Hidden Dimensions: Illuminating Landscape History through Mobile Apps

Ole R. Sleipness[1], Benjamin H. George[2], Amanda Hughes[2], Sriram Ramineni[2]

[1]Utah State University, Utah/USA · ole.sleipness@usu.edu
[2]Utah State University, Utah/USA

Abstract: Visitors and tourists in unfamiliar places often rely on guidebooks and popular tourism-themed websites to interpret the landscape around them. These resources often direct visitors to the same few landmarks recognized as preeminent destinations. While docents can provide additional information, their presence is logistically limited to interpretation of only points of interest with a consistently high level of visitor interest. Lost in these experiences are the abundance of sites that initially lack a high profile, as well as the many underlying layers that create context and meaning within the landscape. This presentation describes the development and user experience of a mobile application designed to uncover the hidden layers of a landscape while illuminating its biophysical, historic, and cultural dimensions. The application responds to the user's movements, making them aware of the landscape around them, regardless of the paths they choose to explore. Geo-tagged landmarks are used as triggers to provide rich visual and audio commentary to a visitor, with an emphasis on facilitating discovery and understanding of elements that would have otherwise remained hidden. Through a focus group of users, response data directs how this responsive mobile application can be employed on a larger scale, uncovering meaning in the landscape and revealing previously hidden biophysical, historic, and cultural dimensions.

Keywords: Mobile applications, landscape history, landscape interpretation, cultural landscape

1 Introduction

The landscape is a palimpsest, with countless overlapping layers of history and meaning. To the trained eye, and with patient observation, many of these layers become more apparent, painting a rich fabric around us, woven with threads of biophysical, ecological, historical, and cultural dimensions. Unfortunately, many lay observers only see the most apparent or well-known features of the natural and built environment; many landscape dimensions remain unrevealed: out of sight, and out of mind. This exploratory study documents the development of a new mobile application which responds to the individual user's movements, in order to make them aware of the landscape around them, regardless of the paths they choose to explore.

1.1 Nostalgia and Cultural Landscape Interpretations

According to LEWIS (1979), all human-modified landscapes have cultural meaning, no matter how ordinary they may be. As a culture's "unwitting autobiography" (LEWIS 1979, 2), the complex layers of cultural landscapes are often difficult for the layperson to discern. Managers of well-visited cultural landscapes grapple with how to facilitate a richer interpretation of the natural, historic, and cultural dimensions of places (VOS & MEEKES 1999), particularly due to the various lenses and values through which individuals can view a particular landscape (JACKSON 1984, MEINIG 1979).

Journal of Digital Landscape Architecture, 1-2016, pp. 273-280. © Wichmann Verlag, VDE VERLAG GMBH · Berlin · Offenbach. ISBN 978-3-87907-612-3, ISSN 2367-4253, e-ISSN 2511-624X, doi:10.14627/537612031.

Globalization and its local transformations has sparked a renewed interest in the past. Perhaps fueled by unease about the future and its specters of resource depletion, economic upheaval, and military conflict, the past serves for many as a tangible and secure anchor on which to fix their community and cultural identity. While nostalgia is often presented in cultural terms – "linking us with events and people prior to ourselves" (LOWENTHAL 1985, p. 48) – in the United States, the celebration of natural heritage also contributes to our sense of identity. Conceived as tangible and secure, many people think of the past as fixed and unalterably recorded. However, it must, by necessity, be viewed and interpreted through the lens of the present (LOWENTHAL 1985). Representations of place, especially those that cater to tourists, are often criticized as trivializing history (WALLACE 1996) – often in ways that inaccurately represent past events, people, and cultures through a sanitized, nostalgic lens (LOEWEN 1999) – ultimately missing the complexity or essence of the place.

1.2 Layered Approach to Landscapes

In contrast, the disciplines of landscape architecture and planning, recognize the complex and interrelated biophysical and cultural systems in a multilayered approach that is enculturated in their processes of analysis and design. MCHARG'S *Design with Nature* (1969) pioneered this approach in landscape suitability analyses, and its application is found in landscape architecture's subsequent manifestations, particularly within Geodesign (STEINITZ 2012).

Located in the western United States, the state of Utah is rich in natural and cultural history. From adrenaline-pumping recreational activities set amid vast landscapes of dramatic geologic features, rich histories of indigenous native tribes, settlement of Mormon pioneers, and global reputation solidified as host of the 2002 Olympics, Utah provides a rich context in which to explore an interrelated and multifaceted layered landscape.

