Stopmotion Photowalk Animation for Spatial Immersion in a Remote Cultural Heritage Site

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This paper explores the use of an animation technique, the stopmotion photowalk, to convey a spatial awareness to the viewer for individual extant buildings and a discrete section of buildings and ground, using case study from the disused whaling station at Grytviken, South Georgia Island. Possible mechanisms for immersion resulting from the technique are discussed in terms of flow and spatial presence. Some implications of immersion are considered for virtual tourism, personal remembrance, memorialisation and situated decision making of policy makers for remote environments. The station considered was in operation in the Antarctic Convergence region from 1904-1965 and a wide range of nations are represented in the cultural heritage of the island, which has no indigenous population and is a remnant from the British Empire, currently designated as a British Overseas Territory. This case study is part of a broader PhD research agenda which will culminate in the production of a virtual reality environment of a section of the contemporary station and examine presence and immersion achieved through these means while documenting an attempt to create an ontological reproduction of a walk through the station by virtual means.

1. INTRODUCTION

Shields (1991) refers to the term spatialisation as ‘related to the spatial forms that social activities and material things, phenomena or processes take on’. In a later clarification, he asserts a spatialisation as a virtual object, but one that can manifest materially ‘in discourse and as a frame through which problems are understood’ (Shields 2003).

Spatialisations then are virtual constructions that can be represented, just as ideas and thoughts can be represented. Visual representation of a spatialisation will communicate differently to people for a variety of reasons, for example based on their level of trust, beliefs, familiarity and personal experiences with the spaces and social issues depicted. Different spatialisations of the same subjects overlap, compete, interrelate, and mix organically, in personal and public ways. Memories and knowledge affect our interpretations and judgement about which spatialisations are appropriate to possess or accept. Likewise, skill in articulating or capturing a spatialisation may affect how spatialisations are considered and communicated to others.

In this paper, we will look at an example of a style of animation, the stopmotion photowalk, examine theoretically relevant issues and explore the application of the ideas in the production of an image sequence based on photography from a defunct whaling station located on South Georgia (SG) Island in the Subantarctic.

2. SOUTH GEORGIA

Explorers, whalers, sealers, researchers, military, government, support personnel and Antarctic tourists have visited the remote island location of SG and its heritage sites. Only a relative few of the general public are able to physically travel to the site due to its difficult to reach location in the Antarctic Convergence, the Subantarctic. Most with knowledge of the island have gained it in a virtual way, through established cultural and educational methods such as viewing of photographs, reading books and articles, listening to lectures and verbal stories related to the island. Motion picture films have had their setting here (visually created from a range of methods) as well as documentaries on the area, wildlife and the whaling history.
More recently as technology has provided expanded options, virtual visitors to SG can utilise websites that collate multimedia information and resources. Online visitors can watch QuickTime panoramas that can give them more of an experience simulating human perception, through a changing and continuous viewpoint that they control. Panoramas are available online (Stang 2014) and as applications for mobile devices (University of Dundee 2012). There are currently two live webcams at King Edward Point (KEP) SG operated by the British Antarctic Survey (BAS) that show live snapshot views of the area in real time (British Antarctic Survey 2015).

Physical remains of the defunct industrial whaling stations in South Georgia exist in unprecedented quantity and quality, due to the abrupt nature of the suspension of whaling in the region. There was an abandonment of equipment and structures that are overwhelming in the scale and complexity of industrial remains left in situ. This abandonment combined with limited visitors and inhabitants of the remote location have led to a remarkable repository of this vanished industry.

A computer visualisation strategy or programme has been implemented by various stakeholders in South Georgia cultural heritage, with a range of goals and methods.

This research paper aims to contribute a specific experience, which is a virtual experience of walking around extant buildings related to the whaling station’s operation. The area is composed of a collection of proximate buildings that supported the industrial whaling workers (bakery, coffee roasting house, and larders) and provided luxuries (a ‘slop chest’ with tobacco, chocolate, and other items for purchase). The area also contains buildings and sites that provided accommodation for management (see Figure 1).

