process of creating still and video panoramas that are described in the next section.



Figure 11 Historical image merged with the panoramic image is the beginning of 3D reconstruction.

4. STILL AND VIDEO PANORAMAS

4.1 Still and video panoramas in 3D modelling software

The generation of panoramas in 3D modelling software in the same locations as they were created on the site is not an straightforward task. The method of trials and errors was executed in this case because there is no preview with 360° field of view in 3ds Max that allows an immediate comparison of the position between the currently rendered panorama and 360° image created on the site. The application of SPi-V panoramic viewer made this task possible, because of the use of two layers

and additional programming in XML. The process helped in the generation of five spherical panoramas in 3D modelling software in the same location as the starting panoramas. These five locations were the start and end points of 360° video rendered within 3ds Max (Figure 14). In order to view the results before generating the content for an immersive screen, panoramic viewers are necessary. They are discussed in the following subsections.

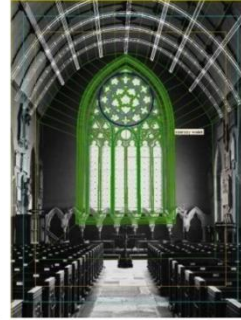


Figure 12 Historical images are the basis for 3D reconstruction of the church.



Figure 13 A completed 3D reconstruction of Charles Church.

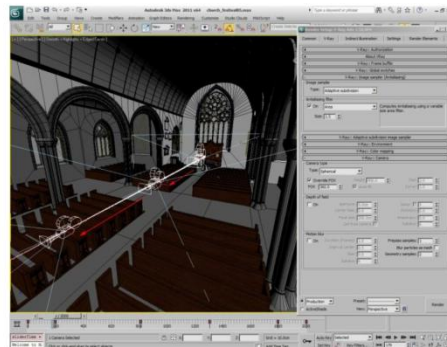


Figure 14 The generation of 360° video in 3ds Max environment.

4.2 Panoramic viewers

There were, at the time of writing this paper, many sophisticated panoramic viewers for presenting high resolution panoramas on the Internet. The most recent being: krpano (Krpano, 2009) and Pano2VR (Rauscher, 2009) all of which are based on Flash technology and enable the display of gigapixel files using streaming technology. The researcher will employ Lucid Viewer (Villmer, 2011), which is the most recent panoramic viewer and provides the opportunity for presenting video panoramas in a creative and flexible manner by using XML coding. The limitations of panoramic viewers (limited field of view; necessity of interaction e.g. via a mouse to see other parts of a 360° video; the lack of spatial audio effect) also have an impact on the creation of 360° narratives. These limitations can be eliminated in immersive environments based on 360° screens which are discussed in the sixth section of this paper.

4.3 Panoramic viewers for 360° video

Only a few panoramic viewers are capable of displaying spherical and panoramic video at the time of writing this paper. These are: Lucid Viewer; KrPano; Pano2VR; Yellow Bird's viewer (YellowBird, 2010). Software for viewing wrap-around images is necessary in the process of creating 360° films because such content needs to be tested first on a computer screen and then if successfully implemented, in an immersive environment.

4.4 Recordings of 360° video on the site

Recordings on the site were performed using spherical video cameras – Ladybug2 and Ladybug3 (Figure 15), manufactured by Point Grey Research. These cameras have 6 lenses, where one of them is looking up to record the zenith area. They generate a large amount of data (approx. 2-3GB per minute; 15-30fps). Table 1 includes a few parameters that differentiate these two cameras. 360° images and 360° video are the basic elements for the panoramic film presented in this paper. 360° footage helps to visualise the site only if presented on an immersive screen which provides the illusion of being in that location.



Figure 15 Ladybug 3 - spherical video camera in action.

Feature	Ladybug 2	Ladybug 3
max. resolution	3500x1750px	5400x2700px
max. frame rate	30fps	16fps
data transfer	2GB/min	3GB/min
weight	1.19kg	2.41kg

Table 1 Differences between two spherical video cameras.

