Urban Social Tapestries

Urban Tapestries is an exploration into the potential costs and benefits of public authoring—that is, mapping and sharing local knowledge using pervasive user-generated media.

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Urban Tapestries (UT) is an exploration into the potential costs and benefits of public authoring—that is, mapping and sharing local knowledge, memories, stories, sensed information, and experiences. It aims to reveal the potential of pervasive computing to create and support relationships that surpass established social and cultural boundaries and enable new practices around place, identity, and community. Proboscis, an artist-led studio, conceived and initiated UT in 2002, and since then, has further developed the concept in collaboration with several technical, academic, and civil society partner organizations.[1,2] The core enabler is a pervasive computing platform developed specifically to support public authoring in its many expressions.

Public authoring in general implies a rift with the concept of publicly authored knowledge in the traditional way—in which information is passed from a center to the margins, such as generally encountered in the broadcast model of newspapers, television, and radio. In contrast to this model's passivity and narrow focus, public authoring with UT suggests an alternative experience in which people have the opportunity to be agents, actors, and authors. In this sense, UT has an intimate relationship with practices of participatory or citizen's media: alternative and community radio, television, fanzines, and other print media have similar aims.[2] More recently, BBS, "Indymedia" (a term used in critical media studies to refer to a movement of nonhierarchical journalism from the '90s—a quick way to say independent media), and, of course, blogging, which is perhaps most reminiscent of the public authoring framework, also use technology to enable content production and distribution through public participation.[4]

Rationale and Objectives

Public authoring was initially proposed as a counterpoint to the prevailing view of cellular mobile and location-sensing technologies in the early 2000s that saw tourists as the principal general users of such technology. But if most people are only tourists for a few weeks a year, what location-sensitive services are being devised for the other 50 weeks? The answer seemed to be mobile advertising, spam, and coupons for loyalty-card services triggered by your presence at a particular location. This vision is unnecessarily impoverished; we wanted to explore what it was about local places that mattered to people as they went about their daily routines. True daily life is richer and more complex than the traditional view, relying as much on social networks, personal experiences, and chance interactions and connections, so pervasive computing applications should attempt to reflect this.

At the core of such diverse everyday activities lies *social knowledge*, a term used in UT to refer to the communications that are the glue of soci-

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ety and communities. Social knowledge posits communication as storytelling, a social and cultural practice that's not just informational or practical. It's a term that attempts to indicate the broad variety of human activities, concepts, and ways of being social. From early on, UT sought to define more clearly what constitutes social knowledge, to articulate its significance, and to make concrete what can often appear ephemeral or intangible as something that has intrinsic value within a context of locality and community, if not a clear relation to monetary value. In fact, the more deeply embedded such knowledge is, the harder it is to gauge its value. Public authoring, as implemented by UT, offers a means to expose this knowledge and the social networks that support it.

Public authoring can offer opportunities for individuals and groups to intervene in situations that were previously tightly controlled. An example of this might be a museum or gallery in which the interpretation of the works displayed is the preserve of the curators it employs. With public authoring, we can easily imagine digitally annotated alternative interpretations that challenge an institution's position and that the institution wouldn't permit being stated within its physical domain.

To foster the development of public authoring, Proboscis designed UT around four principles:

- *Content co-creation*. UT relies on the people who participate in sharing content to create it rather than on the consumption of the mass-produced content media that most organizations offer. Essentially, it's another form of personal communication, differing mainly in its link to geographic places and the public nature by which it's shared.
- *Organic growth*. Publicly authored content grows and fades at the pace set by the people who participate in it. It reflects the complexities of the world we live in and doesn't attempt to simplify or replace any aspect of human interaction.
- *Decentralized operation*. Maintenance and distribution of publicly authored content is carried out over a cooperative and largely anonymous service fabric. Sharing pervasive, user-generated content is supported by a network of peers and depends on trust networks, risk, and chance for its validation.
- *People-centric functionality*. UT assists and augments everyday life rather than seeking to replace any of its aspects. It triggers social encounters and enables participation in social and community activities. As such, UT gives priority to those facilities that empower individuals and communities rather than those dictated by engineering constraints.

