Audio Technology to Enable Connection & Exploration
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Introduction

Spaces inevitably change over time. Physical features like structures, sculptures, murals, flora, and fauna come into existence at the whims of political, social, and cultural forces that govern a given space. When these features are removed, destroyed, or replaced, the stories associated with them often disappear as well. Visitors thereafter have no way of knowing that these stories exist.

This project set out to connect people with the untold stories of their surroundings by building a platform that associates place-based audio content to a geographical location.

InSite is a mobile app platform that allows people listen to personal audio stories connected to places. InSite walks users through curated tours of interesting landmarks and enables free exploration near users’ current location. Stories are audio narratives from communities and individuals who have been traditionally denied a voice. Story content comes from organizations such as community-based organizations, historical societies, local governments, and researchers.

At the heart of our work was the goal of fostering understanding between people. Through the meanderings of our user-centered design process, we are pleased that the final product reflects this core value.

We were fortunate to be able to partner with Susan Moffat at the Global Urban Humanities Initiative at UC Berkeley. Susan had conducted research and interviews around the community of the Albany Bulb, a former dump that was home to a homeless community for many years as well a place full of artistic expression and natural beauty. In April 2014, the residents of the Albany Bulb were again evicted by the City of Albany so that it can be turned into a state park. Susan allowed us to use her interviews and photos of this group and we were glad to help tell the story of this displaced community.

Team

Sandra Lee...........Project manager. UX researcher. UI designer. Front-end developer.
Purpose & Rationale: Building Connective Technology

Fostering Connection
Our team was unequivocal from the beginning about being involved in a final project that would support connection and understanding between people. The Albany Bulb fit as a hyper-local contested space with many different communities deeply invested in its future, from homeless people looking for safe and peaceful shelter, to dedicated dog-walkers, to artists and art enthusiasts. We wanted to create a tool that would enable connection between otherwise disconnected groups. The complex political dynamic made this an interesting challenge.

Amplifying Unheard Stories
This project aims to facilitate access to unheard narratives. In the context of the Albany Bulb, these are the stories of the otherwise homeless community that took up residence on the peninsula. The multiple evictions that removed them from the Bulb have also eliminated the evidence of the community infrastructure that they built there. The plans to transform the Bulb into state park risks erasing the stories of the community who, for over 10 years, made it home.

Early on, we considered creating an app that enabled crowd-sourced audio and photo content. Because of our goal of amplifying unheard stories, we were concerned this route would lead to a flood of stories from the technologically connected and the privileged.

Relying on Experts & Building on Existing Work
We agreed from the outset of this project that we wanted to work on something that would have a concrete impact on an existing problem. As a result, we developed InSite from a grounding in known problems and in collaboration with practitioners in City and Regional Planning, archaeology, community engagement, and the arts. Both the infrastructural and content components of InSite build on existing work.

Susan Moffat, director of the Global Urban Humanities initiative at UC Berkeley provided inspiration, extensive research and knowledge, as well as audio content and photographs of the Albany Bulb and its former residents and landmarks.

We leaned on Sarah Van Wart’s Local Ground project, originally a MIMS final project and now the focus of her doctoral work. Local Ground provided a content management system for multimedia associated with geographical coordinates. Without this tool, we would have
not made as much progress as we did on the InSite app, because much of our energy would have been spent developing our back-end infrastructure and an interface for managing content.

Creating a Functioning Tool that Will Live Beyond the Project
We set out to build something that we would be able to implement by graduation. This led to trade-offs related to scope. In some cases, we opted for a restricted scope and simpler plan in order to create a working app. We happily achieved our goal of producing a functional tool that is ready to release to the public.

Creating a Platform That Works Anywhere
From the start, we envisioned a tool that could be used beyond the Albany Bulb, such as in historical sites and educational settings, as well as in venues not known for providing audio tours, such as gentrifying neighborhoods, pilgrimage sites, festival grounds, and nature areas. Although we designed for the specific context and content available related to the Bulb, we ensured that InSite would be extensible for other projects and other goals.

Scope
Thanks to Sandra’s connection with Susan Moffat as Graduate Student Researcher, the Albany Bulb presented itself as an amenable context for our project. The several distinct communities and their various needs and behaviors offered a challenging but manageable landscape in which to undertake user research.

We opted to design specifically for the Albany Bulb context and for the audio and photo content provided by Susan Moffat. We anticipated that we would create a better project if tailored specifically to our target area. This meant forgoing considerations of designing for a highly urbanized space, for example. However, it gave us the opportunity to dive more deeply into our own design rationale and test the effects of particular decisions we made, with enough time to make corrections.

Design Process
Our initial design goal envisioned an “audio tour app for life”. That is, we wanted to build an app to enable people to listen to place-based audio stories in such a way that they would remain immersed in and learn from their environment.

