Master Praktikum Games: AR

Final Presentation

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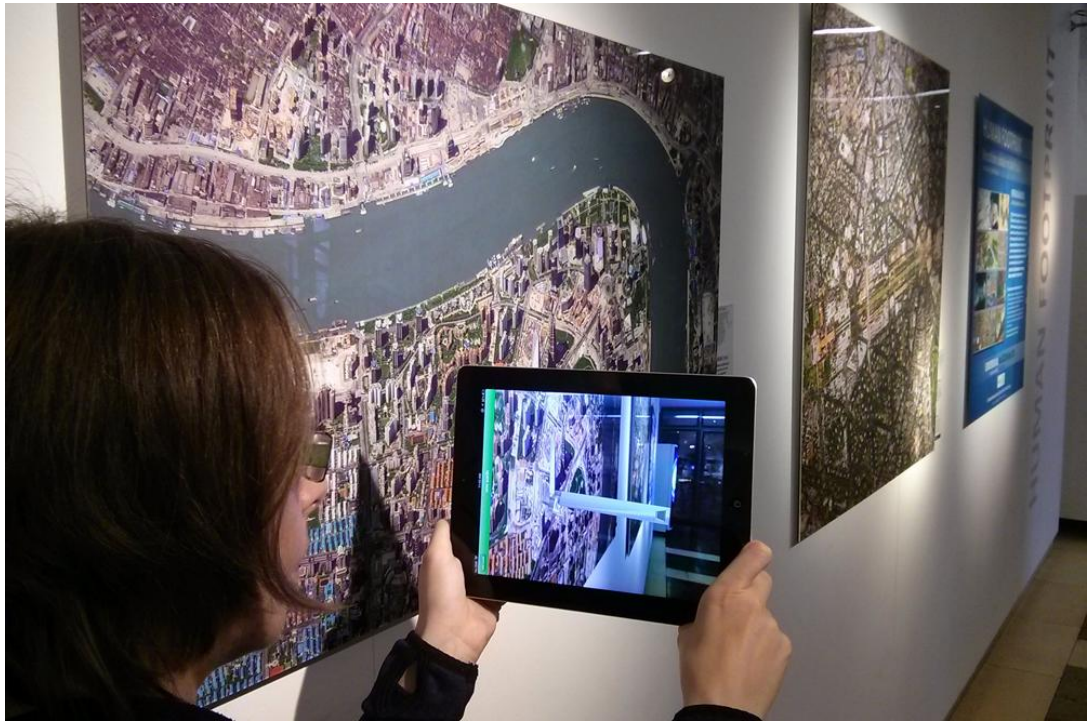
Elisabeth Fraberger, Annalena Bloch, Tim Kaiser, Jonathan Borowski
Supervisor: David Plecher

AR In Museums



[1] https://www.wikitude.com/blog-augmented-reality-museums/

Findings from the existing AR implementations

- Visitors feel engaged [2]
- Elderly groups might be left out [2]
- Visitors consider the experience enhanced [3]

[2] https://www.museumnext.com/2019/02/how-museums-are-using-augmented-reality/

[3] https://www.culturehive.co.uk/resources/cuseum-results-from-augmented-reality-museum-visitor-impact-study/

