

# Internes Kolloquium

Am Montag, dem 07. Februar 2011, um 16:15 Uhr hält

**Amna Asif**  
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im Rahmen seiner beabsichtigten Dissertation einen Vortrag mit dem Titel

## **Supporting route guidance of car drivers with a tactile display on urban roads**

**Der Vortrag findet im OFFIS, Escherweg 2, Konferenzraum F02 statt.**

### **Zusammenfassung:**

Following a route is an essential driving task. Conventional car navigation systems are designed to provide turn-by-turn route guidance to the driver. Visual and auditory displays successfully complement each other in presenting route information in conventional car navigation systems. However, a car navigation system increases the demand on the driver's visual and acoustic attention and can distract drivers from the primary task of driving, such as maneuvering the car or observing the traffic. The driver performs many primary and secondary tasks on visual and auditory displays increasing the mental workload, which is harmful for the safety of driving.

Tactile user interfaces can provide an alternative way to display spatial information in the car. Nevertheless, how exactly information should be presented in a vibro-tactile way is rarely explored. Tactile parameters need to be examined for designing vibro-tactile messages, which help to present route information to the car drivers. In the process of exploring vibro-tactile parameters, it is necessary to: (1) investigate which information is essential for route guidance of car drivers (2) investigate appropriate design of vibro-tactile messages for presenting that information (3) evaluate the developed design solutions.

For route guidance, drivers require knowledge about: (a) directions in which they are required to turn from the next intersection and (b) the distance between car and the next intersection. Urban roads consist of different types of intersections. Tactile interface can be used to provide essential route guidance to drivers on those different intersections. This thesis explores the design of vibro-tactile messages for presenting route information on simple, flared, channelized, and roundabout intersections.

We investigate a tactile display to present directions to the driver. For this purpose, some initial designs based on brainstorming sessions are proposed. Vibro-tactile messages are designed to present direction information by exploring parameters of the body location. Similarly, we conduct studies to present distance information with a tactile display. Distance information is presented by exploring parameters of rhythm, intensity, and duration. We further conduct some studies to explore tactile parameters for roundabout presentation.

This thesis adapts an experimental approach to evaluate tactile displays for route guidance in the car. The experiments measure performance and cognitive workload of drivers, when they use vibro-tactile display for route guidance. The results show that the tactile display can successfully be used to display navigation information to drivers. It can be used as a substitute to current interfaces for presenting route guidance to drivers. Tactile displays might be helpful to decrease the reaction time in an emergency situation where the driver needs to observe the situation using visual and acoustic senses.

**Betreuerin: Prof. Dr. Susanne Boll**