Timeline Newcastle: Reconstructing Industrial Newcastle – Implementation and Exhibition

Tessa Morrison, Helen Giggins and Nicholas Foulcher
School of Architecture & Built Environment
University of Newcastle
Australia

tessa.morrison@newcastle.edu.au, helen.giggins@newcastle.edu.au, nicholas.foulcher@newcastle.edu.au

At last year's EVA conference a paper was presented by the authors entitled "Applying Augmented Reality to Preserving Industrial Heritage". This paper outlined an alternative and holistic method of preserving the cultural heritage of industrial sites, which would otherwise have been lost, using augmented reality and mobile technologies. Newcastle, with its strong industrial history, was presented as a case study for this method. In December 2011, the authors were awarded a small pilot grant entitled "Reconstructing Victorian Newcastle through Augmented Reality and Mobile Technologies". The purpose of the grant, for the amount of \$A15,000, was to lay the foundations for the larger study of the industrial heritage of the city. This pilot grant funded an exhibition, the equipment, a research assistant, and the associated websites. This paper examines how these aims were successfully achieved on such a small budget and its impact on the community.

Augmented reality. Museum exhibition. Pilot grant.

1. INTRODUCTION

Newcastle, Australia, has an extremely rich industrial heritage; its original European settlement was in 1801. This settlement arose because of its abundant coal deposits and these remain central to the economic fabric of the city since, in terms of tonnage, it is now the largest export coal port in the world. There is no sign of this industrial growth slowing down; in fact, the port's capacity for loading coal is about to increase by 25% (Fahrmann 2012). However, with this continual growth very little of the city's industrial heritage has been preserved – most of it is lost in the continual need for modernisation. In the paper presented at the EVA conference (Morrison *et al.* 2012) last year the authors outlined a long-term project for the intangible preservation of the cultural heritage of Newcastle's industrial sites using augmented reality and mobile technologies. After downloading an application onto a mobile device (such as an iPhone/iPad), a viewer walks around the city and passes or enters a site that has an industrial history, the viewer will be able to browse the selected historical records in the forms of digital photos and digital models that reflects key facets of the industrial history of this site, through their mobile device. The selected sites for the current implementation are centred around Newcastle Harbour. In this manner, the public can view the 'past' of the site *in situ*. Newcastle has had

some significant periods in its development and its extensive photographic documentation goes back to the 1860s. The project ultimately aims to reconstruct three eras of industrial growth: the 1880s, 1930s and 1950s. The viewer will be able to switch from one era to another viewing the old photographs from each era *in situ* and oral histories from the 50s.

The reason that the Victorian era was chosen for this pilot was that this period in the city's history witnessed rapid expansion and industrial development and it was during this period that Newcastle became the industrial heart of Australia. In addition, the Cultural Collection at the University of Newcastle library has many thousands of photographs of Newcastle dating back to the 1860s. They have a unique collection of photographs, the Ralph Snowball Collection, which documents the Victorian industry and the city's architecture, particularly between 1885 and 1910.

The pilot grant that we received was \$A15,000 and was awarded by the Faculty of Engineering and Built Environment, the University of Newcastle. Because of the size of the grant we were unable to do anything on a large scale and our options were limited as far as developing any new technology. To take advantage of this grant it was decided to centre the pilot around an exhibition at the

Newcastle Regional Museum. This would ensure public interaction and engagement in the project which was important to the success of the project and to the collection of extra data, such as photographs of the city when expanding the project beyond the Victorian era. The grant was to pay for equipment, a research assistant, the exhibition and the websites. Since we did not have enough funds to create a new mobile application our first aim of the project was to adapt existing mobile technologies.

2. PLAN AND DEVELOPMENT

The initial plan was that the visitors to the Museum would obtain information about a route around the city which would enable the user to walk around with their smart phone or tablet and view the 19th century photographs which have been digitally overlaid onto the 25 modern sites – bringing the Victorian city to life.