Project description

Interactive exhibition at the museum of classical Greco-Roman castings

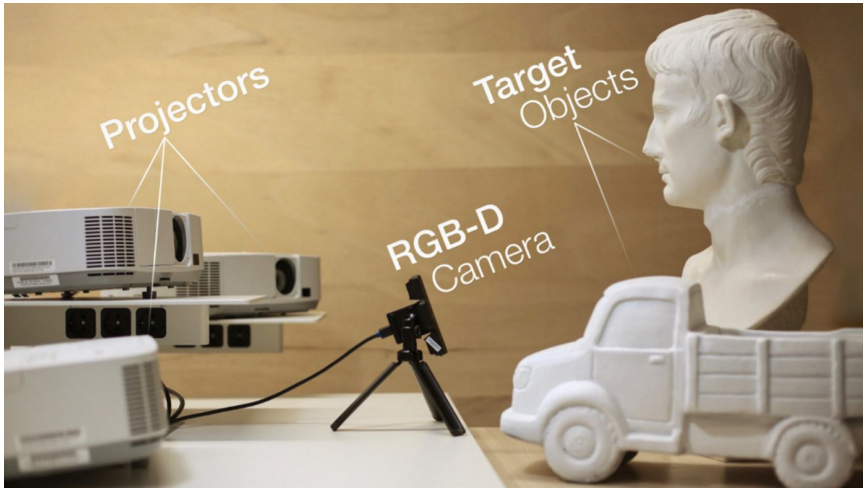
Our Project - Tombstone of Xanthippus

- ~420 BC, Athens
- Excavated 1747
- Currently in British Museum, London
- Shows deceased with his two daughters holding shoemaker’s last

Our Project - Tombstone of Xanthippus

- ~420 BC, Athens
- Excavated 1747
- Currently in British Museum, London
- Shows deceased with his two daughters holding shoemaker’s last
- No scientific reconstruction of paint

Related work

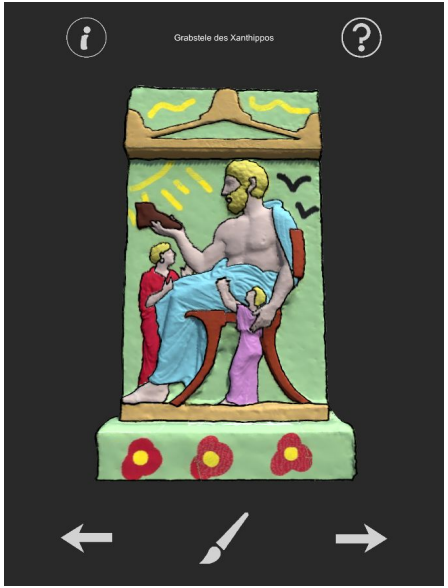


[4] Auto-Calibration for Dynamic Multi-Projection Mapping on Arbitrary Surfaces (November 2018)
Kurth, Lange, Siegl, Stamminger and Bauer. Friedrich Alexander University Erlangen

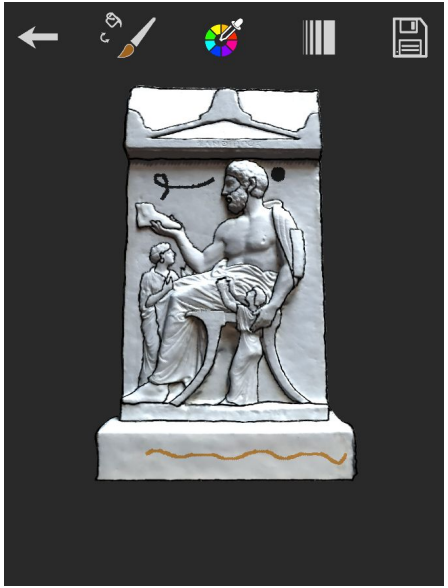
[5] Dynamic Shader Lamps: Painting Movable Objects Bandyopadhyay, Raskar, Fuchs, University of North Carolina at Chapel Hill

