
Using Simple Mobile Devices to Inform and Guide Pedestrians Indoors

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Technical Configurations for AR

- Outdoor
 - Tracking: GPS, compass, ..
 - Displays: HMD, Handheld, Panels
 - Communication: Wavelan, radio
- Indoor
 - Tracking: compass, IR
 - Displays: HMD, Handheld, Panels
 - Communication: Wavelan, IR



Project Context

- Part of the Collaborative Research Center „Resource Adaptive Cognitive Processes“
- Goal: Generate way descriptions for pedestrians in various situations
- Research focus: looking at computational and cognitive limitations



Gegenwärtiger Technologiestand

- Datenübertragung: Statisch, Funk, Infrarot
- Ortsbestimmung: Funk, Infrarot
- Richtungsbestimmung: Kompass, Infrarot
- Informationspräsentation: Handhelds, Mobiltelefone



Situated Information

- Keeps people informed in the proper context
 - respect cognitive and computational limitations
- Reduces the information load to a minimum
- Speeds up cognitive processing of information

Examples:

- Guiding tourist through a town (outdoor)
- Assist a visitor of an exhibition (indoor)



Indoor AR for everybody (who wants to)

- Keep receiving devices simple
- In turn, make the environment smart



- Use Off-the-shelf devices
- Install Infrared-senders at critical places
- Use IR for “tracking” and data transmission
- Restriction to unidirectional communication



Situation=Location+Orientation+Context

Chagal created some of the windows of Metz Cathedral
(weak location)

Some of the windows here were created by Chagal
(strong location)

This window was created by Chagal
(orientation)

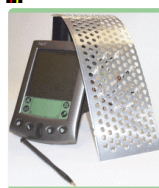
Turn right to see Chagal's
window
(context)

You won't make it to see Chagal's window
(another context)

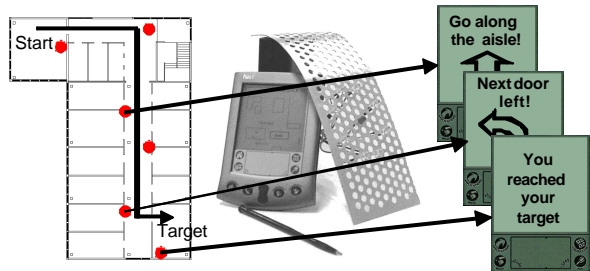


Eyeled-Technologie

- Starke Infrarotsender übertragen Information auf handelsübliche Organizer
- Eine spezielle Software (BrowsIR) präsentiert die Information in Form interaktiver Graphiken und Texte

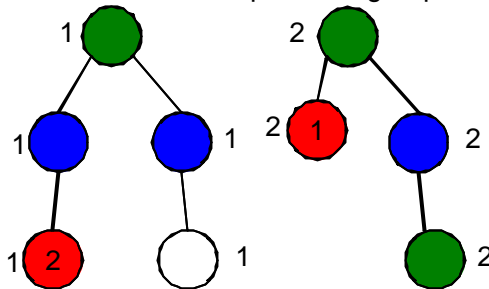


Example



Context (2)

- Introduce Concept of user groups

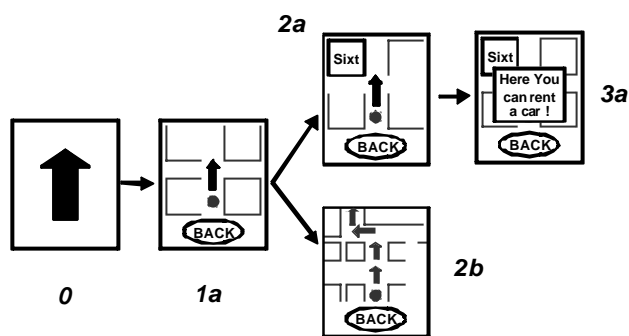


Broadcast Presentation Graphs

- Principle of teletext
- Handhelds offer more interaction possibilities than TV does
- Transmit presentation graphs rather than single pages node by node.
- Different broadcast probabilities allow for smooth and fast interaction with the presentation

