

## [I-METRO] UNIVERSAL ACCESS TO INFORMATION

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This locative media project takes the position that information, as both a resource and an integral component of the public sphere, should be equally available to all. In response, the URL: Urban Research Lab at the University of Illinois Urbana Champaign designed [i-metro], an interactive information portal to be situated within metro stations, providing locative and comprehensive travel-related information in realtime.



*Locative media installations such as this could become an important feature of public transit spaces accessible to multiple users simultaneously. © Tierney.*

### Introduction

Navigating through an unfamiliar city and gaining access to its many services presents challenges for visitors and new residents alike. As more location-based information moves online, however, mobile communication devices are becoming increasingly important as wayfinding tools. Yet, while such devices (e.g., blackberries, i-phones, droids, and in-dash GPS systems) provide instant access to maps and directories, their price and monthly service fees are frequently prohibitive. Thus, while many urban residents own cellphones, a lack of mobile Internet access may create a tiered system of information privilege. This condition may be particularly acute among those who rely on public transportation, such as job seekers, tourists, low-wage workers, and students. To live without a car in a major American city is often to live without full awareness of one's options and possibilities, limited by unnecessary wayfinding challenges.

For the last two years, URL: the Urban Research Lab at the University of Illinois, Urbana-Champaign, has worked to address this problem through the design of a public interactive information portal, "i-metro." Beta testing is expected in Los Angeles transit stations in 2012 (Fig.1). URL's i-metro project envisions a series of installations whose engaging physical design will combine with interactive features to make

them vastly more useful and empowering than old-line transit maps. Through i-metro, transit riders will be able to freely access GPS and other Internet-based applications, assisting them with wayfinding and emergency communication, while offering access to service directories and providing broad-based messaging capabilities. [1]

## Theory and Background

With the expansion of computing and ambient intelligence into many aspects of everyday social life, it has become critical to reexamine the potential and objectives of locative media. This effort has sparked discussion of the contemporary urban condition and how people interact with it.

Over the last decade the increasing power of Information Communication Technologies (ICT) has opened the traditional concept of locative media (printed maps) to new dimensions of interactivity. Yet, whether interactive or old-school, a map remains a representational system; never socially inert, it operates as a stand-in for the city, describing how a particular social group imagines it to be. Since a map is thus both interpretive and productive, it prefigures user experience by structuring a navigational regime.

As a model of Lacan's social imaginary, a map engenders a larger set of questions about how people visualize a city. What do we want our cities to be? How can we employ representational systems and strategies to further those objectives? How might a networked organization dissolve certain barriers and strengthen others? Moreover, if we acknowledge that participatory practices are an integral and important aspect of location-based media, it stands to reason that "scribbling on the map" might actually change the territory. [2]

Since cartographic methods derive their conceptual underpinnings from both spatial and urban theory, the design of locative media is more than a technical problem. Considering the spread of ICT, it also follows that contemporary planners and analysts might focus less on physical boundaries than on shared resources and informational linkages.

Melvin Webber, an urban planner at UC Berkeley in the 1960s, once argued that "the urbane" might be defined less by buildings than by a rich exchange of information; he described communities of people joined by affinities, not by physical proximity. [3] Such a notion of informationally connected communities is compelling, but it fails to address many realities of urban life as they developed in the latter part of twentieth century. For example, the social theorist David Harvey has noted how, during the 1970s, market forces, expressed through new means of accumulation and distribution, began to pressure the historical city, reshaping its borders and diffusing its boundaries. [4] One result was the diminution of public space. Today, however, the adoption of universally accessible locative media suggests the possibility of reembedding the public sphere into a broader or different set of institutions.

A key aspect of URL's work is concern for the public realm — in particular, leveraging existing technologies to create more equitable systems of urban infrastructure. In this regard, the i-metro project is positioned within Kevin Lynch's notion of "The Image of the City," emphasizing the establishment of clearly legible urban environments to facilitate the inclusion of all residents. [5] Lynch wrote in the 1960s, a time when many ideas related to the establishment of socially just societies derived from a discourse of "spatial practice." More recently, the urban sociologist Manuel Castells observed how cities may be better understood as cultural networks. [6] With this in mind, the architect Carlo Ratti of the MIT Media Lab has since called for the establishment of an "Open Source City" based

on collaboration and knowledge sharing. [7] As Malcolm McCollough has further observed, “The notion of a commons . . . has moved beyond the desktop into many more formats and physical contexts, demanding new approaches to shared resources. The genre of ‘urban computing’ has arisen to explore this. How might the architectures of ambient information enrich urban experience, operate architectures, cultivate environmental sensibilities, or renew responsibility to some idea of a commons?” [8]

I-metro takes up McCollough’s challenge by reviving the notion of a commons, working to strengthen information access as an element of the public domain.