An example is offered by the UT Eyes on the Street project: Residents of the Havelock Estate in Ealing are engaged in public authoring with a view to employ local knowledge to support the operation of a tenant organization that aims to take over the estate's management. This implies that a public authoring approach may provide unique insights by creating a record of living that far exceeds what is possible through typical estate management services. Such activities should not necessarily be seen as threats to established authoritative sources of knowledge but rather as people's desire to participate.

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The UT Experience

According to the definition of public authoring, users are both authors and consumers of media. In UT, users as authors go about their everyday activities as they usually do, but whenever they wish to add new content, they can do so via their mobile phones. The UT client facilitates this task (see Figure 1) and displays the user's current position so that he or she can mark location boundaries that the published content relates to—thus creating a so-called "pocket" (of content). The user then adds media to the pocket, which can be text, sound, images, or video. Pockets can be persistent or set to expire after a short period of time. Time-limited pockets are a means to create digital street graffiti that lets users leave messages tagged to locations.

When pockets share a common theme—for example, a historical, personal, or practical topic—authors can link them together into pocket sequences to create so-called "threads." Threads and pockets are public on UT and are shared with other system users. By weaving together the different threads authored and published by all users, UT effectively creates an accretive information tapestry overlaid on the urban fabric (see Figure 2). Subsequently, users as content consumers can search for, browse, and access content other participants publish, using the UT client application on their mobile phones. Pockets also support a rating and commenting system whereby users can express their opinions or comment on existing material.

To offer a specific example of how pockets and threads are used, consider a thread across Bloomsbury about the rich literary history of this central London neighborhood. One pocket in this thread could mark Virginia Woolf's house at 46 Gordon Square and hold a picture of the building as it stands today as part of Birkbeck College, taken by the thread's author using the UT client on her smart phone. This pocket could

Figure 1. The Urban Tapestries client interface. (a) Exploring all existing threads at a specific location; (b) selecting the location of a new pocket; and (c) browsing a location using the latest Java-based client with Google Maps (2007).

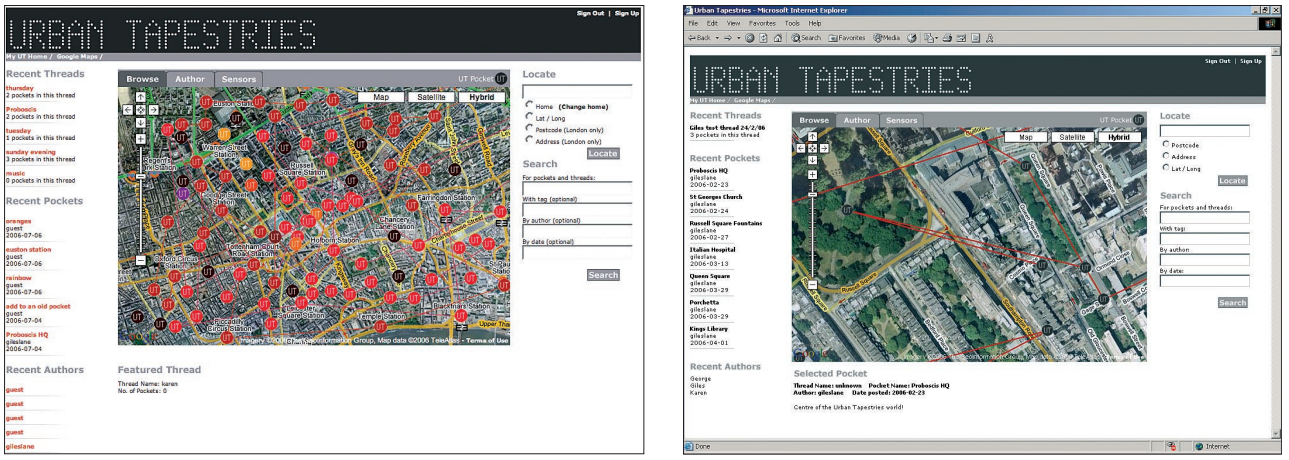

Figure 2. Urban Tapestries thread-browsing interface for the Web. (a) Viewing all threads and (b) following a thread around Russell Square in London.

also contain a hypertextual annotation and an audio clip—also recorded with the UT client—reminiscing about a memorable evening spent reflecting on the nature of perception while reading Woolf's *To the Lighthouse* (Hogarth, 1927). Another pocket in the same thread could be placed at the Elyseé Taverna off Tottenham Court Road, where George Orwell used to enjoy dinners with his companions. This pocket would hold a picture of the infamous statues at the restaurant's entrance as well as text commenting on the property's current use as one of the few remaining plate-smashing Greek music venues.