The cinematic view is presented through the medium of a form of animation related to stop motion, the ‘stopmotion photowalk’ (Cross 2012). The intention is to promote a spatial immersion of the viewer and thence to provoke consideration of the spatialisation issues of SG relative to the viewer. A further goal is that of documentation, to create a record of the station as it was when photographed from multiple angles at a point in time and to contribute to the body of SG media.

2.1 Grytviken, South Georgia

Grytviken is the name of the SG station selected for this project (one of seven whaling stations on the island). It is located adjacent to KEP and is readily accessible to those who visit SG. It is situated at the most protected harbour on SG and is the site of the Museum (see Figure 1) and Post Office of SG.

Remains of the industrial operation are in open evidence as the area has been ‘cleaned up’ with removal of asbestos, unsafe structures and general debris that could be dangerous to visitors (Basberg 2004). Private yachts are required to call in at KEP, to check in with the government officers before proceeding to tour SG. Most people, who have visited South Georgia, have passed through Grytviken. Indeed for many it will have been their first SG port of call.

3. IMMERSION

Immersion is a somewhat broad term that is used in many ways in different types of media and mediated experiences. Seeking a useful definition for this paper includes taking into account its relevance to the broader research project incorporating virtual reality environments.

Weibel separates the immersion effect typical in video game environments into two discreet categories; spatial presence and flow (2011). He states ‘Flow and presence share conceptual similarities such as an immersive component and intense feelings of involvement, but there are clear differences whereas flow can be defined as immersion or involvement in an activity (i.e. the gaming action) presence rather refers to a sense of spatial immersion in a mediated environment’.

3.1 Spatial Presence

Watching animation on a two dimensional screen is not a spatially present activity for most people; they would not feel in most examples as though they would be present in the depicted world in a bodily way. However there is an interesting correspondence to some styles of stop motion animation (those that have relatively larger jumps or gaps between movements of the subject) and
cognitive science research showing views of three-dimensional objects that have been rotated. Shepard (1976) proposed that his ‘subjects make the comparisons by carrying out a mental analogue of the actual physical rotation of one object into congruence with the other, and further, that the mental representations that are internally transformed in this way are more akin to the three-dimensional objects portrayed than to the two-dimensional retinal projections of those objects.’

3.2 Flow

Watching a film or animation has been traditionally viewed as a passive activity, and so immersion due to flow characteristics (involvement in an activity) would seem counterintuitive.

However, Anderson sees the viewer as “a meaning-seeking creature who engages the film as actively as he engages the real world about him” (1993). This observation arises from his debunking of the myth of persistence of vision in film and animation studies, an early theory that sought to explain viewer perception of motion when in fact they are seeing a series of still images in fast succession. The discredited theory goes that there was a piling up of the images in the physical eye, where an image is retained (similar to an after image that we have all experienced) and merged with the succeeding image. Anderson points out that there isn’t evidence of this phenomenon in science, but it persists in film criticism.

The perception of apparent motion is a complex phenomenon that is processed and integrated in different systems of the brain, according to different types of motion and signal interaction. One difference of interest in considering stop motion animation (with relatively large gaps) is that summarised as ‘…closely spaced displays may be mediated by the same mechanisms as real motion, while more widely spaced displays involve a different type of processing’ (Anderson 1993). These are termed ‘short-range’ and ‘long-range’ apparent motion.

This paper does not make the claim that the apparent motion in the produced stopmotion photowalk is either definitively short-range or long-range, but it is possible that the idea of flow might be invoked in processing of long-range apparent motion. If long-range apparent motion is not processed as real motion (in the way short-range appears to be) then it's possible that there is a more task-related type of activity, an engagement, taking place in the brain that contributes to a flow based immersive quality when viewing a stopmotion photowalk.

4. THE STOPMOTION PHOTOWALK FORMAT

Cross seems to have coined the term ‘stopmotion photowalk’ to describe a process of taking numerous photographs in such a way that they later can be assembled as sequences in a manner similar to both stop motion photography and time-lapse photography (Cross 2012). The term seems appropriate in that it communicates in the first compound word that there are selections or manipulations of motion at intervals and in the second word that these are achieved by photography of a subject and the photographer’s movement. The form of the ‘walk’ is thus revealed by the viewer’s immersion in the point of view of the camera.