## Research

I-metro envisions a socially just and civil society, in which information, as a resource, is available to all. Current ICT product development, however, is increasingly oriented toward individualized and hierarchically structured access through personal mobile devices, generically known as smart phones. A working hypothesis for our research therefore was that, while the vast majority of a city’s residents own cellphones, the increased power of information acquisition that comes with them does not extend equally across all income levels.

To test this hypothesis and evaluate possible design responses, our research was divided into three parts. In one part, graduate students sought to determine the potential utility of permanent installations for location-based information services within the space of public transit. They traced the historical emergence of ICT as it related to physical mobility from the 1990s to the present, including issues of social equity, accessibility, interactive technology, and the development of participatory media practices. Another part of the research involved review of ethnographic studies concerning the use of public space by the social geographer Claire Cooper Marcus, as well as a literature review of recent sociological work on transit use in urban areas. A third part entailed collection and analysis of demographic data, primarily from the U.S. Census and government surveys, to determine possible correlations between public transit use and lack of access to digital technologies, specifically mobile Internet.

The statistical analysis pointed to just such a correlation between demographic factors, income, and accessibility. For example, 80 percent of smart-phone users earn more than \$50 thousand per year, while 34 percent earn more than \$100 thousand, reinforcing an already existing digital, economic, and social divide. [9] Such data can be seen to intersect with findings from the report “Public Transit in America: Results from the 2006-2011 National Household Travel Survey,” which revealed how strong differences in “household” and “workplace access to transit” are a function of race, income, auto ownership, and urban area size. [10] In general, low vehicle availability predicts high public transit use within the following groups: college students; newly employed 21 to 32 year olds; recent residents; under-represented women; older adults; non-national tourists; and other under-represented groups.

Not surprisingly, some of these groups also have less access to digital technology through computers, the Internet, and smart phones — a phenomenon that has come to be known as the “digital divide.” The term refers to the gap between people with effective access to digital and information technology and people with very limited or no access, both in physical and economic terms and in terms of the knowledge and skills to use it. The gap reflects such characteristics as gender, income, race, ethnicity, and location, and is part of a broader divide contributing to social and economic exclusion.

While the digital divide is traditionally defined in terms of access to computers and the Internet, the Census also points to a correlation between income level, education, public transit use, and lack of access to digital technologies. In this case, the missing link is mobile wireless Internet. While smart phones can provide travelers with maps, directions, and information about local services, their cost may effectively create zones of information privilege. Free information portals located within public transit hubs would serve as an educational and wayfinding resource, contributing to a more livable and accessible city.

## Project Description

Historically, communication and transportation infrastructures have been strategically paired. For example, the Southern Pacific Railroad built its own communication system using its rights of way, which later evolved to become the telecommunications giant Sprint. Within urban areas metro stations and other enclosed transit hubs are strategic locations to introduce such a public wireless infrastructure because they present fewer problems related to security, weather, and maintenance. Unlike a bus stop, a metro or subway station is an enclosed, supervised space, frequented by great numbers of people.

To attract people's attention, our design envisions a crumpled analogue subway map approximately 6.5 ft. high by 7 ft. wide. Each unique installation would be generated from its specific context, with the overall goal of enticing travelers to examine them and discover the wealth of information they provide.

In functional terms, the i-metro interface will provide a hybrid data input system: a touchscreen surface for primary information retrieval similar to a smart-phone screen, and a motion-detecting sensor to record the user's position in two directions relative to the interacting surface. The surface will also be partitioned graphically to accommodate multiple, simultaneous users, enabling them to share information with each other on-site as well as with others through the Internet.