The process of recording on the site was not a straightforward task due to the fragility of the equipment that was produced for the office use, rather than in an environment such as a ruined church. A powerful laptop with Firewire 800 output and hard drive with RAID0 system has to be constantly connected to the camera. There are also a number of cables connecting a laptop, a spherical video camera and a battery and this set up makes the process of recording spherical video from point A to point B rather difficult. The researcher developed a motorised wheelchair for the recording of such 360° films, but this solution cannot be applied to this heritage site. Instead a trolley (Kwiatk and Woolner, 2010) or a Manfrotto Dolly was used for the recordings inside the ruin.

4.5 Merging 360° footage

In order to achieve the effect of changing the environment from the current ruin to the reconstructed site which was necessary in the 360° film (to present the dream of a bride), the researcher had to render similar trajectories within a 3D reconstructed church (Kwiatk and Woolner, 2009). To do this an animation of panoramic cameras was generated and resulted in thousands of panoramas which were then used to create 360° video. The time of rendering only one panorama (2000x1000px) was about 5-10 minutes, so the process of rendering animation from spherical camera is considerably longer. The method for creating video panoramas is based on creating a number of individual panoramas, while the environment around the cameras is animated or alternatively the set of cameras is moving through the space. Video panoramas in 3D modelling software were rendered between these 5 locations (Figure 7) where the first still panoramas were taken. The animations were set up between these points: 1-5, 1-2, 1-3, 1-4. The movement in the opposite direction was also used in the generation of 360° film and such video panoramas were rendered in Adobe After Effects CS5 using the reverse function. The frame rate of recordings in this project is 15fps which is enough for the projection on a large wrap-around screen. The sequence of spherical images was imported to QuickTime Pro and exported as MOV files using H.264 codec that is compatible with Lucid Viewer or without compression for display on a 360° screen. One of the advantages of using 3D modelling software is that it facilitates the rendering of files with a resolution adequate for the 360° screen (max. resolution of 9600x1080 pixels, whereas 360° video from Ladybug2 is limited to the resolution of 3500x1750 pixels – and Ladybug3 to 5400x2700px). These resolutions from Ladybug cameras are in equirectangular (spherical) format, but 360° screens accept content which is in cylindrical format.

4.6 Cylindrical and spherical video

The footage from 360° rig (Figure 16) provides the resolution of about 8000x1080 which is the resolution needed for a cylindrical screen. Ladybug cameras do not provide enough resolution for such screens, but were necessary to prove the concept of creation 360° films. They create spherical video which is acceptable by panoramic viewers which needs to be cropped (from an equirectangular to a cylindrical format) when used on 360° screens that are discussed in Section 6.

360° film discussed in this paper also consists of actors that are playing roles of guests, parents or a groom and a bride within this panoramic environment. The next section describes techniques that were used in order to transport real actors to 1941.



Figure 16 Six HD cameras create a 360° rig which generates cylindrical video panoramas.

5. CREATION OF 360° FILM

5.1 Process of creating 360° film

The process of the creation of 360° film in Charles Church consists of these elements:

- 3D reconstruction of the site;
- definition of a storyboard;
- recording 360° images and 360° video, first on the site, then in 3D modelling software;
- recording actors in a green screen studio;
- editing and testing of the final film in a panoramic viewer;
- presentation of the 360° film in an immersive environment.

This project uses a 360° field of view to tell a narrative of a wedding that happened in Charles Church in 1941. In order to follow the tragic moments of that day, the researcher decided to use 360° imaging. It also helps the viewer to be transported to the past and by making decisions, hopefully changes the sequence of the narrative.

5.2 The narrative

The researcher chose a story of a wedding of Ken Beer and Phyllis Corry who married in the ruins of Charles Church on 22nd March 1941. The marriage was the last one that happened on this site (Rees, 2010). The Blitz began on the night of 20th and 21st March 1941. As a result, incendiary bombs left the church in a ruin. The vicar of Charles Church decided to have the wedding in the church the morning after the bombing, even though the site was destroyed. In fact, the original wedding happened on the day following the bombing of Plymouth and they had their wedding in the ruined church, but the researcher decided to move this event in time to create a more dramatic atmosphere. The mentioned couple are in their 90's now and they still live in Plymouth. In 2011, they are going to celebrate their 70th wedding anniversary.

