The Atlas Project—Comparing Time and Place

Tim Nugent
University of Tasmania
tnugent@utas.edu.au

Christopher Lueg
University of Tasmania
Christopher.Lueg@utas.edu.au

Andrew Bennett
University of Tasmania
acb0@utas.edu.au

Abstract

The Atlas Project is an interdisciplinary project investigating spatial and historical exploration of geographical areas, with Hunters Wharf in Hobart, Australia being the example space used in this research. One of the goals of this research is to create a mobile application allowing historical information to be transferred out of the traditional static historical media and made more easily available for a variety of different tasks. Through a heavily iterative process, a prototype designed through continuous discussion amongst three different groups led to the research focussing on comparison of historical maps supported by additional spatiotemporally indexed features as the primary means of interacting with historical data. This paper outlines the iterative development of this prototype, presenting research challenges and solutions encountered during that process; it introduces a novel approach of presenting both spatially and temporally sensitive information that satisfies multiple workflows and multiple disciplines. Finally, the paper presents many interesting opportunities for future work and further analysis toward a generalised method of providing context sensitive spatiotemporal map overlays on mobile devices.

Keywords: spatiotemporal systems, historical maps, tourism, exploration, interdisciplinary, interaction, mobility

Introduction

The Atlas project is a multidisciplinary project between the University of Tasmania schools of History and Classics, Computing and Information Systems, Architecture and Engineering. Atlas is attempting to create a new means of exploring historical information, by combining historical data with up-to-date spatial maps and mobile interaction. The project aims to enable people from different domains and with different goals to gain a new insight into the historical data which has been traditionally locked up in static media such as paper maps and books. With so many varied disciplines working on a single project, each are likely going to have ideas for such a system that are incongruous with the other disciplines. One of the great challenges this project had to overcome was deciding which goals and features to include and which to modify as the research evolved over time. The primary objective of the project was to combine historical data, primarily in the form of high resolutions maps of different eras, with current spatial data. The primary means of gaining insight from this information was to be through comparison; mostly comparison between the historical maps and the current terrain. This led to the decision to create a mobile prototype system through rapid iteration to allow for the greatest flexibility amongst the differing goals of each school whilst still remaining in sync with the overall vision for the system. The idea of visualising historical events and data is certainly not unique to this research. (Friendly, 2008) document one of the earliest known visualisations of historical data, from the 18th century, their research depicts a gigantic plot of almost 3000 years of births and deaths of famous historical figures.

More recent technology has certainly aided the increase in historical visualisations, since the 90's Geographic Information Systems (GIS) tools and techniques have been a popular choice for visualising historical data (Coppock & Rhind, 1991; Maguire, Goodchiled, & Rhinds, 1991). Modern GIS tools such as Google Maps have allowed geographic historical visualisations to become more and more varied, such as the HistoryLines system by (Klaebe, Foth, Burgess, & Bilandzic, 2007) for the newly built Kelvin Grove Urban Village in Brisbane. HistoryLines allowed residents to easily see where other residents had lived in the past as a series of lines and points on a map. Historical visualisations have even started taking on

more artisticand social properties, such as the BBC Dimensions project, which allows for popular historical events, such as the path and distance the Mars rovers have taken, or the flooding in Pakistan, to be shown as an overlay anywhere on Earth (BBC, 2011). The historical art video 'A History of the World in 100 seconds' (Lloyd, 2011) was created by parsing all Wikipedia articles with location and date metadata. The video progresses through time from 387BC to the present day, flashing notable historical events at both the time and place they occurred in a world map. Whilst this is a very focused view of history, based solely on what Wikipedia had available, it is still a novel means of seeing a snapshot of the historical information available for general access. With a goal in mind for the system and what had been done before the next step was to chose a historically interesting area to use as a data source for the prototypes development.

Hunters Wharf

Hunters Wharf is an area of the Hobart city waterfront which has undergone a large amount of change in it's relatively short lifespan of European settlement. Hunters Wharf was settled in 1804 by Europeans after failed settlement attempts in other areas of Tasmania. Originally an island the space between the island and rest of the city waterfront was eventually filled in,. Nowadays there is no obvious signs of Hunters Wharf once being Hunter Island. Over time the development of Hobart city had the Hunters Wharf area playing host to a great deal of merchant and industrial facilities, including a gasworks, Iceworks and a jam factory; many of which are now classified as historical buildings by the Hobart council. The Hunters Wharf area today is mostly a tourist site and component of the Hobart city waterfront area, as well as hosting the University of Tasmania School of Arts building in an old Iceworks building. Despite its relatively young age, Hunters Wharf has had quite a busy life with a great deal of building and landscape development undertaken in this time. Due to this heavy activity Hunters Wharf was chosen to be the area that the Atlas project would initially focus upon. It was decided for this research to initially focus on a small, busy, area in greater detail rather than try to cover a larger area in less detail.

