Hyperrealia: Augmented Reality cultural heritage object interventions

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Abstract

Hyperrealia is a media art collective that explores creative ways to engage with cultural heritage objects and investigates the potential of AR from both creative and critical perspectives. Hyperrealia developed a collection of prototype Augmented Reality (AR) interventions that enable interaction with objects known as "realia", in the collections of State Library Victoria (SLV), in Melbourne, Australia. In this paper we discuss the possibilities and challenges involved in the creative application of AR technologies and present what we have developed and exhibited, and discuss insights gained from observing public engagement with our AR interventions. Using the medium of AR, we have creatively and experientially linked the past and the present through selected archival objects. This is a way to enable engagement with concepts of living history, by providing visitors with a creative interpretation of historical artefacts and the fragments of stories and information connected to them, enlivening hidden static objects through contextualising research-based narratives.

Keywords

augmented reality interventions, media art, interactive media, audience engagement, cultural heritage objects, museum collections

Introduction

Creative Augmented Reality

As history exists as much in objects as it does in the written record, using Augmented Reality (AR) technologies to digitally recreate and activate cultural heritage objects can bring the past to life in equally compelling ways. Both in-situ AR interventions and remote access to AR experiences offer novel means of interacting with objects and places. AR is an emerging medium for artistic expression, so it is important to both critically investigate its nature, whilst creatively expanding its potential, to experimentally push the conceptual and technical limits of this medium. A decade before the term "augmented reality" was coined in 1992 by Boeing engineer Tom Caudell, media artist Jeffrey Shaw had developed digital 3D objects which appeared in a physical space. Shaw's pioneering *Virtual Sculpture* (1982), was itself inspired by, and responded to, Charles Wheatstone's invention of the stereoscope in 1838 and his experiments with 3D drawings, which Wheatstone published with notes for artists to assist in the creation of convincing three-dimensional representations of objects [1].

Contemporary AR artworks accessed through handheld devices have largely followed Shaw's *Golden Calf* (1994), which allowed one to view a virtual object on a plinth from different angles, and it is only in recent years that artists have expanded AR past such passive modes of observation. As is discussed in this paper, AR can be developed much further, in terms of developing novel forms of audience engagement and interaction with AR entities, by giving the digital objects a form of agency as a way to express their stories.

Augmented Reality and the GLAM sector

In response to the rapid developments in computer technologies, cultural institutions in the GLAM sector (Galleries, Libraries, Archives, Museums) are undergoing immense change in the way they provide services, access to collections and continue in their role as sites of cultural diversity and engagement. [2] Extended Reality technologies such as AR potentially have a key role in engagement with GLAM institutions, as they "can enrich the museum experience via the addition of atmospheres, narratives, and storytelling and the intangible aspects of culture… [however] needs and concerns in research and application areas have yet to be addressed to the full". [3] One such issue is developing AR experiences that activate social engagement and interaction in novel and creative ways. As Director of the Australian Centre for the Moving Image Seb Chan stated, public AR art projects often comprise virtual objects arbitrarily "plonked" into a space [4]. Another related issue is that interaction with digital 3D cultural heritage objects is often quite limited - as one museum curator said anecdotally, critically reflecting upon a current museum AR project "you can pick up a virtual object and spin it around and that's all". Our project responds to such prompts in intuitively guided and also carefully crafted ways to be site and object specific, and bring both objects and locations to life in creative ways that engage the audience through unique interactions.

Figure 1. The Cork Horse in its archive box from the SLV realia collections (left); and the Cork Horse digital twin from the Elephant Lift AR intervention (right). © Hyperrealia

AR interventions with "realia" collections

Hyperrealia is a media art collective, based in Naarm / Melbourne, Australia, using digital AR technologies to creatively engage with cultural heritage objects. The collective includes Chris Henschke, John McCormick and Donna Kendrigan, working with the Centre for Transformative Media Technologies at Swinburne University. Hyperrealia's initial project was with State Library Victoria (SLV) in Melbourne, supported by their "Alchemy" project development program in 2021.

This project utilised mobile AR to enable unique forms of audience engagement with normally inaccessible archival objects held within the collection of State Library Victoria, called "realia" in library terminology (see Figure 1). Three objects were chosen by Donna Kendrigan, selected through a combination of research and intuition, following her 2018 SLV Creative Fellowship, where she explored the realia collection and discovered various obscure and forgotten objects. Using photogrammetry, 3D scanning, digital modelling, animation, and spatial sound design, we brought the objects from the past to life in the present. Through these technologies we gave the objects a form of contemporary agency and voice, allowing their stories to be told through sound, image, and motion. We developed contemporary ways of engagement with the museological objects, and alternate ways to present narrative forms, through poetic and aesthetic transformations, giving the audience unique personal experiences with such artifacts, in ways that transcended language and age barriers. Each of the activations produced personal responses from the public, and through people's individual experiences with the objects, each object's stories thus become more resilient through such personal emotional engagement.