What we ended up with was actually quite close to our original vision. The pilot version of InSite used the Albany Bulb as a canvas for prototyping our idea, but the interaction that it facilitates could be interesting anywhere there are human stories. Our final product is an adaptable platform for people to create audio tours of any physical place.

What follows is a discussion of the design process that informed the development of InSite.
Based on Professor Tapan Parikh’s early encouragement, we focused on audio as a medium through which to transmit stories to users without compromising their ability to remain alert and immersed in their environment.

Testing Assumptions: Validating the Audio Format
An initial visit to the Albany Bulb gave us the chance to discuss the idea of an audio-based story app with our target user group. These conversations confirmed the validity of the focus on audio, and enriched our understanding of what Bulb visitors do while on site. The conversations led to a narrowing from all the available content that Susan Moffat provided to a subset including physical places related to either artwork or former Bulb residents.

In our research process, we took a tour of San Francisco’s Tenderloin, a downtown neighborhood known for its high concentration of low-income housing and its struggling community. Del, our tour guide and a formerly struggling member of the Tenderloin community, escorted us through soup kitchens, a theater, and other organizations providing innovative services to connect poor people with resources and support in the neighborhood. Throughout, Del greeted friends, got us waved past lines and other gatekeepers in the various organizations, and shared the kind of history that only one long acquainted with a place can have. This gave us the feeling that we had an “in” and could more quickly understand this unique place. The experience challenged us to capture the feel that Del gave us as a community insider, and to reduce the conventional “touristy” feel.

We could not design InSite to replace a human community tour guide. However, in later interviews with Bulb users, the concept of an audio tour of the Bulb was received with enthusiasm. Many Bulb visitors wished they could get
insider information about the changing artwork and learn more about the former residents and history of the place.

Paper Prototype: The Map Becomes Central
The paper phase was instrumental in clarifying our own ideas and steering our project towards a more intuitive initial interface. We tested with people interested in the Bulb who attended Susan Moffat’s joint art exhibit about the Bulb at the SOMArts Gallery in San Francisco. We also tested in this phase on site with Bulb visitors, and with several archeologists familiar with the site.

At the Bulb, we learned of visitors’ hunger for more information about both artwork and the former residents. Because of the controversial eviction, there was much speculation and sometimes confusion about what had happened. People were eager to have an authoritative source which they could refer to either at home or while walking around at the Bulb. A subset of our interviews suggested that there was also interest in the flora and fauna of the Bulb. We held on to the idea of creating a nature-oriented tour, though the content provided by Susan included very few stories specifically related to natural features, such that a full nature tour was not feasible. Fortunately, we designed InSite so that the mere inclusion of additional content in a new category would enable a new tour.

Testing our paper prototype shifted our initial design towards emphasizing the map as the central mechanism for organizing our content. At first, we designed an introductory flow that enabled users to either view the set of sites of interest in a list-style view and a map view, and both were equally prioritized and accessible. Instead, users expressed the urge to use the map as the primary interface through which to understand the sites, their relation to each other, and to the user’s position. For this reason, we implemented the map as the primary entry point for exploration, with a toggle to a listing of the same sites.

Simply having the paper on hand helped people evaluate functionality enough to give us suggestions, even those that were actually impossible to test with paper, like audio. For example, one frequent podcast listener was adamant that audio clips be 1-3 minutes long. In slicing up Susan’s recorded videos to create the audio stories, we adhered to this rule.
Our decision to include audio self-introductions, in the spirit of the audio app, as well as the audio history disclaimer, came from user tests at this stage. Various users explained that they would want to learn about the app creators and hear us take a candid stance on our position on the Bulb’s history and the recent eviction of the residents.

Through the paper prototype testing, we learned that it would be helpful to link stories together, which prompted us to introduce tags that function as searches. Audio content linked with any tag could then lead users to a set of similarly tagged audio stories.

The paper phase through the final development stages prompted us to continue navigating the complexities of organizing our content. We had the challenge of taking audio, photos, and descriptions within Susan Moffat’s organizing scheme and rethinking the organization for use by mobile users at the Bulb. While Susan had a multi-level hierarchy of types of art, landmarks, former residents’ dwellings, and natural features, which we could have borrowed wholesale, we instead reduced to two primary categories: People and Sites. We did this both because it was in line with InSite’s focus on unheard stories, and also because users were overwhelmed with the quantity of information we were presenting to them. The trend of reducing categories continued as we observed users back-pedal and seek other options when faced with the map displaying all content.

**Improving Accuracy: Quality Control with Amber Whitson**

Another major improvement came with an interview with Amber Whitson, one of the former residents whose stories are featured prominently on our app. She was enthusiastic about the work we had done and improved the point accuracy of the map markers by examining each on the Local Ground site, one by one. She provided a measure of quality control without which serious Bulb visitors may have found using InSite frustrating, rather than fun.

