Representation of self-reported information usage during mobile field studies: Pilots & Orienteers 2

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Research Methods

- Shadowing, usage tracking, surveys, cultural probes, labs, self-video, diary studies
- Data analysis issues
- Use of environmental information during mobile activities
- Need to understand behaviour while moving through changing context

Context & Mobile Behaviour

Problems facing mobile development:

1) Understanding effects of mobile context
2) Depicting mobile behaviour and context
3) Finding suitable research methods

> "Ecologically valid study of today's mobile technologies is challenging, because the conditions for technology use are dynamic, varied, and difficult for investigators to directly observe." - Palen and Salzman (2002)

> "It is commonly accepted that data collection for evaluation of mobile services and devices is a central challenge, and that novel methods must be found for that."
> - Isomursu, et al (2004)

- We used a diary study, in-situ self-reported data

Pilots & Orienteers Study

Purpose:

- Better understand in-situ, egocentric navigation behaviour

Method:

- 3 pilots took 10 pictures along distinct paths
- Each orienteer used a sequence of pictures to find a destination
- Diary records of confidence and information usage
- Interviews immediately following
- I was an orienteer

(More detail in Pilots & Orienteers 1 paper)

Pilots & Orienteers Study

Results:

- Better understanding of attributes of good landmarks
- Communication between pilot & orienteer pair was problematic
- Methods were needed to visualise mobile behaviour
- Repetitions visible in actions of users
- Large data sets make seeing detailed patterns difficult
- Excellent opportunity to try to explore analysing and depicting mobile behaviour

Understanding Mobile Behaviour

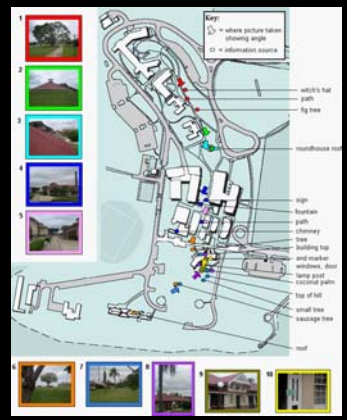
Different perspectives on behaviour and information usage:

- Textually, showing interactions and detail
- Supplemented with pictures

Information Flow Chart (IFC)

- Graphically, extrinsic
- Supplemented textual detail

Context Information Map (CIM)



Information Flow Chart (IFC) – Part 1

Participant identification number

Photo taken by pilot

Information pilot wanted to communicate to orienteer

Information used by orienteer

Decisions by orienteer

Action orienteer takes

Confidence of correct location

Pilot and Navigator Set 3

Photo	Intended Info	Info Used	Conclusion	Action	Conf
1					
	- Bark tree	- Lamp post near - Tree far - Building left - Street right - Cognitive: memory of campus layout - Cognitive: different angle visualization	- Near correct location - Oriented correctly - Road is probably path	- Head down sidewalk	1
<Portion of table removed>					
4					
	- Timber furniture	- Chairs - Table - Cognitive: cultural knowledge of eating location - Cognitive: memory of eating location	- Is patio of deli in library	- Go to library	1
5					
	- Sunshade - Direction	- Four windows - Side of building - Red brick	- Found match - Unsure if unique object - No indication of direction after	- Walk towards under object	2
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Rough approximation of what orienteer saw while navigating.

Each row is a 'scene' in the overall activity. Each is a different length of time.

Example of usage of memory and cultural knowledge in navigation.

Problematic information transfer coloured red. Sunshade viewed by pilot and windows viewed by orienteer.

Information Flow Chart (IFC) – Part 2

Problematic information transfer coloured red. Tree never used by orienteer.

Orienteer giving very low confidence rating indicating communication problem.

Orienteer gets lost due to usage of inaccurate memory in previous step and poor navigation information provided and takes unnecessary steps to complete activity.

Example of accurate information transfer of building and fence between pilot and orienteer coloured green.

7		- Tree - Corner - Path	- Stairs - Walkway - Bit of ramp - Brick building far	- Walk up walkway - Direction possibly indicated	- Walk up walkway 2
8		- Building corner - Metal fence	- Car - Cognitive: semantic pairing with parking lot - Cognitive: memory of location of parking lot - Many possible paths	- Head down side path towards remembered parking lot	- Head down side path 3
8.1		- Building corner - Metal fence	- Street - Buildings - Multiple paths	- Doesn't match photo	- Backtrack to last confident location - Try new path 3
8.2		- Building corner - Metal fence	- Car - Gray fence - Building corner	- Found landmark - No direction indicated	- Stand there 1

