3rd Workshop on User Experience of Autonomous Driving

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ABSTRACT
User experience (UX) in autonomous vehicles has been a growing area of research in recent years. Car manufacturers have presented various automated vehicles recently, ranging from combined ADAS to self-driving vehicles with the ability to drive without any human intervention. This workshop is the third in the serious that started in 2013. The workshops gave brought together researchers and practitioners from various domains. This year the objective is to develop a ten-point plan of research goals the automotive UI community must solve in order to improve UX in Autonomous Driving (AD). This includes a discussion on how we can face upcoming challenges in designing UX for AD, as well as, how to shape the design space for UX in AD. The workshop will focus on the areas of methodological issues, human factors, entertainment, social driving, and novel user interface approaches.

Author Keywords
Autonomous vehicles, user experience, research agenda, social vehicular network

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

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MOTIVATION
Over the last decade Autonomous Driving (AD) has gained attention in academia and industry. With the advent of appearance of Google in 2011 in this area [9] the topic has gained increasing public interest. At CES 2015 in Las Vegas, Mercedes has presented the research vehicle F 015 Luxury in Motion[1], which constitutes their view on fully autonomous vehicles in the future.

Liberating the driver from the responsibility of operating (or even supervising) the vehicle means that we are facing a future where we can provide novel in-car services while the vehicle is under fully automated or semi-automated control. Furthermore, it is predicted that AD will be widespread in the near future [1]. Numerous research organizations and major companies have developed working autonomous vehicle prototypes [8].

The proposed workshop is based on a series of workshops over the last years (i.e. [10], [4], and [5]). It covers aspects such as the level of automation [6], visualization of uncertainty in autonomous vehicles [2], automated vehicles in the wild, the transition phase from manually driven vehicles to autonomous vehicles [3], Socially-inspired mechanisms for future mobility [7], and driving fun and entertainment in future cars.

OBJECTIVES
The workshop will collect radical, innovative, versatile and engaging works that challenge or re-imagine human interactions in future automated driving scenarios. It seeks to challenge existing thinking by exploring what is possible now and by the time the autonomous vehicle become a

[1] https://www.mercedes-benz.com/en/mercedes-benz/innovation/ (last access May 22, 2015)

standard feature of our roads. Participants will be encouraged to suggest new concepts. Experiential works and hands-on demonstration are especially encouraged. The workshop is an opportunity to re-shape the conversation of automobile technology and explore new ways of thinking.

Topics of interest include (but are not limited to):

- Driver and passenger interaction with (semi-) autonomous vehicles (e.g., What will the role of driver and passenger be in this new paradigm?)
- Driver situational awareness in autonomous vehicles (e.g., How much context information does the driver need to be aware of in order to be able to take over control?)
- Handover situations between drivers and automated vehicles (e.g., How to effectively inform drivers about handovers? How to share control between car and driver? How to deal with passive fatigue?)
- User experience factors relevant for autonomous driving (e.g., How will autonomous vehicles influence UX factors such as acceptance, trust, complacency, driving fun, etc.?)
- Novel user interface approaches including natural and gaze interaction, subliminal information, and brain computer interfaces (e.g., How can utilize new UI approaches to foster seamless interaction between the driver and the autonomous vehicle?)
- Multimodal driver information displays and how they differ from non-autonomous modes (e.g., What type of information is relevant / irrelevant to an autonomous car driver or passenger?)
- Increase of workload due to additional monitoring tasks of autonomous vehicles (e.g., How to reduce mental workload for monitoring tasks?)
- Accessibility for elderly and people with impairments (e.g., How can we ensure that elderly are able to use the advantages of AD?)
- Experience studies in the lab and in the field with autonomous vehicles (e.g., What prerequisites do we need to conduct user studies in the lab and the field?)
- Study and evaluation methods for autonomous driving (e.g., Do we need new methods for AD evaluation?)
- Entertainment and learning for drivers and passengers in autonomous vehicles, as well as gamification approaches (e.g., How can we fight deskilling of drivers?)
- Ethical issues of autonomous driving (e.g., Which ethical issues arise when conducting user tests with autonomous vehicles? Which ethical issues arise for UI designers and researchers?)
- Security issues of autonomous vehicles (e.g., How do we address vehicle hacking dangers?)
- Standardization among automakers (e.g., How can we safeguard standardized behavior in algorithms for self-driving vehicles?)
- Interaction of autonomous vehicles with vulnerable road users (VRU's) (e.g., Which communication/negotiation strategies between autonomous vehicles and non-technology equipped humans do we need to design?)

