

# Mobile and Ambient Storytelling

## Introduction

The Mobile and Environmental Media Lab is currently exploring location-specific mobile storytelling. This research investigates the idea of *ambient storytelling* and how the built environment can act as a storytelling entity that engages and interacts with the people in specific spaces. Development of personalized responsive environments arise as people spend time in these spaces and build a relationship with the spaces they spend time in every day. By integrating context-aware interactions and access to backstory about an environment, ambient stories emerge and can be accessed through mobile and pervasive computing technologies and applications.

Our current research concepts came out of early research about new models for mobile advertising in which the goal was to create compelling experiences in contrast to the current state of mobile advertising, which relies on banner ads or text messages. The idea of backstory, location and context-specific information about products and objects became a recurrent theme when thinking about new forms of advertising. This became the groundwork for our current research into ambient and mobile storytelling.

In addition, the practice of lifelogging, or documenting and broadcasting one's daily activities with wearable computing devices, has been another topic of our research. However, instead of people documenting their activities, we are focusing on designing lifelogs for the built environment. These lifelogs for physical spaces combine various building, environmental and human sensor data, as well as collaboratively-authored character development. These elements, when combined, create the groundwork for ambient, mobile storytelling.

Finally, backstory plays a significant role in our conceptualization of mobile and ambient storytelling. By embedding objects with contextual information about what materials objects are made of, where those materials came from, who designed and built the objects, and how the objects was transported, we can provide a deeper emotional connection to the objects and spaces of everyday life. It is our objective to provide a novel way to access an object's backstory using mobile and pervasive technologies and applications, while the overarching goal of our research into ambient storytelling is to merge lifelogging and collaborative character development with these backstories and context-aware interactions.

Exploration of these concepts is integrated through a new research effort called the Million Story Building project.

