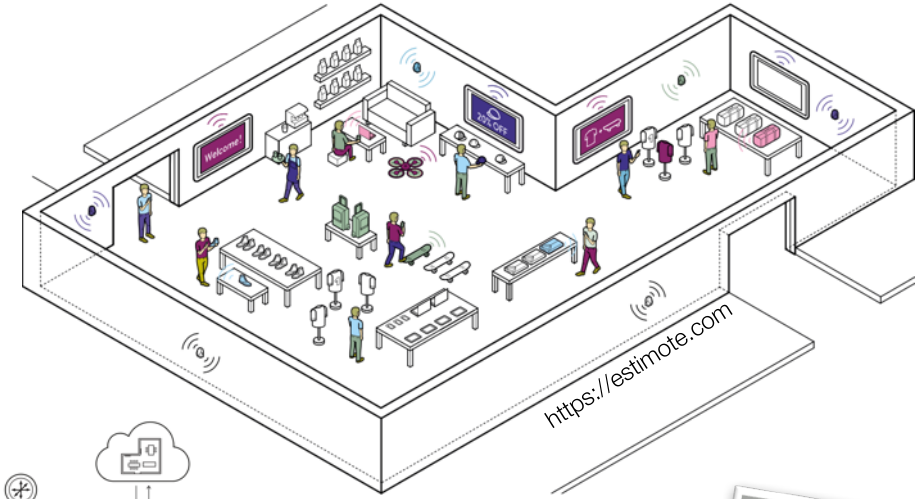
Design

Bachelor / Master

Indoor Navigation and Proxemics Interaction for Museums

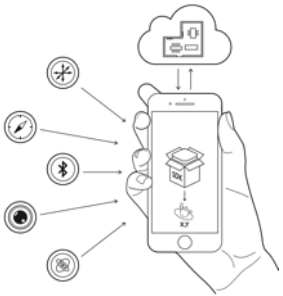
Scenario

Navigation and orientation within exhibition spaces are important for the visitors' experience. Emerging technologies in Bluetooth low energy proximity sensing like iBeacon (Apple) and Eddystone (Google) enables smartphones, tablets and other devices to perform actions when in close proximity to a transmitter (e.g. Beacon). Therefore, this technology enables on the one hand indoor navigation but on the other hand proxemics interactions like on demand content presentation can be implemented.



Project Goal

The outcome of this project is a software prototype (app) for indoor navigation in a real exhibition. Together with the museum curators' contents for proxemics interaction will be created. The app should be evaluated with real visitors.



Task

Literature research, state-of-the-art analysis (seminar presentation & paper)

Development of software (project presentation & paper)

Content integration (Use case) & study (thesis & thesis defence)

Contact

Daniel Klinkhammer

Room: PZ905

daniel.klinkhammer@uni.kn,

Design

Evaluation

Bachelor / Master

Navigation in 3D Spaces: Design and Comparison of Input Devices

Scenario

Interaction in virtual 3D Spaces is an important topic due to the new era of virtual reality and augmented reality devices. Input modalities and devices range from classical game controllers to new 3D controllers up to bare hands (e.g. leap motion). A whole body of research has looked on the performance of different input modalities for 2D spaces (e.g. Fitt's Law studies). However for 3D spaces only a few studies exists. So it is still an unanswered question which interaction device performs best in specific tasks and environments.

Project Goal

The outcome of this project is a comparative study of different 3D input devices. This study should at least answer the following questions:

- Which device has the highest navigation performance (Fitt's law)
- How high is the physical demand of the different devices

Task

Literature research, state-of-the-art analysis (seminar presentation & paper)

Development of software (project presentation & paper)

Conduction of study & analysis (thesis & thesis defence)

Contact

Daniel Klinkhammer
Room: PZ905
daniel.klinkhammer@uni.kn,

Design

Bachelor / Master

Design and Evaluation of a Mixed Reality System for Museums

Scenario

Mixed Reality (MR) is an enabling technology for a much more interactive and intuitive experience of museum exhibits, that allows museum visitors to interact with exhibits, without using complex virtual interaction metaphors. In a current cooperation project we are developing a new exhibition concept for the „Stadtmuseum Radolfszell“. You will work in a interdisziplary team (Designers, Architektecs). You will create a innovative mixed reality installation for the new concept.

Project Goal

Implementation of an interactive mixed reality installation for the „Stadtmuseum Radolfszell“ which can be evaluated with real users in the wild.