Implementation - Features

Info Screen



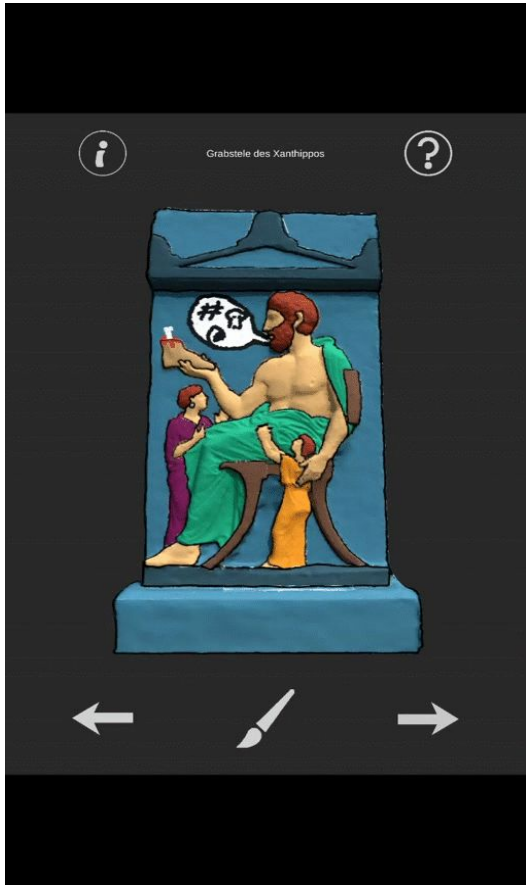
Gallery



Drawing

Implementation - Gallery

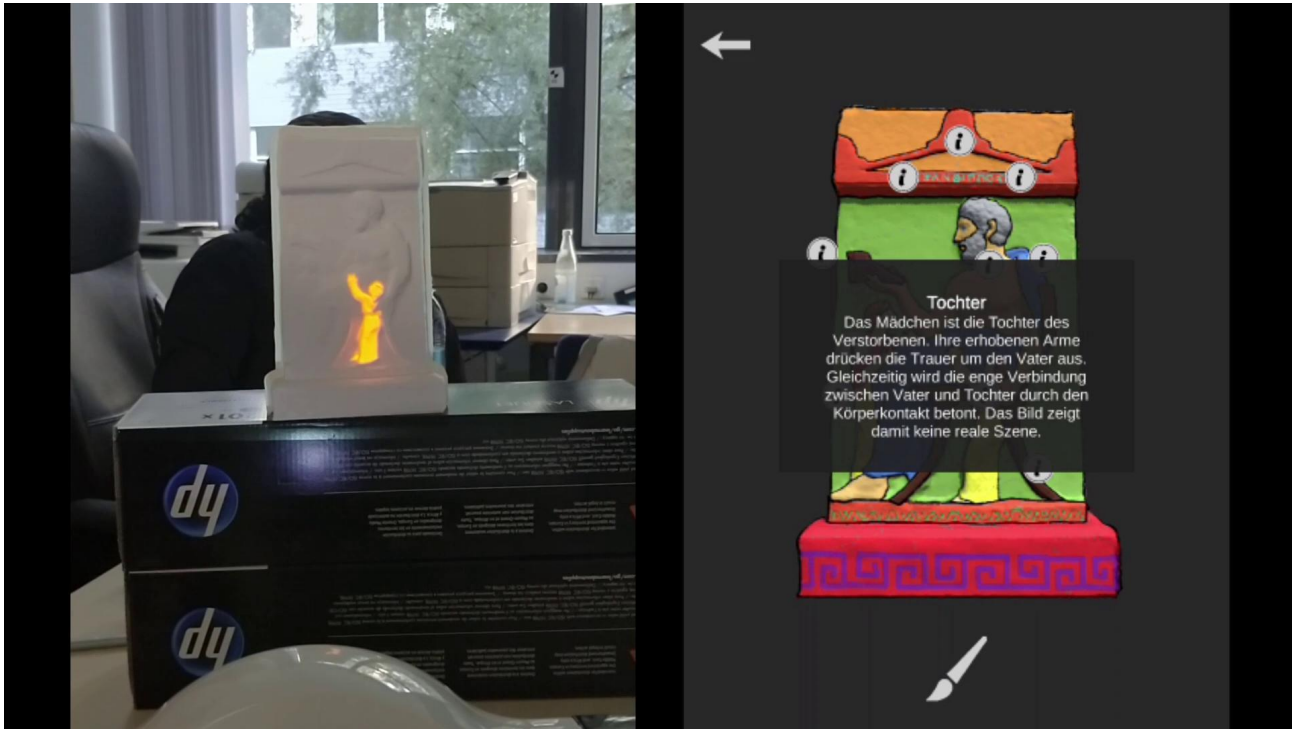
- Displays saved paintings
- Switches every 30 seconds
- Acts as main menu with access to Info and Draw Screen