Because the amount of the pilot grant did not allow for the development of a new mobile application, we first needed to investigate what existing technology was available to be adapted for our specific needs. The first prototype that was considered for the project was Hoppala (<http://augmentation.hoppala.eu/>) an open-source platform for building mobile augmented reality (AR) content in conjunction with Layar (<http://www.layar.com/>), one of the industry pioneers in mobile AR development and browsing tools. Using the Hoppala platform provided an excellent starting point for understanding what information we needed to display via geo-coding and GPS tracking. However, this proved to be difficult in later stages of our development due to the high resolution, or quality, historical imagery we wanted to display for the user. There was also a downfall in the GPS location technology that was required for the prototype. As most consumer-end smart devices possess similar capabilities, it became evident that the lack of adequate cellular, 3G and 4G coverage was the main contributing factor. The application make use of Points of Interest (POIs), which as a minimum specify an exact location, via a longitude and latitude, and name and descriptive data. As the host application, Layar, requires a steady stream of GPS location data with relevant POI's, this open source platform was insufficient and at times unreliable due to patchy cellular coverage. Ultimately, this resulted in a poor user experience and it was decided that another approach was required.

Figure 1: One of the panels in the exhibition

The prototype that was eventually decided upon and featured at the Newcastle Regional Museum exhibition employed two separate 'experiences' for the user to interact with the POI's. These could be defined as an 'exhibition experience' and a 'walking-tour experience'. The 'exhibition experience' used a series of large high resolution, physical photographic panels that were individual stored as 'reference' images within the 'Layar Creator' platform. When scanned with Layar by the user within the exhibition space, using augmented reality technology, a unique set of meta-data would be display to the user. In the exhibition, this consisted of two images, one the historic photo or the location, and secondly an icon linking to further information online. This resulted in the user being presented with 2 ways of interacting via AR, these were:

- Tapping the high resolution image of a pop-up historical photo (Figure 2) – this allowed the user to be linked with further information and alternate photos of the site via a free blogging platform (set-up using Tumblr). This additional information might for instance include facts about the location at the time the historical photo was taken.
- Tapping the "WhatWasThere" (<http://www.whatwasthere.com/>) button – this allowed the user to be linked with a web and mobile based application called *WhatWasThere* revealing the historical images overlayed in-situ. The site allows the user to place the location in the context of a local map.

The 'walking-tour experience' makes use of a printed handout to encourage users to visit 25 in-situ locations around the CBD of Newcastle (see Figure 1, 10, 11, & 12). When the user is at the location, they can use the photo that appears on the handout to be able to access the "WhatWas There" information about each location. The user can bring up the historic image on their mobile device, and then fade this image in and out to

experience how it would overlay on the current location.

Figure 2: Screen shot of the iPad

3. THE EXHIBITION

The Newcastle Regional Museum is situated on Newcastle Harbour. It is a part of a complex of eight adaptively reused buildings which belonged to the former Honeysuckle Railway and the Wharf Precinct. The Museum was the old Smiths workshop. This is one of the few adaptive reuse buildings from Newcastle's industrial past. Because the exhibition was at the Regional Museum the exhibition had to be also be viewed without the technology so that viewers without iPads/smart phones could understand the project and historical significance of the images. The exhibition consisted of 30 large aluminium photo graphic panels, approximately 120 cm by 90 cm. Three of these panels were information panels, on the project and how to use the technology. The other 27 panels were streetscapes of 'now and then' panels such as Figure 1. The now and then images showed mixed aspects of Newcastle; it showed landmark buildings which no longer exist such as Figure 1, it showed 19th century drapers proudly showing their wares, it showed butcher shops horrifyingly displaying their meat outside in the Australian sun and advertising to be the cleanest butchers in town it also showed coal trains and their tracks throughout the city. The images of Newcastle from the 19th century clearly demonstrated the importance of coal to the city. By scanning one of the panels in the exhibition the viewer could download a website specific to each site which would contain historical and relevant information on that site, other images from different eras and any relevant websites. The Layar sites were the main source of information for each of the sites.