**Testing the Working App: Curation Becomes Key**

After developing the working app, we were able to take it through a second round of testing, including on site at the Bulb.

A pivotal evaluation of the app with Susan Moffat, following a test with an ideal target user, convinced us to curate the content more explicitly. Though we had steadily approached development with the intention of allowing maximum exploration and avoiding crafting a specific narrative about the Bulb and its former residents, we could not continue to avoid it. We realized that users would be less likely to actually explore if we designed for completely free-form exploration.
Paradoxically, curating a tour of must-see highlights, and thus limiting the amount of content easily available to them would actually make it more likely for users to experience more content.

In retrospect, we can see more clearly that this maps well to the experience we had with Del in the Tenderloin. He didn’t let us wander aimlessly through the neighborhood, quietly waiting for us to ask to see something. Instead, he guided us expertly through the neighborhood with a set of pre-selected sites in such a way to take us through a logical narrative arc.

This led to a series of specific features, including a set sequence of important markers for which we wrote explanatory context. This was the point at which we began to admit our roles in shaping the stories we were selecting. We also created functionality to walk users through the tour, zooming in on each tour stop in sequence. To preserve the exploratory mode, we also made it possible to enter and exit the tour easily.

**On Site Testing: Insights at the Bulb**

The final significant change came as a result of realizing that the curated tour functionality should extend beyond general highlights to cater to the two major interest groups that would use the app: those interested in former residents’ stories and those interested in art. This conviction came while exploring with InSite – it was clear that the curated tour provided order and digestibility to an otherwise overwhelming set of content. At last, we arrived at an app with three curated tours, two of which were specialized to particular user groups.
Features

InSite, a platform for map-based multimedia content discovery with a focus on audio, includes the following features.

1. **Audio play and pause functionality**
   InSite allows users to listen to audio stories on mobile devices.

2. **Map-centered content that toggles to a list view**
   From the map, any set of filtered content is also viewable in a list format. This is not the primarily accessible view, but responds to the type of user that is less comfortable with a map-oriented view of the content.

3. **Map zoom to current location of mobile user**
   For ease of orientation to the map, we also provide a “you are here” button that allows immediate adjustment of the map to show the user’s exact location.

4. **Stop-by-stop tour wizard**
   The tour functionality includes zoom and sequence that allows users to walk through the tour. Numbers on each marker act as reinforcing feedback with respect to where on the tour the user has arrived.

5. **Auto-updated distance between user’s location and all markers**
   From the list view, users can learn how far from each marker they are standing. This distance automatically changes as a user moves, supporting navigation by indicating whether the user is moving towards or away from the marker.

6. **Open exploratory mode**
InSite also allows exploratory users, or those who may have already experienced the tours, to view all content. Because of the data we are working with, there is quite a bit that falls outside the curated tours and we wanted to enable a freer mode of exploring.

7. **Easy transition between tour wizard and free exploration mode**
The Start Highlights Tour button enables moving into the guided mode from a search-oriented exploratory mode.

8. **Tour-based content filter**
The tours essentially allow discovery of a specific set of content based on the app administrators’ content curation decisions, including what the sequence of markers should be and what the tour should be called. In the Albany Bulb version, we include three tours: one with general highlights, one exploring the sites of former Bulb residents’ dwellings, and one showcasing artwork around the Bulb.

9. **Tag-based search**
All content can be tagged. Any tag is clickable, re-rendering the content to show only that which is relevant to the clicked tag.

10. **Category-based filter**
In addition to pre-set tours, we also made a determination that our content could be sliced up in two primary ways: everything related to either art or former residents. This could be customized to allow any number of similarly customized categories. It’s possible to filter on these pre-determined categories.

11. **Free-text search**
Those more familiar with the Bulb can search on all content, such as a resident’s name.
12. **Item Detail**
   For each marker, we all display all related content in a list showing description, audio stories, and photos.

13. **Photo gallery**
   For a given marker, users can scroll through photos, each of which have an accompanying description.

14. **Ability to edit content through Local Ground for content providers**
   Users can place feature markers, associate media, tag items, and create tours through the Local Ground interface.
Implementation

We developed InSite to separate content management from the app itself. A user loads the InSite app on their browser then retrieves data about locations as well as media artifacts from a separate data server. We developed InSite using the Local Ground project as a CMS and media server.

By using the Local Ground API, we allow future users to use the existing Local Ground interface to associate their own content to geographical points. Although we developed around Local Ground, this functionality is isolated in a single class. If future users wish to use a different content management system, they simply must replace this class with one that will connect to their chosen store and transform its data into the format expected by InSite.