In its broadest form, UT invites people to get involved in negotiating place and their own spatial practices, thus enabling a user-generated articulation of meaningful or interesting behaviors. It realizes the translation of space into place in that it's designed to reveal the layers of presence in urban environments across time. It also lets individuals and communities communicate and understand the intimate knowledge that makes a place home, or conversely, what makes it not home; to

share what parts of the landscape hold meaning for people; and to read the individual markers people use to make sense of the city. Moreover, UT enables the exploration of the social, historical, and tangible materials that define the social qualities of place and the repository of the largely invisible pathways urban occupants leave to better understand the identities and specificities of place—what we refer to as urban social tapestries.

Since its initial design, UT has evolved to reflect the rapid developments in pervasive computing and our developing understanding of everyday public authoring practice. Several subprojects have been developed within UT—notably, Feral Robots, Snout, and Everyday Archaeology—focusing on particular aspects of public authoring and learning, entertainment, and community building.

Constructing UT

UT was designed with a client-server architecture, with the UT server constructed as a peer-to-peer federation of content repositories established and maintained by independent organizations. UT clients are pervasive computing devices that associate and communicate with servers via well-defined service access points and protocols. In collaboration with Orange and HP labs, we developed the first version of the UT platform in the period during 2002 to 2004 using proprietary APIs; we subsequently redesigned and redeveloped it during 2005 to 2007 as an open source system. The current version is implemented in Java on top of PostgreSQL (with some PostGIS extensions) and Apache Tomcat, with Web service interfaces to clients supported through AXIS SOAP and a custom Java servlet implementation. Flexible data management and object-relational mappings are provided by Hibernate ORM. We developed the current version with a view to support rapid development of new client services tailored to a variety of non-mobile phone pervasive computing devices, such as the Feral Robots toy data harvesters and the Snout participatory sensing garments.[5]

The current version introduces new functionality to pockets and threads. It supports pockets of different shapes, including arbitrary free-form polygons, and has a content-aging property so that pockets expire after a user-selected time period. Pockets can also record user comments and ratings in blogging style. This version extends user-group-based access control to threads and introduces a categorization scheme for thematically classifying pockets and threads. Moreover, its meta-threads performance is significantly enhanced over other versions by providing aggregate thread classes in a single object reference. This new design also extends system logging and usage analysis and lets thread-related RSS feeds be published to subscribers. GPS tracks, a new data primitive, support sensor data in addition to the usual user-generated media content.

The latest UT smart phone client is implemented using Java mobile MIDP 2.0. Several additional J2ME interfaces provide the required UT facilities, including JSR75, to support reading and writing files to persistent memory; JSR135 for interacting with Web services; JSR82 for Bluetooth connectivity to external devices, including standalone GPS receivers; and JSR179 to manage location services (for example, GSM beaconing). Maps are retrieved on demand via the Google Maps API.

UT has two Web-based interfaces: a simple Macromedia Flash application to visualize threads and a richer JavaScript-based application for authoring. Using the new clients, users can extract UT threads and pockets to Google Earth through a semistructured process, and then print them as hard-copy foldable storybooks or storycubes using the Diffusion generator (http://diffusion.org.uk). More recently, we developed an open source hardware and software sensor network platform to support participatory sensing, which was employed in the Feral Robot and Snout experiments.

Exploring UT

From its beginnings, UT sought to develop a people-centered approach in the design and development of its pervasive user-generated content platform. To understand public authoring's structure and its implications, we employed three research methods—namely, experimental ethnography, bodystorming, and public field trials. Bodystorming workshops focused on playful experience whereas in public system trials, we adopted an iterative approach toward refining UT client interfaces. Social scientists involved in UT developed a so-called experimental ethnography approach that involved a methodological triangulation of participant observation, phased interviews, and experimentation. Although complementary, these methods are also contrapuntal in their viewpoints and offer insight into public authoring.[6] We conducted all studies in or around Bloomsbury with participants drawn from local communities.

