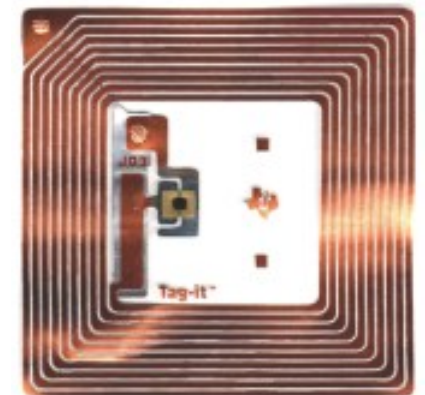


User Perceptions on Mobile Interaction with Visual and RFID Tags



Sara Belt, University of Oulu, Oulu
Dan Greenblatt, Nokia Multimedia Experiences, Oulu
Jonna Hakkila, Nokia Multimedia Experiences, Oulu
Kaj Mäkelä, Nokia Research Center, Tampere



Motivation

- Lots of research has been done on the application concepts utilizing physical tags, focusing mostly on technology
- The focus of our study has been on how the physical tags are perceived and used by non-technical users in everyday context
- Study aims at charting the issues related to current state of perception of RFID and 2D barcodes including:
 - Familiarity
 - Expectations on interaction and functionality
 - Social acceptance
 - Perceived reliability
 - Usability issues

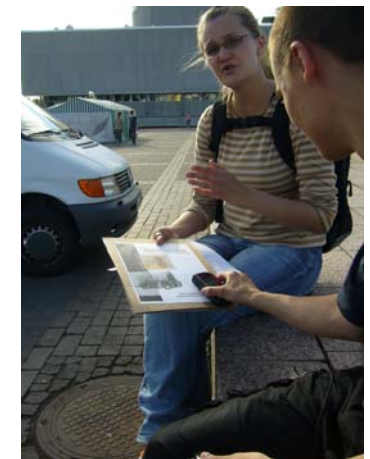
Setup

- Interviews conducted in downtown Oulu (Finland), pedestrian shopping mall in June 2006 during one day
- 26 participants
- 15-60 yrs
- Interview duration was 5-20 minutes
- Users were explained that the interview focused on two technologies enabling interaction with the real world (RFID and Visual tags)





Procedure

- Participants were introduced both technologies, the starting technology was varied to avoid bias
- Study consisted of following steps:
 1. User is presented a poster and asked about the familiarity of RFID/Visual tag
 2. User's expectations on the information/services provided through the tag
 3. User's expectations on the interaction with the tag
 4. User is asked to interact with the tag by using mobile device
 5. User's perception and understanding on the occurred event
 6. Questions 1-5 repeated for other technology
 7. General questions
 - Social acceptance
 - Reliability
 - Acceptance
 - Aesthetic considerations
 - Preferred technology
 8. Demographics: gender, age, is the user carrying a phone and, if yes, does it have a camera




