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4.20 Mobility of the 21st Century – Automated Driving and Future Mobility Concepts

Bastian Pfleging (TU Eindhoven, NL)

Before the inventions of trains and the automobile, transportation was a very challenging, expensive, and potentially dangerous activity – especially over longer distances. This heavily influenced how people lived: Especially home and workplace were often at the same location or close to each other. Once mobility became affordable – especially in form of cars, motorcycles, bicycles, trains, and busses – this led to a massive change for many people in large parts of the world, since they gained the opportunity to easily reach a remote location. Today, people spend a considerable amount of time in their cars, be it for the daily commute, for shopping, business trips, or to go on vacation.

With assisted and automated driving, we hope to not only increase driving safety and reduce road fatalities. At the same time, we hope to enable the drivers to make use of the time in their cars and convert their cars into a new space for (non-driving-related) activities: One of my current research goals is therefore to understand how we can adapt the design of the car to accommodate for these activities and make the automated ride (again) an enjoyable comfortable activity.

Once driving time becomes time for other activities, this may have huge societal effects: For instance, this can influence how we perceive our daily commute: If we already can start with our daily work when entering the car (or have breakfast during the commute), we might care less about the length and duration of our commute. This can in turn impact the decision where we want to have and, thus, have an influence on future urban planning.

Beyond the interaction in the automated car, we also need to understand how these cars interact with the outside world, especially other road users such as pedestrians, bicyclists, and drivers of manual cars. Our current research also addresses these questions.

With automated (and potentially electric) vehicles, the way how we use the car potentially may change: Already today, we see that car sharing and ride hailing are novel forms of transportation whose acceptance seem to rise. With automated vehicles, we expect that this trend will continue towards using mobility as a service: Similar to using a music streaming service instead of buying, and playing CDs or music files, we might pay for the access and use of shared cars. We can imagine that this increases the user's flexibility: While using only a small "bubble", like a car for individual use during the morning commute or on the way to the train station, we might use a different (bigger) car when returning from the grocery store. In the evening, we might invite the partner in a sporty car to the theater, while a spacious and comfortable vehicle offers flexibility when going on vacation. In combination with a better link between different modes of transportation, this could drastically change the patterns how we use mobility in the future.

For all the cases explained above, we see challenging and inspiring research questions with regard to human-computer and especially human-vehicle interaction. The Dagstuhl Seminar on "Users and automated driving systems: How will we interact with tomorrow's vehicles?" therefore is a timely seminar to identify and discuss these research questions and shape the roadmap for (joint) future research in this area with the goal to improve our mobility.

4.21 Level 0, Level 1, ... High ... 3.78 ...Autonomous?

Andreas Riener (TH Ingolstadt, DE)

After having organized the predecessor seminar in 2016, we came back to Dagstuhl to see how research (and industry) has evolved/progressed since then and what new challenges have been identified (have arised). Interestingly, many topics in 2019 are similar to the ones identified in the previous seminar, but are discussed in much more details, with much more enthusiasm and flavors, and arguments brought-up are well underpinned with recently published related work (partly co-authored by Dagstuhl seminar 16262 participants). The big topics identified in 2019 are 1) conflicting mental models – an interface issue in human-machine interaction around for quite a while and 2) the levels of automation. There was a long debate on the appropriateness of subdividing automated driving systems (ADS) into 5 subclasses. Quite a few people argued that the classification should be more fine grained (i. e., level x.y), others provided arguments to abolish the levels at all. Already in today's automated vehicles, it is sometimes hard to discriminate between levels, as a car model is likely to have automated driving functions on different levels while one function can also come in variants on different levels (for example a parking assistant). It is rather intransparent for the driver/passenger, which "mode" is currently on and how (if allowed at all) to interact with the vehicle in that mode or with the function currently engaged. This problem domain was an ideal starting point for the seminar 19132 with the underlying question "how to interact with tomorrow's vehicles"? 31 participants tried hard to come-up with solutions by applying different creativity methods, such as brainstorming rounds, break-out groups, prototyping sessions, amongst others. Even though we have not solved concrete problems, it was (again) a fun week and we (=co-organizers) are pretty certain that the discussions will have an influence on the future work of our participants. We've been already asked to propose another follow-up seminar in 2 years time for the next round of interaction. We will definitely consider!
Thanks for the warm hospitality,
Andreas

4.22 Understanding and Designing Plausibility and Self-Awareness into Automated Systems

Maria Rimini-Doering (Robert Bosch GmbH – Stuttgart, DE)

As a Senior Expert in Human-Machine Interaction within Corporate Research of Robert Bosch Gmbh, I coordinate publicly funded projects for the division of Software intensive Systems (e.g. Embedded Systems, User Interaction Technologies, Consumer IoT).