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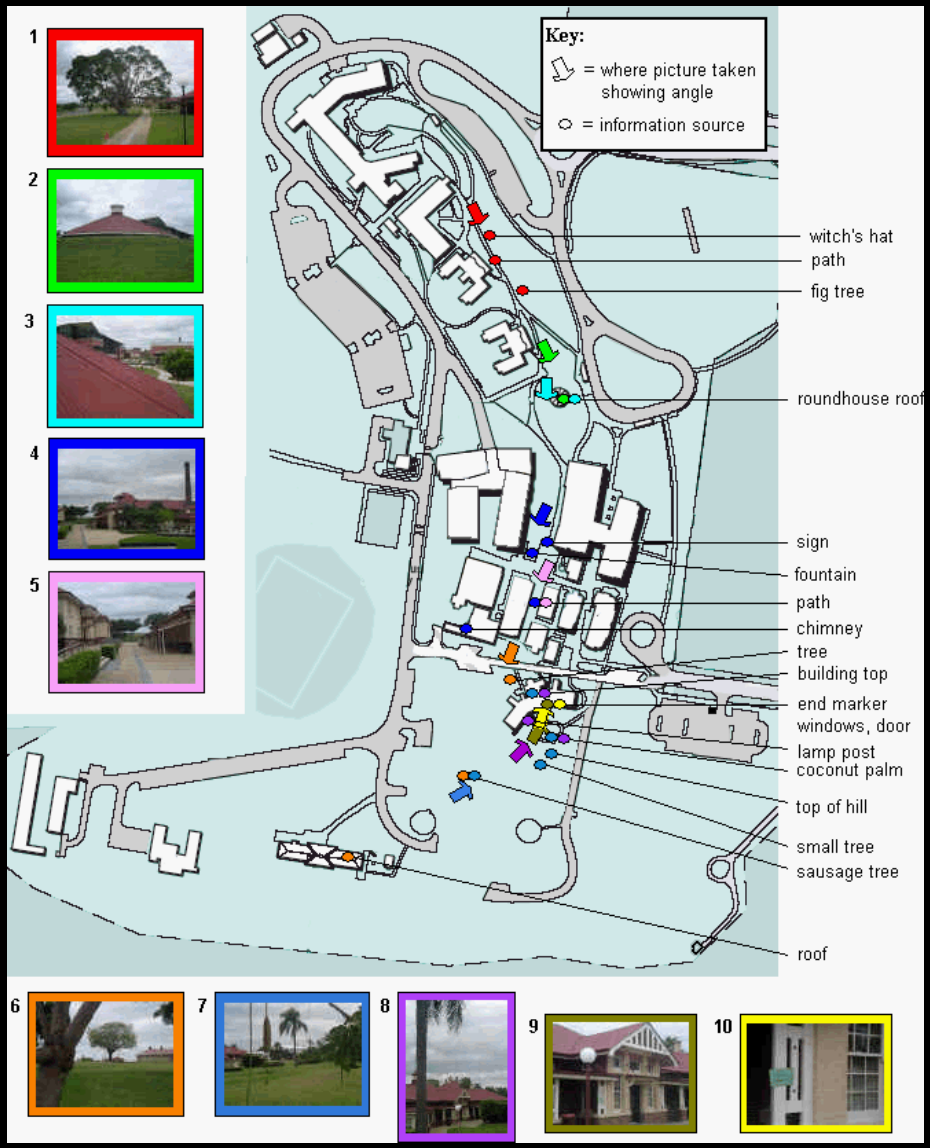
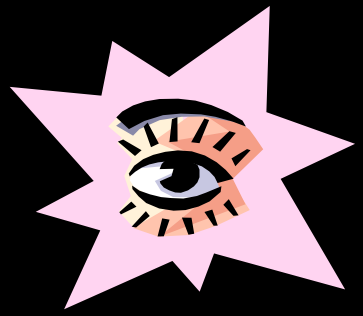
Context Information Map (CIM)



- Aerial conceptualisation of navigation information and user movement
- Egocentric navigation
- Distance and angle of information objects used
- Re-use of objects
- Visualize how information used effects resulting choices

What are they useful for?

Visualization



- Mobile behaviour hard to visualize
- Seeing environmental information
- Effect of information on actions
- Different perspectives on information

Analysis

- Organization (bottom-up structure)
- Communication breakdowns
- Interaction effects between people
- Relationships (scenes or people)
- With participants

Communication

- Written reports between field researchers and designers
- Depicting in-context behaviour for those who weren't there
- Documenting unexpected actions

Conclusion

Summary

- Difficulties depicting context and movement
- Study gave opportunity for depicting mobile behaviour & communication
- Two representations developed to assist analysis and communication:

1) Information Flow Chart (IFC)
2) Context Information Map (CIM)

Future Research

- 'Territory is the Map' study run in Darwin
- Focuses on mobile group communication using SMS
- Adapting IFC and CIM to the new setting
- Finding useful for aiding data analysis

Contact Information

Questions?

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References

1. Palen, L. and Salzman, M. (2002) Voice-Mail Diary Studies for Naturalistic Data Capture under Mobile Conditions.

2. Isomursu, M., Kuutti, K., & Väinämö, S. (2004). Experience Clip: Method for User Participation and Evaluation of Mobile Concepts.