

Enhanced ADAS

Providing contextual information about ADAS limitations in real-time through a driver vehicle interface

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Motivation:

- Advanced Driver Assistance Systems (ADAS) needs to adapt to real-time contextual information in order to address poor driver experience with ADAS and decreased use of these systems.
- Contextual information includes but is not limited to: in-cabin monitoring data, sensor data, and map data.
- The integration of these data sources enables a system to adjust to real-time traffic context and assist the driver in taking decisions, as well as clarify to the driver about decisions that the system takes.



Figure 1: Illustration that shows how integration of data sources enables enhanced ADAS.

Aim:

- The aim of this particular study is to investigate how integration of multiple ADAS data sources can improve the driver's experience, trust and utility of the vehicles ADAS.

Research Questions:

- What is the effect of providing contextual information about ADAS limitations in real-time through a driver-vehicle interface, in terms of driver experience, efficiency and utility?
- What is the effect of perceiving sensor information together with map information, in terms of driver experience, efficiency and utility?

Method:

A driver-vehicle interface was designed with capabilities to 1) show what the vehicle is perceiving combined with road map information, 2) inform the driver about limitations in the vehicles ADAS in real-time and in relevance to the surrounding environment, and 3) warn the driver of inattentiveness. Nine participants experienced the drive-vehicle interface whilst driving on public roads, and providing feedback during and after the drive.

Acknowledgement

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Results:

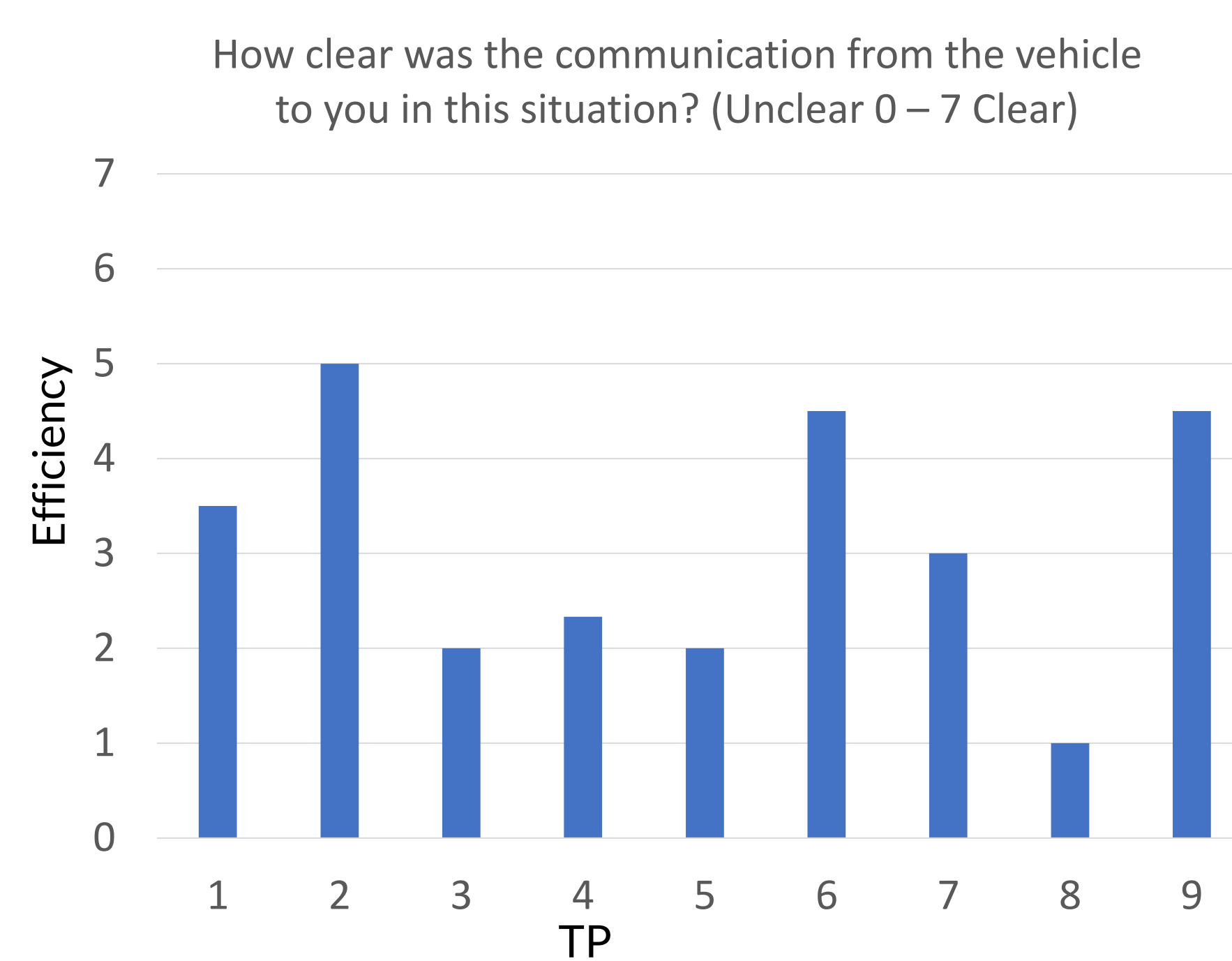


Figure 2 - during driving: graph of each participant mean score (x-axis) on the efficiency (y-axis) of the communication from the vehicle interface after scenarios where the ADAS informed that it will not give any assistance due to operational design domain limit.

