Location Based & Context-Aware Systems

Context-based City & Museum Tour Guides
Readings by Abowd, Cheverst, Reinhard, Petrelli

Presented by Jamie Cooley
Ambient Technologies, MIT Media Lab
The Cyperguide project

- Sue Long, Dietmar Aust, Gregory D. Abowd, & Chris Atkeson
- Early example of context aware research (early to mid 1990’s)
- Uses Apple Newton PDA
- Vision: the interface will follow the user, not the other way around
The Cyperguide project

GVU Conference Room

Cyberguide: Intelligent Mobile Tour Guides
The Cyperguide project – System Architecture

- **Map**
  - The visitor uses this view to navigate

- **Information Base**
  - Pen touch on hypertext of a “demo”

- **Positioning System**
  - IR beacons

- **Communication System**
  - Application-level protocol on top of AppleTalk
The Cyperguide project – Lessons

► 6 months, 3 versions
► Context aware applications can be cost-effective
► Absolute positioning information within a space is not that important... better to sense/locate a person around a particular object rather than pinpoint location everywhere
► Separate location and communications system. Communications services need to be everywhere, location awareness needs not be (as mentioned above)
Experiences of Developing and Deploying a Context-Aware Tourist Guide: The GUIDE project

- Keith Cheverst, Nigel Davies, Keith Mitchell, and Adrian Friday
- Hand-held, context-aware tourist guide based on Fujitsu TeamPad, dependant on Cellular Connection
- Lancaster, UK
- Highly individualized, customized system
GUIDE

Welcome to Lancaster Keith

Thanks for choosing me as your Guide to Lancaster. You can find information on the city by pressing any of the buttons at the top of my display. If you would like me to construct a tour for you then press the button labelled 'follow a tour' at the bottom of my screen.

If you need help at any time please don't hesitate to ask me by pressing the Help button.
Figure 3: The GUIDE information model.
GUIDE

The following attractions are near to you now.

Note: The list below is ordered according to closeness and whether or not they are open or closed.

John O'Gaunt Gateway

The Cottage Museum

The Tourist Information Centre

Currently receiving location updates
GUIDE – Application Functionality

- **Access Context-Aware Information**
  - Based on current location (cell) present info local to that spot
  - Findings also demonstrated that system should not OVER-RESTRICT information available at a given spot... providing access to any information is better

- **Create a Tailored Tour of the City**
  - Based on personal preference on sites a user would like to visit

- **Access Interactive Services**
  - i.e., book hotels, query movies currently playing and book seats

- **Send and Receive Messages**
  - Keep in touch with other GUIDE users as well as Tourist Info Center people
GUIDE – Application Functionality

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GUIDE – Followup

- Concern that GUIDE would lead to less social interaction between visitors, actual tour guides, members of the Tourist Information Center
- Privacy Concerns – people may be unwilling to allow the system to know their location

...plus a whole lot more on how the Information model is organized
A Context-sensitive Nomadic Information System as an Exhibition Guide

- Reinhard Oppermann and Marcus Specht
- “Hippie” system that is Nomadic
- Nomadic = User has access to both his/her personal information space as well as public information space
- Designed for an art exhibition
Hippie

Models to identify context of use

- **A domain model** describes and classifies the objects of the domain information are to be presented and processed about (i.e. Religion & Magic, Nature, History, ... taxonomy)
- **A space model** describes the physical space where the nomadic system is used and the location of the domain objects in the space (infrared indoors, GPS outdoors)
- **A user model** describes the knowledge, the interests, the movement and the personal preferences of the user (user preferences stored,.. Psychology...)
Figure 2: Notification of a new exhibit next to the wandering visitor
Figure 3: Form design description by graphical teaching lines with written and spoken text