Task

Concept creation (seminar presentation & paper)

Development of software (project presentation & paper)

Installation and evaluation of the system (thesis & thesis defence)

Contact

Daniel Klinkhammer
Room: PZ905
daniel.klinkhammer@uni.kn,

Design

Bachelor / Master

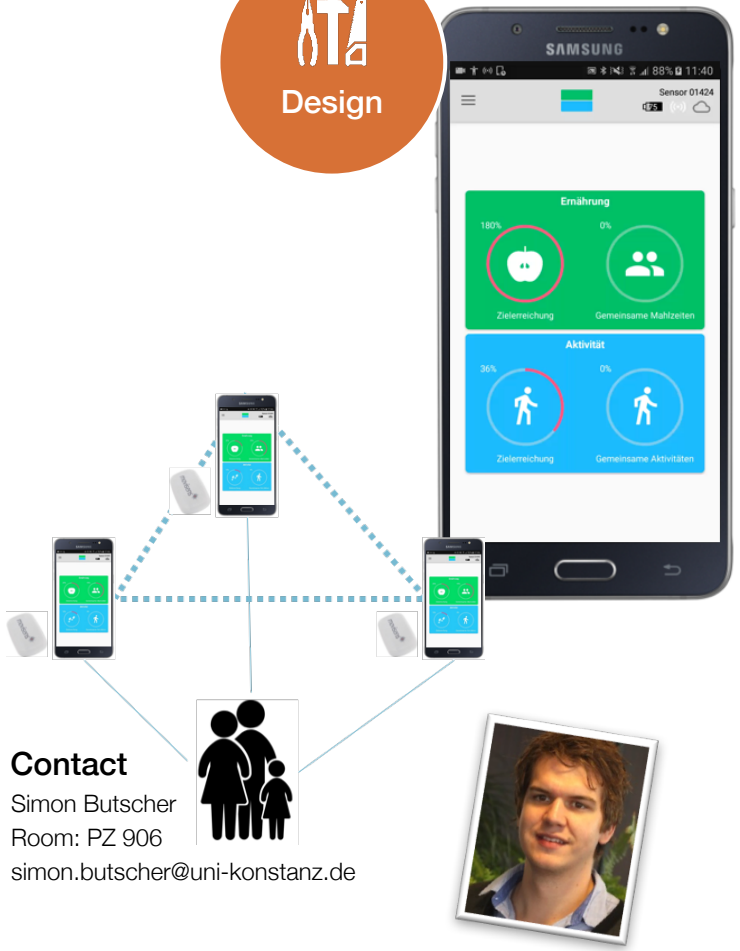
Motivational messaging in small groups

Scenario

Mobile health applications for behavior change target healthy eating and physical activity. These applications often consist of a tracking part and a feedback part. Interventions which are designed to induce a behavior change towards a healthier lifestyle are often based on automatically generated visual or textual feedback about the user's performance. Novel research additionally investigates the effectiveness of interventions based on the performance of small groups (e.g., families) instead of the performance of a single person. In this context an open question is if a group messaging functionality which enhances the automatic generated performance feedback which the possibility to send motivational messages to group members can raise the intervention's effectiveness.

Project Goal

The goal of this project is to enhance an existing mobile health application (android) with a real time group messaging functionality. The massager should allow for sending text messages as well as status reports or recommendations based on the individual user's or the current group performance.



Task

Literature research and state-of-the-art analysis (seminar thesis)

Design and discussion of several interaction and visualization concepts (project work)

Implementation of a prototype for Android (project work)

Conduction of study & analysis (thesis & thesis defence)

Contact

Simon Butscher
Room: PZ 906
simon.butscher@uni-konstanz.de

Design

Bachelor / Master

Group, aggregate and filter: Data preprocessing in mixed realities

Scenario

Immersive Analytics is a research strain which investigates novel approaches to analyze complex information in mixed realities. Several previous work focused on the visualization of large datasets in virtual or augmented environments. Also the interaction to configure the visualization and explore the information was already partly tackled. However, for an effective data analysis not only the visualization but also the preprocessing of the dataset as well as the possibility to fluently repeat or adapt preprocessing steps like grouping, aggregation and filtering are an integral part of the analysis workflow.

Project Goal

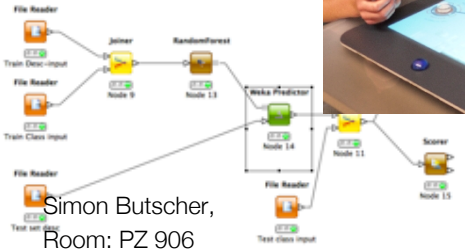
The project is embedded in a bigger research project which considers the creation of a visual data analysis pipeline (similar to e.g., KNIME, SQUIDY, FacetStreams) in an mixed reality environment. The analysis pipeline consists of nodes which are connected to each other and in which the dataset is transformed or visualized. The goal of this project is to design, implement and evaluate nodes to group, aggregate, or filter the dataset using mixed reality devices.