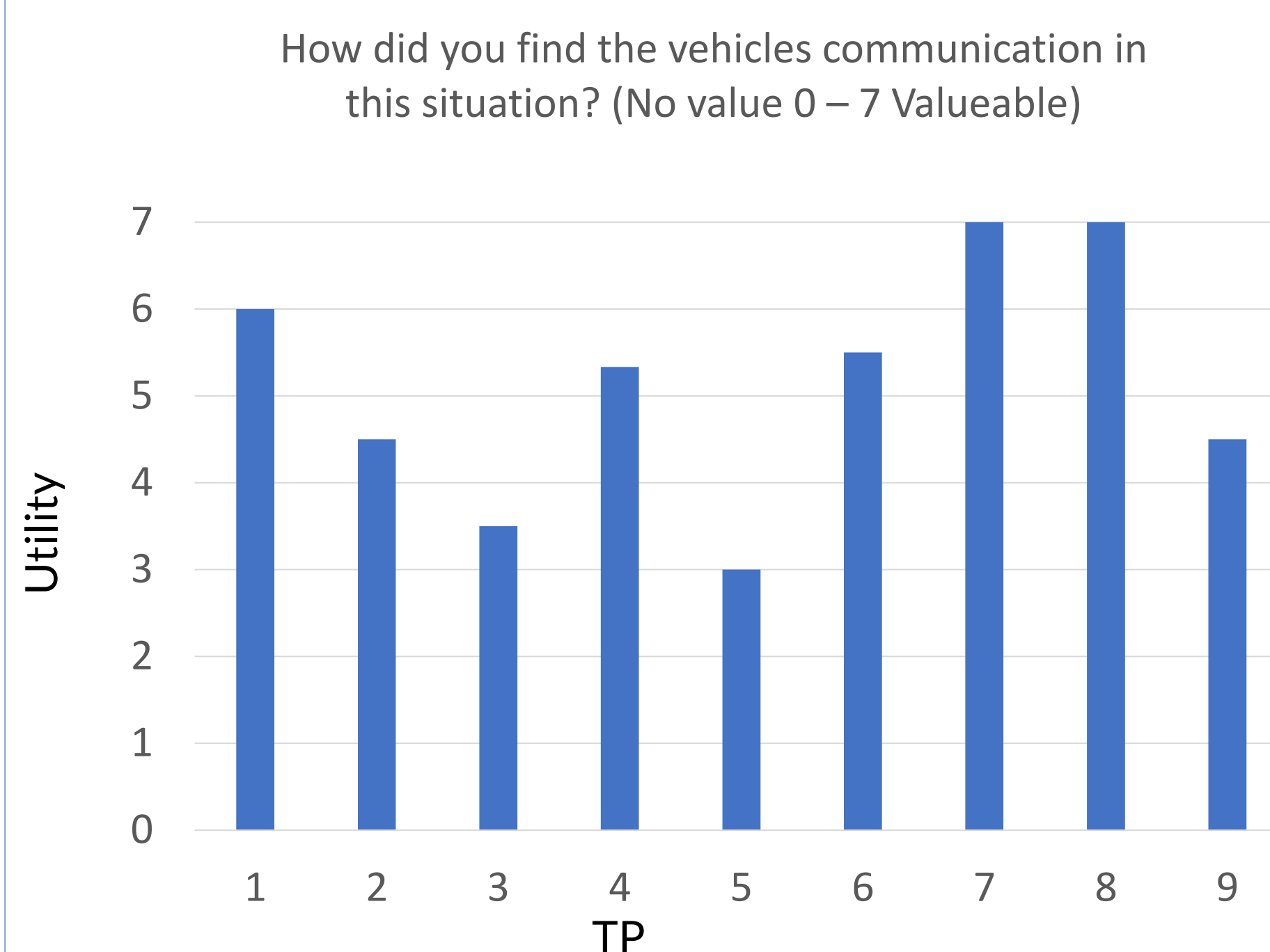


Figure 3 - during driving: graph of each participant mean score (x-axis) on the utility (y-axis) of the communication from the vehicle interface after scenarios where the ADAS informed that it will not give any assistance due to operational design domain limit.

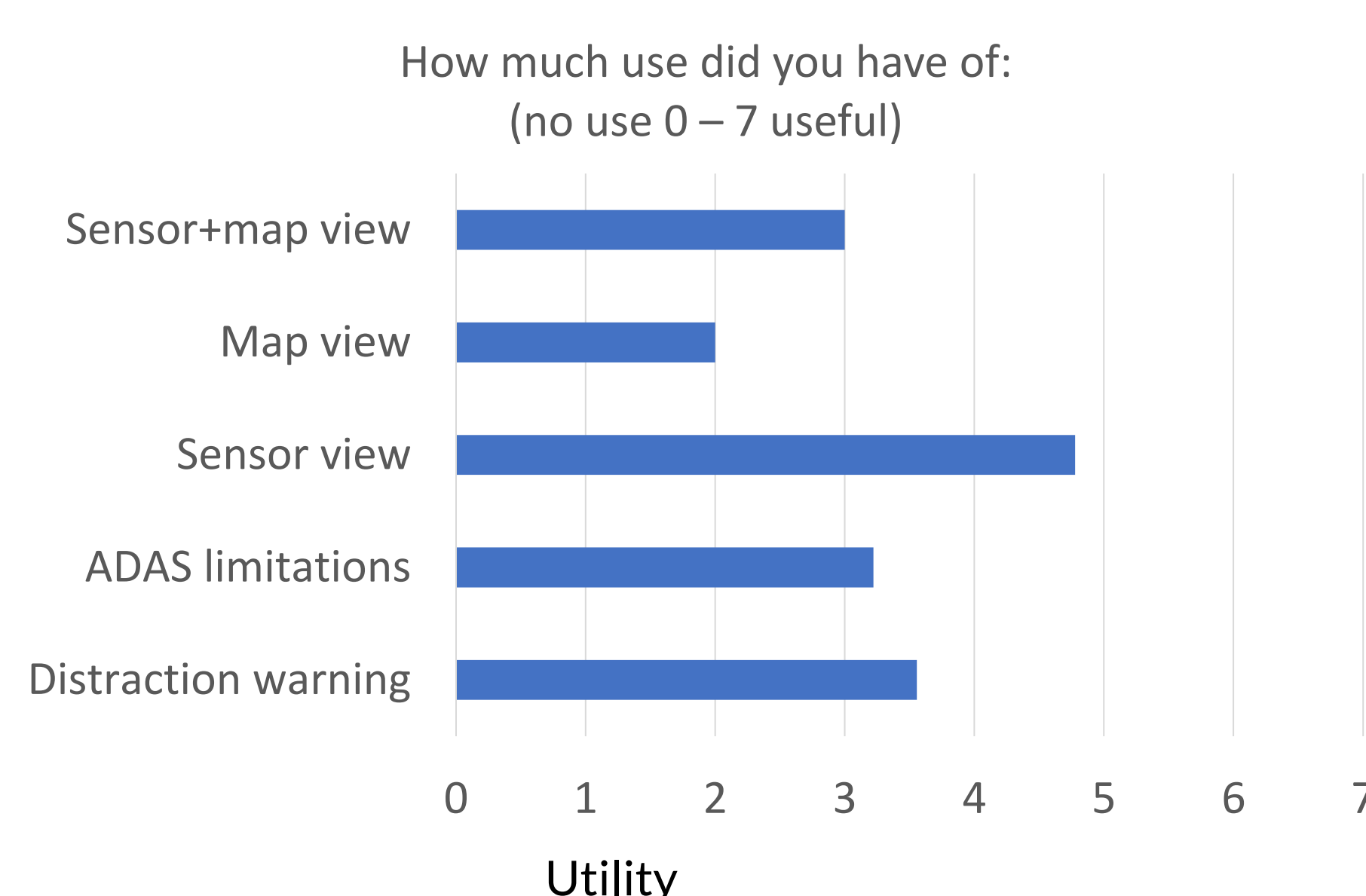


Figure 4 - after driving: graph of all participants mean score on the utility (x-axis) of different features in the driver-vehicle interface (y-axis).

