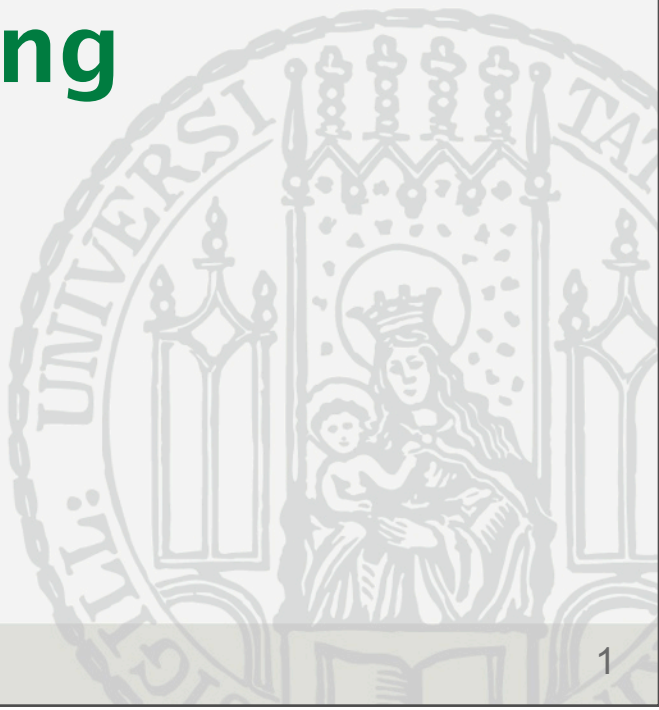
LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

LFE Medieninformatik • Fabian Schmidt

Digital Sandbox – User centric urban planning

Medieninformatik Oberseminar
Sommersemester 2009
Abschlussvortrag Projektarbeit



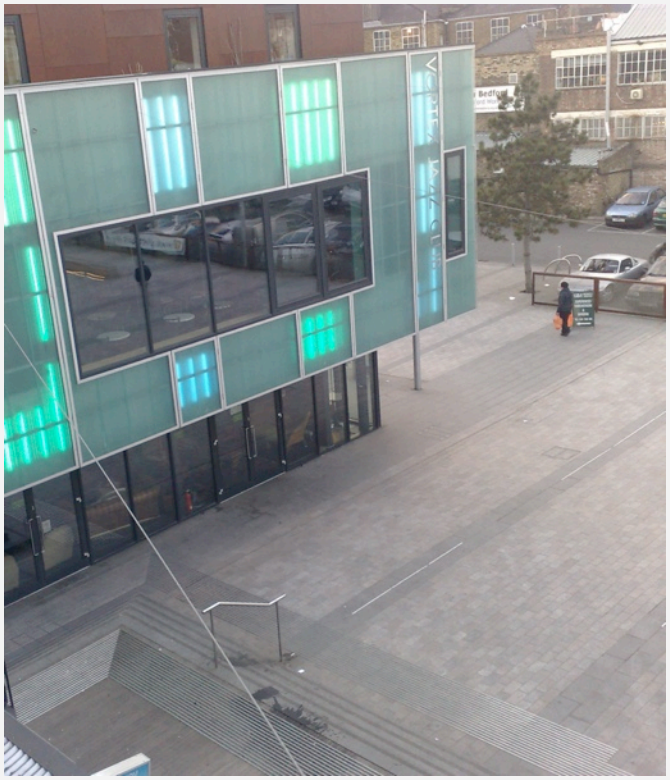
AGENDA

- The team
- Project – idea and approach
- Some details on implementation
- Related links, Source code
- Small demonstration

The team

- Project done in association with :
  - Gadi Sprukt
  - Helmut Feder
- 'Central Saint Martins College for Art & Design', London
  - part of their master thesis in 'MA Creative Practice Narrative Enviroments'

Project – Idea and approach



site of workshop
(image: Helmut Feder)