The AR interventions expressed the journeys that selected realia objects may have taken, through image, sound, movement, and interaction. Instead of providing standard digital museological information or narratives, we delved deeply into the histories surrounding each object, and responded to this in creative ways, guided by our collective knowledge, intuition, and aesthetic sensibilities, creating alternate ways to embed such information in the AR experiences. We digitally reconstructed the selected realia as site-specific AR interventions, with each experience design informed by our research into the objects' stories. Such stories are expressed in a non-didactic and creative way - the research informed the aesthetic forms and dynamics of the animations. The histories bring the objects to life, and the objects bring their histories to life, telling their stories through motion and interaction with the audience. Each experience was also developed with the SLV's specific spatio-historical contexts in mind, responding to and revealing the material histories within the SLV buildings.

A methodology was developed during the SLV project, including digital object construction and manipulating processes. We intended to 3D scan the objects, but this was interrupted by the COVID lockdown in 2021 - luckily, we took detailed photographs of key objects prior to this, and were thus able to accurately reconstruct the desired objects. Working remotely, we collectively produced three AR interventions, Elephant Lift, Matchbox, and Fern Fever, each in response to realia objects selected by Donna Kendrigan. Aside from this challenge, we found that we were pushing the limits of the technologies, in terms of the complexity of the objects and animations and the capabilities of the playback devices. Although the hardware and software has improved over the last decade, it was still difficult to achieve our artistic visions, showing that this technology is still somewhat nascent.

Elephant Lift
This AR intervention reveals two hidden State Library Victoria treasures at once (see Figure 2). The Cork Horse was discovered by Donna Kendrigan uncatalogued in the realia collection, so it had lost its story and its history, but there was a clue that it once belonged to the Melbourne writer Marcus Clarke. He was famous for writing the 1870's international bestseller novel 'For the Term of His Natural Life' (and coincidentally, he obtained a position as a sub-librarian at SLV, then called the Public Library of Victoria). The "Elephant Lift", as it is affectionately nicknamed by SLV staff, is the lift that was used to carry taxidermied elephants when the building was home to Melbourne

Museum. We brought to life the Cork Horse and the Elephant Lift together, in a way that was inspired by the Cork Horse's lost story and need to be free, (as it may have belonged to a convict) and Clarke's curious psychedelic dream experiments recorded in his text, titled "Cannabis Indica (A Psychological Experiment)". [5]
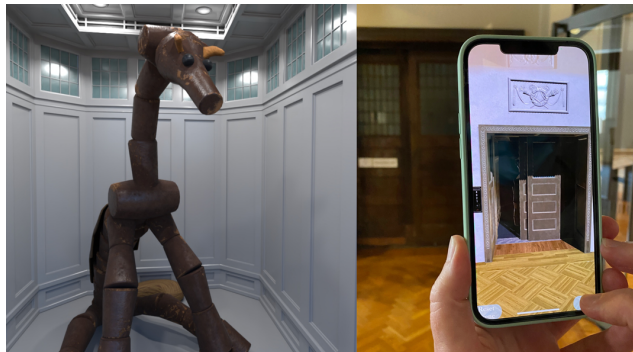

Figure 2. Elephant Lift AR intervention: digitally reconstructed interior of the library's Elephant Lift with reclining horse (left); and the physical Elephant Lift with smartphone displaying AR activation - the door is opening and the horse is about to gallop out (right). © Hyperrealia

Matchbox

This AR intervention was designed to be embedded in the marble walls at the entryway to the SLV dome room (see Figure 3). The idea was inspired by SLV's matchbox collection, and the Victorian gold rush era which led to the building of SLV. The cardboard matchbox capsules with sandpaper bottoms for wax-vestas were made between 1865-1910, exclusively for the Australian and New Zealand markets. They were popular with the gold miners for storing their gold dust or gold sovereigns. [6] Matches have provided inspiration to past artists including commissions by Bryant & May. Arthur Melbourne-Cooper made the world's first object stop-motion animation in 1899 for Bryant & May, using real matchsticks which moved around like people. Thus, this project responds to the history of SLV, and the gold that helped build it, and also pays homage to the origins of animation, all contained within and revealed through the one object. In this instance, the "object" was not placed in front of the wall, but was a cavity within the wall itself, a mine within the locally mined marble.

