Bauhaus-Universität Weimar
Faculty of Media
Degree Program Computer Science and Media

Can't touch this -
A Prototype for Public Pointing Interaction

Master Thesis

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Abbrevations

1 Abstract

Annotations

- Exciting summary

- Create interest

2 Introduction

Annotations

- Short overview, about what has been build

- Summary

- System of libraries for pointing interaction

- Information system (Information On Demand)

- 'Uncharted territory' $\rightarrow$ technical focus

- Template solution / 'just a proof of concept'

- Motivation

- Working within the confines of museums respectively public installations

3 Related Work

Annotations

- Backgrounds
    - Historical
    - Technical
- Application areas

- Not to much detail
- Only in respect to the thesis' topic

3.1 Museums

Annotations

- Historical evolution
    - Museums are believed to be old fashioned
    - Mostly willing to experiment (Examples)
        * Dioramas
        * ...
        * Animatronics
        * Robotics

3.2 Public single-user interfaces

Annotations

- Human behavior concerning public interfaces

    - self-service at train-stations

    - public interfaces, such as Tobias Fischer's *SMS-Schleuder für Fassaden*

    - Intuitive usage vs. inhibition

3.3 Tangible Interfaces

Annotations

- Technologies for input / interaction

- Hands-free

- Gestural interaction (Kinect)

3.4 Virtual Reality

Annotations

- Input

    - Metaphors and devices

        * Navigation and selection in 3d space

        * Possibilities

        * Difficulties

        * Constraints

4 Museums

Annotations

- Project process: Partnering

- Preselection of possible partners
- Criteria
    - Proximity
    - Flexibility
    - Open-mindedness
    - Attractiveness of theme
- 'Supply and demand'

4.1 Requirement analysis

Annotations

- 'What do we have to offer?'
- 'What do we need?'
- 'What should the museum be offering?'
- 'What does the museum want?' *better: need*

4.2 Further investigation

Annotations

- Visit preselected museums

- Getting an Overview $\rightarrow$ (Im)Possibilities

- Establish a first contact

4.3 Determination

Annotations

- Offical introduction at the museum

  - Personal

  - Present requirements see 4.1

- Brainstorming

  - Museum-staff: 'Emphases'

  - Me: 'Possible solutions'

5 Conception

Annotations

-

5.1 System design

Annotations

- User perspective
    - Visitor
    - Curator / staff
- System view

- Development of ideas according to the plan
    - Method of elimination
    - Feasibility
        * Effort
        * Cost

5.2 Design options

Annotations

- Possibilities of hard- and software

- Capabilities of a single programmer (me)

5.3 Constraints

Annotations

- Technical

- From the museums perspective

  – Size

  – Cost

  – Inclusion

- Limitations of hard- and software

- Capabilities of a single programmer (me)

5.4 Final concept

Annotations

- 'Pflichtenheft'-criteria

  – Must

  – Should

  – Could

- Contract between MUFT, BUW and me

5.5 Testing

Annotations

- Test of pointing accuracy

- Development of algorithms for eye-hand mismatch (elbow/hand + head/hand)

- Test of algorithm's accuracy
    - Target = '90 percent of all values within a 10cm radius of mean value'
    - Differentiation between real and virtual point
    - Necessity of 1:1-mapping of real and virtual point

6 Implementation

Annotations

- Explanation of functionalities
- Diagrams
    - Classes
    - Sequences
- Sketches

6.1 Interactive Museum Installation - Libraries

Annotations

- 'What are the libraries?'
- 'What does each one do?'

6.2 Interactive Museum Installation - Administration-software

Annotations

- 'What is the administration-software?'
- 'What does it do?'

6.3 Interactive Museum Installation - Presentation-software

Annotations

- 'What is the presentation-software?'

- 'What does it do?'

6.4 Interactive Museum Installation - Presentation-remote

Annotations

- 'What is the presentation-remote?'

- 'What does it do?'

6.5 Interactive Museum Installation - Statistics-tool

Annotations

- 'What is the statistics-tool?'

- 'What does it do?'

7 Installation

Annotations

- Current State
    - Comparing Lab- and Summaery-setup
    - Documentation of system's installation

8 Evaluation

Annotations

- Pre- and postcondition of exhibition

- Survey of visitors' behavior prior to system's installation and afterwards

  - Interaction between visitors

  - Interaction with display

  - Length of stay (LOS)

  - Interview

  - Evaluation-Form

9 Discussuion

Annotations

- Conclusions

    - Comparison to Conception

    - Comparison to 'Pflichtenheft'

10 Future Work

Annotations

- My work in relation to situation described in chapters 2 and 3

- Outlook of possible further developments or optimizations of the system

    - Multi-user

    - Mobile devices

    - Audio

    - 3-dimensional positioning of objects and users

    - different possibilities of feedback

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Affidavit

Affidavit

I hereby declare that this master thesis has been written only by the undersigned and without any assistance from third parties. Furthermore, I confirm that no sources have been used in the preparation of this thesis other than those indicated in the thesis itself, as well as that the thesis has not yet been handled in neither in this nor in equal form at any other official commission.

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Michael Pannier