## **Million Story Building Project Overview**

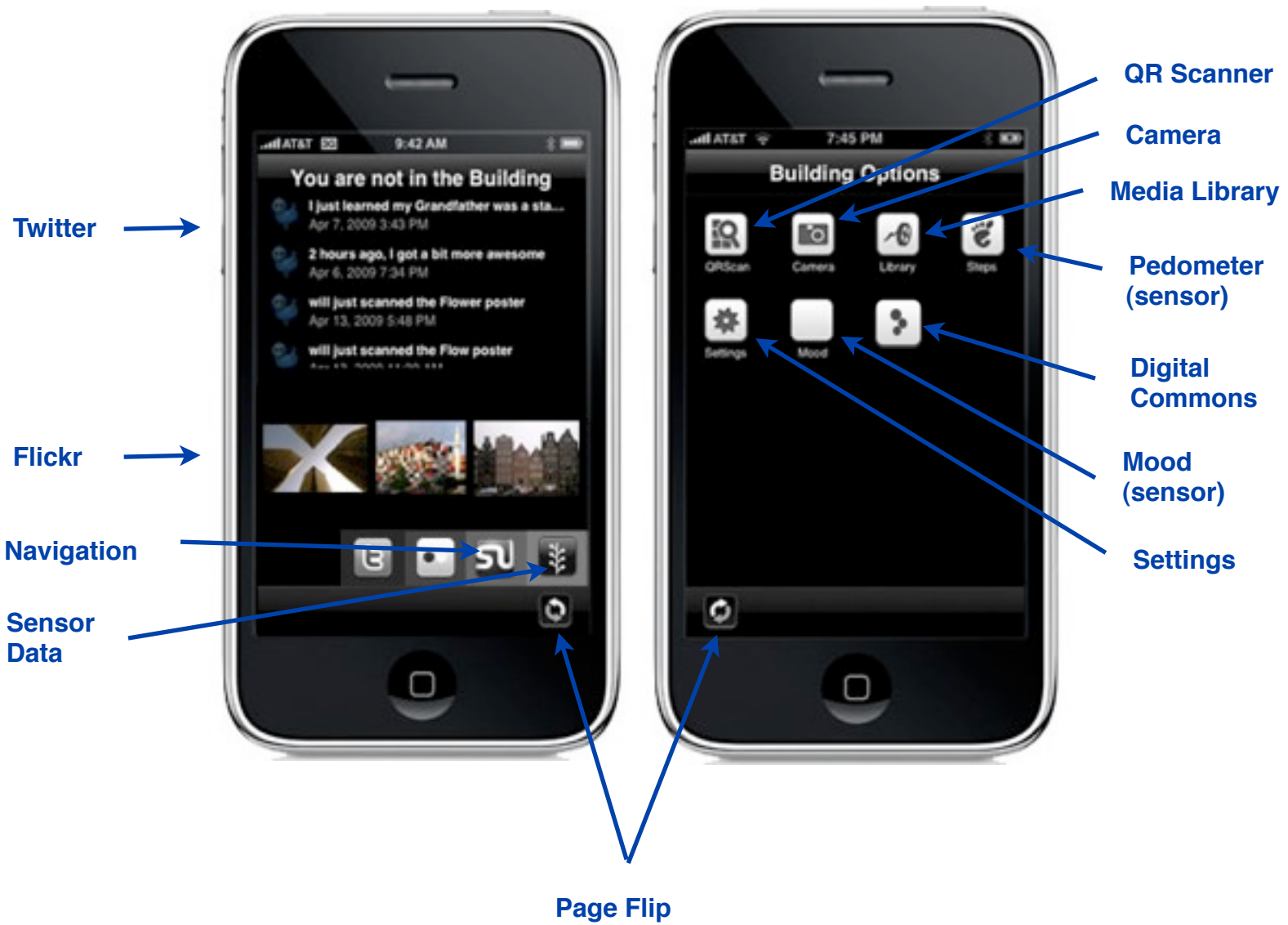
The Million Story Building (MSB) project introduces the idea of mobile, ambient storytelling within the new School of Cinematic Arts Lucas Building. Through the use of the downloadable MSB mobile phone-based application, inhabitants and visitors become immersed in an emergent, responsive environment of collaborative storytelling. By designing location-specific interactions in the built environment, the Mobile and Environmental Media Lab has created an interface to the George Lucas Building through the use of mobile phones, sensor networks, and software applications.

This application is intended to be used by the students, faculty and staff of the School of Cinematic Arts on a daily basis. As these inhabitants begin to interact with the building regularly, a relationship will develop between the building and its inhabitants. The building can create user profiles by learning names, locations and activities of its inhabitants, if the inhabitant chooses to have an active relationship with the building. This user profile can be used by the building to offer information tailored to the likes and interests of a specific user. Furthermore, we have designed experiences that deliver a daily surprise to an individual as they spend more time in the building and sustain a playful relationship with the building. Experiences such as tagging movie clips, taking photos of specific elements of the building, and collecting videos from film locations are introduced to inhabitants in the form of missions or quests that the building proposes as a way to help it learn. These requests are made by the building in a pervasive game-like way in which inhabitants are asked to complete more difficult tasks only after becoming actively engaged with the building over time.

Additionally, as inhabitants begin to interact with the building and provide the requested information, a digital archive of all the collected videos, images, tagged movie clips and other data is created. The resulting database for this collected data will be useful to the School of Cinematic Arts not only as a way of developing a living history of the new Lucas building, but will also provide useful tools that can be used in the classroom. For example, as more movie clips are collaboratively tagged, professors and students will be able to access the database and call up movie clips by keyword in the classroom. Having access to the kinds of information that the building collects and stores will be an invaluable resource to the School of Cinematic Arts.

The Million Story Building project has allowed us to explore new ways of interacting with the built environment. By embedding a digital layer of information into an existing building, we have created a new kind of space for storytelling in which a mobile phone application lets users participate in a persistent story world. The research and development we have done so far will inform our future design plans for the new Interactive Media building. Our goal for the new building is to embed interactive systems and backstory elements from the ground up at the beginning of the design and construction process. Additionally, we are considering other ideal application spaces to expand this kind of project to, such as children's hospitals and museums.

