Towards supporting wayfinding
LBS components

1. Mobile devices
2. Communication Network
3. Positioning Component
4. Service and Application Provider
5. Data and Content Provider
Navigation

• Car navigation, pedestrian Navigation

Google Map Navigation

Wikitude Drive
Mobile guides

Mobile Augmented Reality

- Combines camera, GPS and orientation sensors
- Enables mass market augmented reality
- 3G phones can embed these components

AR+Wikipedia=Wikitude

Nokia: Mobile Augmented Reality Applications
Location-based game

Geocaching: a worldwide game of hiding and seeking treasure.

A geocacher can place a geocache in the world, pinpoint its location using GPS technology and then share the geocache's existence and location online. Anyone with a GPS device can then try to locate the geocache.

http://www.geocaching.com/iphone/
Social networking

Foursquare: check-in
Pedestrian Navigation
Master Plan

1 Sensor Fusion
2 Ubiquitous Infrastructure
3 Behaviour Modelling
4 Semantic Wayfinding
5 Landmark Taxonomies
6 Context-Awareness
7 Keyhole Effects
8 Communication and Interfaces
9 Pragmatic Wayfinding
SMART ENVIRONMENT

CLIENT

Positioning
- Multi-sensor Fusion Model

Modelling and Communication
- Context-aware Route Calculation
- Context-aware Route Communication
- Context Gathering & Reasoning
- Data Mining & Analyzing

User Tracking
- Gathering real-time information
- Accumulating historical data

Typology
Tracking/Interaction Database

TU VIENNA/RGC ARCHITECTURE

Navigation Guidance
Interaction & Annotation

RFID
ZigBee™
Data acquisition and Modeling
Collaborative Filtering
Augmented Reality and Social Media
## Behaviour modelling

<table>
<thead>
<tr>
<th></th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>f: 40% m: 60%</td>
<td>f: 36% m: 64%</td>
<td>f: 67% m: 33%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>~ 30</td>
<td>~ 35-40</td>
<td>~ 30-35</td>
</tr>
<tr>
<td><strong>Duration of observation</strong></td>
<td>~ 5 min</td>
<td>~ 10 min</td>
<td>~ 23 min</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>~ 1.2 m/s</td>
<td>~ 0.6 m/s</td>
<td>~ 0.2 m/s</td>
</tr>
<tr>
<td><strong>Number of stops</strong></td>
<td>almost none</td>
<td>1.4</td>
<td>3.6</td>
</tr>
<tr>
<td><strong>Duration of stops</strong></td>
<td>7 sec (max. 1 min)</td>
<td>2.5 min (max. 8 min)</td>
<td>4.7 min (max. 17 min)</td>
</tr>
</tbody>
</table>
Semantic Wayfinding

**Urban area** in situ experiments in Vienna and Salzburg, oral descriptions of environment and possible actions

**Ski touring**
additional experiments for comparison
SemWay

- "Gehen Sie an der Felsformation links vorbei im Tal hinauf."
..engineering the semantic dimension
Ways2navigate
Keyhole Problem
FemRoute, Fem2Map

How do the psychological route qualities attractiveness, convenience and safety depend on the context of use?
EmoMap

Considering the emotional perception of space in navigation systems for pedestrians

Project goals
1. Gathering relevant parameters from pedestrians for creating an emotional layer of Vienna
2. Contributions via VGI to an open online database - OpenEmotionMap.org
3. Using collected data for improving/personalizing pedestrian navigation
Hypothesis

- The strength of emotional attachment for a particular landmark, place or space embedded in memory, by an individual, influences our structuring of space, thus our “identity building” and “well being”
Concept

applying crowdsourcing methods using state-of-the-art tools/social media
correlate with psychological findings
Evaluate (focus groups, CF)
App

- Android Platforms
- OSM
- GPS location
- downloadable from cartography.tuwien.ac.at
Openemotionmap.org
International Cartographic Association
International Cartographic Association

mission

the **world authoritative body** for cartography and geoinformation science
International Cartographic Association

mission

world authority means national and affiliate members represented at UN bodies and other international organisations
International Cartographic Association

Aims

- Understanding and solve world-wide problems using cartography
- Informing about environmental, economical, social and spatial information through mapping
- Promote professional methods, techniques and solutions
- Global forum on cartography
International Cartographic Association
Commissions

International Cartographic Association
Commissions

International Cartographic Association

Instruments: Publications
International Cartographic Association
Instruments: Maps (Exhibitions, Awards)
International Cartographic Association

Instruments: Research Agenda

Geographic Information
Metadata and SDI
Geospatial Analysis and Modelling
Usability
Geovisualisation
Map Production
Cartographic Theory
History of Cartography and GI Science
Education
Society
International Cartographic Association
Instruments: Conferences

International Cartographic Conference
August 2013, Dresden, Germany
www.icc2013.org
International Cartographic Association
Instruments: Conferences

International Cartographic Conference
August 2015 Rio de Janeiro, Brasil