In ‘Stopmotion Photowalk – Times Square Petra Cross’ (Cross 2012) not only documents some of her friends in a section of the popular New York City intersection, but she spatialises this experience for viewers as she presents the energy, colour, and vibrancy of the area. Her work as expressed in the interval timing and position of the subject between frames makes no attempt at the continuity of motion normally aimed for in stop motion. In some stop motion cases, movements of subjects are somewhat larger than can be accommodated as smooth motion and this is an effect that her work approaches but is different from. Her imagery is also photographic of natural subjects rather than constructed ones.

5. CREATIVE PRACTICE

This computer visualisation research project began initially as the gathering of photographic data for use in creating a virtual reality environment of Grytviken. Extensive photography was taken as reference material for 3D modeling and texturing of the buildings and surrounding environment on expedition to South Georgia Austral winter of 2013-14 (Smith 2014). Photographs were taken in a rotary pattern to capture all angles of a building subject.

Where other artefacts/subjects precluded a consistent distance from the subject along the arc of a circle, the view was moved in or away from the centre and traversed around the obstacle. An attempt was made to space the gaps between photographs as evenly as possible given the terrain and without using exact measurements. The author used a sidewise stepping, shuffle motion to achieve a degree of consistency.

See Figure 2 for a detail view of walking paths and camera positions of two buildings.
Stop motion animation for spatial immersion in a remote cultural heritage site

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Figure 2: Detail view of the Coffee Roasting House 45, Provision Store 41 and path/points of photography in Grytviken, SG (© The author 2015)

When combined together these various weeks of photography create an overlapping record of separate walks, combined into one experience of the spatial characteristics of individual buildings in Grytviken and the section as a whole. See Figure 3, where each white dot in the figure represents the location a photograph was taken. At the rough centre of each enclosure is the subject building represented here as a point cloud constructed via standard photogrammetry process from images.

Figure 3: Points of photography on walks and reconstructed photogrammetry of area in Grytviken, SG (© The author 2015)

The image in Figure 3 responds to O’Rourke’s questioning “Without form, a thing is invisible.

What form is involved in a walk?” (2013) by creating a cartographic map of sorts, which shows not only buildings and land features, but also the paths taken by the author to create the image itself, consolidated in time. By viewing each individual image in sequential form (through the medium of the stopmotion photowalk), time is once again expanded although not to the experience of the author taking the photographs. The spatial characteristics are communicated in the animation, not at a glance as in a map, but through a temporal ordering and presentation of static views that provoke a perception of apparent motion.

In modern society, to walk often means to take time, or slow down our transit between two points, enjoying a journey for its own sake rather than choosing the most expeditious method. In this walked timeframe there is a gradual incorporation or formation of the spatialisation of a walked scape through a walked sensorium. Extended walking is more often a choice than a necessity; it has come to be associated with optional exercise, with pleasure and pastime. Over time walks will make a trail, a physical trace in a landscape and leave a mark even in an urban environment...for example in old buildings on stairs one can often see smoothing of the edges of a stair, from accumulated years of human passage. In South Georgia ephemeral trails of (now extinct) introduced reindeer appear on rocky hillsides, hikers follow these trails and reinforce them and over time will alter them.

Walking is an active activity, one is not a passive witness or bystander to an environment but participant to and a changer of that environment.

Any one individual’s contribution to this build-up can be difficult to discern. With digital trace creation, marks can be made more obvious and amplified- in this way a singular and minute contribution can be dramatised. Normally the passage of a singular walk is felt to be of minimal impact. Perhaps by reflecting we can become more aware of our passage through space and time, in singular contribution and aggregate by engaging with content created from a framed walking experience.

Spatialisations that a viewer holds will largely depend on their own personal relationship and knowledge of the site. Generally speaking the SG photography is neutral, the selection of the buildings from the entire region of Grytviken shows an essentially village section, where some character of the earlier appearance of the settlement remains.

The individual photos of SG when organised and viewed in sequence (Smith 2015) create a stop motion effect that was noted to promote spatialisation awareness in the viewer. As the researcher watched these for his own entertainment and recollection of the site, he became aware of others working in this way and creating sequences that were being called stopmotion photowalks. The stopmotion photowalk of the area (Smith 2015) shows a selection of the
remaining station infrastructure that supported the workingmen.