1.3 Review of Location-Aware Applications

The study of location-aware mobile applications in facilitating understanding of landscapes has increased in prevalence, and many of these studies have focused on the use of predefined points of interest (POI) and prescribed routes (JOYE et al. 2012, BRABEC 2013). The most noted of these applications is *Detour*, a venture capital funded walking tour application that focuses on a few urban locations. While excellent at providing otherwise non-visible information in an attractive and informative method, *Detour* does not support unguided discovery of the landscape, but requires users to follow a prescribed route. Similar apps, such as *Pocket Guide*, *VoiceMap*, and *iTourMobile*, also prevent users from independently exploring the landscape around them and restrict them to a predetermined route. We believe that restricting users to such routes is problematic in that it perpetuates the focus on a set of particular landmarks in the landscape. While these previous applications focus on the urban environment, there are far fewer applications that focus on broader regional or rural landscapes. One example is *Yellowstone Driving Tour*, provides information on the history, wildlife, and geological features of the landscape within Yellowstone National Park. However, the application fails to utilize geo-location data, making the user experience frustrating as the user must pause and restart the audio commentary to match their rate of travel. Finally, there are site-specific applications that enable a user to explore a single site. A good example of this is the application *Scapes*, which augments the user experience at the DECORDOVA Sculpture Park and Museum in Lincoln, Massachusetts. The *Scapes* application does not provide a

built-in interpretation of the landscape, but relies on user-generated content which is played back when users enter the same area that the content was recorded.

Our review of existing landscape interpretation applications failed to find one that simultaneously provides users with rich layers of data about the landscape around them, especially landscape elements that are traditionally less valued by tourists, and that enables users to freely explore the landscape. Furthermore, the technology infrastructures that interface with mobile devices limit users' abilities to tailor experiences to their unique interests. Due to challenges in accommodating flexibility in personal choice, many users resort to using location-aware mobile devices to only follow predefined routes, perpetuating the problem of only revealing well-known landmarks and reinforcing popular landscape myths. *Hidden History* tries to address these shortcomings through the use of Geofencing to enable users to freely explore the landscape around them, with information provided through a media-rich commentary that focuses on the elements and history of the landscape that users typically would not consider, or do not have ready access to.

2 Methodology

This exploratory study describes the motivation, development and user experience of a newly initiated mobile application – *Hidden History* – designed to uncover the hidden layers of a landscape while illuminating its biophysical, historic, and cultural dimensions. Following descriptions of its features and testing, and evaluation, we recommend ways in which location-aware applications can be tailored to cultural landscape interpretation purposes.

2.1 Application Description

The *Hidden History* application (Figure 1) supports three different modes: Route, Explore, and Tour. These modes support flexibility in discovering a landscape, allowing users to create a customized route, explore an area independently, or follow a prescribed tour. The "Route" mode lets the user specify a start location and destination location. After entering this information, the application displays the available customized routes to the user, after which the user can select their preferred route (Figure 2). Once a route is chosen, the application shows the sites of interest that are in proximity to that route (Figure 3). These sites of interest can be sorted by different categories, such as historical, cultural, or other dimensions. The user can select as many of these sites as they would like, allowing them to customize their experience. Finally, the user is ready to travel their customized route. As the user approaches each of the sites, the application presents the user with information about that site, such as images, text, and audio (Figure 4). In "Explore" mode, the *Hidden History* application displays all the sites around the user's current location on a map (Figure 5). The user can then explore the area around them using the map as a guide. As they get close to a site, the application displays the information page for that site (Figure 4). Finally, the "Tour" mode offers preconfigured guided tours to particular locations.

Fig. 1:
The home page of the *Hidden History* application

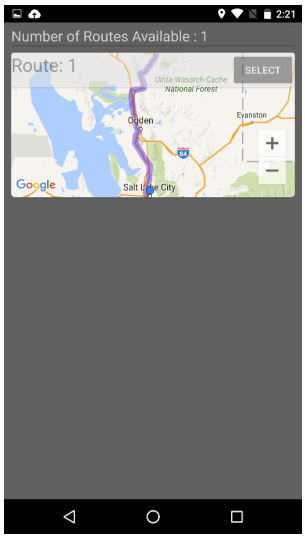

Fig. 2:
This application page lets the user select the route they prefer to travel

