PRiMMA
Privacy Rights Management for Mobile Applications

The Open University

Studying Location Privacy in Mobile Applications:
‘Predator vs. Prey’ Probes

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Overview

Privacy issues are sensitive and difficult to study, and therefore poorly understood. Survey methods such as questionnaires or standard interviews commonly used in requirements elicitation gather large amounts of data but provide only limited insight into what users really feel and need when it comes to privacy. Asking users what level of privacy they want on their mobile phones may not reveal their actual preferences, because they may not know how they will actually feel and what they really need until they find themselves in a real situation. Here we discuss the use of a breaching experiment, which envisages putting participants in uncomfortable situations and forcing them to make their inner feelings and reactions observable.

Aims of the Study:

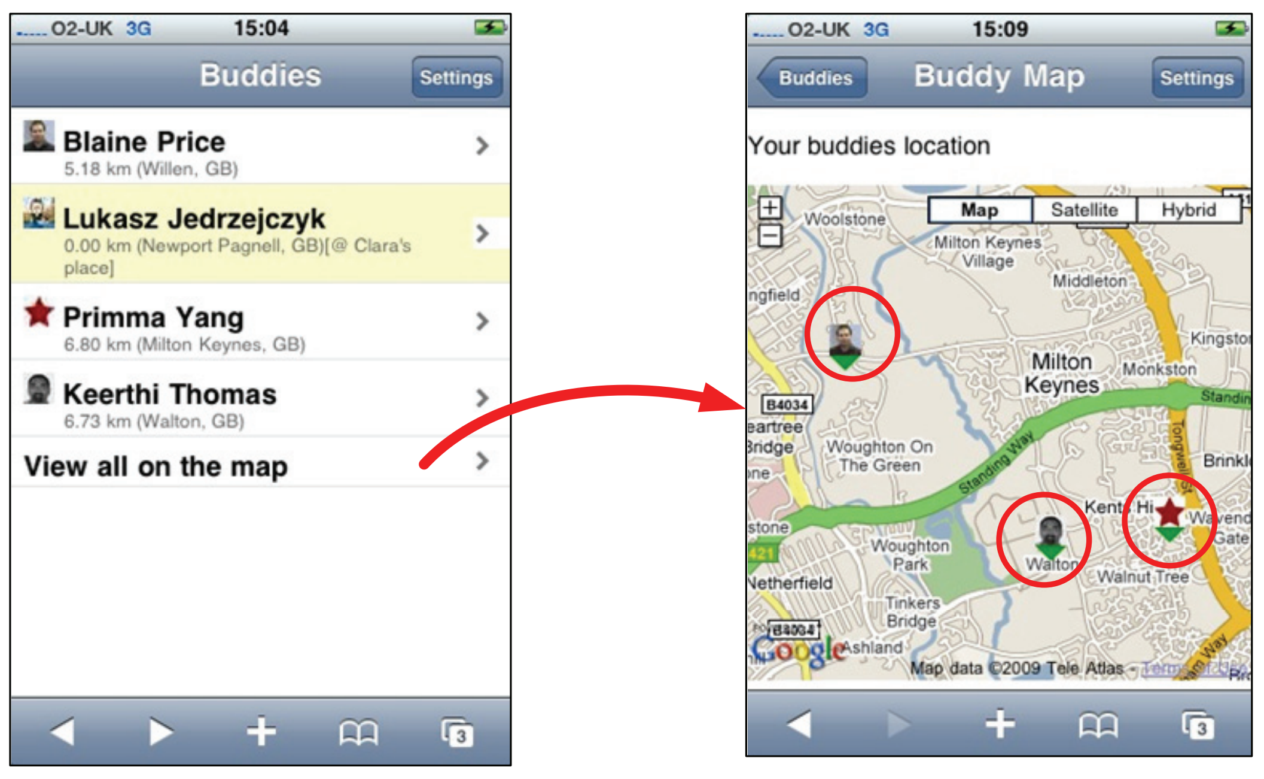
To investigate:

- how mobile users feel about the disclosure of their location and, if and when they are concerned,
- how far are mobile users prepared to go in order to avoid being tracked.
- what mobile users do (what actions they take or what assumptions they make) with the information they get about others’ location
- understand why and how mobile users feel the need to protect themselves.

