



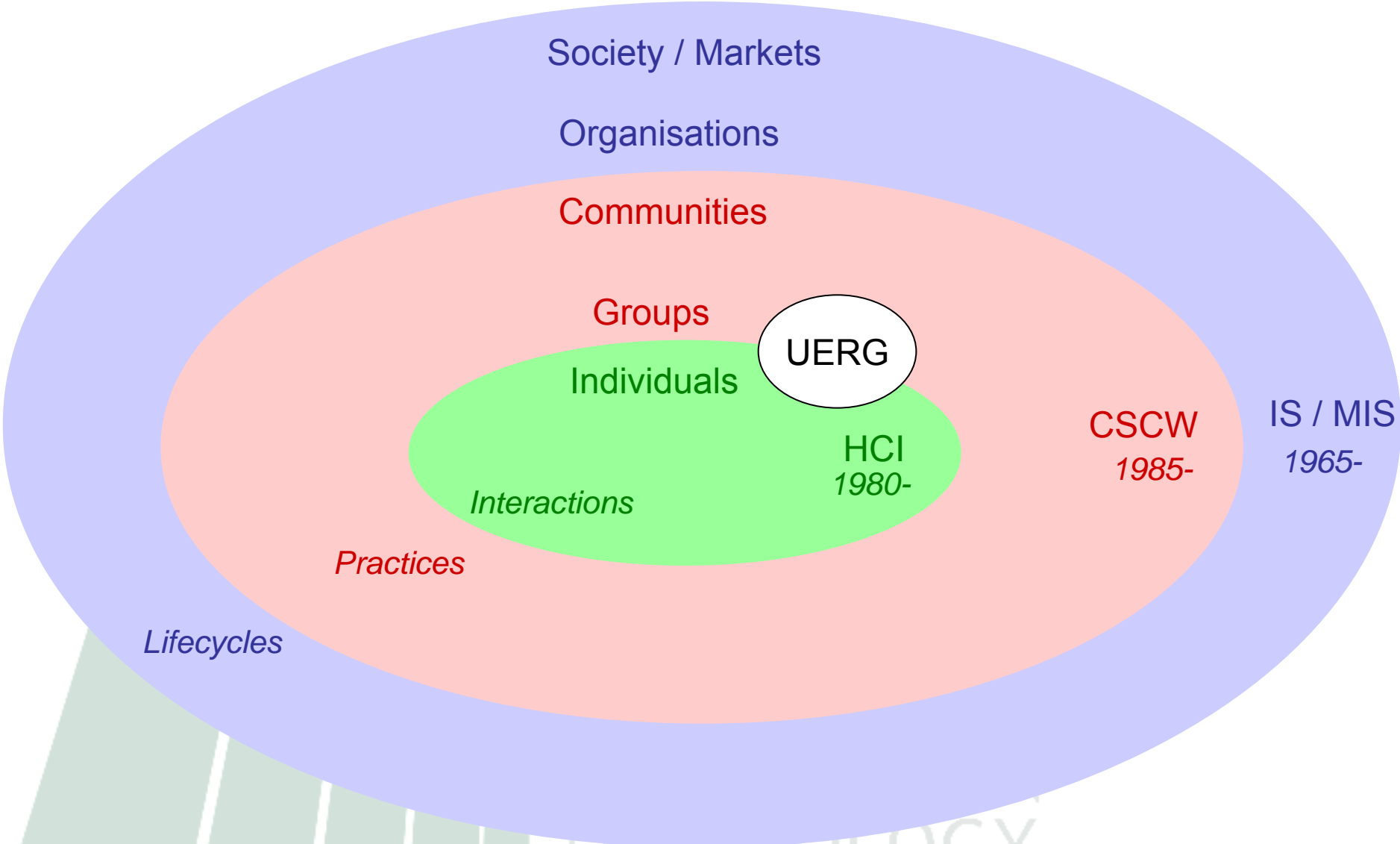
the Future of Mobile Interaction: User Experience Research Group