Task

Literature research, state-of-the-art analysis (seminar presentation & paper)

Concept design, implementation (web technology/Unity) of concept(s) (project presentation & paper)

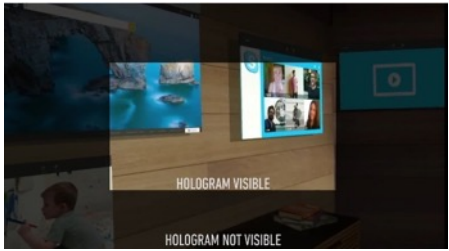
Conduction of study & analysis (thesis & thesis defence)

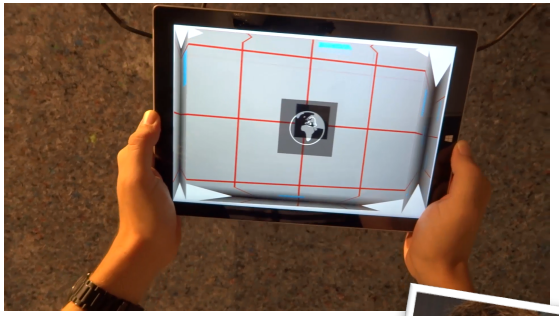


Simon Butscher,
Room: PZ 906
simon.butscher@uni-konstanz.de

Evaluation

Bachelor / Master
Focus + Context Techniques for Mixed-Reality Devices





Scenario

Mixed-reality devices like the Microsoft HoloLens or the Google Project Tango provide the means to overlay our physical environment with digital content. However, to date these devices provide only a very limited field of view. They therefore only allow for a peephole navigation which cuts of contextual information.

For desktop systems there is a huge variety of approaches to overcome the display size limitation and provide contextual information to the user. These techniques are called Focus+Context techniques and range from FishEye views to folding techniques like SpaceFold.

Project Goal

Provide answers to the following question:

Are known Focus+Context techniques (especially folding techniques) suitable for mixed-reality devices?

Task

Literature research and state-of-the-art analysis (seminar thesis)

Design and discussion of several interaction and visualization concepts (project work)

Implementation of a Unity prototype for Microsoft Holo Lens and/or Tango tablet (project work)

Evaluation of the Focus+Context techniques in a lab setting (thesis)

Contact

Simon Butscher
Room: PZ 906
simon.butscher@uni-konstanz.de

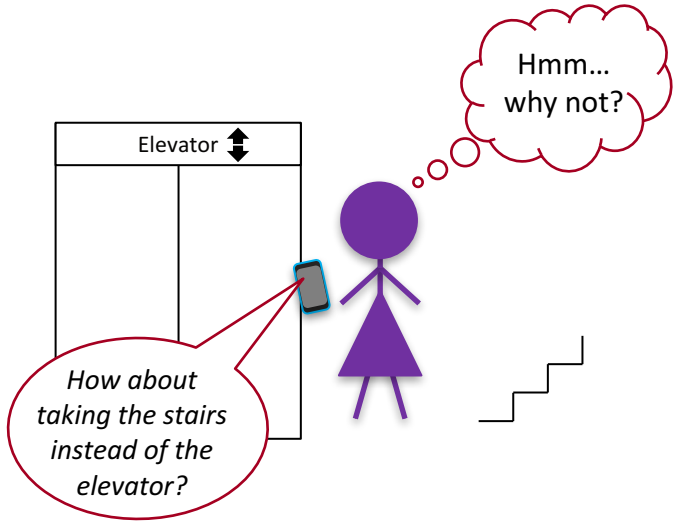
Evaluation

Bachelor / Master

Increasing Physical Activity Using Mobile Devices

Scenario

Mobile devices have proven to be valuable tools to track users' physical activities. Users who wish to increase their physical activity (e.g., to avoid sedentary behavior), however, may require more than simple tracking: they need to be reminded to become physically active and they need to be reminded at the right moment. Mobile devices may detect such meaningful moments, which should be taken into consideration for the goal of increasing physical acitvity.



Project Goal

The Design and implementation of a mobile app that supports users in increasing their physical activity with timely reminders: #1 identification of potential meaningful moments, #2 application of meaningful moments in terms of timely reminders, #3 evaluation of timely reminders.