A group of 20 mobile phone users (half of whom will have prior experience in the use of mobile location based services) will take part in the study over a period of three weeks. The participants’ mobile phones will carry an application which can track the location of the other participants in the study and plot it on a map. This study will also use a novel method to enable the observation of a mobile user’s spontaneous behaviour without physically intruding their privacy using *enhanced experience sampling* and *differed contextual interviews*.

Phase 1 : No Privacy

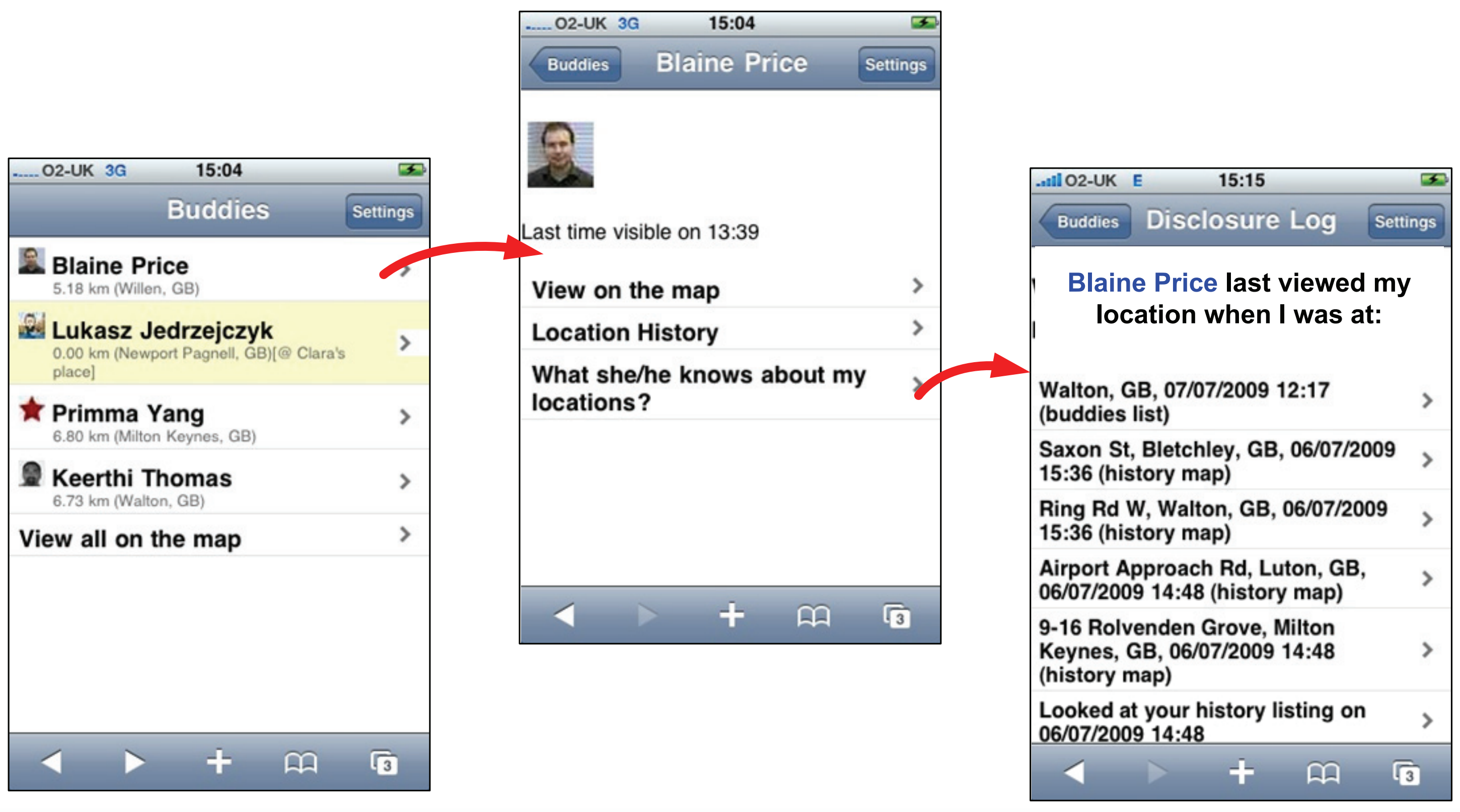
Participants will have no privacy controls to protect their location and will be free to use others’ location information as they like.