Implementation - Info Menu

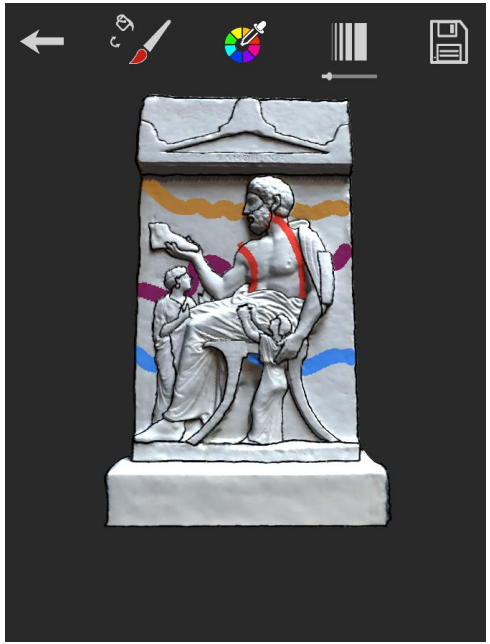
- Gives historic background information
- Information provided by museum
- Highlights selected parts on real stele

Implementation - Info Menu

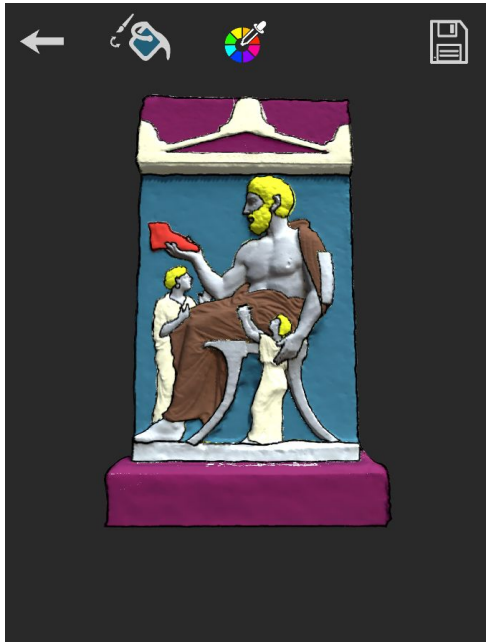


Fachgebiet Augmented Reality
Technische Universität München

Implementation - Draw Screen