To enable smooth connections between different modes of transportation, i-metro will provide comprehensive travel information in real time. But the world of digital maps is far more interactive and powerful than can be understood through analogies to printed resources. Additional services such as Google maps, foursquare, Goby, and AroundMe produce another city — one of layered opportunities and data, access to which is most useful when people are on the go. Transit riders might thus query i-metro not only about nearby bus routes and schedules but about the local availability of zipcars and citybikes. Or they might make hotel reservations, purchase event tickets, or find an inexpensive sushi bar.

With its fixed central location, transit riders might also use the interactive map as a messaging board, a digital version of LOck in Seoul or Juliet's Wall in Verona. It might further encompass a gamelike structure, enabling the user to explore, participate, and play, as well as connect with others.

The combination of participatory with locative media will enable i-metro to make visible the connections between individuals and the cultural resources of surrounding neighborhoods. Through social media a neighborhood becomes a location-based network with nodes for eating, drinking, clubbing, dog-walking, etc. Such a locative social network was established on a temporary basis at the 2011 SXSW festival in Austin, Texas. Through i-metro, user-generated content such as narratives and images might not only situate each individual but also acknowledge common interests among transit riders and urban residents, binding them into a greater whole.

## Design Process

As part of i-metro's design, demographic data was used to create various scenarios to determine the information that might be most useful to incorporate. During scenario planning, one objective was to establish the personal identity as the anchor in the map. Using the i-metro interface, each user should be able to "find" his- or herself in e-space as well as participate in the construction of a local resource map by uploading content and feedback. Thus the map would change over time, creating a metacommentary on the surrounding environment.

*Scenario One: Student Study Group. How an interactive locative messaging board could be used to connect people between e-space and street-space.*

In New York, John is extremely stressed. With an exam coming up, he needs to find a place to study because there are too many distractions at home. Judy is on the other side of town, looking for a classmate to study with. On the way to his local coffee shop, John uses twitter on his cellphone to check in/announce his plans. Meanwhile, at her subway stop, Judy runs into another classmate, Jeff, and they decide to study together. While Jeff looks for a coffee shop on i-metro, Judy casually notices on its foursquare feed that John is already on his way to one. Judy shares the message with Jeff by swiping onto his screen. She then texts John to ask if it's okay for them to join him. John, cellphone in hand, notices Judy's request and texts her the address. Judy and Jeff then use i-metro's mapping capabilities to figure out the best way to get there, using its directories of bus schedules, zipcar drop-off points, and subway routes. Judy and Jeff decide the cheapest way is by subway. Boarding the next train, they head off to join him.

*Scenario Two: Lost Tourist. How two people with different languages might access wayfinding information, and in the process discover a shared interest and possible unplanned destination.*

In Chicago an international tourist is lost; she did not apply for global cellphone service before coming to the U.S. Now, not only does she not speak much English but her smart phone does not work. A native Chicagoan passing by assists her. During translation efforts using the i-metro interface, the two serendipitously discover they have similar interests — baseball, anime comic books, and obscure hip-hop vinyl. The resident places a location tag and uploads comments onto the map, so they will be stored there for future like-minded tourists.

*Scenario Three: Vehicle-less Job Seeker. How a job seeker might avoid an embarrassing mistake that might make him late for his appointment.*

On route to a job interview, a new Los Angeles resident remembers he forgot to ask directions to the company headquarters. Although he owns a conventional cellphone, he does not wish to call the prospective employer and admit his mistake. Instead, he heads back to the subway station and queries i-metro by entering the business address on its touch screen. The map graphically displays the route and concurrently sends a text to his cellphone with directions. Happy job seeker is on his way!

## Conclusion

The project began with the hypothesis that the acquisition and use of smart-phone technology is creating zones of information privilege that exclude many public transit riders. This aspect of the

“digital divide” will become ever more problematic as more locative information moves online. As a design response, i-metro proposes to subvert the inherited navigational regime by offering an interactive, layered method of wayfinding, enabling the user to explore and consider multiple opportunities.

As an urban intervention, i-metro demonstrates how design research might be applied to observe, document, and analyze the embedded politics of unequal information access within a prescribed context and go beyond those constraints to develop a more egalitarian means of information distribution. According to the late William Mitchell: “The task before us is not one of prioritizing technological solutions over human solutions, but rather one of imagining and creating digitally mediated environments for the kind of lives we want to lead and the sorts of communities we want to have.” [11]

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## References and Notes:

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