Design and Evaluation of a Near-Eye Notification System

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Design and Evaluation of a Near-Eye Notification System
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Hintergrund

Technology and its users are moving closer and closer together, not only in the figurative sense but above all in the spatial one. From desktop computers and laptops, which require up to minutes to access information, over smartphones, which are usually carried directly on the users, to smartwatches which can be accessed in a fraction of a second, the spatial and temporal distance between information, displayed by technology and users reduced. In the next step, smart glasses reduce these distances even further by bringing the technology and thus the information directly in front of the user's eye. With these steps, the information content is reduced, but the time needed to inform the user is minimised. While notification systems can also transmit information through auditory or tactile feedback, visual feedback can be discreet and does not affect the surrounding people.

A body of work investigated approaches to bring information even closer to the user. Previous studies explored using peripheral vision through smart glasses with peripheral vision displays [6] or glasses with blinking LEDs as a navigation system [7]. Similarly, peripheral notification systems have also been tested in rooms and not on the human body, which can help not to disturb the workflow of the user [4, 5]. Cidota et al. found that in certain situations, users prefer visual notifications over auditive ones or none, regardless of the difficulty of the task they carried out simultaneously [2]. Different target groups can benefit from different notification systems, visual ones seem to be suitable for hearing-impaired or sleeping user [1]. Additionally, there are areas of application that seem more appropriate and useful for visual notifications than others, such as light pattern notifications in critical care units [3].

As existing approaches only work with systems for open eyes. A system that can also visually provide information to users could bring information even closer to them. Consequently, there is a need for a user-oriented visual notification system which is as close as possible to the user to guarantee fast information transmission.

Zielsetzung der Arbeit

This thesis aims to explore the design of a visual notification system that can display information even if the eyes are closed. Based on this exploration, we will design, implement, and evaluate a prototype, that should be tested regarding its use, usability in everyday life, and social acceptance.

After collecting ideas based on related work, a prototype will be designed and developed. Following, possible fields of applications, user groups, and application scenarios will be collected. Depending on the situation of the Corona Pandemic the prototype will be tested either from the point of view of the user of the notification system or regarding the people surrounding the person using the prototype and the corresponding social acceptance.

Konkrete Aufgaben

- Determination of the current state of research
- Collection of possible implementations of near-eye visual notification systems
- Design, development, and implementation of a prototype
- User study concerning fields of application, user groups, and application scenarios
- Test of the prototype concerning either use and usability or social acceptance, e.g. through images and videos of the usage of the prototype in different situations
- Implementation and evaluation of the chosen study (depending on feasibility due to the Corona Pandemic)

Erwartete Vorkenntnisse

- Knowledge in developing a prototype (hardware and software)
- Design, implementation, and evaluation of empirical studies

Weiterführende Quellen

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