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Industrial Design / Specialization Automotive Human Factors

AT Specialization Meeting, September 15, 2022

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Driving to riding – a paradigm shift



Source: MarketWatch research, SAE International

Automotive Human Factors

automotive technology from the perspective of human



What research/design challenges do automated vehicles bring?

How to create satisfying, meaningful, and coherent driving experiences with (partially) automated driving? How to avoid or minimize disadvantages? Ensure driving safety and have AVs be designed with human capabilities and limitations?

How can people understand their new role and feel safe but not overtrust the car?

a. Perspective of Driver/User – Vehicle interaction:



b. Perspective of Vehicle – other road users interaction:



Driver/User – Vehicle Interaction

(in-vehicle perspective)

Driver/User – Vehicle interaction (in-vehicle perspective)





Can drivers still understand their cars?

- Trust and trust calibration
- Vigilance
- Situational Awareness
- Attention / Distraction
- Shared Control
- Automation surprise
- Transition of control

Other aspects:

- Comfort
- Support for Non-Driving Related Tasks
- Switching cars

Driver/User – Vehicle interaction (in-vehicle perspective)

How to design a future mobile meeting room/living room/bedroom/...?



Vehicle – Other Road Users Interaction

(external HMI)

Vehicle–Other Road Users Interaction (external perspective)



AT Specialization, 15-09-2022

Missing driver-centric communication



Source: Lundgren, V. M. et al. (2015). AVIP : An Interface for Communicating Intent of Automated Vehicles to Pedestrians.

Missing driver-centric communication



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eHMIs

- Eye contact is far less important than one imagines: Close encounters Ambiguous situations
- One-on-one communication: multiple people, multiple cars (AVs and MDVs)
- Current research... explore designs of scalable and unambiguous eHMIs (ISO WGs)







Research Facilities

Driving simulator

Mobility Lab (simulated AD)









VR lab facilities (HTI)



Thank you for listening!