Helsinki Institute for Information Technology

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<http://www.hiit.fi/uerg/>

Research: humans and computing



Research Topics

- Advanced Mobile Interaction Issues
 - Distributed interfaces and cognition
 - Adaptive and emotional mobile interaction
 - Mixed reality presence and interaction
 - Evolving practices of mobile groups
- Technologies
 - Mobile phone and its developments
 - Ubiquitous computing
 - Mixed reality technologies
- Applications areas
 - Everyday communication
 - Participants in events
 - Spectators at Large Scale-Events
 - Mobile workers (urban renewal, mobile meetings)
 - ...

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Projects

- **IPCity** Mixed Reality Interaction and Presence in Urban Environments
 - EU Integrated Project
 - UERG: Presence and Experience and Event Showcase
- **MobiLife**
 - EU Integrated Project
 - UERG: Coordinating user-research activities
- **Pasion** Improving the efficiency of communication
 - EU Integrated Project
 - UERG: Psychology of context
- **CALLAS** Conveying Affectiveness in Leading-edge Living Adaptive Systems
- **Wireless Festival**
 - Eureka Celtic
 - UERG: Ethnographic studies prototype development and field trials
- **MC2** aka Mobile Content Communities
 - TEKES
 - UERG: Community research, concept development, field trials
- **Context**
 - Academy of Finland
 - UERG: User-research on and modeling of "mobile use contexts"
- **Drama**
 - Academy of Finland
 - UERG: Methodology development

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Research Approach

Strategy

- Human-centeredness
- Empiricism
- Multi-disciplinarity

Principles

- Contextuality
- Naturalism
- Constructivism

Process

- Iterative development
- User participation

Basic user research

- Explorative user/interaction research
 - (Interactional aspects of media sharing, Interaction in multi-device environments)
- Hypothesis-testing and experimentation
 - (Influence of mobile situations on attentional resources)

Constructive research

- Concept innovation and development
 - (Community of Gamers, Methods)
- Interaction design
 - (Context cues in m Contact lists, 3D mobile maps)
- Interventions
 - (Event and spectator's application, Installations and participative media)

Examples

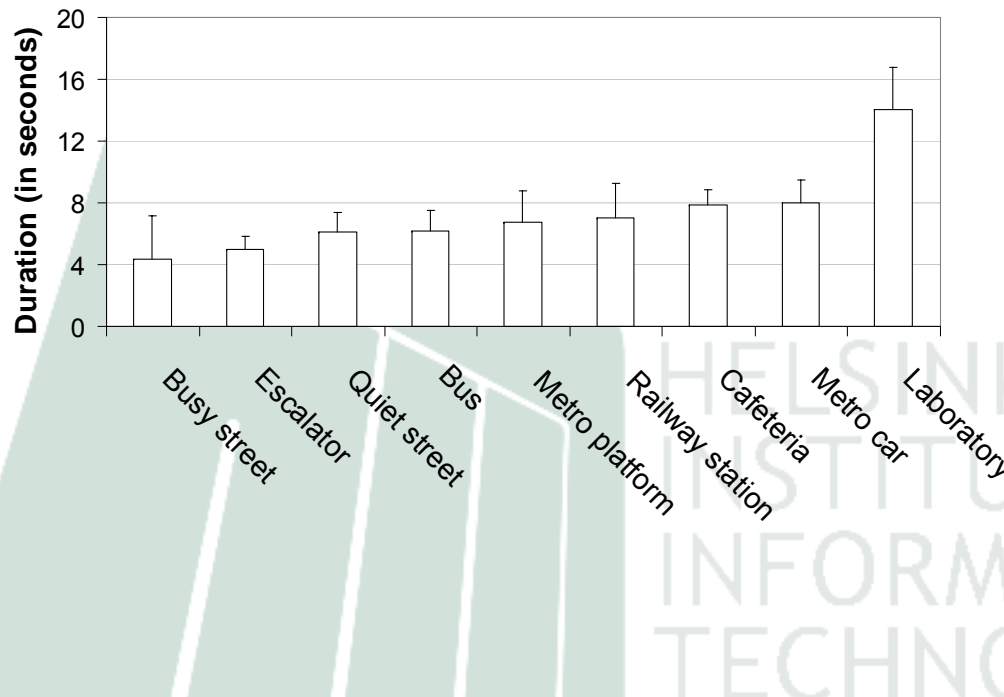
- Mobile cognition – mobile adaptive interaction
 - Attentional resources and multitasking
 - Mobile maps
- Evolving group practices
 - ContextContacts
 - mGroup spectator' co-experience
- Mixed reality
 - Interaction and presence in Urban environments
 - Manipulate media