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UT employed bodystorming workshops[7] as a tool to explore the social,

Figure 3. Conducting UT bodystorming workshops. (a) Public authoring on a large map of central London. Post-It notes represent pockets (hand-written text and images) and color links threads. (b) A table-top version of bodystorming at the community center. In addition to pockets and threads, we tested the client application's user interface using a paper-based prototype.

cultural, and practical dimensions of technological concepts and tools. These sessions focused on the specifics of public authoring—in particular, on identifying annotations that could be shared and the steps required for their publication. Participants created threads and pockets using color-coded Post-It notes on a large map (20 x 20 feet) of Bloomsbury (Figure 3a). Starting with hypothetical usage scenarios, we invited participants to act them out in a series of workshops with people from many different walks of life, including several associated with a local community center (Figure 3b). These studies demonstrated the limitations of single-instance interfaces and interaction, which we understood to be due to the fact that user-generated content comes in different formats and processes of articulation—and that having just one or even two ways to share it with others is far too limiting with which to engage most people.

We held two open public field trials of UT—the first, in December 2003, used the initial PDA-based prototype, and the second, lasting for four weeks during June 2004, used the initial version of the mobile phone prototype. Individual UT subprojects run their own trials investigating specific aspects of public authoring including the Feral Robots trial in February 2006 and the Snout community events in 2007. Over the past five years, more than 100 people have used a version of UT in different London neighborhoods and participated in a trial or some other event. We collected their experiences and used them as feedback to guide the development process. Especially when users carried the UT client over a period of days or weeks, we asked them to record their experiences online; we also captured their writings and reflections this way.

We selected participants in the experimental ethnography studies for their relationship to Bloomsbury as residents, commuters, occasional visitors, and tourists. Initially, we asked them to fill in questionnaires to identify their relationship to technology, including their computer skills, degree of dependence, levels of importance, and the ways in which they value their communication technologies. The second phase of the process was a detailed briefing about UT and its capabilities, followed by an in-depth interview regarding their relationship to Bloomsbury and how they communicated with their social networks in or out of these locations. Next, researchers led a walking tour together with participants and closely observed their use of UT. For the first part of the tour, the researcher and respondent first explored existing UT pockets. Respondents weren't instructed what, when, or where they should start making their own pockets, but when they did, the researcher departed to let respondents author individual content. The study concluded with an interview, during which researchers asked respondents to talk about their experiences with UT, where they went, what their pockets were, and how they decided what to include in their threads. This section of the interview also probed respondents' vision of the future.

Lessons Learned from UT

Our studies of public authoring with UT through experimental ethnography,[6] bodystorming, and public field trials[2] revealed several interesting observations related to pervasive user-generated media and the practice of public authoring.

Place, Space, and the Spatializaton of User-Generated Media

UT acts as the catalyst for users to express their embedded knowledge and illustrates their "views from somewhere." In this case, user views were firmly grounded in Bloomsbury and local experiences of community and place. To be sure, the "threads" concept appears particularly effective in providing a conceptual model to record and organize such place-specific user-generated content. Visualizing UT knowledge by overlaying all user threads on the urban structure facilitates the media's exploration and distribution. It provides a unique opportunity for participants to reflect on place and experiment in a way that they haven't experienced elsewhere. In these respects, the way UT has elected to construct representations of pervasive user-generated content seems to provide useful mechanisms for both media production and consumption.

Participation

People who participate in UT reinterpret popular culture in more intimate and meaningful ways. But public authoring practice goes beyond this, enabling creative expression and encouraging participation in culture and, through it, in technology. We believe that UT is one, if not the first, expression of place-cognizant user-generated media enabled by pervasive computing that questions the dominant model of broadcasting and proposes to rebalance cultural production to public participation. Even reticent participants—perhaps because of technical unfamiliarity, sensations of technological saturation, or even outright distrust of new technologies—spoke about what they did with UT, about their experiences of locality, of home, their relationships with technology, and their perceptions of UT in ways that are both rich and engaging. UT users view the experience of public authoring as an enjoyable one—a finding we suggest means that UT is fundamentally a playful technology and this promotes participation.

