

Master Thesis

In Human-Computer Interaction research, evaluation is used to understand the strength and weaknesses of novel user interface concepts and their implementations. Research questions being answered through evaluation include, but are not limited to, how well the interface supports users' performance (e.g., task completion time or error rate while using a novel smart watch text entry method), how easy a novel interface is to use (e.g., does a novel authentication mechanism support the user in remembering the password), what the users' experience is, whether the interface protects privacy, how acceptable the user interface is, how it affects people's behavior (for example in a public space), and what social implications it has.

Different research paradigms exist to answer the aforementioned questions. While some of the questions are particularly suitable for evaluation in controlled lab settings (e.g., performance), others require more complex approaches, such as field studies or deployment-based research (e.g., understanding effects on audience behavior or acceptability). The caveat of conducting research in the field, however, is the large effort. Prototypes need to be sophisticated and robust to sustain evaluation in an unsupervised environment over a longer period of time and significant researches may be required on the researcher side, e.g., as they observe users in the field.

The advent of virtual reality devices provides an opportunity, to transfer parts of the research until now being conducted in the field to the lab. The reason is that virtual reality allows for creating realistic experiences that elicit behavior comparable to the real world.

The objective of this thesis is to investigate, which research questions are particularly suitable for investigation in virtual reality. In particular, the task of the student is to review previous work that investigated virtual reality as research tool. Subsequently, one application area should be investigated in more detail. Possible areas are automotive user interfaces, large public displays, or appliances for smart homes. The work will be complemented by a discussion of the strengths and weaknesses of the approach and how it can be expected to generalize to other application areas.

Tasks:

- Comprehensive survey of related work
- Review of different application areas and relevant research questions
- Development and implementation of a virtual environment that allows for investigation different research questions
- Running a user study both in the real world and in virtual reality
- Analysis, reflection, and discussion of the outcomes

Requirements:

- Skills in 3D modelling and programming with Unity
- Interest in designing and conducting user studies
- Independent scientific work and creative problem solving

Contact:

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