Attentional Resources

- Explaining attentional resources in mobile HCI

Continuous span of attention to mobile device



#	Cognitive faculty	Provided resource	Limitations related to mobility and interaction
1	Motor control (-hands) (-legs)	Sequencing, timing, control, and finalization of motor actions Manipulation of physical objects Positioning and moving the self	Fluent execution dependent on learned procedural skills Reach, capacity, strength, dexterity and accuracy Limited speed, stamina
2	Sensation	Intake of external stimuli	Acuity, accuracy
3	Perception	Organization of sense data	Uniformity of perception
4	Attention - visual - auditory - motor	Search, selection, and integration in modality-bound representations	Limited spatial span, limited object span
5	Central executive	Meta-level control of cognitive operations -selection, inhibition, updating, shifting	Serial processing
6	Working memory - visual - auditory - motor	Retention of previously attended information	Short retention span, small capacity
7	Prospective memory	Proactive control and timing of actions	Susceptibility to interference
8	Episodic memory	Mental "time travel"	Distortions, slow and effortful access
9	Semantic memory	Fact knowledge	Susceptibility to interference
10	(Conscious) Thought	Conscious manipulation of Working memory materials -abstraction, inference, reasoning, problem-solving	Uniformity of thought, reliance on heuristics

Table 1. Cognitive faculties taxed in mobility, their provided resources and limitations.

Mobile Cognition

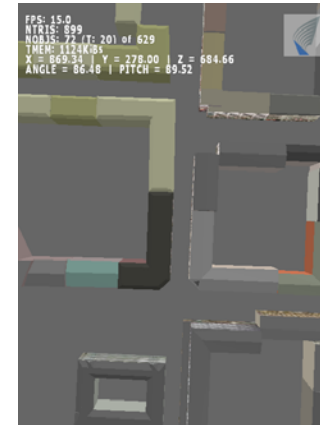
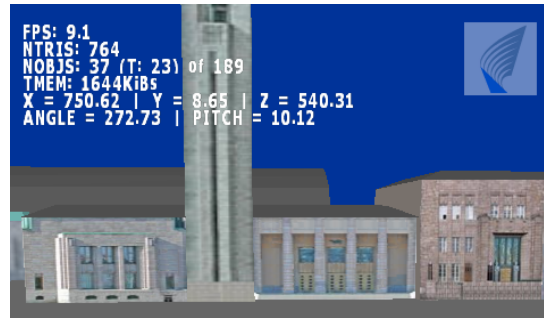
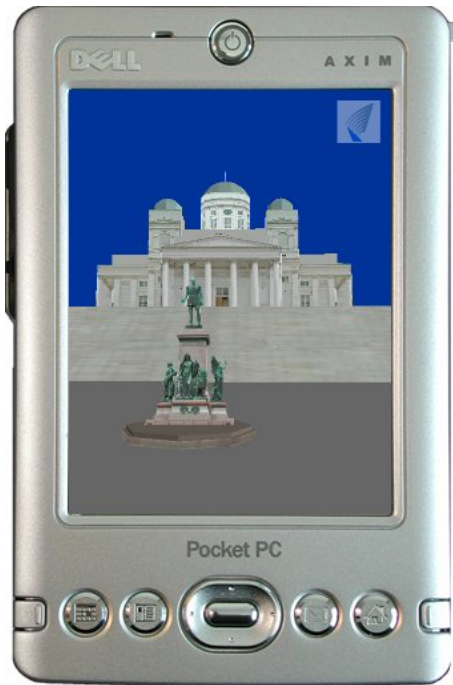
- Mobile quasi-experimentation