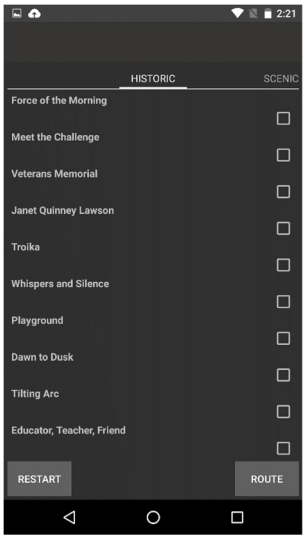

Fig. 3:
The user can choose the sites they want to visit as they travel to their chosen destination

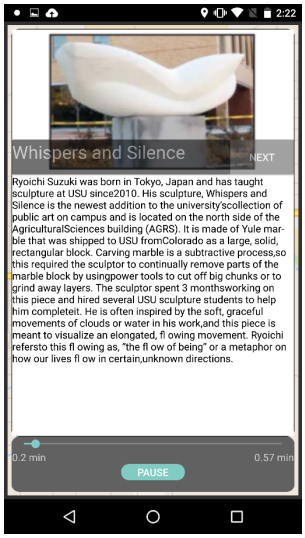

Fig. 4:
An information page about a sculpture on the campus. The page contains an image, a textual description, and audio commentary

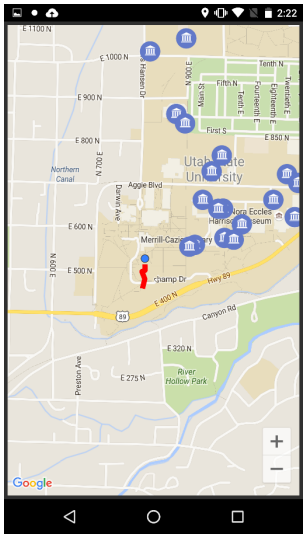

Fig. 5:
The map interface in "Explore" mode displays icons for nearby sites of interest

2.2 Prototype Development

Prototyping began with a series of hand-drawn low-fidelity paper prototypes. These prototypes allowed us to imagine how the three different modes of the application might function and explore different design options. After several iterations of evaluating and improving the paper prototypes, we created a final paper prototype that would inform application development efforts.

Next, we developed a high fidelity prototype of the Hidden History application on the Android mobile platform. The focus of this prototype was to implement a testable interface for the "Route" and "Explore" modes. The "Tour" mode was not implemented in this version of the prototype. This prototype would allow us to experiment with ways that a user might discover a landscape and to gather user feedback for improving the application. In the prototype, landscape features were selected from a list of sculptures and artwork included in an existing artwork guide on the university campus. However, future versions of the application will support user-generated content in order to fulfil the larger vision of the application to highlight lesser-known features in the landscape.

To support the wide range of activities offered by the application, we used several services and techniques. Google Map API (Application Program Interface) was used to provide mapping and GPS (Global Positioning System) location services. To detect when users are close enough to trigger information about a site of interest, we created custom geofences around each geo-tagged site contained in the application. A geofence is a virtual barrier that is triggered when the user crosses it. Geocoding services are used for converting street addresses into GPS coordinates and reverse geocoding is used to convert GPS coordinates to street addresses. Finally, we used the Open Route Service API to provide routes between various location coordinates and alternative routes.

2.3 Testing Protocol

Geo-tagged landmarks are used as triggers to provide rich visual and audio commentary to a visitor, with an emphasis on facilitating discovery and understanding of elements that would have otherwise remained hidden. Through a survey of users, response data indicates how this responsive mobile application can be employed on a larger scale, uncovering meaning in the landscape.

Four users participated in the initial focus group usability testing for the *Hidden History* Application using the high fidelity prototype. All focus group testing users were international graduate students who were new to the test location (1-2 years living in the area). The users were all proficient with technology and mobile applications, though they had never used an application like *Hidden History* before.

Participants were first given a brief tutorial and some time to become familiar with the mobile application's user interface. The participants were then asked to complete a set of tasks using the prototype. The first set of tasks related to using the "Route" mode of the application. For the second set of tasks, we asked participants to test the "Explore" mode of the application. While the application is ultimately designed to facilitate the interpretation of features across larger-scale landscapes, its beta testing was undertaken at a smaller campus scale. For this testing and evaluation, we prepopulated the application with the locations of various sculp-

tures located on the campus of a public university in the United States. We then asked participants to walk around the campus while using the application to discover the locations of these seventeen sculptures.

Fig. 6: One of the selected sculptures that served as a location within the application

We asked the participants to verbalize their thoughts while completing the tasks using the "Think Aloud" protocol (LEWIS 1982). After the participants completed the tasks, we asked a set of questions about their experience with the prototype. During sessions, responses were audio recorded and detailed notes were generated. Each test sessions lasted approximately 30 minutes.