Fern Fever

'Fern Fever' is an immersive architectural site-specific AR experience, inspired by the fern albums of Mary Armstrong and the heritage glass ceiling of the Ian Potter Queen's Hall in the Library (see Figure 4). Armstrong was a pioneering Victorian naturalist and entrepreneur who collected natural objects such as ferns and seaweeds and arranged them in albums as artworks. She developed a thriving international business from her fern interests. [7]

Figure 3. Matchbox AR intervention: smartphone screenshot of the gold mine with matchstick men augmented within the marble wall at SLV (left); and smartphone displaying AR activation of the wall with the virtual cavity (right). © Hyperrealia

Collecting ferns became a trend, known as "fern fever" and people grew their own specimens from the dried spores in such albums. Fern albums offered an intimate experience and functioned as a combined herbarium, nursery, and virtual tour of specimens and scenic views. In this AR experience, users trigger towering versions of Armstrong's fern album arrangements, inside a Victorian era conservatory, poetically bringing the ferns back to life. This is accompanied by lyrebird songs quadraphonically recorded in a fern grotto in the Dandenong Ranges, where fern fever took hold.
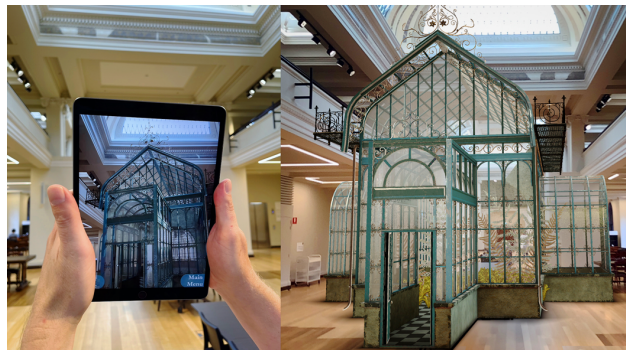

Figure 4. Fern Fever AR intervention: tablet displaying the augmented conservatory in the Ian Potter Queen's Hall at SLV (left); screenshot of AR activation - the conservatory doors open to lead the user inside (right). © Hyperrealia

Outcomes & Insights

We organized a two-day event at SLV during Melbourne Design Week 2023 (MDW) called "Hyperrealia : AR Interventions with the State Library Victoria Collection". In a way this event was an informal and implicit qualitative study of how people responded to our AR prototypes. This event was advertised both through the SLV events page and the MDW website, which led to a diverse range of

participants. The app was preloaded on iPads, eliminating the need for attendees to download it, which is an issue we have noticed from observing people trying to download AR apps which were gigabytes in size.

We gained several key insights from observing people's interactions with both the AR experiences and, consequently, with each other. Over the course of the event, we realised this was more than just testing the design and technology, it was the study of human behaviour. Observing people's personal experiences revealed surprisingly different responses and variations every time. The sensory effect when the AR entities come right at them really engages and activates people. Through such encounters we are affecting people's emotions and behaviour, and getting people to move around and explore, like a form of personal theatre, creating a form of engagement that is at once both physical and emotional. Moving around in the physical / virtual space is integral - it informs and shapes the narrative structures. Building up the technical and conceptual complexity through the journey and increasing the levels of interactivity made people more confident as they built up to the final and most immersive experience. Ultimately the event was about activating the audience with physical and social interactions. As we activated each of the AR interventions at the same time, people experienced the events together, which created a collective and socially dynamic experience.

Another key insight was around the communication of the stories and history relating to each object. As this component of the project was still in development, we shared this information in our artist talks. We received feedback from a post-session survey that people enjoyed hearing more about the objects as they were experiencing the AR interventions, as it provided more context about the cultural importance of each object along with our creative/conceptual responses. The fact that the interventions were in-situ with the physical objects from the SLV vaults and spaces, such as the Elephant Lift, made several people comment positively on the connection they felt with the location. As these AR objects weren't just arbitrarily "plonked" in the space, but were designed in response to the specific and unique areas within the SLV building, it appeared to make the experiences more meaningful for the participants.

The survey feedback also confirmed a key aspect of our next stage of development: the importance of including interpretive content and factoids into the AR interface/realm, so that people can explore this dimension themselves rather than needing us to be there. We are researching this aspect and are keen to find a way to communicate information that breaks away from a screen style interface such as free-floating text and image panels, with a focus to develop information elements that feel more

embedded in the AR realms. However, we are also aware that any aspects of the app that impede the AR experience will break the sense of presence. With this in mind, we plan to explore the use of sound, voice recordings, interactivity, together with mixed reality elements, a pathway that creatively reveals information while expanding the sensory experience. How to present other collection items that relate to each augmented object, such as images, videos and the original artefacts, is our next creative challenge.

Conclusion

The Hyperrealia AR interventions provide access to parts of the SLV collection that are normally inaccessible to the public. Our work with SLV focused on objects that are too fragile to be handled and displayed on a regular basis. Our digital interventions creatively and experientially link the past and the present, and engage with concepts of living history by providing visitors with an experiential interpretation of historical artefacts and the fragments of stories and information connected to them, enlivening static objects through contextualising narratives based on research. Our research also addresses these common issues facing the GLAM sector while also progressing capabilities for self-directed experiences through digital engagement. Informed by our art practices and intuitive responses to the selected objects, artistic animation and sound creation techniques are key to the contextualising of the realia objects and engagement with visitors, enabling hidden gems to reemerge into the public realm.

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