## Application Tools



## **PHASE I**

### ***Twitter***

The Lucas Building has its own Twitter stream, which is used to update its inhabitants of various activity in and around the building. When the mobile application is launched, the Twitter stream is visible and is the first interaction a user has with the building each day. The building might share information about when its plants need watering, who has recently entered the building and launched their mobile application, when someone is interacting with the building or QR codes, and the mood of the building and its inhabitants.



### ***QR Reader***

The camera can be used as a Quick Response, or QR reader to discover information embedded within the buildings' walls. When a QR code is discovered in the building, inhabitants can take a picture of that QR code and will receive contextual information related to the location of that QR code, i.e. movie poster, faculty office. Many of the movie and game posters in building will have a QR code that links to information such as alumni interviews, movie trailers, movie stats, and reviews.



### ***Flickr***

The camera can also be used by inhabitants and guests to take photos around the building, which are directly uploaded to Flickr. The building might send requests to users to take photos of certain objects or attributes within the building. A database of photos is created and might show changes to the building over time. The photos are also accessible for viewing on the Flickr page within the application and can give the building and its users a real-time perspective of what is happening in the building.



### ***Sensor Information***

Sensor data from both sensors in the phone and within the building is visualized and can be viewed within the application. By accessing the sensor tool, users can see information such as personal pedometer steps, human movement through the building, building information modeling data, and environmental data.

### ***Plasma Displays***

The plasma displays located throughout the building broadcast RSS feeds from the SCA Community website, the Interactive Media Division website, and other information about what is happening around the building. These displays also provide a platform for interaction between the building and its inhabitants

### ***Movie Tagger***

When the building begins to recognize that certain users are actively engaged with the building, it will ask users for help in defining and tagging certain movie clips with keywords. For example, when a user accesses certain movie/game poster QR codes, certain information about that movie/game will be immediately available. Over time, the building might ask its users to find a plasma screen within the building and help tag a movie clip or series of movie clips. When the user approaches a plasma screen, the plasma display will sense that the user is within range and will ask a question and play a movie clip related to the poster whose QR code was accessed earlier. As the user begins to interact with the building and respond to its requests, the building will develop a stronger relationship with that user and will begin to ask for more help. In addition, this application enables users to collaboratively create a robust annotated clip library for the School of Cinematic Arts, in which students and professors will be able to access for classroom use at any time.



### ***Location-Specific Information***

This iPhone application also provides a platform for providing students, faculty and staff with everyday information about classes, nearby events, and upcoming screenings. Additionally, mobile-based games are currently being developed to actively engage building inhabitants in events and activities that are happening at SCA.

### ***Media Library***

The media library allows the user to save any media they access via QR code scanning, movie tagging, etc. When a QR code is accessed and information is retrieved, the user will be given the option to save any related information to their personal media library for future viewing.

## **PHASE II - Future Development**

### ***Provenance***

Objects within the building, in addition to the building itself, are embedded with a backstory and contextual information. These objects can tell stories about the materials they are made from, where those materials came from, and who made the objects. These objects contain QR codes, bluetooth proximity sensors or AR applications and will alert the inhabitants to information that is available within them. Furthermore, inhabitants can embed additional information into the objects or the building, creating an ongoing digital archive for the objects and the building.

### ***Digital Story Archive***

The statue of Douglas Fairbanks and the courtyard at the entrance to the Lucas Building will act as a story repository, where users can engage with stories that have been left there in addition to leaving their own stories behind. When a user scans the courtyard with their camera tool, a number of story bubbles will be generated from stories that have been left there. Each bubble links to a story which can be opened and read by the user. The user then has the option to leave their own story behind as well.



