Collecting end-user needs regarding driver state based automation in ADAS&ME project

Tania, Dukic Willstrand, VTI, Sweden; Anna, Anund, VTI, Sweden; Marta, Pereira Cocron, TU Chemnitz, Germany; Stefan, Griesche, DLR, Germany; Niklas, Strand, VTI, Sweden; Sonja, Troberg, Scania, Sweden; Luca, Zanovello, Ducati, Italy; Stella, Nikolau, CERTH

Motivation & Focus
• Adaptive ADAS can support drivers and riders and thereby mitigate risks, and thus contribute to an overall traffic safety
• Finding the right use-cases and fine-tuning them with end-user input is needed to secure a human-centred development of future ADAS
• This study addressed end-user involvement for use case development and prioritization and present their feedback on the first iteration of use-cases

Methodology for Use Case Development

ADAS&ME Use Cases
• Represent situations in which interaction between user and vehicle can be improved through automated driving systems based on driver/rider state

Survey Participants
• 1094 participants from across Europe
• 18 – 85 years of age
• 32% women
• Representing drivers of trucks, electric cars, cars, motorcycles, and buses

Survey Results
End-users:
• ...are positive to support from automation
• ...want to be able to take back control when they see it as appropriate
• ...recognise decreased task demand resulting from automation
• ...see an increased opportunity to do other tasks while supported
• ...value improved working conditions (bus drivers)

The monitoring aspect and feedback of ADAS was appreciated by all end-user groups, but most by the motorcycle riders. Why? They are aware that their physical conditions can be low due to physical and environmental constraints.

Although most were positive to automation some major security and privacy concerns were raised...
• ...in relation to ownership and use of data
• ...in relation to cyber security (risk of being hacked and surveillance by authorities)

Similar findings has been found by others (Sivak, 2014; Kyriakidis et al, 2015).

Implications for use-cases were based on:
• ...how the users want to receive information and experience transitions
• ...how automated systems will adapt the behaviour of users
• ...their needs in terms of information and support
• ...suggestions for added functionality
• ...how automation could be adapted to actual work conditions (ticketing)
• ...insights on HMI requirements and needs
• ...scenario selection to realize use cases
• ...driver state monitoring demands and requirements, but also the automated systems capability of influencing driver states

Conclusions & Recommendation
• The end-user needs regarding driver state based automation provide valuable information for the ADAS&ME development of adaptive ADAS
• The main contribution was for the re-iteration of ADAS&ME use cases as several implications for use cases could be identified
• Collecting end-users needs allows for human centred development
• Data security and privacy issues needs to be (1) addressed by legislation, and (2) communicated to future users’