

PhD in Computer and Control Engineering

Research Title: Improving HUD design in AR contexts

Improving AR HUD Design

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Context of the research activity	<p>The project will be carried out by developing a running prototype that will be used as the basis to evaluate the different design choices. This prototype can leverage VR approaches, possibly integrated with motion platforms for simulating car movements in real driving scenarios, which allows a fast implementation of alternative designs and their assessment involving panels of volunteers. The availability of high-quality rendering pipelines, spatialized audio, haptic and inertial feedback improve the realism of the simulation and the feeling of immersion and presence of volunteers. Assessment of design choices will involve mixed methods analysis by integrating qualitative data (i.e., questionnaires) and quantitative data (collected within the application to capture various essential pieces of information like external events, users' actions, reaction times, head, eye, and hand movements).</p>
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Objectives	<p>This research project focuses on the design of automotive HUDs with the following objectives. First, assessing the user experience and usability of the current solutions to provide the foundation for HUD design improvement. Second, offering a thorough analysis of different visual cues (including novel ones designed ad-hoc for this research) in terms of naturalness, communication efficiency, and cognitive load. Third, analyze the integration of visual and auditory cues to improve the driver response to situational changes in the environment.</p>
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Skills and competencies for the development of the activity	<p>Knowledge on the following areas:</p> <ul style="list-style-type: none">• UI/UX/Human-machine system• Visual communication• Cognitive & Processing loading• Automotive HUD• Augmented Reality / Virtual reality• Automotive systems /networks / signals
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