O2-UK 3G 15:04
Buddies
Settings
Blaine Price
5.18 km (Willen, GB)
Lukasz Jedrzejczyk
0.00 km (Newport Pagnell, GB)[@ Clara's place]
Primma Yang
6.80 km (Milton Keynes, GB)
Keerthi Thomas
6.73 km (Walton, GB)
View all on the map

O2-UK 3G 15:09
Buddies
Buddy Map
Settings
Your buddies location
Map Satellite Hybrid
Map data ©2009 Tele Atlas

Phase 2 : Breaching User’s Privacy

Participants will be given tasks such as investigating the location of co-participants to make inferences on what they are up to.

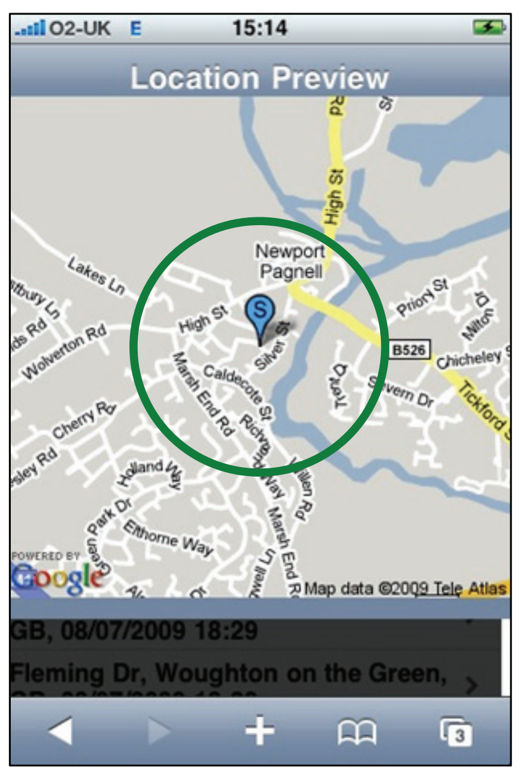

O2-UK 3G 15:04
Buddies
Settings
Blaine Price
5.18 km (Willen, GB)
Lukasz Jedrzejczyk
0.00 km (Newport Pagnell, GB)[@ Clara's place]
Primma Yang
6.80 km (Milton Keynes, GB)
Keerthi Thomas
6.73 km (Walton, GB)
View all on the map

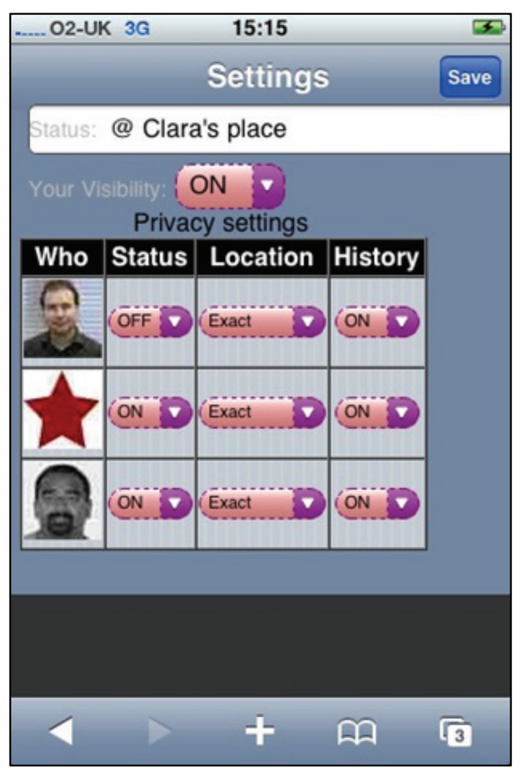
O2-UK 3G 15:04
Buddies
Blaine Price
Settings
Last time visible on 13:39
View on the map
Location History
What she/he knows about my locations?

O2-UK E 15:15
Buddies
Disclosure Log
Settings
Blaine Price last viewed my location when I was at:
Walton, GB, 07/07/2009 12:17 (buddies list)
Saxon St, Bletchley, GB, 06/07/2009 15:36 (history map)
Ring Rd W, Walton, GB, 06/07/2009 15:36 (history map)
Airport Approach Rd, Luton, GB, 06/07/2009 14:48 (history map)
9-16 Rolvenden Grove, Milton Keynes, GB, 06/07/2009 14:48 (history map)
Looked at your history listing on 06/07/2009 14:48

Phase 3 : With Privacy Controls

Participants will have privacy controls and will receive alerts every time one of their co-participants is within a given geographical range or is checking their location.