This was the area of the station where the coffee beans were roasted and ground, where their bread was kneaded, risen and baked (see Figure 4), where food was stored for the summer workers and for the skeleton maintenance staff who overwintered during the very long nights.

Music to accompany the animation was selected as the traditional British seafaring song, ‘The Sailor’s Hornpipe’ (D’Almaine 1921). This reflects the presence of the British at KEP around the harbor who interacted regularly with the Grytviken residents and acknowledges the political hegemony of the British in licensing the station as the regulatory authority in the region. Captain Cooke who made landing and claimed SG for Great Britain was known to promote the song and dance on his ships for the sailors’ exercise (National Maritime Museum 2015). So it is just possible that this was the first music performed in SG waters.

Basberg (2002) points out the maritime background of the shore whaling stations, ‘In many respects a whaling shore station became “a ship ashore” especially in terms of how the accommodation was organised’. This influence points to the naming of the ‘Slop Chest’ for the building in Grytviken where workers could buy tobacco, clothing, chocolate and other treats. See Figure 5.

6. DISCUSSION

This paper has been conceived as a discussion and creative practice exploration paper rather than as a formal results-orientated one. Evaluation of the form of the stopmotion photowalk as to quantifiable or qualitatively based claims is left for future work. Now that the animation has been produced, and considering Weibel and Wissmath’s methods of investigation into immersion in computer games (2011) it is feasible to gather data using questionnaires to evaluate participant perception of:

(i) Presence, using scale developed by Kim and Biocca (1997).
(ii) Immersive tendency, using the questionnaire developed by Witmer and Singer (1998).
(iii) Motivation, by asking participant before viewing “How motivated are you to view footage from a defunct whaling station in the Antarctic?” (1 = not at all, 5 = very much) inspired by (Weibel 2011) (pre)motivation questioning.
(iv) Flow, short scale by Rheinberg et al. (2003).
(v) Enjoyment, by asking participant post exposure “Did you enjoy the animation? (1 = not at all, 5 = very much).

As mentioned earlier, existing SG media: panoramas, accounts, video footage, photography collections, and others showcase SG and also in particular the Grytviken station. This stopmotion photowalk effort attempts to add to the existing richness of media content for the remote location as well as explore possibly unique contributions from an animation perspective.

A choice to use video footage replicating the walked paths would be qualitatively different in experience for the viewer, perhaps effecting a more short-range apparent motion perception, than what seems to be the long-range apparent motion of skipped views in the stopmotion photowalk.

Transitions between various walks have been made by zooming into and utilising the high-resolution raw format of the photography, which would not have been possible in video recordings at standard resolution. Real time video walks would take longer in duration than the stopmotion photowalk, and if sped up would lend a different

Figure 4: Ruin of the Old Bakery 43 at Grytviken, SG with view of KEP across the harbour (© The author 2014)

Figure 5: The Slop Chest 46 at Grytviken, SG. Now in use as a storage area and workshop (© The author 2014)
quality to the footage than the selected views of the photography based stopmotion photowalk.

6.1 Virtual Tourism

SG remains a remote location having no airplane service to the island. The nearest airfield is in the Falkland Islands, necessitating a journey by ship. Travel time depends on the weather, sea conditions, and vessel capability but minimally takes a number of days to traverse.

There is a great deal of interest in the region for its wildlife and relatively untouched natural setting. However increased tourism brings with it risks of impact on the wildlife and environment, therefore virtual tourism serves a purpose of enabling a form of non-impacting virtual travel to those who cannot afford the expense and time of actual travel. Virtual travel also allows those who have visited remote sites in the past to reactivate and relive those memories.

6.2 Personal Remembrance

Those who have lived or visited for a period in SG generally come away with an appreciation for this unique part of the world. People often appreciate innovations in media that provide methods of reliving experiences and spaces, or spatialisations. The reactivation of memories is an interesting area for exploration as links with memory and spatial processing areas of the brain are emerging in research, as well as the long established recognition of elaborate encoding and spatial imagination found for example in techniques such as building memory palaces (the method of loci) for storage of long term memories and retrieval strategies (Foer 2013).