Options such as the data store, as well as map starting location, tours, and welcome text are configurable through an options file. This allows future users to configure the app to their needs without needing to dig through code.

Our front end is built on the Riot JavaScript templating framework. This allowed us to create a single page app with multiple user interface elements that is quick and responsive to user input. This also will make it easier to change and add new interface elements in continued development. We also made use of a number of existing JavaScript libraries including Leaflet for mapping, Blueimp-Gallery for image image display, and Audio.js for audio control.
Information School Concepts

Below, we explain how the InSite project embodied many challenges related to the theory and practice of designing and managing information systems.

Information Organization & Retrieval
Our project relies on a relatively novel way to organize multimedia information according to spatial coordinates. Because of this, there aren’t established design patterns for organizing this kind of content that we can borrow or that users will necessarily expect.

Our starting place was a highly conceptually organized dataset because we were relying on Susan Moffat’s research and content collection to create InSite, we had to make several decisions about the degree to which we would adopt the organization of the original curator.

The Local Ground interface gave us map markers as the basic containers for content, and allowed tagging of any content type: marker, audio, or photo. Through user testing, we understood that users may want to search for only audio content, only photos, or for markers themselves.

The decision to limit content contribution from the crowd, and to accept only content from professional or academic sources reigned in the scope of our information organization challenge.

User-centered Design
We strove to center our design process around target users of the app, and give their reactions to our prototyped designs utmost importance. Indeed, as is evident from the changes we made along the way, nearly all significant changes to the design and functionality of the app came from formal and informal interviews with users while testing iterations of InSite. This is discussed in detail in the section on Design Process.

Modularity, Extensibility, and Openness
One of the major strengths of InSite is its flexibility to be deployed in other places for other purposes. We developed the user interface using the observer pattern so that various elements are decoupled. This allows for easy modification and creation of interface elements in future development. Where possible, we created avenues for customization that will enable future users to easily change the filters and tours for new instances of InSite.

Social Issues of Information Organization
This project surfaced some of the challenges of creating technologies for use within controversial political dynamics. The Albany Bulb is an area of land that many different groups are deeply invested in, from officials representing the City of Albany, homeless people, dog-walkers, art enthusiasts, and nature seekers.
One firm decision based on social considerations is discussed in the Governance section. We anticipated that existing socioeconomic structures would make it more likely for contributions to come from smartphone users that do not share the political and social marginalization of the homeless people whose stories we intended to amplify.

We used this project as an opportunity to explore a controversial local issue. We did not expect to solve any social ills, but in deepening our knowledge about the current situation of the Albany Bulb and who belongs there, we considered the role of technology in fostering understanding between people and influencing their perspectives.

We also examined the approach of creating an app that would let future Bulb visitors “peer in” on the former residents of the Bulb. We had an occasion to hear the challenge of Osha Neumann, an outspoken activist and the creator of the iconic Bulb Water Goddess statue, while on site at the Bulb. He was critical of the idea that a mobile app will have an influence on the situation now that the residents have been displaced, and critical in general of academic projects that serve to document, but did nothing to fight for the interests of the residents before the eviction. This challenge helped us think more deeply about the role of technology in the lives of marginalized people in our communities.

Ultimately, we can only claim to have built a technology platform that enables the building of curated audio tours, but using the Bulb as the pilot site for the app sets a precedent for creating audio tours to uncover less-known perspectives and amplify unheard voices.

**Information Visualization**

We reinforced the differences between the distinct tours with color-coordinated map markers and matching styling of the Item Detail page for each marker. InSite includes indications on the map pop-up labels and in the List View of the kind of content that will be available at each marker to enrich context and provide an intuitive user experience.

**Governance**

We discussed enabling users to contribute content at great length. We understood that opening up the app to user contributions could welcome unheard voices to the conversation about the Bulb. However, we opted against building this into our app given the concern about reinforcing the status quo by allowing technologically connected users an easy route to contributing content, while leaving the rest behind.

Had we moved forward with a crowd-sourced content model, we would likely have implemented a voting mechanism to ensure quality control. We also discussed balancing that with a mechanism to encourage users to listen to un-rated content so that new users’
content would have a chance to float to the top. With the right governance model, this functionality would be a great addition to a future iteration of InSite.

Next Steps

We are pleased that the InSite app will be used by the Global Urban Humanities initiative as a companion to the Atlas of the Albany Bulb main website.

Conclusion

The InSite app was born out of our team’s shared interest in creating technology to foster understanding and connection between groups of people that would not normally interact.

The final product, InSite, enables the development of customized local audio tours. Our work has yielded a successful proof-of-concept for the Albany Bulb in San Francisco’s East Bay. Other possible use cases for our platform include tours related to documenting family history, changes in gentrifying neighborhoods, or important sites for any kind of gathering.