OneWayInteraction

Designing Presentations

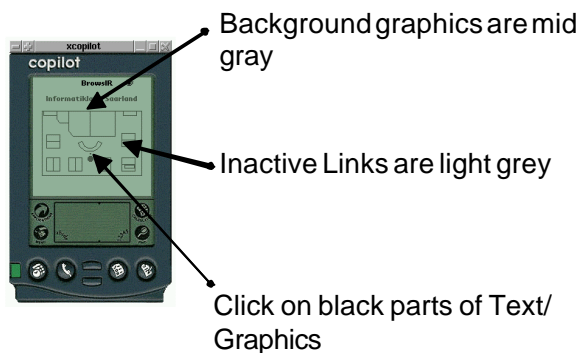


Presentation Graphs (1)

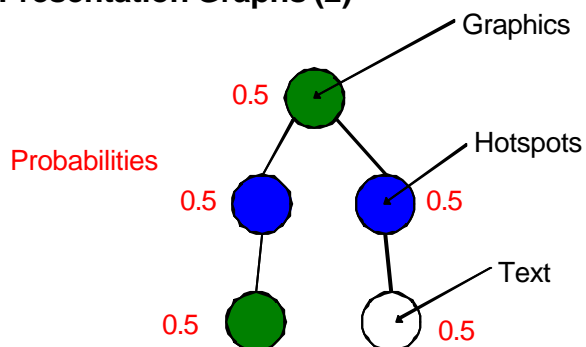
Cut presentation into chunks that allow for incremental refinement of the presentation

- Graphics
- Text
- Hotspots

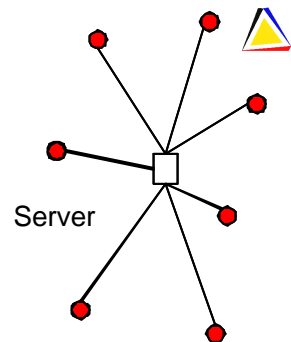
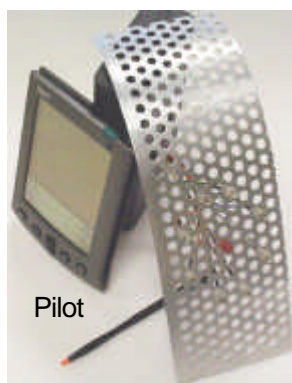
Basic UI Design



Presentation Graphs (2)



The Irreal-System



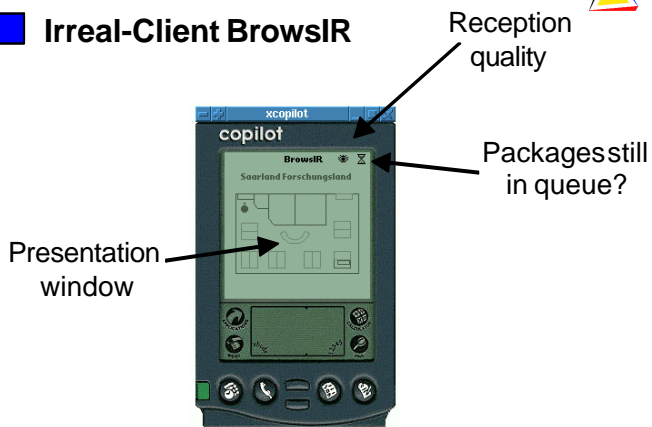
IRREAL-Server

- Runs on a Linux PC
- Each Sender is fed by its own process
- Dynamic modification of content over the internet
- Supports several types of hardware

Allgemeine Einsatzmöglichkeiten

- Multimediale Dienste in Museen
- Unterstützung von Krankenhauspersonal
- Notfallsysteme für Einsatzkräfte
- Informationssysteme für den Handel
- Infopunkte in Flughäfen, Bahnhöfen, Kinos, Restaurants etc....

Irreal-Client BrowsIR



Future work

- Technical issues
 - Get rid of the wires!
 - Explore backchannel possibilities
 - Provide dynamic services over the infrastructure
- Presentation issues
 - Plan presentation and probabilities
 - Generate graphics from 3D-model
 - Develop smart presentation tools

IRREAL at CeBIT 2000

- Show location (with floor plan)
- Help identification of exhibits
- Provide Information on exhibits

The demo will show those tasks for two senders

IRREAL at CeBIT 2000 (2)

