

LFE Medieninformatik • Sascha Gebhardt

# Superimposed Displays

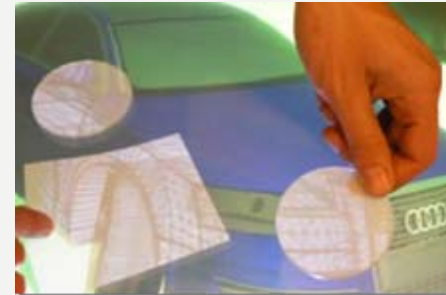
**Medieninformatik Hauptseminar  
Sommersemester 2009  
„Interactive Surfaces“**



# Retrospection to the First Part

previously heard about

- connection
- tracking
- projection
- navigation
- other forms of interaction





# Overview

- retrospection to the first part
- examples for superimposed displays – divided in three main categories:
  - virtual superimposing
  - distant superimposing
  - direct superimposing
- summary



# Superimposed Displays – the categories

- virtual superimposing
  - only one screen
  - no physical superimposing
- distant superimposing
  - devices have a certain distance
- direct superimposing
  - nearly no distance or devices are touching each other

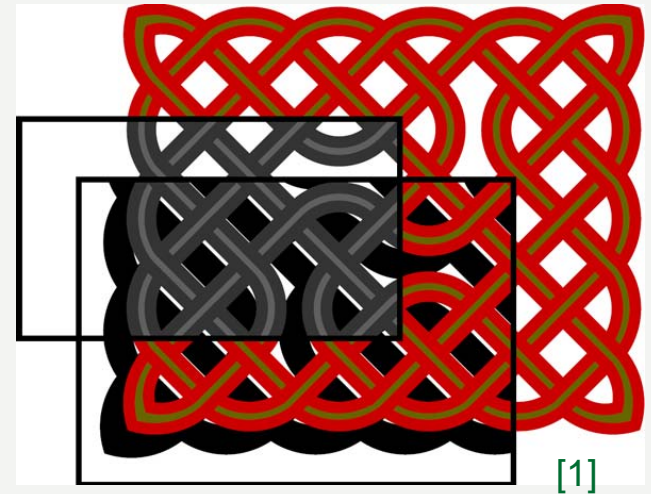


# Virtual Superimposing

# Virtual Superimposing

## Virtual Superimposing on one Screen

- window-based UIs, Remote Desktops, Virtual Machines
- Magic Lenses

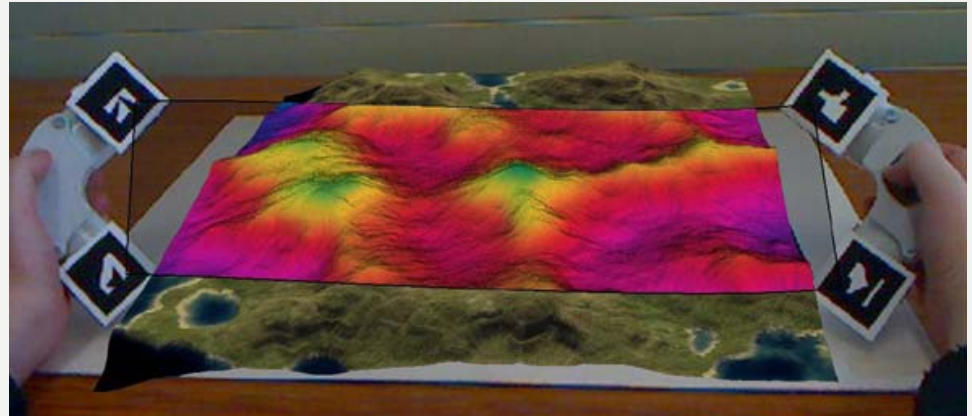


[1] E. A. Bier et al. Toolglass and magic lenses: the see-through interface, SIGGRAPH '93

# Virtual Superimposing

## Virtual Superimposing with Magic Lenses in AR

- 3D tangible Magic Lens in the form of a flexible sheet [2]
- Lens is created by two handles
- different postures control user interaction