5.3 Locating actors within the 360° film

The researcher decided to use video recordings of actors who are used as characters in 360° narrative whereas the co-evolutionary narrative developed by Kenderdine (2008) presented computer-generated (CG) characters which were embedded with this type of storytelling. The concept of adding actors to the 360° film was one of the tools which helped in the conversion of viewers gathered within a 360° screen to participants of 360° stories. *Chroma keying* techniques enabled the researcher to use the same recording of a person walking in a number of stages throughout the narrative. On one occasion the actors are displayed on a background of the reconstructed site, another time they have a ruined site behind them. The process of the actors walking was recorded using Ladybug 2

camera (Figure 17) in a green screen studio (Figure 18) to achieve the same type of distortion that appears in spherical panoramas. Figure 19 presents a spherical panorama that was created by merging footage recorded in the green screen studio and the spherical panorama rendered in 3ds Max.



Figure 17 Recording actors with Ladybug 2 camera in a green screen studio.



Figure 18 A spherical view of a green screen studio, created using Ladybug 2.



Figure 19 The wedding takes place in a historical (3D-reconstructed) Charles Church.

6. IMMERSIVE ENVIRONMENTS - 360° SCREENS

6.1 The idea of 360° cinema

In the past, early panorama paintings presented in a wrap-around form on a cylindrical screen, transported viewers to remote locations or historical or biblical events (Wilcox, 1996). Today, seamless multi-projector 360° displays maximise the realism of such travels by displaying high resolution 360° images and 360° video. Panoramic films discussed in this paper might be the next step of the development of the cinema. One of the best known movie directors, Steven Spielberg, has already seen the potential of 360° cinema. Spielberg, in the interview in

The Times in 2006 (Philadelphia, 2006), states that: "in the not [too] distant future you'll be able to go to a movie and the movie will be all around you. The movie will be over your head, it will be 360 degrees around you". It seems that this time has come and this type of experience is now available due to the use of projectors and proper computer software. Some of these 360° screens focus on the presentation of scientific research (Elbe Dome in Magdeburg (Schoor et al., 2008), Cyclorama in Montreal (Chapdelaine-Couture, 2009)), whereas others (ICCI360 (Innovation for the Creative and Cultural Industries, 2010) or Totavision's screens (Garlot, 2010)) are good examples of telling 360° digital narratives that are presented on 360° screens.

6.2 360° screens

360° screen provides an opportunity for spatially situating the audience within the site where the narrative is located; here they would feel personally involved. This project supports the visitor in imagining the church before it was destroyed by triggering emotional responses to the tragedies from the past. Additionally, the 360° arrangement of screens offers the potential for the user to feel as though they were truly there and feel personally present on the site.

6.3 Screenings of the 360° film

The panoramic film about the wedding in Charles Church was presented three times on immersive screens. First in August 2009 in Vision3D lab in Montreal (Canada) (Figure 20), then in February 2010 in Plymouth during the event called Arena360 (Figure 21), and then in September 2010 in Plymouth (ICCI360 Festival) (Figure 22). The construction of the screen was provided by IglooVision (Igloo Vision, 2010).



Figure 20 The screening of the 360° film on a 360° screen in Vision3D lab at the University of Montreal (Canada).



Figure 21 The interior of an immersive space (Arena360) where the audience is watching 360° film about Charles Church. Photo: D. Hotchkiss.



Figure 22 360° view of the interior of ICCI360 screen with the presentation of the 360° film about Charles Church.

6.4 360° documentary of these events

The recordings from these events are available on the researcher's website: <http://www.360stories.net> (accessed 3.02.2011).

7. CONCLUSIONS

This paper presented a method of generation of 360° film based on the example of the bombed church in Plymouth. 3D reconstruction of this heritage site (built on historical images) and recordings in a green screen studio were necessary in order to present the interactive narrative on immersive screens. The application of spherical video cameras (Ladybug2 and Ladybug 3) and a camera with a 360° field of view in 3D modelling software, provided a number of alternatives which are necessary for the generation of interactive films. The audience gathered inside 360° image spaces had a chance to decide about further developments of the story. The future development of the project could progress in the direction of presenting stories, not only within cylindrical screens, but also on a fulldome projection system or even within the existing ruins of buildings, where 360° films can be projected on walls of buildings.

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