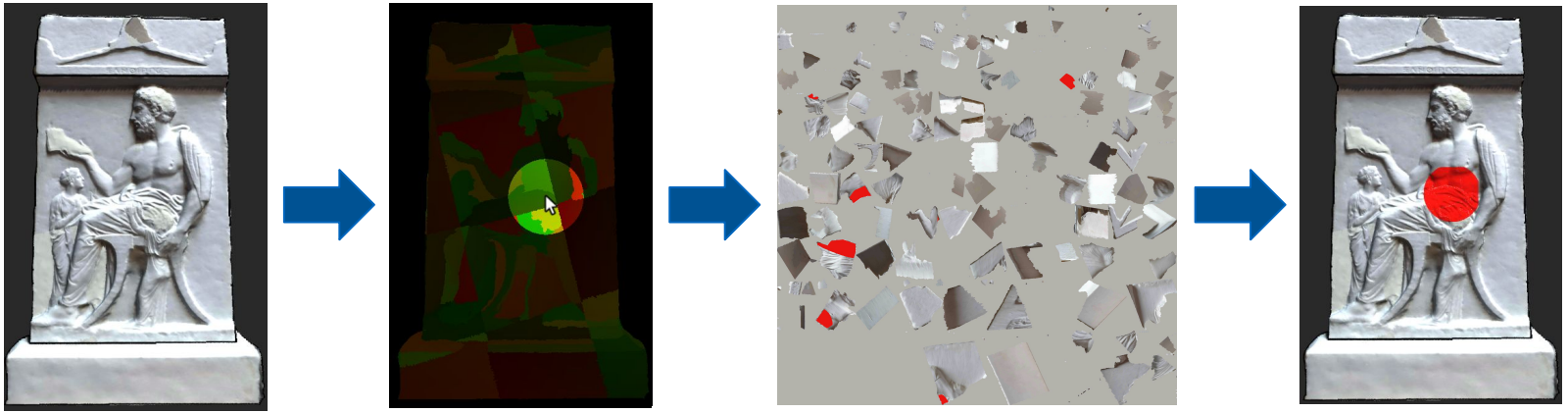
Brush Tool



Fill Tool

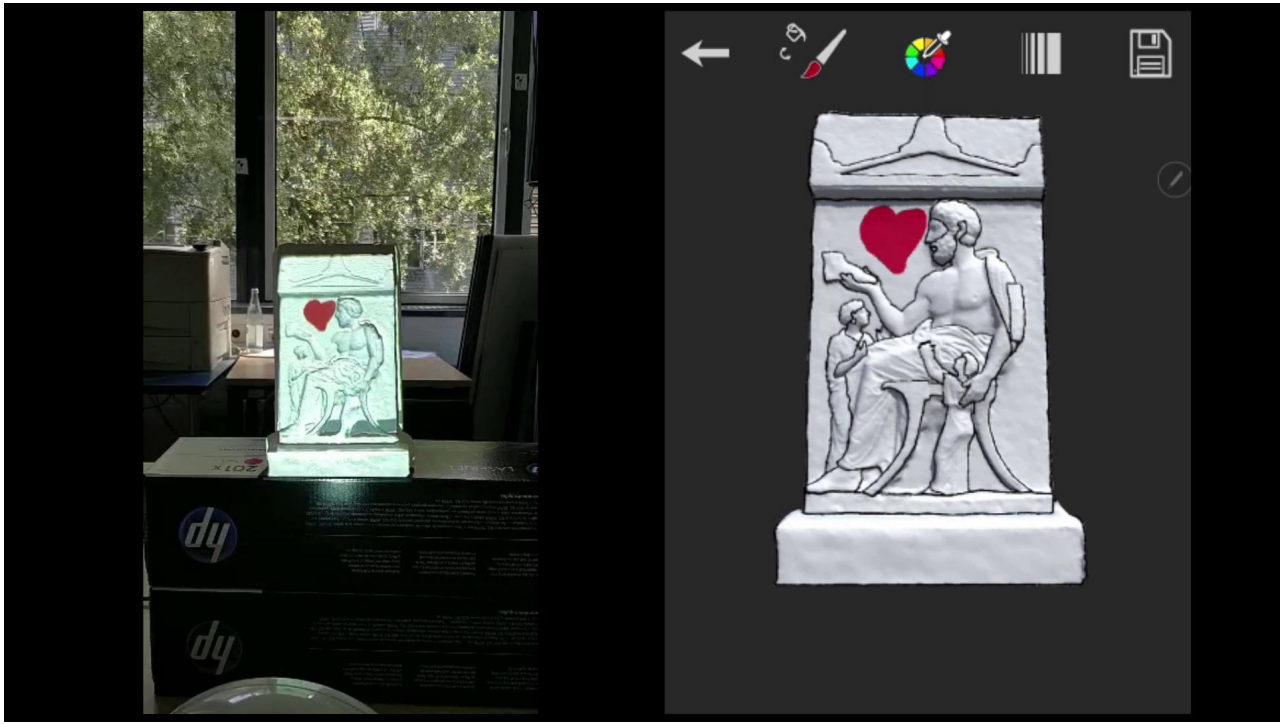
Color Selection

Implementation - Draw Screen



Draw Screen | Texture Coords. | Texture | Projector

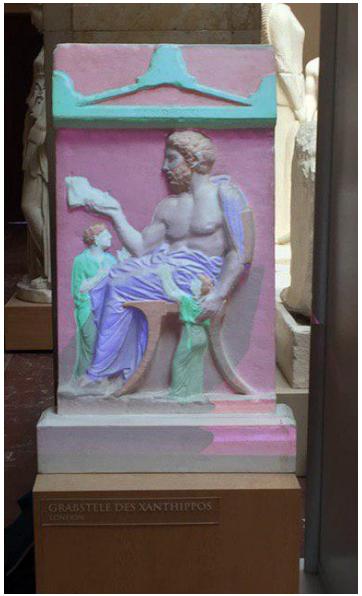
Implementation - Draw Screen



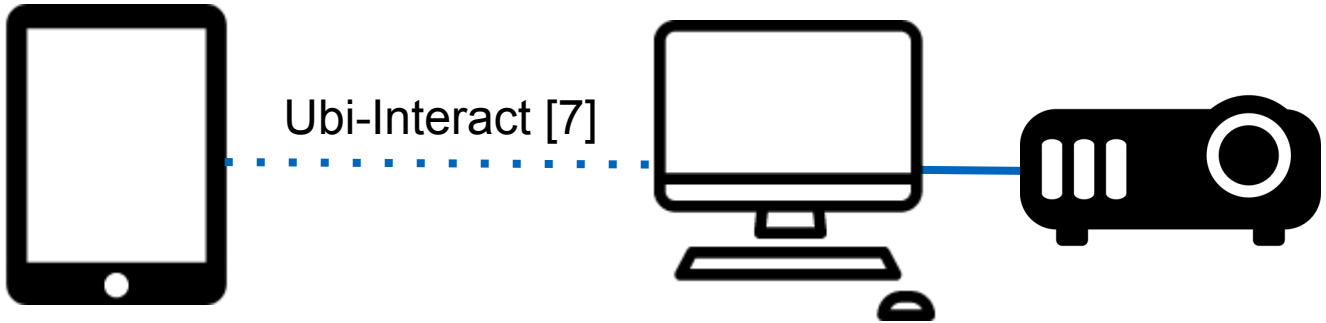
Implementation - Projection

- Calibration necessary to match projection and real object

- Only simple calibration due to 2D object
  - Translating,
  - Scaling
  - Simple Perspective manipulation



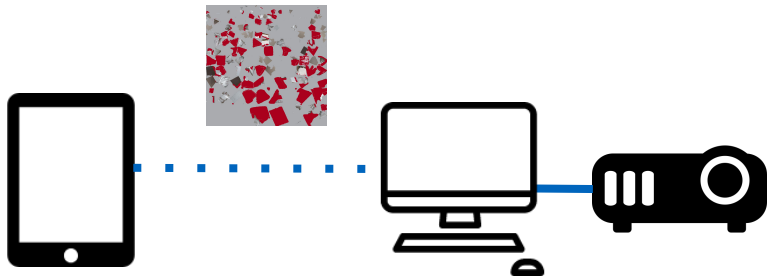
Implementation - Wireless Communication



[6] All Icons made by Freepik from www.flaticon.com
[7] Ubi-Interact: https://wiki.tum.de/pages/viewpage.action?pageId=71313835

