



Physical Browsing Research at VTT Human Interaction Technologies

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PERMID 2005, München, 11 May 2005



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Physical Browsing: Introduction

- Associating physical objects and digital information
- Examples:
 - Point at links in posters to open web pages
 - Touch a business card to make a phone call
 - Read remotely a temperature sensor in the environment
 - Point at a lamp to switch on lights
- Mobile terminal
- Several implementation technologies possible
- First step: Physical selection
- Second step: Action



Physical Browsing: Physical Selection

- 'Clicking' a link in a physical environment by using the mobile terminal
- We have introduced three physical selection methods:
 - Touching, short range
 - Pointing, long range, directional
 - Scanning, long range, non-directional
- 'Result' of selection is one link for further action

Physical Browsing: Action

- What happens after the link is selected
- Does not depend on selection method
- Can be anything the mobile terminal is capable of doing, for example:
 - Open a WWW page
 - Send email/MMS/SMS message or make a phone call
 - Control a device via a web-based UI or for example switch on lights via X10 interface
 - Switch the terminal to silent mode

Physical Browsing: Implementation Technologies

- Visual tags, for example bar codes
- Infra red
- Bluetooth

- RFID tags: emerging passive tags do not require batteries or other maintenance
 - first touch-based systems already available for mobile phones
 - UHF tags make remote reading possible → scanning
 - UHF tags with sensors will make directional remote reading possible → pointing

From Theory to Practice: User Interaction Design

- Generic concept: information tag
 - Attached to a physical object
 - Contains information related to the object
 - No direct influence on the object, only a link to it
- Touching and pointing: selecting a single known link
- Scanning
 - checking what's available or
 - selecting a link whose exact location is not known
- Analysis of passive long-range RFID tags as implementation technology

From Theory to Practice: Scenarios

- EU project MIMOSA: User-centred design for MEMS components
- Ambient intelligence scenarios
 - Scenarios designed for five application areas: Everyday, Sports, Fitness, Housing, Health Care
 - Scenario evaluations with application area experts and users
 - Technical analysis of scenarios
- Physical selection a recurring pattern in the scenarios



From Theory to Practice: Proof of Concept

- Passive RFID Tag Emulator
- Implements all three selection methods
- iPAQ as mobile terminal
- SoapBoxes as tags
- User experience should be similar to passive RFID tags



Work in Progress

- User Interface Study
 - Proof-of-concept as a tool
 - What is a usable interface for touching and pointing?
 - When do users choose different selection methods?
- Visualisation of Physical Hyperlinks
 - How to communicate to the user how the tag can be selected?
 - Action in visualisation?
- Tag data contents

Related Work

- Cooltown
- Xerox PARC
- CyberCode
- WebStickers
- GesturePen