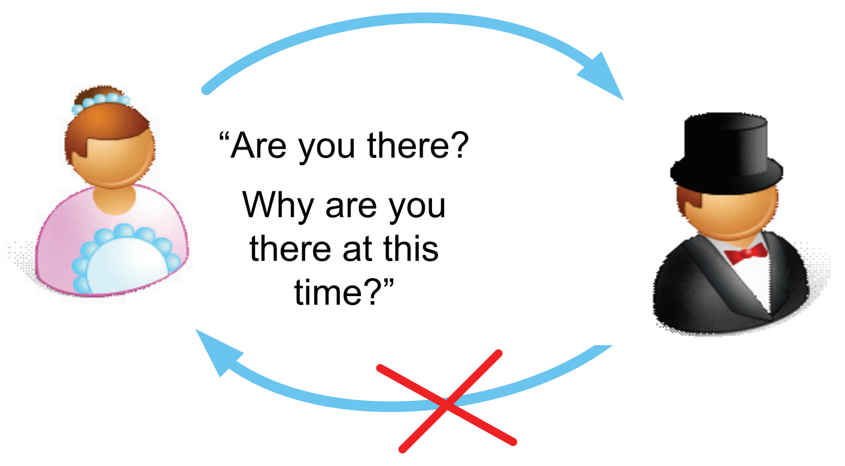

O2-UK E 15:14
Location Preview
Map data ©2009 Tele Atlas
GB, 08/07/2009 18:29
Fleming Dr, Woughton on the Green,

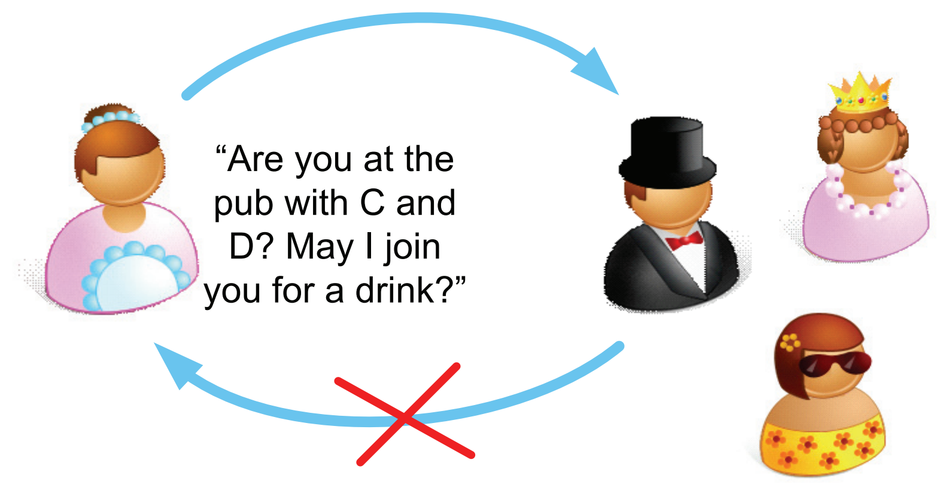

O2-UK 3G 15:15
Settings
Save
Status: @ Clara's place
Your Visibility: ON
Privacy settings

Who	Status	Location	History
	OFF	Exact	ON
★	ON	Exact	ON
	ON	Exact	ON

Scenarios

Alice might want to use **Bob**’s location information to maintain certain control and make sure that certain social rules are respected but **Bob** may wish to escape **Alice**’s control without incurring any social consequences.




“Are you at the pub with C and D? May I join you for a drink?”

Alice may want to know where her peers are and whether they are together but **Bob** may be meeting with other common peers and may not wish **Alice** to be part of it.

Alice might want to know where **Bob** is to take advantage of **Bob**’s location for personal gain however, **Bob** may not wish to be at others’ disposal.

“While you are there, could you buy some milk for me, please? I forgot to get it”

Conclusion

Breaking location privacy boundaries and forcing people to take action to re-establish them will enable us to observe the emerging patterns that are critical to our understanding of people’s drives and motivations in acquiring or divulging personal information.

Acknowledgments

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