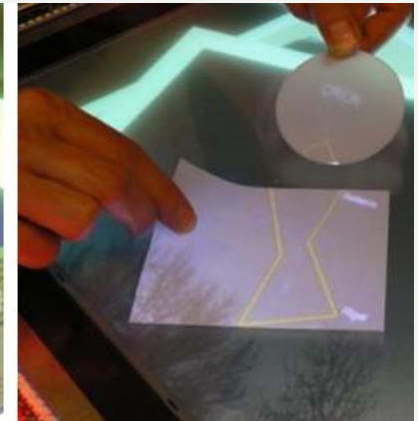
[2] J. Looser et al. A 3d flexible and tangible magic lens in augmented reality, ISMAR '07

[2]

# Virtual Superimposing

## Projection Through an Electronically Switchable Diffuser

- Secondlight [3]
- rear projection system with possibility to project through the surface
- key element is an electronically switchable diffuser line known from privacy glass



[3]

[3] S. Izadi et al. Going beyond the display: A surface technology with an electronically switchable diffuser, UIST '08





# Distant Superimposing

# Distant Superimposing

Projection Through an Electronically Switchable Diffuser

- Secondlight [3]
- possibility to realize distant multi-touch
- perspective correction on distant elements



[3]

[3] S. Izadi et al. Going beyond the display: A surface technology with an electronically switchable diffuser, UIST '08

# Distant Superimposing

## Acquiring Information from Public Displays

- Shoot and Copy [4]
- selecting contents to download by taking a photo with a mobile phone
- selected element is detected by pattern recognition



[4]

[4] S. Boring et al. Shoot & copy: phonecam-based information transfer from public displays onto mobile phones, Mobility '07

## Distant Superimposing

### Distant Superimposing in AR Environments

- Magic Lenses for Augmented Virtual Environments [5]



[5]

- four kinds of displays: wall display, workbench display and two magic lenses
- two different applications: Anatomy Explorer and Aztec Explorer

[5] L. D. Brown et al. Magic lenses for augmented virtual environments, IEEE Computer Graphics and Applications



# Direct Superimposing

# Direct Superimposing

## Direct Superimposing to Augment Static Maps

- LightSense [6]
- spatial awareness either by tracking of a photo light or with NFC Tags
- can be used to offer additional information or to aid disabled people



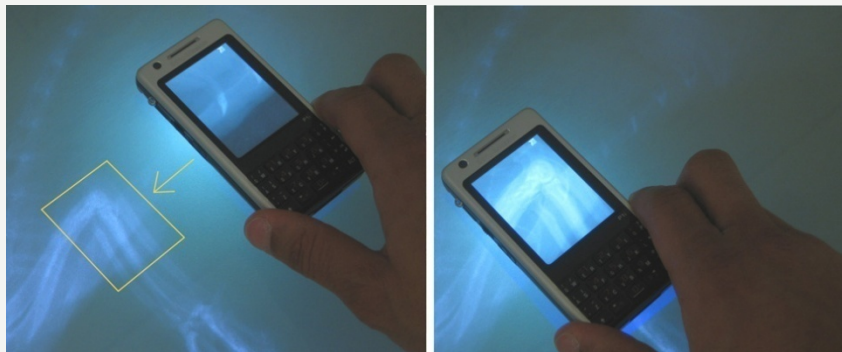
[6] A. Olwal. LightSense: enabling spatially aware handheld interaction devices, ISMAR '06

[6]

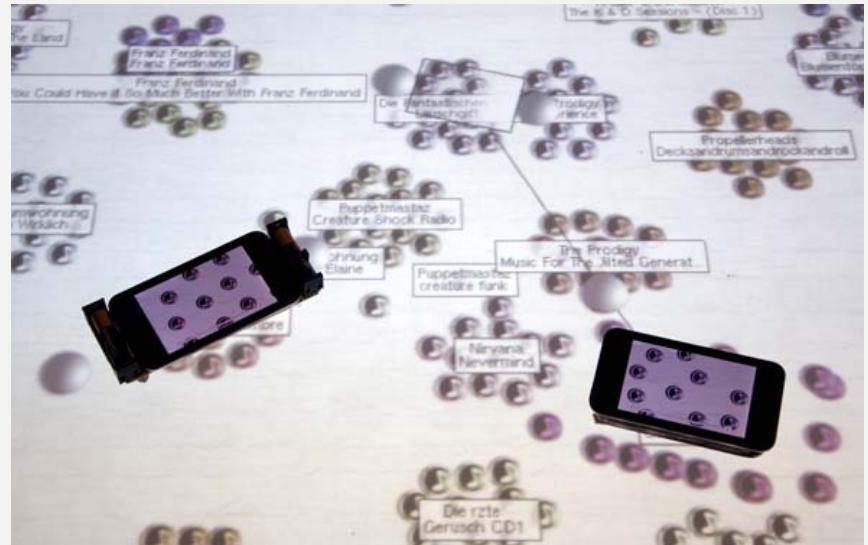
# Direct Superimposing

## Superimposing Displays to Enhance Local Resolution

- Spatially aware handhelds for high-precision tangible interaction with large displays [7] and iPod Party [8]
- higher spatial input and output resolution of mobile device in comparison to tabletop device