6.3 Memorialisation

Animation methods, and specifically the stopmotion photowalk, create a crafted audio visual artefact, making it appropriate for memorial work. Opportunities exist for memorial treatment of SG events and people, such as the site of explorer Earnest Shackleton’s grave, and the oft recreated walk of him and his crew upon their landing at SG, following their trials resulting from their ship’s destruction in the polar ice. There are others stories of SG and sites of historical interest for example the story of the whales, the fur seals, the elephant seals, and birds. Animation in general, and the stopmotion photowalk in particular can create opportunities for conveying spatialisations to an audience.

6.4 Situated Decision-making

As an overseas British territory and without an indigenous population, SG is administered from the Falkland Islands and ultimately Great Britain. Although there are local government officers resident on the island, decisions are of necessity made remotely. Looking at maps, schematics, reading reports, and relying on scientific data help support decision-making for remote locations, but there may be scope for immersive experience and access to information from within media that can situate or spatialise decisions. Providing for human context and space for these types of collaborative decisions may be helpful.

6.5 Cultural Heritage Attribution

The difficulty inherent in attributing the cultural heritage of SG, lies in not having a base culture that is long term settled at the island itself. It is largely thought of as part of the British culture as a consequence of possession or as part of the Norwegian culture due to the largely Norwegian nationality of the whalers, especially in residence at Grytviken. The changing nature of those inhabiting the island over time also point to ambiguity of any absolute cultural heritage definition.

The current inhabitants tend to rotate over time, with typically a season or two spent on the island (although there are notable exceptions). The British Antarctic Survey (BAS) cultural traits and make-up mix with the Norwegian interests and legacies in the island and the overlapping naval cultures involved, including the tourists and the tourism providers and workers. The involvement of Falkland Islanders has also been significant. Argentina also maintains a stance of having territorial claims of ownership. Attribution of cultural heritage in SG is tied up with place and remoteness. The cultural forces at play in residents of the island are unique in many ways, and there is a legacy that devolves from the earliest visitors to the island’s visitors today.

7. CONCLUSION

The stopmotion photowalk format animation produced from this research joins other forms of virtual media created concerning South Georgia. It provides for a form of virtual tourism that approximates a walk around a section of the station, without the need for travel or expense. It also preserves cultural heritage documentation in the form of photographic evidence of the site as it existed at the time of photography.

There is some basis to suggest that the apparent motion perceived by viewers of the stopmotion photowalk technique, are utilising the process of long-range apparent motion perception, a form of perception that differs in processing quality from real and short-range apparent motion perception. This different type of perception processing may
lead in turn to a perception of flow being perceived at some level that is more of a feeling of active involvement or participation with the sequential images, hence to a heightened sense of immersion.

There may also be a level of immersion achieved in the stopmotion photowalk technique by the formation of internal mental representations of rotating forms where views are anticipated slightly according to an internalised model, filling in missing gaps of the rotated image views.

Spatialisations of Grytviken, South Georgia will vary widely according to a viewer’s previous exposure, attitudes and personal beliefs. The perception, reinforcement, reflection on, rejection, or alteration of personal spatialisations of a viewer when exposed to representations of time and place are of interest in considering the production and consumption of media content for a remote location of cultural heritage.

7.1 Further Work

Further research devolving from the creative practice of crafting an animated media artefact, to focus on viewer perceptions measured in qualitative and quantitative ways is needed to fully explore the possibilities and impacts of flow, spatial presence, and immersion from the stopmotion photowalk technique and spatialisation. The fields of human computer interaction and cognitive science may be especially appropriate disciplines to approach these questions from. The photographic documentation gathered in the form of Canon Camera Raw files (.CR2) is published via online repository (Smith 2015) at resolution of 5184 × 3456 pixels at 300 pixels per inch.

This research’s attempt to create virtual tourism content for South Georgia invites participants to consider their spatialisation(s) of the region. Creation of a virtual reality environment of Grytviken, SG with an immersive head mounted display and proprioception input/feedback would magnify levels of presence and spatial immersion also allowing for better possibilities of incorporating flow experiences with interactive elements to the representation.

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