Iterations:

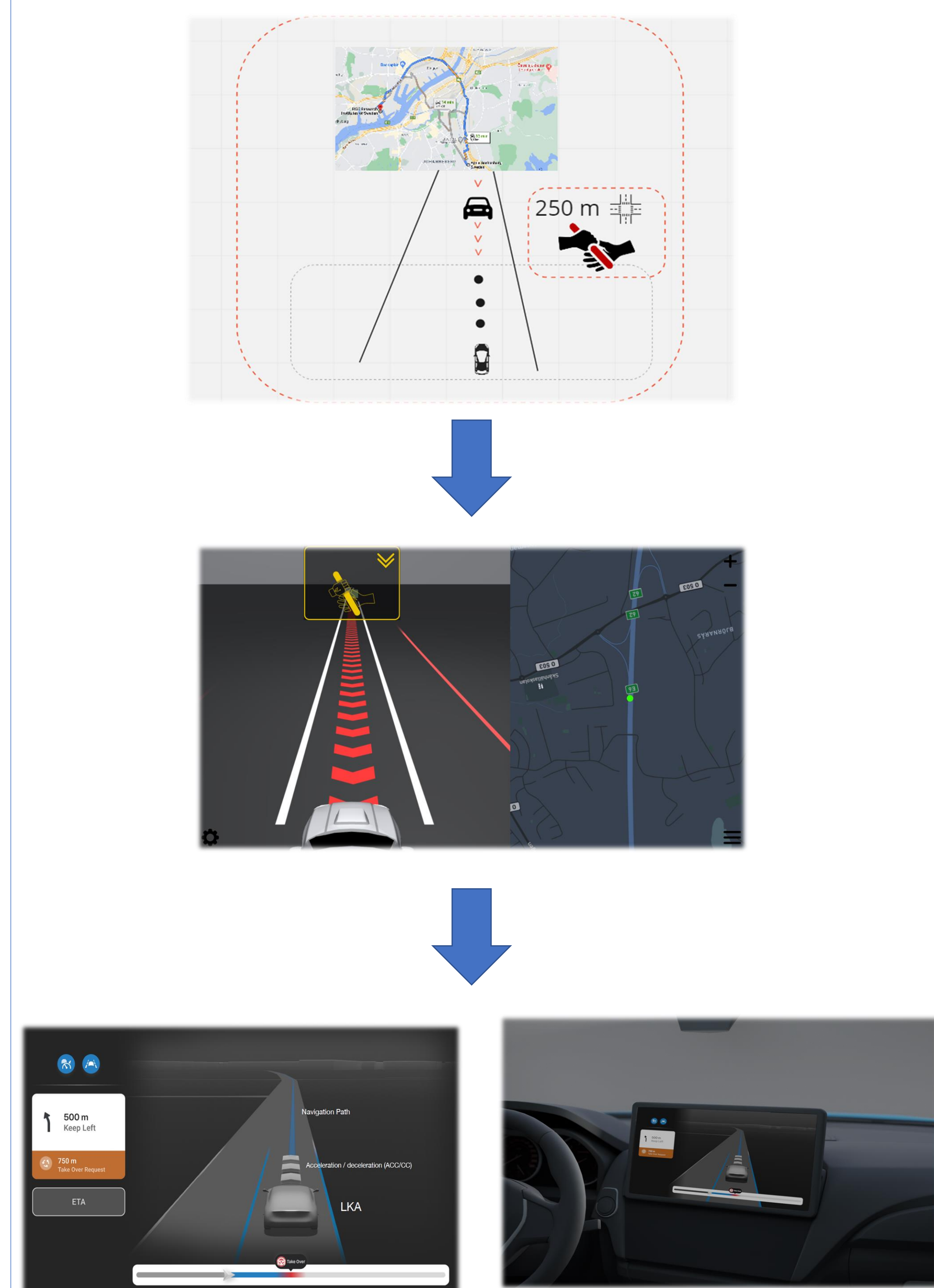


Figure 5: Early sketch of interface used in current study at the top. Interface used in current study in the middle. First iteration of interface in upcoming study at the bottom.



Photo credits: Niklas Strand
Figure 9: Photo from during test with driver-vehicle interface in the middle