Empirische Forschungsmethoden für die Evaluation visueller Fahrerassistenzsysteme im Kraftfahrzeug

Abstract of the PhD Thesis of Regina Sprenger

The human-machine interface in motor vehicles is influenced by new driver assistance systems. The technical feasibility of a new system does not guarantee a safety gain by using it. The additional information provided by an assistance system can affect the driving behaviour.

The development of new driver assistance systems for vehicles requires an evaluation of these systems already during the development process. It is important to know how drivers cope with such a new system and how the workload of the driver is influenced by using it. This work discusses which empirical methods could be used to evaluate a visual driver assistance system.

Here the strategies how drivers use a night vision enhancement system were evaluated with an eye tracking system, a questionnaire, and the "thinking-aloud" method. In some cases the objective eye tracking data did not correlate with the subjective impressions of the drivers.

For the measurement of drivers' workload a recent high-resolution blood pressure measurement technique based on the pulse transit-time was used. The results of these measurements were confirmed by the comparative physiological parameters heart rate and skin conductance level. The self-report measures NASA-Task Load Index (TLX) and a modified version of the Rating Scale of Mental Effort ("Anstrengungsskala") were used to determine the mental workload of the drivers.