Figure 3: Website that is downloaded after scanning

From the 'exhibition experience' the user was then prompted to go and explore the city to find the relevant POI's displayed via the exhibition panels – hence the 'walking-tour experience'. We used a separate application (still linked initially via Layar) to input the geo-location of each individual site. Once prompted to download the WhatWasThere application (www.whatwasthere.com) via scanning a custom handout available to visitors of the exhibition, the user could then follow their smart device to the locations all around Newcastle. Alternatively the user can experience this at home too via the WhatWasThere website, viewing the actual locations tagged on Google Maps and the historical imagery *in-situ* via Google Street View.

Each site is mapped and any site that is nearby is also indicated on the side. This site that is indicated is the Centennial Hotel built in 1888. The Centennial Hotel was very elegant and lavish, it had 60 rooms and 4 bars, the largest dining room outside Sydney, hot and cold running water and flushing toilets, the rooms were furnished with Paton and Paton's half-tester beds, wire spring mattresses and cretonne hangings.

Figure 4: Map of the sites throughout Newcastle's inner city along the harbour

Figure 5: Google maps indicating the sites through WhatWasThere

Figure 6: Streetscape, through Google Maps of the Centennial hotel. The body of the Victorian building still exists. However, its grandeur has not survived. It is located directly opposite the railway station and it is in decline, its large elegant verandas have been removed, old windows and doors replaced with more 'modern' ones as well as decorative works on the facade have been also removed

Figure 7: Fade function in WhatWasThere makes it possible to see the changes between then and now

Figure 8: The image of the grand Victorian building is superimposed on the modern site

4. PILOT GRANT AND COMMUNITY RESPONSE

The grant of \$A15,000 was to be spent within a year and was purely to lay the foundation of the larger project so it was important to design the project to be something that could be completed within budget and within the time allowed. Also the responses to the exhibition and to the mobile applications were significant to future development of the project. The 30 large aluminium panels for

the exhibition was over \$A4,000 of that grant, use of the WhatWasThere application was free and the Layar sites cost €15 each to publish and the rest was spent on a research assistant and an iPad for the research assistant to allow for adequate testing of the technology.

Figure 9: Visitor at the Museum interacting with exhibition panels

Figure 10: Hunter Street 1893 & 2012

The combination of the two applications was easy to use and free to the public and the public response to the project was overwhelming. The exhibition achieved favourable reviews from the local papers and regional radio; the exhibition ran from 6 November to 9 December 2012 and the number of visitors within that period to the exhibition was an extremely gratifying 11095. From this project we have learnt a great deal to take forward a larger project. In particular we have come to understand the possibilities and limitations of various mobile augmented reality applications.

Figure 11: Market Square 1892 & 2012

5. CONCLUSION

This project was done on a shoestring budget which has its own problems. As a small project it has been very successful with the two mobile applications working together in the Museum and on the Street. The photo recognition of the Layar application supplying the main information of the sites in the Museum and the visual imagery in the street of the WhatWasThere application supplied an integral whole while the exhibition was open. At the close of the exhibition the main source of information on each sites, the Layar sites which were generated in the exhibition, were removed. The WhatWasThere application has only 1000 characters of information in addition. Currently, a

small set of postcards of the exhibition panels, is being developed for the Museum so that the visitor can use these on their walk around the city. This is particularly of relevance to users who do not have access to mobile devices. It will also be used by the educational services of the Museum as an online resource for senior primary high school students and their teachers as well as the general public. To see the Layar sites scanFigures 1, 10, 11, 12.

To develop a larger project on such a small budget has its challenges. The next stage of the project will again be involved around an exhibition at the regional Museum this time it will be directly on the industrial heritage of Newcastle. Similar technology will be used but will also include oral histories as well as photographs, historical information and websites.

6. REFERENCES

Fahrmann, C. (2012) 'Major Port expansion in Newcastle – T4, <http://catefaehrmann.org/2012/04/major-port-expansion-in-newcastle-t4/> (retrieved 25 February 2013)

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Figure 12: The Newcastle Harbour 1889 & 2012 – scan this image