[7]



[8]

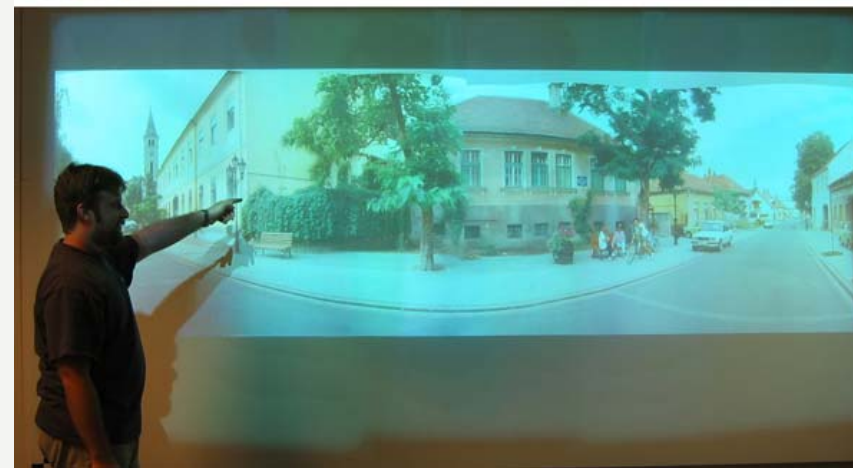
[7] A. Olwal and S. Feiner. Spatially aware handhelds for high-precision tangible interaction with large displays, TEI '09

[8] S. Gebhardt. iPod Party: Designing an application to explore the possibilities of the combination of a tabletop display with one or more handheld displays

# Direct Superimposing

Superimposing Displays to Enhance Overall Resolution

- PixelFlex [9] and PixelFlex2 [10]
- multiple projector's images slightly overlap to achieve a higher display resolution



[10]

[9] R. Yang et al. Pixelflex: a reconfigurable multi-projector display system, VIS '01

[10] A. Raj et al. Pixelflex2: A comprehensive, automatic, casually-aligned multi-projector display, IEEE International Workshop on Projector-Camera Systems, 2003





# Summary



# First Part

Theories and technical aspects:

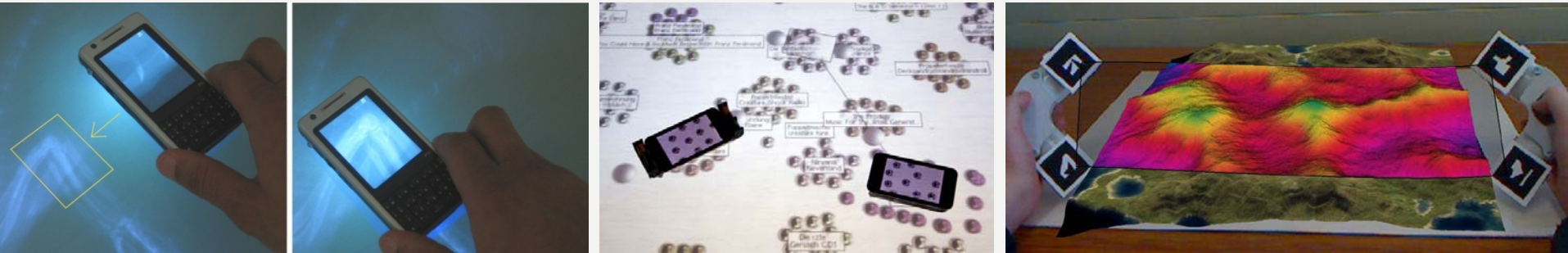
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## Second Part

Examples, grouped by categories

- virtual superimposing
- distant superimposing
- direct superimposing



# Thanks for your attention!