Constructing Public Space and Socialization

The practice of public authoring also appears to facilitate tracing, negotiating, and marking individual and collective boundaries. Study participants engaged with different navigational tactics (depending on their relationship to Bloomsbury) and used UT to place themselves in their localities—or as some theorists would argue—to claim ownership over their territories. Then again, UT can support group activity through alternate modes of socialization in which people have different tasks; for example, one group (seniors) has the stories, and another group (youths) has the time and inclination to work the technology. Not only do different age groups have different technological capabilities, they also have very different motivations for sharing memories and knowledge. For seniors, it's not as important that other people can access their stories and memories, but that they come together regularly to share. In fact, the sense of community that the practice of public authoring creates is surprisingly stronger than the capability to leave memories as traces of their presence in the city.

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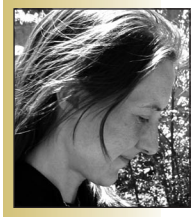
Reflections on Media Studies Theory

Several of the ideas we explored within UT have an intimate relation to the work of theorists of the urban and the everyday (other work has an overview of this area[8]). This is because UT raises questions about the relationship of space, time, and the social, which force a reexamination of our assumptions about the city and media consumption. These ideas seem to fit particularly well within the frameworks of production of space and place, as Henri Lefebvre and Michel de Certeau have discussed, in that they also view movement through the city as integral to its experience.[9] Of particular relevance is the similarity to the way de Certeau views the process of reappropriation of cultural processes by everyday people to construct their ordinary lives as one of a constant struggle to reuse traditions, language, symbols, art, and articles of exchange and the practice of public authoring. Indeed, the latter can be seen as a practical way to support the former through the process of producing and sharing pervasive user-generated content using UT.

Urban Computing and UT

UT enables encounters with particular types of urban inhabitants and allows observation of their spatial practices. Some of these reflect behaviors of conceptual stereotypes, including Guy Debord's *dérive*, the situationist practice of "unitary urbanism," and Georg Simmel's concept of the "stranger."[2] Walter Benjamin's vision of the city walker, the *flâneur*, and the ability of technology to make the invisible visible are also directly related to public authoring practice.[6] Thread visualizations overlaid on a city map in particular create direct associations to Kevin Lynch's city as the experience with districts, edges, paths, nodes, and landmarks, and their relational properties.[9]

the AUTHORS



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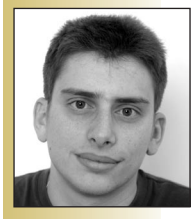

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Giles Lane is co-director and founder of Proboscis, where he has led projects such as Urban Tapestries; he also worked as a visiting tutor at Goldsmiths College at the University of London and served as a research associate in the London School of Economics' media and communications department. Lane was elected a fellow of the Royal Society of Arts in 2008 for his contribution to community development through creative practice. Contact him at giles@proboscis.org.uk.

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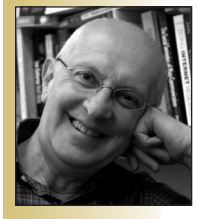

Roger Silverstone was professor of Media and Communications and Convenor of the Department of Media and Communications at the London School of Economics until the time he passed away in August 2006. He held a PhD in sociology from the London School of Economics. His research interests were wide ranging and included some of the key dimensions of media scholarship and research. Silverstone wrote five books and many papers.

User-Generated Content and System Evaluation

Our bodystorming sessions particularly highlighted the role of creating continuous feedback loops to incorporate responses in the software development process. One effective way to do this is by putting all the material into the public domain to stimulate informed debate and share insights. UT maintains a creative lab and public forum, in which diverse experiences, event documentation, films, research notes, and articles are published, seeking to engage people in a dialogue about public authoring.

We extended this approach to the system trials, which used blogs to capture and immediately disseminate the participants' experiences.

UT set out to explore locative pervasive media, taking an approach that puts users at the center of production. This break with the typical view of "users as recipients" has been well received and has inspired other investigations to follow a similar approach. We believe that UT has succeeded in revealing the potential of pervasive user-generated content to create and support relationships beyond established boundaries and enable new practices around place, identity, and community. Several aspects of UT have yet to be explored—notably, how its use changes within differing spatial contexts.

Unlike other research projects, UT attempts not only to record but also to effect change. It has developed into a comprehensive interdisciplinary research program to explore public authoring for education and learning, people and the environment, and citizenship, neighborhoods, and public services. In the spirit of public authoring, participation in this debate is always welcome and facilitated through the project Web site, forum, and discussion lists all via socialtapestries.net.

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