PROPOSAL FOR THE SCHEDULE

Before the workshop

To attract as many participants as possible, we will provide information via multiple channels. We will set up a workshop website to publicize the workshop details and call for papers (CfP). The CfP will also be distributed electronically via the official AutoUI channels diverse appropriate mailing lists. Workshop organizers will further personally invite researchers in the field to submit their works.

People interested in workshop participation have to submit a one to two page position paper in ACM SIGCHI two-column format. Workshop organizers will select the papers invited for short presentations at the workshop. We will also allow participation without submission.

During the workshop

The workshop will cover a half day (4 hours). We will start the workshop by introducing its aims, objectives and structure. During the second part the participants who have submitted position papers will be invited to present their work. The final session will feature either one or more groups discussing identified topics of interest and the workshop will end with a summary including a ten-point plan for future areas of research within the field of autonomous driving UX.

After the workshop

We will compile workshop adjunct proceedings (PDF) that will be circulated between workshop participants and published on the conference website (subject to participant agreement). Furthermore, a journal special issue and follow-up workshops at related conferences are planned.

OUTCOMES

The outcome will be a community of people working in the area who have articulated a set of new research visions for the area of autonomous driving UX. Many of the authors already work together on projects and we expect the workshop to lead to further collaboration.

Building on the results of the previous workshops this workshop will develop a ten-point plan of research goals the automotive UI community must solve in order to improve UX in Autonomous Driving (AD). This includes a discussion on how we can face upcoming challenges in designing UX for AD, as well as, how to shape the design space for UX in AD. Areas of focus include: methodological issues, human factors, entertainment, social driving, and novel user interface approaches.

ORGANIZERS

The following list describes each co-organizer of the workshop briefly.

Alexander Meschtscherjakov is an Assistant Professor at the University of Salzburg. He directs the car team at the the Christian-Doppler-Laboratory "Contextual Interfaces".

Manfred Tscheligi is Professor at the Center for HCI at the University of Salzburg and was Conference Chair for the 3rd Conference AutomotiveUI 2011.

Dalila Szostak is a User Experience researcher and designer at Google. She has been involved in the UX in AD workshop series from the beginning.

Rabindra Ratan is an Assistant Professor at Michigan State University's Department of Media & Information.

Rod McCall is the leader of the IGNITE (Interaction, Games and Novel Interface Technologies) research collective at SnT, University of Luxembourg.

Ioannis Politis is a PhD student in University of Glasgow, Multimodal Interaction Group, working on the design of multimodal displays for drivers.

Sven Krome is researcher at RMIT's Games and Experimental Entertainment Lab. In collaboration with Audi Electronic Ventures he is re-thinking the piloted driving experience from an ix- and game designer's perspective.

Andreas Riener is a senior research and teaching assistant at University of Linz's Institute of Pervasive Computing. He is working on cyber-physical automotive systems and further interested in human factors in general and the recognition of vital bodily functions.

Myounghoon "Philart" Jeon is Assistant Professor of Cognitive Science and Computer Science at Michigan Tech. He directs the Cyber-Human Systems Center.

Jacques Terken is an Associate Professor at the Technische Universiteit Eindhoven. He leads the Automotive Human Factors team in the department for Industrial Design. He was the organizer for the 5th Auto UI conference in 2013.

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