Competing Goals

As stated above, the Atlas project is an interdisciplinary research project between several University of Tasmania schools, each with their own views as to the best way for historical and spatial data to be combined and each with differing goals for the project to meet. The researchers from the Computing and Information Systems were focussed on the exploration aspects of the available data. The intention being that anyone would be able to use a mobile device and be able to easily see the changes that had been undertaken in the very area of the Hobart waterfront they were currently exploring. The researchers from History and Classics goal was to have a system allowing them to better visualise the historical data already available to them, in some ways an electronic and interactive encyclopaedia. They wanted a system where they could overlay numerous maps to illustrate changes, as well as support for spatiotemporally indexed points linked to supporting information. The School of Engineering wanted a system to that would assist with surveying and relating tasks when working near or on historical areas of Hunters Wharf, they wanted to be able to see at a glance if they were about to dig into historically significant positions, old piping, sewage, or foundations of systems that had been built up over the years. These are three very different goals yet they do have an important element in common; they all are based around the idea of seeing spatial changes over time. Combined with the majority of the historical data available in the form of maps, it became apparent that the most obvious method of continuing would be through maps overlaid over a current map of the Hunters Wharf area. This commonality amongst the dissonance led to an environment of constant discussion, compromise and feedback. Every two weeks each of the researchers would meet in person and discuss any changes to the project and the current iteration of the prototype. New features and changes to existing ones were debated and decided on during these meetings. After each meeting a new iteration of the prototype was developed and distributed to the members as rapidly as possible to allow them time to experiment with the prototype before the next meeting. The decision to develop for mobile platforms was made very early on with each party agreeing that any future system to come out of this research, regardless of the specific task it was being used for, it should be able to be used in the field to give context. As such any prototype needed to be mobile to facilitate this.

Prototype evolution

The iPad was chosen as the primary development platform as it possesses a large enough screen to better enable fine details to be seen in maps whilst still being easily portable. The iPad was also seen as a device that anyone interested in the Hunters Wharf area may be carrying regardless of their goals. Additionally, the iPad has a great deal of existing libraries and services for presenting and manipulating

geographic data and maps with ease. Finally the programmers for this research also had experience developing on the iPad platform. The advantage of development experience and the existence of iPad libraries was the main reason why the prototypes were developed as high-fidelity, (Rogers, Sharp, & Preece, 2003). It was not much more effort to create and experiment with a working proof of concept than it was to mock it up in any other form, allowing constant feedback with a working system at each stage of the project.

The rapid high-fidelity prototyping through pre-existing software is very similar in nature to web-mashups, allowing new ideas to come forth that are not immediately obvious without a working system to demonstrate them (Floyd, Jones, Rathi, & Twidale, 2007).

The prototype was initially just a single historical map overlaid onto a current map of the Hunters Wharf area, with a single slider at the bottom of the screen to adjust the opacity of different historical maps. Whilst at this stage the prototype was mostly a technical exercise, investigating how complex it would be to display and change the opacity of a map, it proved popular with the entire project team and became the base of the rest of the prototype evolutions.

