

Portfolio

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Introduction

About me

I am a fourth year PhD student at the Human-Computer Interaction and Cognitive Systems group in the at the University of Stuttgart. My research focuses the attention management in the smart home.

My Background

Prior to my PhD work I studied Software Engineering in Stuttgart. During my time as student, I did an internship at the FARO Scanner Production GmbH in the research & development department.



Exemplary Project 1:

Calendar Application Supporting Event-Suggestions

Published at MUM'17 and PerDis'18.

Project Background

- Calendars are used to organize the user's daily schedules.
- Social networks allow their users to create and share events.
- The concept of **Caloo** (<u>Cal</u>endar <u>of Opportunities</u>) creates a link between calendars and event suggestion applications.



Project Structure



1. Concept Evaluation

- Interviews with 4 participants were conducted in Stuttgart.
- Participants were asked about how they use calendars and get informed about events. Then, a high-fidelity prototpye of Caloo was presented and discussed.

2. Implementation

Calendar

Server

Google

Database

RSS-Feed

Website

Event

searcher

We implemented a
digital wall-calendar that
displays the users'
Google calendar data.
Further, we retrieved
event suggestions from
local event websites and
added fitting events in a
suggestion layer.



3. Deployment Study

- Caloo was evaluated in a 4-week in-situ study with 4 participants.
- Participants used the application for 4weeks in their daily lives and were interviewed afterwards.



4. Exhibition

The calendar prototype was integrated as an exhibit in in the Telekom Design Gallery (T-Gallery) in Bonn.

Deployment Study

- Deployment in the participants' homes for four weeks.
- Measurements:
 - All user interactions were logged
 - Final semi-structured interview
- Participants:
 - 4 participants (3 male, 1 female)
 - Age: 25 27 years (M = 26.0, SD = 0.8)



Key Insights:

- Experience of the users
 - Participants valued the smart wall calendar and are eager to use it Participants became more open to attend local events.
- Implications for the development
 - Caloo should access the importance of possible event suggestions for the users based on their former attendance, their favorites, e.g., for specific kinds of music or soccer teams.



Exemplary Project 2:

Notifications in the IoT: Exploring Non-Urgent Notifications using a Smart Plant System

Currently submitted to TIOT.

Project Background

 The aim of this project is to investigate how notification systems especially for the smart home should be designed to be obtrusive but still conveying the information to the users.



Project Structure



1. Design

- Two focus groups with 5 participants each were conducted in Stuttgart.
- Participants discussed about information they would be interested about plants and draw their design ideas to provided sketches.

2. Implementation

- A prototype that monitors the plants' water level was implemented.
- Information is shown directly on the plant pot using ambient light and using mobile notifications.



3. Evaluation

- The smart plant system was evaluated within a 8-week in-situ study with 20 participants.
- Participants took care for a plant during the study and experienced every notification type for two weeks in their daily lives.



4. Exhibition

The smart plant system (displaying event-based information at the pot) is shown as an exhibit in the Telekom Design Gallery (T-Gallery) in Bonn.

Implemented notification types:



(a) Persistent notifications: on the plant pot



(c) Persistent notifications: on the smartphone



(b) Event-based notifications: on the plant pot



(d) Event-based notifications: on the smartphone

Deployment Study

- One independent variable:
 - Notification type [within-subject]
- Measurements:
 - Individual questionnaires after each condition
 - Final semi-structured interview
- Participants:
 - 20 participants (9 male, 11 female)
 - Age: 21 60 years (M = 31.9, SD = 12.5)



Key Insights:

- Developers need to provide opportunities for the user to feel in control of home appliances even when the users are not interacting with them.
- Information should be presented in opportune locations at opportune moments.
- Developers of future smart home notification systems have to consider **notification blindness** on the smartphones. Therefore, developers should consider displaying notifications directly on the smart home devices.



Exemplary Project 3:

Comparison of Research Methods to Evaluate Smart Artifacts

Published at CHI'19.

Project Background

 The aim of this project was to investigate whether different empirical methods, e.g, using novel technologies such AR and VR can affect the outcome of a study compared to traditional methods such as online surveys, lab studies, and in-situ studies.



Prototypes

Prototype in a video (Online)





Prototype using VR (HTC Vive)



Prototype using AR (HoloLens)

Prototype using LEDs (Lab / In-situ)









Study Design

- Two independent variables:
 - Between group design:
 - Method (Online, VR, AR, Lab, and In-Situ)
 - Within subject design:
 - Artifact (Cup, Mill, Plant, and Speaker)
- Measurements:
 - SUS, AttrakDiff, and ARI questionnaires
 - Open questions
- Participants:
 - 60 participants (40 male, 20 female)
 - Age: 17 70 years (M = 26.9, SD = 8.1)



Key Insights:

- Participants cannot differentiate between the evaluated prototypes and the used technology, especially for AR and VR.
- The used research method highly influenced results. Therefore, results collected with different methods are not comparable.
- Misleading results could influence future developments of products negatively





Questions?

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