Task

- Literature review on mobile health and meaningful moments (Seminar)
- Implementation of a prototype(s) to identify meaningful moments and to provide timely reminders (Project)
- Evaluation of the effectiveness of the timely reminders (Thesis)

Contact

Jens Müller
Room: PZ 906
jens.mueller@uni.kn

Design

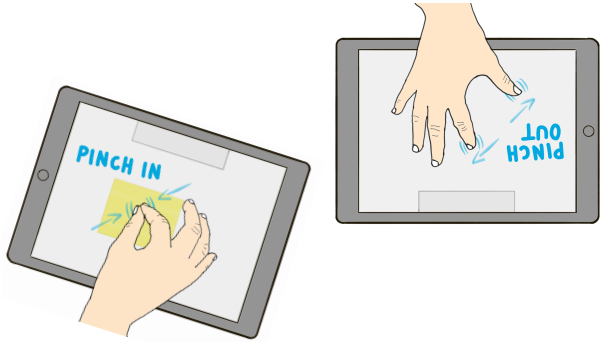
Evaluation

Bachelor / Master

MULTI²: Multi-User Multi-Surface Interaction Techniques

Scenario

Bill and Mary meet at a café to work on a seminar paper. Both of them already found some papers at home and brought them to the meeting – stored on their personal devices. Bill starts to sort and arrange related documents based on their topic to get an overview. Mary places both of her tablets and her smartphone on the table and moves some papers to these devices to cluster them. Arranging their documents, they find similarities, differences, and doppelgangers. Bill and Mary use all of their devices together to simultaneously solve their task while the underlying system takes care of user identification, interactions, and information exchange across devices.



Project Goal

The outcome of this project is a sound state-of-the-art analysis on the topics of cross-surface interaction techniques, user identification techniques, and group work. The development of a prototype allows for further evaluation.

Task

Literature research, state-of-the-art analysis (seminar presentation & paper)

Development of software (project presentation & paper)

Conduction of study & analysis (thesis & thesis defence)

Contact

Ulrike Pfeil,
Johannes Zagermann
Room: PZ 904, PZ 905
ulrike.pfeil@uni.kn,
johannes.zagermann@uni.kn

Design

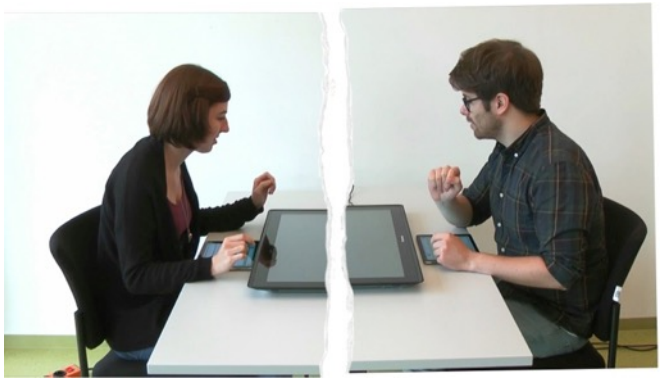
Evaluation

Bachelor / Master

AROUND THE WORLD: Remote Collaboration Techniques

Scenario

Collaboration is part of everyday business for a variety of scenarios: Creative designers combine their ideas as groups, students elaborate topics together and face-to-face communication facilitates successful group work. At the same time, more and more work is spread **around the globe**, which leads to video conferences, excessive mail correspondence and a lack of awareness about work partners' activities. However, today's technology allows for bridging this gap and enabling groups to individually and collaboratively engage in group work activities.



Project Goal

The outcome of this project is a sound state-of-the-art analysis of remote collaboration techniques, a setting that allows for remote collaboration in a specific scenario and a further development of existing prototypes enabling collaborative group activities. The implementation allows for further evaluation.

Task

Literature research, state-of-the-art analysis (seminar presentation & paper)

Development of software (project presentation & paper)

Conduction of study & analysis (thesis & thesis defence)

Contact

Johannes Zagermann

Room: PZ 905

johannes.zagermann@uni.kn

Design

Evaluation

Bachelor / Master

EVA: Framework & Toolbox for Evaluating Interaction

Scenario

Designing, conducting, and analysing experiments is effortful: Experimenters not only need to find appropriate **models, metrics, and tasks** but also have to conduct studies in suitable settings. These two aspects are the basis for the analysis of the outcome of the experiment. Yet, most of the named activities are seperated of each other, leading to even more effort. A framework that guides experimenters during their work and provides necessary documents & tools can tackle these issues and allows additionally for the comparison of experiments.

Project Goal

The outcome of this project is a combination of a state-of-the-art analysis of existing frameworks and toolboxes and a contextual inquiry of experimenters, their tasks, and settings while designing studies and analysing their outcome. This analysis poses requirements for a system to support experimenters in evaluating interaction, which allows for further in-the-field evaluation.