3 Findings

This initial usability testing revealed many issues with the application as well as opportunities for future work and enhancements that will result in a greater ability for users to customize and contribute their own content.

All participants expressed an interest in learning more about the landscapes that surround them. To this end, they appreciated the application features that helped them realize more about locations in their proximity. They also responded favorably to the "Route" feature that would help them discover sites along the way to a destination. Since they were all new to the

area (and to the country), they talked about taking frequent road trips to explore their new surroundings. One participant explained how he and his friends often found the road trip and the stops along the way, to be just as enjoyable, if not more so, than reaching the final destination. He was excited about the prospect of using the application to discover interesting sites and things to do as they traveled to and from their travel destination.

Participants found the information they learned about the sculptures across campus informative and interesting. One participant stated, "I didn't know that sculpture was here." The participant had been in the vicinity of the sculpture many times before, but had never noticed the sculpture until he used the *Hidden History* application, demonstrating that through the application, users were able to uncover and learn more about features in their environment which had previously been hidden (or at least less visible).

In the prototype, the information pages for each site were configured to pop up automatically and start playing an associated audio file (if available) when a user got close to the site. Two of the users liked the automaticity of this feature. The other two users were more reflective. They verbalized situations in which this feature would be desirable, such as while driving a car when they would not be able to easily operate their phone. However, when walking around campus during the test sessions, they wanted the ability to select and choose what information they viewed or listened to. While agreeable to having a notification that they were near a point of interest, they preferred to choose whether to learn more about the point of interest rather than being forced to view/listen to the information.

Participants offered many suggestions for improvement. One participant suggested using different color shades for the site markers, where darker shades indicate the site is closer to the user's location and lighter shades indicate the site is further away. Currently, voice directions for routing are not available, but, as suggested by users, this feature would enhance its usability, particularly when driving. Both the "Route" and "Explore" modes used an auto-zooming feature to refocus the map on the user's location every few seconds. This was frustrating for users, because it prevented them from zooming out and exploring the larger surrounding region around them on the map. In future iterations, we plan to improve the application by addressing the user concerns and suggestions described above.

4 Conclusion and Future Opportunities

Subsequent versions of the application will accept user-generated content to further the objective of allowing users to both uncover and contribute local knowledge to the content available on *Hidden History*. By allowing users freedom to experience the landscape in a sequence and temporal pace of their choosing, the application enables users the autonomy and agency to make decisions on how to experience landscapes. Through inclusion of a variety of different perspectives, the application can be tailored to the unique interests and cultures of diverse populations. By making it possible for users to add their own unique stories through techniques such as Photovoice (WANG 1997), the modified application would promote the democratization of cultural landscape interpretation.

References

BRABEC, E. (2013), Locative Media as a Tool for Landscape Interpretation. In: Proceedings of the Digital Landscape Architecture Conference 2013, Bernburg, 167-174.

JOYE, R., VERBEKEN, J., HEYDE, S. & LIBBRECHT, H. (2012), Location-aware Mobile Devices and Landscape Reading. Proceedings of the Digital Landscape Architecture Conference, 425-436.

JACKSON, J. B. (1984), Discovering the Vernacular Landscape. Yale University Press, New Haven, CT.

LEWIS, P. F. (1979), Axioms for Reading the Landscape: Some Guides to the American Scene. The Interpretation of Ordinary Landscapes: Geographical Essays, 11-32.

LEWIS, C. (1982), Using the Thinking-Aloud Method in Cognitive Interface Design. IBM Research Report RC 9265 No. 9265. Yorktown Heights, NY.

LOEWEN, J. W. (1999), Lies Across America: What Our Historic Sites Get Wrong. Touchstone, New York, NY.

LOWENTHAL, D. (1985), The Past is a Foreign Country. Cambridge University Press, Cambridge, UK.

MEINIG, D. W. (1979), The Beholding Eye: Ten Versions of the Same Scene. The Interpretation of Ordinary Landscapes: Geographical Essays, 33-48.

STEINITZ, C. (2012), A Framework for Geodesign: Changing Geography by Design. Esri Press, Redlands, CA.

WALLACE, M. (1996), Mickey Mouse History and Other Essays on American Memory. Temple University Press, Philadelphia, PA.

WANG, C. & BURRIS, M. A. (1997), Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment. Health Education & Behavior, 24 (3), 369-387.