The next significant evolution was a split view that allowed the user to select from one of several different historical maps, replacing the previous historical map being overlaid. This feature came from the desire to quickly contrast different time periods with how the region currently exists, as such there needed to be an easy way to switch between historical maps, similar to flipping between pages in a book to quickly compare information between two pages. The prototype was then extended so that two historical maps could be overlaid at once and both have their opacity changed independently of each other. This was a logical flow on from the 'page-flipping' idea of quickly changing maps, allowing for more advanced comparing and contrasting, such as having an newer map with the highest opacity possible to just see the modern layout of Hunters Wharf below an older map, with an even higher opacity, allowing for three different eras of the area to be seen at once; or for just comparing directly two historical maps without the need to be bothered with the modern view.
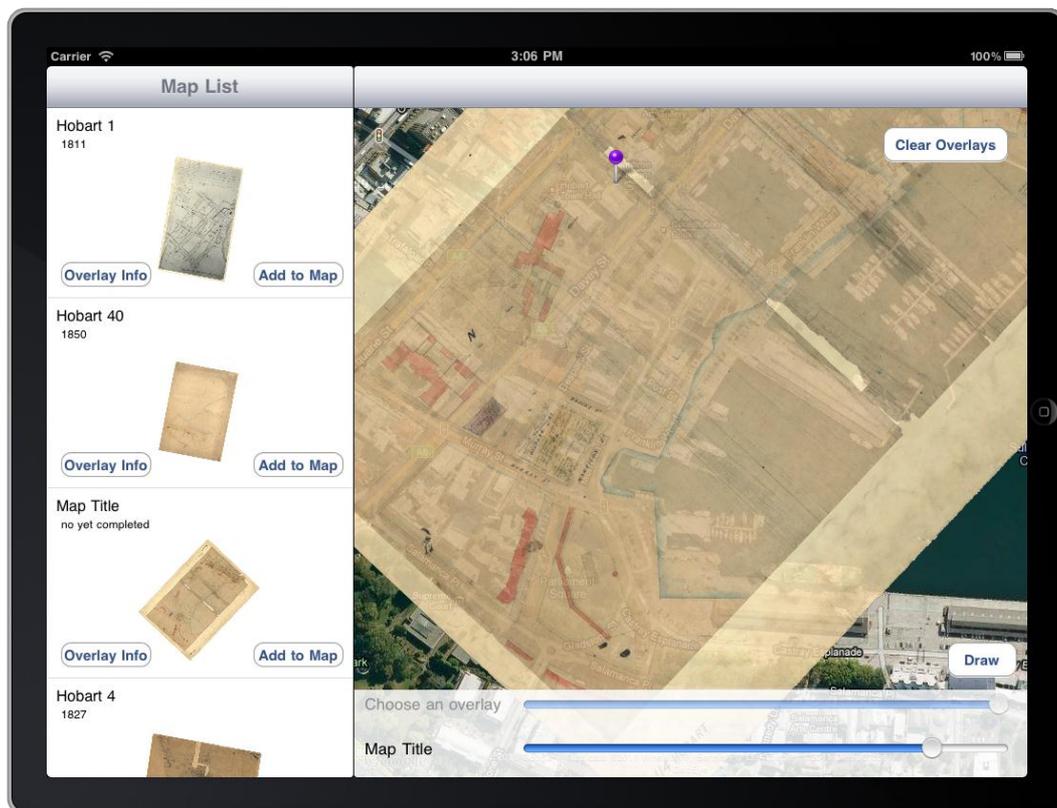

Figure 1. A historical map overlaid onto a current view of Hobart

An additional information overlay was then created to allow additional information to be displayed alongside the maps to provide extra information than what maps alone could provide. This overlay was hooked into the main map view as pins, geospatially placed at the location relevant to their information. The idea behind the additional information was that they would ultimately be tailored to the specific user,

such as interesting historical events for tourists or important historical construction details for builders.

Finally the prototype gained the ability to mark off and highlight specific regions on any of the maps, this was added in at the request of the engineering project members to make analysing an area easier, but it was also seen as a potentially useful feature for anyone to use.