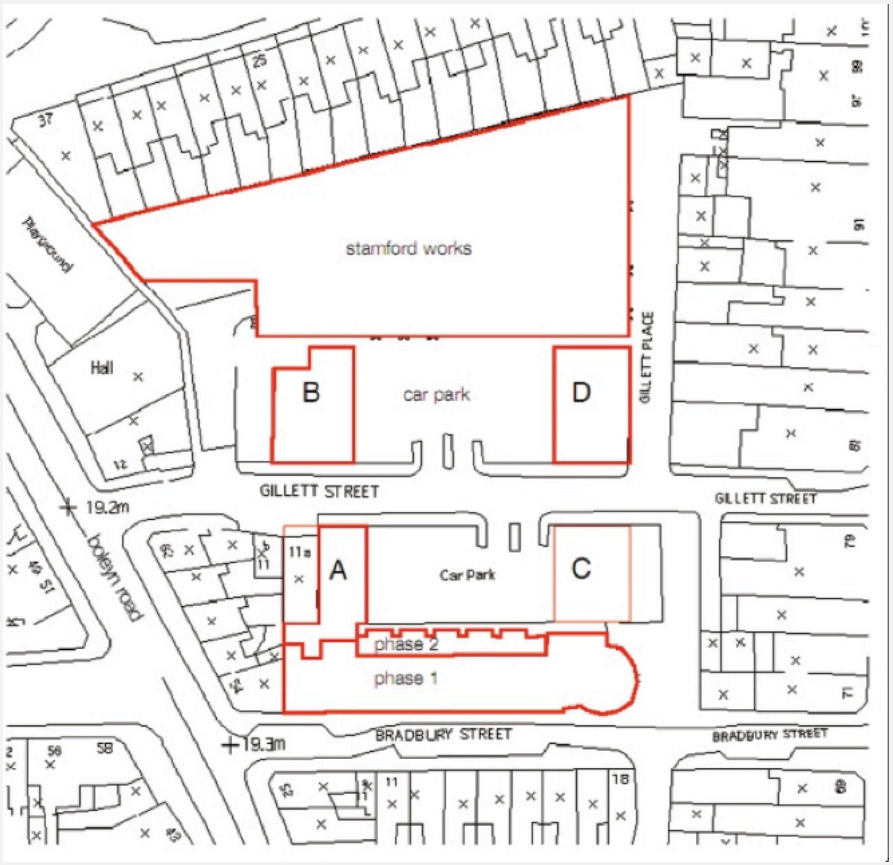
Gillet Square, London
(image: Helmut Feder)

the Project

- Duration: November 08 – Mid April 09
- Context
  - Redevelopment of Gillett Square (Hackney London) in 2006
  - Unpleasing results, only few people attracted
  - Further development planned in the area
  - Opportunity to present own ideas, support by City of London
- Idea :
  - Find ways to better integrate people in future planning process
  - Aid professionals consulting them
  - Enable them to express their ideas with a playfull, easy to understand interface
- Own Part : Technical concept and software-development, aiding with all sorts of technical issues and questions, 3 stays in London in preparation for the workshop

Project – Area in question

- Red marked areas subject to redesign
- Below a mockup image of final size



(image: Hackney City Counsil)

(image: Helmut Feder)

Project – Design needs and workshop

- Design guidelines
  - Enable people to arrange objects by placing and moving cards on a table
  - Projected view of the square as a background
  - Objects on cards correspond to virtual objects augmenting the screen
  - provide basic user-guidance with 3 'Game-Phases'
  - easy to provide with new content and markers
- Workshop
  - 3 day workshop in a cafe situated on the square (stable software !)
  - passengers invited to create individual versions of Gillett Square
  - after filling out a small ration questionnaire rewared with a printed copy of their design

Project – Implementation Overview

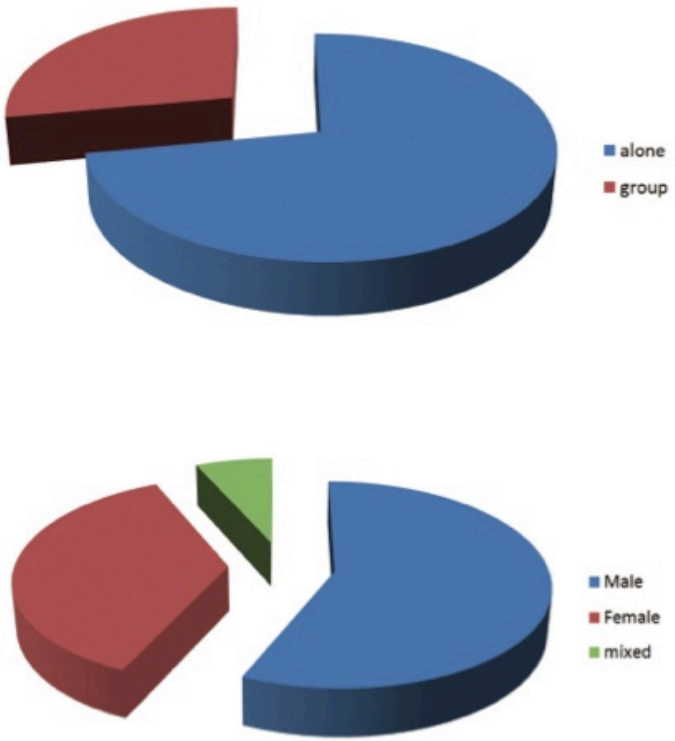
- Implementation ideas :
  - computational camera for pose estimation (using AR-Toolkit)
  - 3d Engine supporting basic features (Model-loading,Scenegraph,etc.)
  - tracking done 'bottom up' through a fibreglass-table (avoiding occlusions)
  - back projection on a canvas (comparably large and bright screen)