Implementation: Wireless Communication

- Three strategies:
  - Gallery: Send drawings as texture

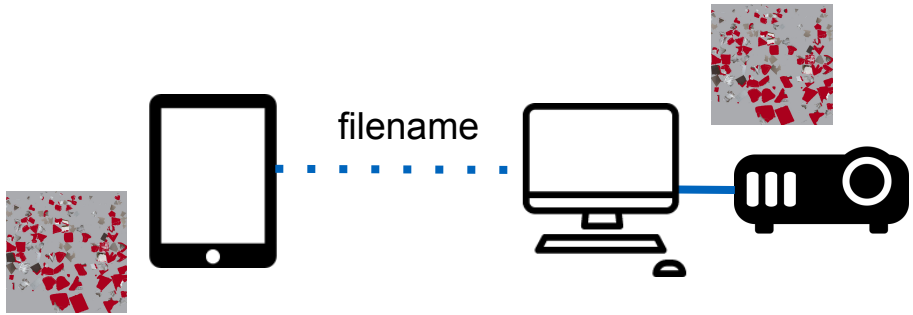


\+ Send anything

\- Huge amount of data, transfer time

Implementation: Wireless Communication

- Three strategies:
  - Gallery: Send drawings as texture
  - Info Screen: Send command and load local file

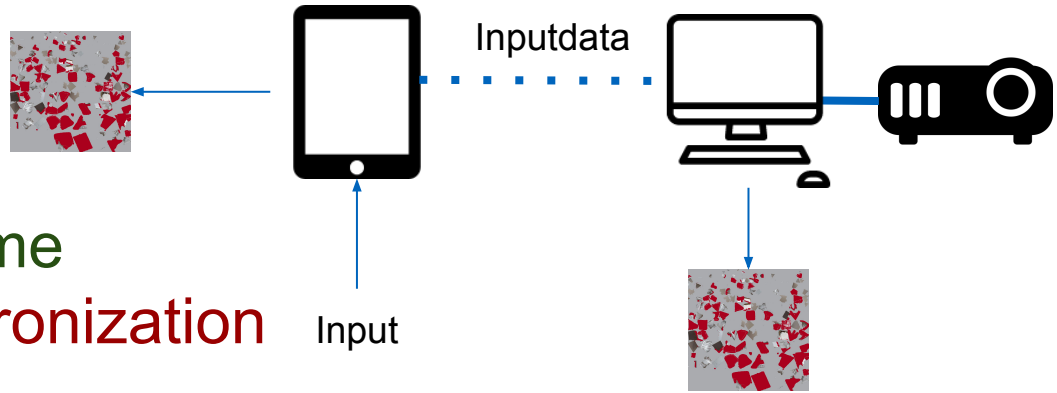


\+ Efficient

\- Limited to static files, redundant

Implementation: Wireless Communication

- Three strategies:
  - Gallery: Send drawings as texture
  - Info Screen: Send command and load local file
  - Drawing: Send draw command and update drawing



\+ Realtime

\- Synchronization

Technical challenges

- Uncertainty of which devices will be used in museum
- Communication: Bluetooth vs. Ubi-Interact
- Crashes on Demo Day (fixed)

Evaluation

- Use INTUI [8] and MMGS [9] Evaluation
- INTUI to test whether the application is intuitive with 4 components:
  - Effortlessness
  - Verbalizability
  - Gut Feeling
  - Magical Experience
- MMGS for evaluating Multimedia Guides in museums with 3 components:
  - General usability
  - Learnability and Control
  - Quality of interaction with the guide

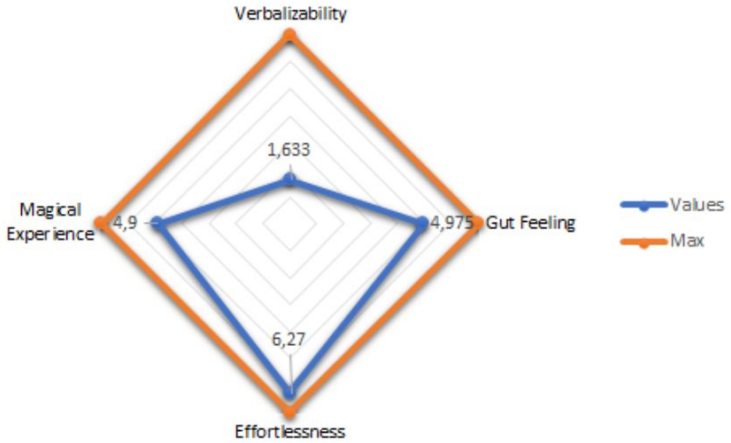
[8] http://intuitiveinteraction.net/method/#download

[9] Othman, Mohd Kamal. “Measuring visitors' experiences with mobile guide technology in cultural spaces.” (2012).