### ***Navigation***

A number of pedestals with AR markers will be located throughout the building. When a user scans the AR marker with their camera, they will see a 3 dimensional model of the floor they are on, as well as information about how to locate specific places on that floor.

Alternatively, there will be a map tool that will allow users to flip to a 3 dimensional representation of the floor they are on and find out where specific classrooms, offices or departments are located.



## Related Research:

### ***Architecture and Space***

#### **Always Building: The Programmable Environment (Herman Miller)**

The Herman Miller Creative Office looks at how to build adaptable, programmable spaces and buildings that can change with changing needs. *Always Building* investigates how digital and building technologies can be used to create flexible, dynamic, sustainable spaces that can be reconfigured when change is required. This paper places the onus on architects and designers to start to think about the spaces they build, and how to integrate digital technologies to offer more programmable, less static structures and spaces. One goal of Herman Miller's research is to determine how, in the future, is how to "incorporate aspects of the digital world into the physical environment to provide meaning, connection, and empowerment."

#### **An Affordance-Based Model of Place for GIS (Jordan et al.)**

This paper investigates the role of creating place in Geographical Information Systems (GIS). Though GIS models generally focus on mapping the representation of a location using certain data structures, Jordan et al. hypothesize that the integration of spatial affordances would make GIS systems more usable to more people. The researchers approach this problem by looking at what people find meaningful about places, determine the affordances of specific places, and try to integrate these elements into their models. They look at the physical features, actions, narrative, symbolic representations and names, socioeconomic and cultural factors, and typologies to help define a place and explain what would be most advantageous to integrate into GIS.

#### **Architecture as Pedagogy in *Earth in Mind: On Education, Environment, and the Human Prospect* (David Orr)**

David Orr writes about the architecture of college campuses and how academic buildings themselves can offer a kind of curriculum, not just that which is taught within them. Orr explains that pedagogical architecture asserts a power over those who use the buildings by dictating specific uses. Since those who use the buildings most often are not usually consulted on what the needs of the spaces within the building will be, the architects will continue to determine the use, rather than the faculty and students. He further believes that how a building is designed, built and operated can add to the flow of ideas and encourage the development of "human relationships in which learning is embedded." With this, Orr hypothesizes that good design can contribute to the learning process and can "extend the imagination about the psychology of learning."

Orr also discusses how academic spaces are often designed without sustainability in mind and are considered successful if it merely serves the educational process, and therefore often lack a sense of imagination and creativity. With this lack of consideration for sustainability also comes the issues of building ethics. He believes it is important to ask questions like: How are building materials extracted, where do they come from, what are they made of, how are they transported? What are the ecological

and human costs involved in constructing a building? And how can buildings be built as “applied ecology”?

### **From Informing to Remembering: Deploying a Ubiquitous System in an Interactive Science Museum (Fleck et al.)**

Cooltown, an HP Labs project based in the Exploratorium in San Francisco, consists of a set of ubiquitous computing applications that enhance visitors’ interaction with the hands-on science museum. This project consisted of an electronic guidebook that could be accessed with a “nomadic computing device” and would help visitors navigate the museum and enhance their experience with additional information about the exhibit, as well as a digital archive or scrapbook of their visit. The exhibit stations were equipped with RFID readers, barcodes and an infrared beacon, all of which could transmit a hyperlink related to the specific exhibit to the visitor’s PDA device. Visitors could also use a tool called a Rememberer to create a personal diary of activities from their visit to the Exploratorium. This personal record could be accessed after the visit via a URL.

### **New Media Urbanism: grounding ambient information technology (Malcolm McCullough)**

In this journal article, McCullough emphasizes the need to form a relationship between the disciplines of interaction design and architecture to fully explore the possibilities of pervasive computing. He states that, “the design challenge of pervasive computing demands new emphasis on ambient, embodied, and habitual experiences” in which the growing emphasis on context in design computing overlaps with the core principles of architecture and urban design. This crossover between disciplines creates a need for ambient experiences, in which pervasive computing should be “experiential and unobtrusive”, requiring a new way of studying both information technologies and physical space.