Task

Literature research, state-of-the-art analysis , and contextual inquiry (seminar presentation & paper)

Development of software (project presentation & paper)

Conduction of study & analysis (thesis & thesis defence)

Contact

Johannes Zagermann

Room: PZ 905

johannes.zagermann@uni.kn

Evaluation

Bachelor / Master

REFLECT: Designing for Reflection in Motor Learning Scenarios

Scenario

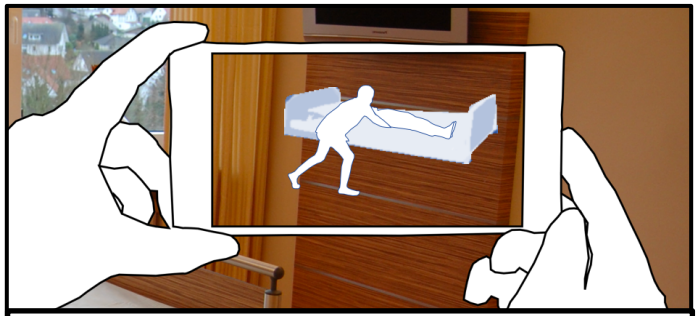
"Without [reflection] no judgment of experience would be possible at all." (Kant, 1790)

Are you a person with a passion for methodical and analytical thinking? If yes, this is your topic:

Different approaches to facilitate motor learning through technical systems exist. However, most existing systems neglect to deliberately support reflection. Reflecting over past experiences potentially fosters the continuous improvement of learned movements. For example, Mixed Reality could be used to show conducted movements in front of a learner. The learner could perceive the movements from different angles and think about them (see image right). Incorporating reflection into the design process could lead to a better support for motor learning.

Project Goal

Survey literature about designing for reflection. Derive a set of criteria which can be used for the evaluation of different designs/systems with regard to reflection. Create a setting to test the derived criteria in a comparison of different conditions. Conduct an evaluation.



Reflecting over movements by placing them in front of a learner and viewing them from different angles.

Task

Literature survey, set of criteria, state-of-the-art analysis (seminar presentation & paper)

Create, implement and pretest an evaluation setting (project presentation & paper)

Conduct an evaluation, analyze/interpret results, provide recommendations (thesis & thesis defence)

Contact

Ulrike Pfeil,
Maximilian Dürr

Room: PZ 908, PZ904

ulrike.pfeil@uni.kn,
maximilian.duerr@uni.kn

Design

Evaluation

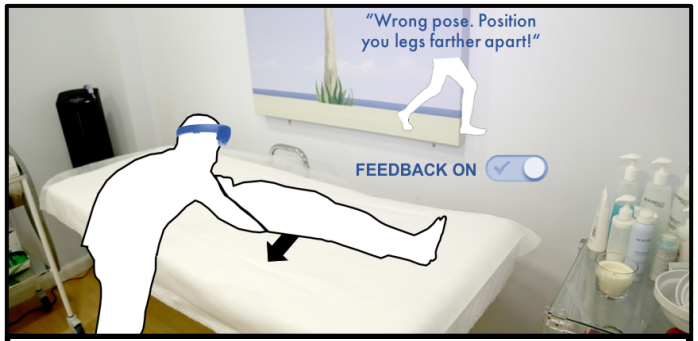
Bachelor / Master

IDecide: Self-Controlled MR-Feedback for Motor Learning

Scenario

[…] at least a certain degree of self-control can result in more effective learning than completely prescribed training protocols (Wulf et al., 2009)

Past research showed that offering learners the possibility to control part of the learning experience can potentially improve the effectiveness of motor learning. In this topic you focus on self-control of MR-feedback. For example, a system might allow learners to control if MR-feedback is given or not (image on the right), the MR-feedbacks frequency as well as various other factors. But what do learners actually **want** to control by themselves? And are they more **efficient** in learning movements if they can control the feedback the way they desire?



Self-Control of feedback by enabling and disabling it.

Project Goal

Survey literature about self-controlled feedback. Based on your findings, build a system which provides MR-feedback for a motor learning scenario (a given system which provides MR-guidance can be used as a base for this task). Conduct an evaluation of the system you implemented.

Task

Literature survey, elicitation study, state-of-the-art analysis (seminar presentation & paper)

Create, implement and test a prototypical system (project presentation & paper)

Conduct an evaluation, analyze/interpret results, provide recommendations (thesis & thesis defence)

MR: Mixed Reality

Contact

Ulrike Pfeil,
Maximilian Dürr
Room: PZ 908, PZ904
ulrike.pfeil@uni.kn,
maximilian.duerr@uni.kn