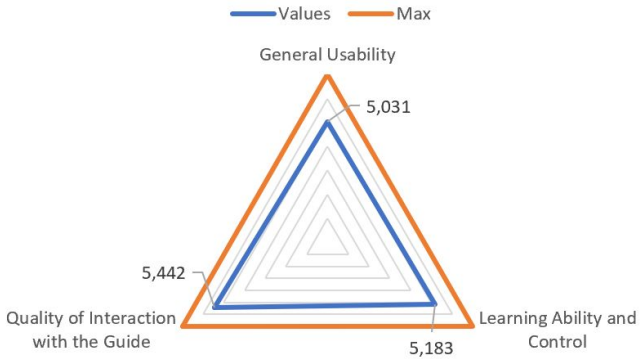
Evaluation

20 users (17 male, 1 female, 2 diverse), aged 21-34

INTUI results:



MMGS results:



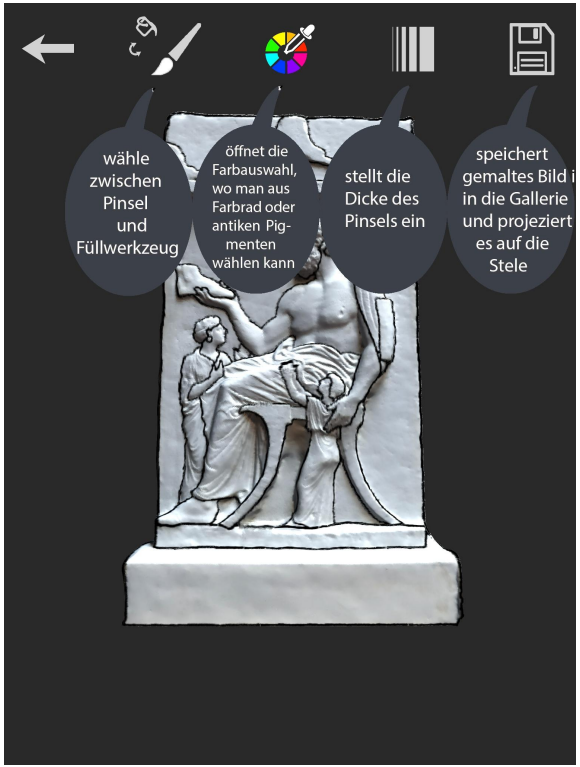
Potential Future Work

- Multiple concurrent users
- Social network features
- Multiple projectors for 3D objects
- Integration into a museum app suite (MA)
- Undo-Feature and command queue
- Synchronization of files

Questions?

Appendix


Grabstele des Xanthippos
Informationen zu der Stele
Hilfebildschirm
kann mit dem Finger rotiert werden
zum durchblättern der abgespeicherten Bilder
öffnet den Zeichenmodus
486.8954.png


wähle zwischen Pinsel und Füllwerkzeug
öffnet die Farbauswahl, wo man aus Farbrad oder antiken Pig-menten wählen kann
stellt die Dicke des Pinsels ein
speichert gemaltes Bild i in die Gallerie und projeziert es auf die Stele

Appendix


Speichern und zur Gallerie zurückkehren?
Name:
Max Mustermann
Alter:
42
Geschlecht:
keine Angabe
Speichern
Abbrechen


Fortfahren ohne zu speichern?
Ja
Zurück