Physical Browsing Research at VTT Human Interaction Technologies

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Contents

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

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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

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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

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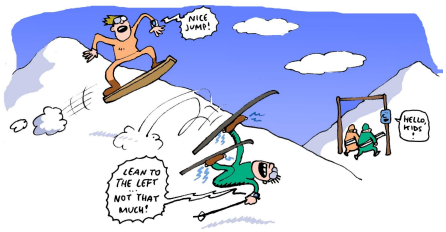
From Theory to Practice: Scenarios

- 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