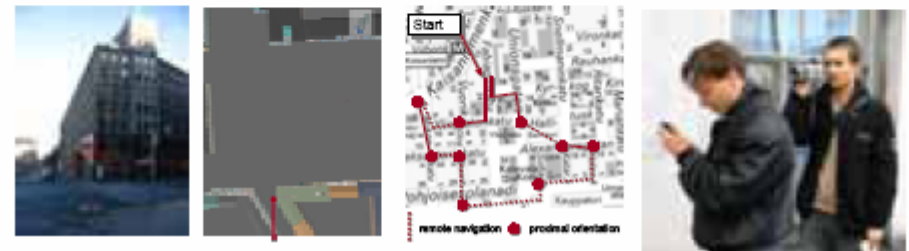
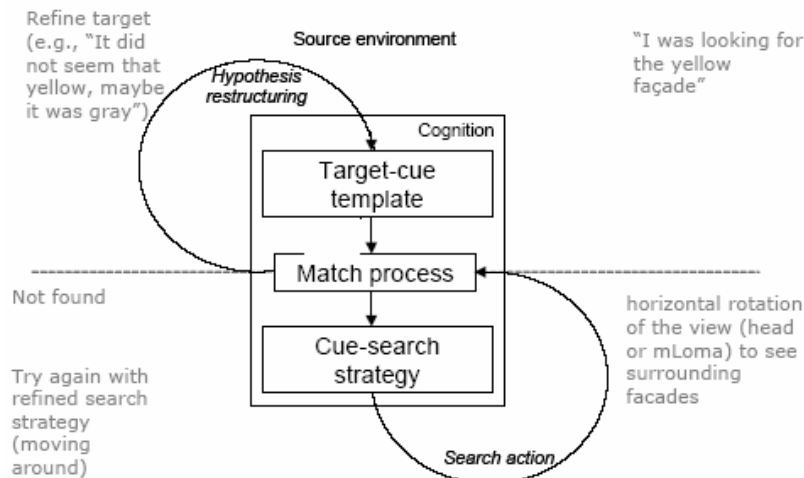
Four minicams wirelessly collected
to one data stream

Example of data

Mobile Maps comparing 2D and 3D



- Orientation Task
 - The subject facing a specified direction, the experimenter pointing at a building: "Please show me where that building is in [the other space]"
- Navigation task
 - The subject facing a specified direction, the experimenter pointing at a building: "Please walk to that building and move mLoma with you"



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ContextContacts

1. CUES

What kinds of situation inferences are made based on different cues?

2. SELF-DISCLOSURE

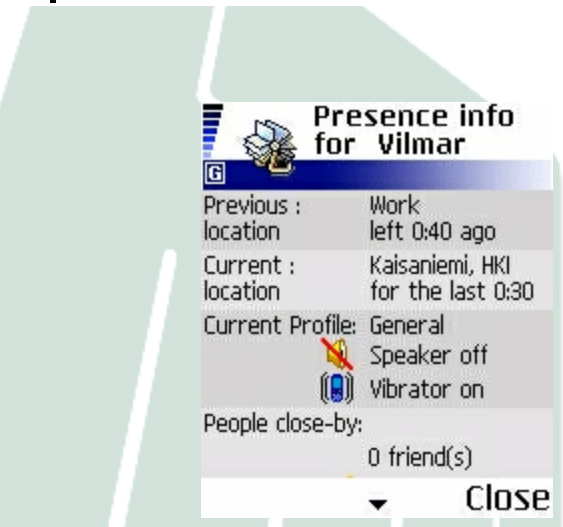
How to support users' normal self-disclosure practices?

3. INTERACTION

How to design interaction with cues for mobile situations?