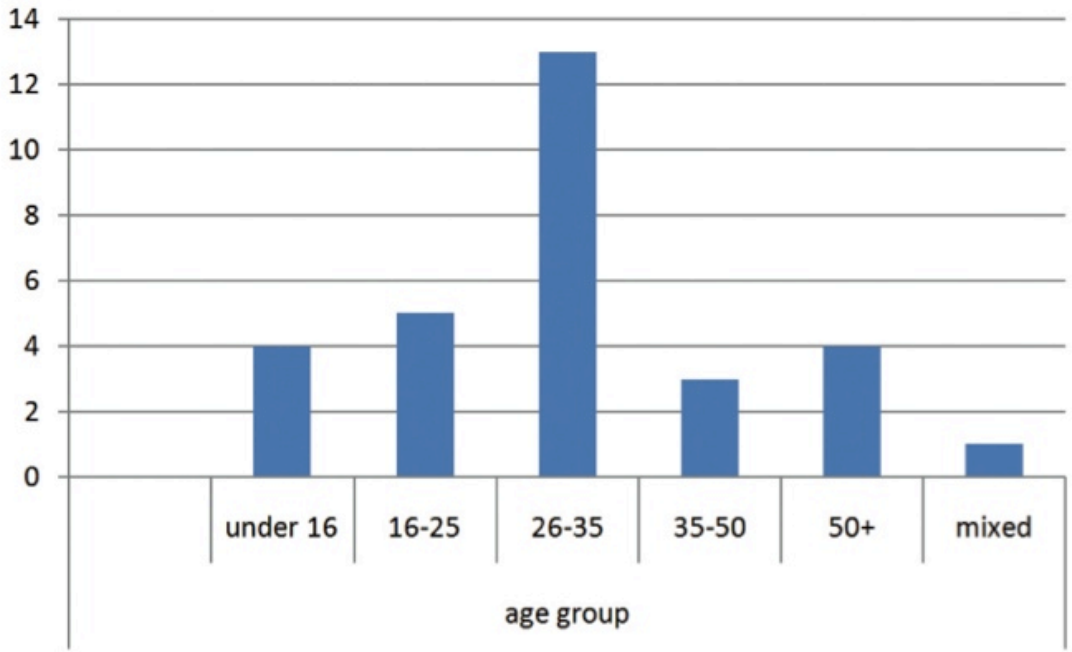
table with markers during workshop

Project – Workshop

- Public workshop in a Cafe on Gillett Square (3 days during april)
- The setup
  - Content divided in different 'game-phases': People, Street furniture and buildings
  - 10 – 15 min on average for creation of scenarios
  - participants talked about what they built and why, filled out a questionnaire
  - printing out final screenshots, presenting them

Project – Statistics





(image: taken from booklet)

Impressions from Workshop

The Sandbox

at Gillett Square / Dalston

video can be found on http://cip.ifi.lmu.de/~schmidtfa/sandbox/workshop.mp4

Screenshot during workshop

Implementation Details

- Software written in C++
  - uses self-written 3d-Engine providing all sorts of file-loading,Scenegraph,Physics,Shaders,Positional audio,Octrees ...
  - using only cross plattform libs (OpenGL,SDL,bullet Physics,lib3DS,CEGUI,...)
  - build available for OSX 10.5 (matter of time;)
- Adaptions for SandBox
  - added marker-tracking with AR-ToolKit
  - simple User Interface (press any key to proceed to next phase)
  - editable XML-Document containing markers/content mapping
  - ShadowMapping on invisible ground-plane
  - Adjustment view to calibrate camera-angles
  - Node-Labels with custom Fonts
  - 3ds Loading

example : Content XML

```
<markerSet>

        <marker name="trees1" width=170 centerX=0 centerY=0 >

            <patternFile>
                res/marker/pattern1.patt
            </patternFile>

            <scene>
                res/scenes/island/tree3.3ds
            </scene>

        </marker>
...
```

still Implementation ...

- heavy use of Standard-Desgin Patterns (Composite-,Visitor-,MVC, ->usual suspects)
- Scenegraph inspired by OpenSceneGraph

Possible future improvements

- Replace AR-Toolkit with decent Feature-Tracker (based on SIFT, SURF algorithms)
- More different kinds of content (+ Physically convincing interaction with scene)
- switch to Collada-Scene and Modelformat (easier sharing of content)
- Projection of user interface-elements among the markers on table

Related links, Source Code

- All images and video taken from Project Website !
  - http://sprukt.com/sandbox/
  - TheDigitalSandbox@gmail.com
- Sandbox Booklet (including questionnaires and polaroids)
  - http://www.cip.ifi.lmu.de/~schmidtfa/sandbox/gillettsquare.pdf
- Source Code Repository
  - https://svn.cip.ifi.lmu.de/~schmidtfa/svn/Asteroid/trunk
- Client for OsX (including content) ~ 300 Mb
  - http://www.cip.ifi.lmu.de/~schmidtfa/sandbox/client_osx.zip

Small demonstration ahead !

- Thanks for listening !
- Any questions so far ?