Augmented indication of lane change intention - Creating an assistive HMI using design thinking

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INTRODUCTION

• Traffic becomes denser, space is limited and drivers interact more frequently. This raises the need for cooperation to ensure smooth traffic flow. The application of modern head-up displays (HUD) offers an ideal possibility to support cooperative interactions.

• Nowadays, information transmitted between drivers is often limited by the binary nature (on or off) of turn indicators.

• Therefore, the opportunity to provide additional information about upcoming lane change maneuvers of other cars in the drivers’ HUD was evaluated.

• The design process of this novel HMI was inspired by the well-known design thinking process illustrated in Figure 1.

METHOD

• Following the design thinking process, at first, four different design variations were developed by understanding, observing, defining and brainstorming.

• Using a low fidelity simulation, these designs were then prototyped and evaluated with naive participants (n=8).

• A combination of thinking aloud, interview, user sketches and questionnaires was used.

• Figure 2 summarizes the ratings of the participants on the van der Laan-scale (Van Der Laan, Heino, & De Waard, 1997). The O in Figure 2 illustrates the rating of a fictive own concept that the participants were asked to sketch.

RESULTS

• The results of both study iterations, show a high overlap regarding the design alternatives which indicates that a high validity could be reached.

• The qualitative nature and the low sample size of this approach do not allow for further generalization.

• However the goal of this approach was to develop a design that is easily understandable and is based on the actual user needs and not merely on the intuition of the designer.

• Achieving these results within a short period of time (two weeks in total) proved the value of design thinking and rapid prototyping during the HMI development process.

DISCUSSION

Design thinking and rapid prototyping proved to be valuable in the HMI design process and can be utilized to generate user centered insights at an early stage.

References:


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