### **Object-Blog System for Environment-Generated Content (Maekawa et al.)**

This paper explores how environment-generated content from both sensors and human activity can be analyzed and visualized for the purpose of a record of one’s daily life. Information is posted to the Object-Blog through personified objects, such as doors, watering cans, coffee makers and drawers, that post blog entries from the perspective of that object’s experience and use. The researchers believe that the content generated from both the personified objects and people using the system serves the purpose of “aiding memory, improving daily life, and sharing information.”

### **When Place Becomes Character (Gloriana Davenport)**

While exploring the importance of place in immersive experiences, Davenport focuses on how place can act as a character in new media works by augmenting space with embedded narratives that an audience has to actively engage with. She describes how new technologies provide the tools for this augmentation of space, while creating new immersive and participatory experiences of place. These technologies make possible the integration of rich and layered narratives onto physical space providing a platform

for space to become a character that can be the protagonist or antagonist of an engaging story.

Davenport describes several experimental projects in which a place becomes a character in situated narratives. These projects introduce a narrative experience accessed via handheld computers with GPS, wifi, audio and video capabilities and include: a time-based layered narratives in which characters could cross paths at certain locations on the MIT campus (MIT in Pocket); an exploration of the life and culture of a 19th-century Irish Brewery, which had become the MIT Media Lab Europe offices (HopStory); and an outdoor experience based on the legend of a remote Irish island which participants had to navigate to uncover the story (The Selkie Story).

### **Ubimedia (HP Labs)**

The Ubimedia project intends to connect physical and digital objects through hyperlinks. HP Labs' research considers how the design of ubiquitous computing systems can support the interconnectedness of the physical and digital to create shared experiences. These Ubimedia experiences require a media device, or "ubimedia player" and usage scenarios include using ubimedia player devices to capture and hyperlink contextual information; to capture location and personal data that can be linked to others in the same room; and to capture and share linked information with others who have similar interests.

### **MediaScape (HP Labs)**

Another HP Labs project, MediaScape, provides an authoring toolkit for location-based experience design and storytelling in which users can create and publish downloadable stories, games or experiences. MediaScape utilizes a handheld computing device in which users can experience location-based stories or games that incorporate visuals and sounds of a place, offering users the experience of a digital layers that corresponds to the physical world. User-created experiences and games can be uploaded to the MScapes website, <http://www.mscapers.com/>, and downloaded by anyone to a GPS-enabled Windows Mobile device.

## ***Pervasive Games and Experiences:***

The Million Story Building was informed by previous work done in the field of pervasive games and experiences, both at the Interactive Media Division and by other researchers and game designers. Alternate reality games (ARGs) like *Tracking Agama* and *I Love Bees*, immersive puzzle environments like *Tomb*, and location-based experiences such as theme parks or interactive museums are some prime examples of the kinds of experiences we have integrated into this project.

### **Tomb**

Created by Matthew DuPlessie, *Tomb* is a 45-minute interactive adventure that is set in a Pharaoh's tomb. Participants are immersed in the disappearance of an archeology professor and they must try to solve the mystery and find the missing professor. The participants move through different rooms of the tomb only after solving both mental and physical puzzles embedded in each room. <http://5-wits.com/home/>

### **Museum 2.0**

Museum 2.0 uses the philosophies of Web 2.0 to create more social, interactive and community-based museum-going experiences. Nina Simon, the researcher who created the Museum 2.0 blog, is trying to create a framework for making museums more dynamic and participatory. <http://www.museumtwo.blogspot.com/>

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**Contact Information:**

Jennifer Stein  
Doctoral Student, iMAP  
Research Assistant  
Mobile and Environmental Media Lab  
Interactive Media Division  
School of Cinematic Arts  
steinjen@usc.edu