Posters



dian
Hypofunktion
new ep - in stores now




Hear samples at
www.dianband.net



dian
Hypofunktion
new ep - in stores now



Hear samples at
www.dianband.net

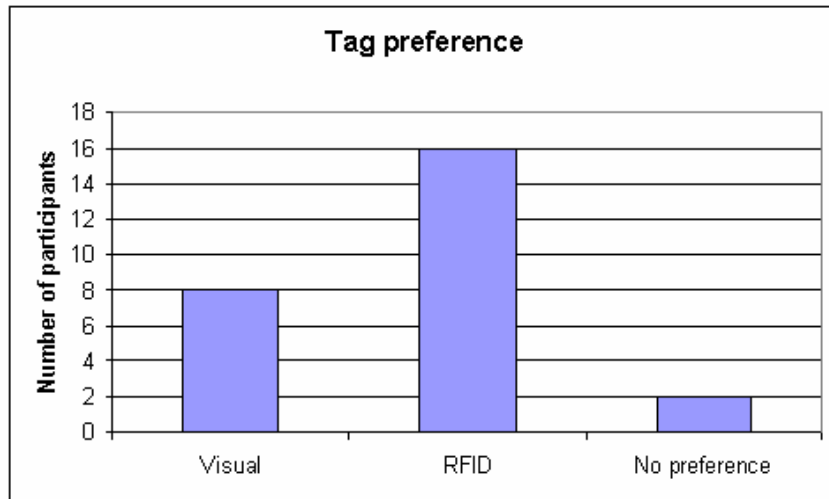
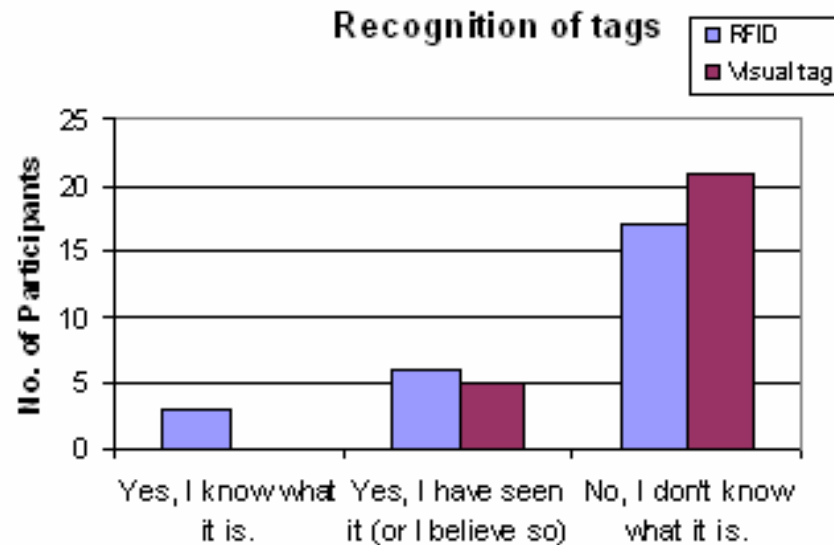


Device and applications

- Nokia 7610 camera phone with RFID reader
- RFID reader extension
 - Range of function only few centimeters, the sensor in the bottom part of the phone, covered by the user's hand
- RFID reader application (proprietary)
 - No trigger needed for reading
 - Application required occasionally booting of the device
- Semacode Reader application, Standalone for Series 60 Smartphones 1.5 (www.semacode.org)
 - User trigger required for reading
 - Sensitive for lightning conditions and distance, often required several attempts
- Applications were started before handing the phone to the user



Statistics



- Users are not familiar with either RFID or Visual tags
- RFID sometimes seen in security tags in shops, in records, books and clothes
- Visual tag sometimes associated to a normal barcode

- RFID preferred (16/24)
 - Quicker, less effort, natural, did not require extra application
 - Active nature concerns for security reasons
- Visual preferred (8/24)
 - Taking photo familiar interaction method, also socially acceptable

Findings

- No existing model for interaction
 - Lack of commercial applications
 - Used RFIDs currently invisible, user is not able to associate and apply the experience (e.g. travel cards)
 - Visual tag's similarity to barcode is not always evident
- Initiation
 - Unclear whether the reading needs to be triggered or not
- Nature of the information in the tag
 - Users assumed the tag to contain direct information, not the reference to the actual data
 - Access to the information was anticipated to depend on the proximity of the tag
 - Information is considered to be stored locally to the tag in encrypted format, it is decrypted and viewed through the device acting as a "lens"

Findings 2/2

- Expectations on the content
 - Information about the band, e.g. music files, gig listing, line-up, web site etc.
- Visual tags
 - Expected to be used with a camera
 - Need of trigger not commonly expected, pointing was assumed to be enough
 - Aesthetically looks too official, technical and unclear, also “cool”
 - From the utilization point of view less effort required and cheaper to create
 - Environmental factors considered to affect the readability
- RFID
 - Not commonly known metaphor / symbol
 - Short range of function
 - Tag hidden, the location needs to be indicated
 - Need to indicate the user the reader component location to enable tag detection
 - Assumptions on interaction varied
 - Reading with infrared port, taking a picture of the tag
 - Sometimes users tried finding matching symbol (round shape) from phone, e.g. camera lens, joystick button, clock on the screen

Future Work

- Second study made in Tampere, Finland. 25 interviews made with more focused questions. Long paper under work

Thank you!

Kaj Mäkelä (kaj.makela@nokia.com)

Sara Belt (sbelt@paju.oulu.fi)