CS 525M – Mobile and Ubiquitous Computing Seminar

Brian Demers
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Overview

• FlightManager: Project Scenario
• Key Requirements
• Approach
  – Technologies
  – Libraries
• Demo
• Conclusions
Scenario

• Information system for passengers in airports
  – Would run on PDA
  – Determines a passenger’s “context”
    • Location
    • Itinerary
    • Current time
    • Airline information
  – Displays context-specific information to passengers
    • Maps
    • Flight/gate information
    • Other external information (ex: commercial sites)
Scenario

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Demo on PC

Implemented
Requirements

- Application: Show maps that apply to the current context
  - User’s current area
  - Short on time: show essential information only
    - Gate locations
    - Their location (not implemented)
  - Lots of time: include nonessential information
    - Restaurants
    - Bookstores
• Information must be created and used by different applications
  – Itinerary – Calendar Program
  – Location – Hardware Device/OS
  – Time – OS
  – Airline Info – Published in well-known format

• User agent – combines this info and makes decisions
Approach: Design

- Data Portability using XML/RDF
  - Semantic Web idea
  - XML/RDF triples: `<subject><verb><object>`

  `<rdf:Description rdf:nodeID="http://myURI">
  <vcard:Given>Brian</vcard:Given>
  <vcard:Family>Demers</vcard:Family>
  <vcard:email>bjdemers@wpi.edu</vcard:email>
  </vcard:email>
</rdf:Description>`

- Ontologies (other XML documents) describe types of information (verbs and objects), allowing programs to infer meaning of data
Approach: Data Hierarchy

- Person
- Location
  - Lat
  - Long
  - Alt
- Calendar
- Itinerary
  - Flight
  - Airport (Dep.)
  - Airport (Arr.)
  - Time (Dep.)
  - Time (Arr.)
  - Year
  - Mo.
  - Day
  - Hour
  - Min
  - Sec
  - Airline
  - Name
  - Homepage
- Maps
- Points of Interest
  - Name
  - Location
  - Type
  - Icon
- Deemphasized
- Not implemented
- Used
- Workaround
Approach: Implementation

- **Java**
  - Free, portable, familiar

- **Jena**
  - Java library for manipulating XML/RDF documents

- **NetBeans IDE**
  - Java development environment
Demo
• Map Idea: so-so
  – Already lots of maps in airports
  – Could just ask for directions!
  – May be useful for anyone overcoming a language barrier
  – More useful (?) (but harder?) alternative: maps for outdoor locations (parks, trails)
Observations/Conclusions

• Semantic Web/XML/RDF
  – Lack of standard ontologies
    • Are often multiple ontologies covering the same concepts
  – Theory: developers will start slowly with standard ontologies, build steam, eventually reach a critical point and begin growing exponentially
  – ...but still a ways off

• Jena
  – Just scratched the surface; probably some poor design decisions in FlightManager app.
  – Basic functions are nonetheless cumbersome to use
  – Jena’s query language, RDQL sounds more promising (tie in to MySQL)
Questions/Comments?