Goals for cue design



MEANINGFULNESS

Automatically fetched district names to replace GSM cell IDs

LEARNABILITY

Detailed view (associative learning), mimicing icon and interaction conventions

VERIDICALITY AND TIMELINESS

Min 15 s updates. If information on a contact cannot be updated -> graying out of the whole row

RELEVANCE

Providing cues that are relevant and useful. But what cues are those??

Supporting the spectator's co-experience with mobile media



Media Stories

- Jarkko 17 days **Ek 8**
- Juha-P. 17 days **Mökkiperä**
- Aleksi. 18 days **Pätkä**
- Result. 17 days **AKK Friday 2**
- Hannu 17 days **maiija ja katja**
- Hannu 18 days **Vellipohja**
- VIP 18 days **AKK Friday**
- Eljas 18 days Allu prive**

Valinnat ▾

AKK Saturday

Threaded (6/19)

- VIP 17 days ago
Fiat nurin Vellipohjalla
- Results 17 days ago**
EK13 Urria, ensimmäisiä väli
- VIP 17 days ago
Haastatteluja EK1-Ouninpö
- WhatsUp 17 days ago
Super rallicross -osakilpailu

Valinnat Back

ilta

Threaded (14/25)

- Hannu 16 days ago
No mikä on meininki? Onko
- AleksiM 16 days ago**
R1: Tilaa on
- AleksiV 16 days ago**
R2: Täällä ei niin kamalasti
- AleksiM 16 days ago**
Tom of Finland

Valinnat Back

Add Media Story Member

- Johan
- Kalle
- Sander
- Sigvard
- Christopher
- Daniela

Options ▾ Back

Media Story Members

- AleksiM
- Juha-Pekka
- Jarkko
- AleksiV
- Zorro
- Support

Options ▾ Back

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mGroup Results

- Demonstrated opportunity for a new service for spectator
- Supporting the co-experience of spectators
 - Mobile group media chat
 - Shared media albums in the web
- Enhancing event presence and engagement
 - AKK stories, Results, whatsapp, etc.
- Organisers, Sponsors, broadcasters
 - Novel formats for interacting with spectators
 - Prolonging and enhancing event
 - Opportunity of integrating spectators content (picture competition)

Msg 4
Aleksi V Sat 17:03:58
Hey gents how is your day going? Any luck with the ladies last night? You guys heading out for a big night again? DaMo.




Msg 5
Aleksi V Sat 17:18:45
The jump



Msg 6 (Reply to 4)
Eljas Sat 17:26:50
Hi guys! Sat night plan -> First to Killeri, there is a rallycross competition from 19.30 to 22.00. After that "little" bit drinking and then to pub. How about you?

Msg 7 (Reply to 4)
Mikko Sat 17:31:08
With these looks the "luck with ladies" is unachievable. But we will try until the sun burns us alive and the wind will tear our skin off.



Msg 9 (Reply to 5)
Maija Sat 17:50:49
Hey eljas! No idea what we are doing yet, we will go wherever the wind (or crazy finnish people) take us. Hopefully we'll meet up with u guys at the pub, for more than a "little" bit of drinking!

Msg 10 (Reply to 7)
Maija Sat 17:58:34
Shit, sounds like we may have to bury you here ... ;) maybe we should all get naked and hang out in a little wooden room with a bunch of boys instead.

Mixed reality and Presence

- Integrated Project IPCity
 - Sixth Framework Programme Priority 2.4.3.2 Presence and Interaction in Mixed Reality Environments
- Showcases
 - Urban renewal
 - Large scale events
 - Time Warp
 - City Tales: cross-reality narratives
- Objectives
 - Mixed reality in everydaylife
 - Presence and interaction
 - Cross reality content authoring
 - Device independent platforms

IPCity: Interaction Technologies

- Mobile Mixed Reality
 - Mobile mixed reality
 - Advanced tracking, e.g. computer vision
- Semi Stationary environments
- Tangible computing environments



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