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iWall: an Interactive Public Display

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Introduction

- What is iWall?
  - A interactive public display allowing to grasp posters (tangible interface)
  - Posters are “posted” to the display by authorized users
  - Posters are displayed adaptively and dynamically according to content, priority, and context
  - Multi-user interaction using handhelds and standard protocols

- Goals
  - Designing and testing new ways of interaction with public information
Introduction

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  - 1) iWall displays posters
  - 2) a user is interested in the displayed poster
  - 3) iWall allows him to pick it up
  - 4) the user chooses a protocol: email, SMS, PDA
  - 5) information is sent to the user for personal use
Introduction
Outline

Introduction

1. State of the art

2. Specification & architecture

3. Display manager

4. Interaction manager

5. Database manager

Conclusion
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Conclusion
State of the art

- iWall is a project based on 3 ideas:
  - display
  - interaction
  - graspable objects
State of the art

- **Interactive desks**
  - DigitalDesk (Wellner, 1993)
  - Responsive Workbench (Krueger & Froehlich, 1994)
  - InteractiveDESK (Arai, Machii, Kuzunuki, Shojima, 1995)
  - Hi-space (HITlab & Battelle, 2004)
  - etc

- **Public displays**
  - SmartBoards
  - AMBIENTE, Roomware, etc (Streitz, Fraunhofer IPSI, De)
  - EnhancedWall (Sato, Koike, Naganishi, Tokyo)
  - WebWall (Ferscha, Linz, Austria)
  - Dynamo-wall (Nottingham & Sussex, UK)
  - etc

- **Context-aware displays**
  - Digital Aura (Ferscha, Linz, Austria)
  - etc
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iWall specification:

- Information is projected on a touch screen using a beamer.
- 4 persons can simultaneously interact with it.
- Information is posted by authorized user using a database.
- Unlimited number of queued posters are displayed onto a finished space.
Specification & architecture

- A modular architecture: 3 modules
  - **display manager**: autonomous agent managing the space available to optimize the displaying of information according to some constraints
  - **interaction manager**: allows the simultaneous interaction of several users with the iWall
  - **database manager**: agent allowing storage, addition, suppression or update of data to be displayed on the iWall
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Display manager

- Objectives:
  - display some objects in a predefined space according to their constraints
- 2 kinds of objects:
  - 1) publication object (poster)
  - 2) interaction object (reserved to interaction with users)
Display manager

- Composed by 3 different components:
  - 1\textsuperscript{st} component: communication with the interaction manager
  - 2\textsuperscript{nd} component: communication with the database manager
  - 3\textsuperscript{rd} component: management of the display: is composed by 2 modules:
    - 1\textsuperscript{st} module: queue manager
    - 2\textsuperscript{nd} module: display posters
Display manager

- Poster positioning using poster constraints:
  - width
  - height
  - padding
  - dominant color (neighbor posters must have distinct dominant colors)
  - theme: preferred display area
  - priority (from 1 to 9)
  - context of display (time, ...)
  - validity period
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Objective:
- allows interaction between iWall and human

2 possibilities to access information
- passive mode: direct (visual) access to information displayed on the iWall
- active mode:
  - selection by pointing using touch screen
  - sending by SMS, PDA/Bluetooth or email protocols
Interaction manager

- How the interaction manager works?
  - each poster has an *observer*
  - when the poster is selected by a user, this observer creates a dedicated interaction window
  - this window proposes several options

- Protocols of transfer
  - SMS: a light text (summary of the poster) is sent
  - Email: a pdf file is attached
  - PDA: small pdf file is sent via Bluetooth

- Security: currently, iWall doesn’t store personal information (email address, telephone number and so on)
Interaction manager

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Valider | Annuler
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Database manager

- **Objective:**
  - manages the objects displayed on the iWall
  - simple interface to administrate the database

- **Architecture**
  - database
  - interface to administrate
  - server
Database manager

- Database manager implementation:
  - Web interface: PHP language
  - MySQL database:
    - store objects
    - model the data structure
    - manage user of the Web site
  - Apache server
    - publication of the Web site and the SQL database via Internet
Summary

- A basic interactive public display allowing to pick up information on the fly
- Multi-user, several interaction protocols
- Dynamic display using (primary) context, poster theme dependent positioning with fixed algorithm
Conclusion

Future work
- Multimodal interaction: voice, gesture, gaze…
- Context-awareness: context-based architecture for adaptation to environment and personal needs
- Integration of dynamic objects (videos, dynamic outputs of applications,…)
- Object zooming and unfolding
- Visualization algorithm: improvement towards a true self-organizing system (with resizing of posters… )