The engineering members also requested a means to modify how the maps were added. Initially whenever a historical map was overlaid, it zoomed the view out to fit the entire map so that the user could see the area the historical map covered. When trying to compare very specific areas at higher zoom levels however, the zooming out behaviour forced the users to replace their view before they could continue comparing. As such this zooming feature was deactivated.
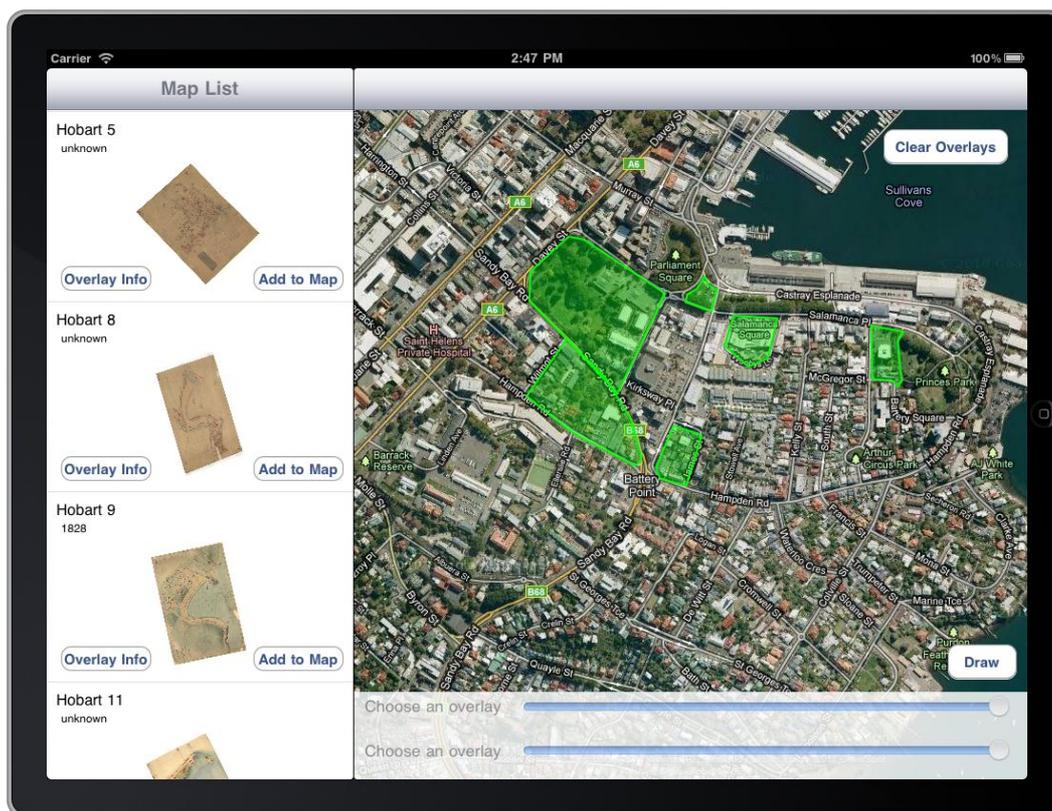

Figure 2. Several highlighted regions of the map

In the next iteration the prototype was ported to the iPhone to better extend the reach of the project. The iPhone version of Atlas is limited to viewing only one historical map at a time, as the two maps caused too much clutter on the smaller screen to be considered useful. The iPhone version also had a different, more paginated, style of navigating through the historical maps and information and did not have the ability to highlight areas. Again these changes were to limit the amount of clutter on the smaller screen and otherwise the iPhone and iPad versions were identical in features.

Conclusions and the Future

The Atlas project is an interdisciplinary project attempting to make historical information more accessible for a variety of different goals for exploration of the Hunters Wharf area of Hobart. As the project advanced it was found that comparison through overlaying historical maps allowed for easy comparison amongst the past and present and the past again. The next step for this work is to evaluate the system with users from the different disciplines. As with the preliminary prototype it is expected that maps overlaid with historic information will be well received by all interested parties. It is also expected to both improve productivity and offer opportunities for a unique and more widely accessible exploration of historic data sets within their modern context. This opens potential research avenues in History, GIS, data

visualisation and HCI, as well as opportunities in the Tourism sector. It is expected that future opportunities and challenges will present themselves as the prototype undergoes testing.

References

BBC. (2011). *How big is it really?* Available from http://howbigreally.com

Coppock, J., & Rhind, D. (1991). The history of gis. *Geographical information systems: Principles and applications, 1*(1), 21–43.

Floyd, I., Jones, M., Rathi, D., & Twidale, M. (2007). Web mash-ups and patchwork prototyping: User-driven technological innovation with web 2.0 and open source software. In *System sciences, 2007. hicss 2007. 40th annual hawaii international conference on* (pp. 86–86).

Friendly, M. (2008). A brief history of data visualization. *Handbook of data visualization*, 15–56.

Klaebe, H., Foth, M., Burgess, J., & Bilandzic, M. (2007). Digital storytelling and history lines: Community engagement in a master-planned development.

Lloyd, G. (2011). *A history of the world in 100 seconds.* Available from http://www.ragtag.info/2011/feb/2/history-world-100-seconds/

Maguire, D., Goodchiled, M., & Rhinds, D. (1991). An overview and definition of gis. *Geographical Information Systems: Principals and Applications*, 9–20.

Rogers, Y., Sharp, H., & Preece, J. (2003). *Interaction design*. Wiley-India.