

AutoWork 2021: Workshop on the Future of Work and Well-Being with Automated Vehicles

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ABSTRACT

The emergence of automated driving systems will influence roles and practices in many parts of work life. Human factors and user interface design will play an important role in shaping the transition towards more productivity and well-being. The AutoWork 2021 workshop builds on its predecessor workshops by refining a research agenda and drafting concrete research studies and projects towards achieving this goal. This year's version will especially tackle the challenge of designing both for bottom-up "worker-driven" empowerment and engagement in individual, partly automated transport, as well as for supporting a selected users and stakeholders in the systemic economically-driven introduction of fully autonomous vehicles in closed intralogistics areas. In a two-session schedule tailored to fit the requirements of an online event, participants will evaluate gathered requirements from previous workshops and projects on these topics and define relevant user stories and elaborate experimental designs with measurable outcomes to contribute to the research roadmap.

CCS CONCEPTS

• **Human-centered computing** ! **Human computer interaction (HCI)**; • **Applied computing** ! *Computers in other domains*.

KEYWORDS

Automated Driving, Human-Computer Interaction, Work, Well-being, Safety, Workshop

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1 INTRODUCTION

Widespread introduction of automated vehicle (AV) technology is not only changing mobility practices, but it is also transforming working life in many different ways. This concerns the support of commuters to save time for office work in the car [7] through driver assistance systems already in vehicles with lower automation levels [15], but more extensively with the advent of L3 automation [3]. A particular goal of the research and design of such systems has been to balance work and well-being in a sensible manner [11]. Another is to provide interaction methods that allow performing non-driving related tasks (NDRT), such as creating text [2, 10, 13] or reading [12], but also safe and convenient multitasking in the vehicle [4, 6, 9, 18]. Apart from these "bottom-up" or "worker-driven" uses of automation features, vehicle automation is also seen as a valuable feature by companies. For example, L4 highly automated trucks, have been considered by logistics companies as a means for performing non-driving related tasks (NDRT) during longer periods of times such as during long-haul highway trips (e.g., [5, 16]). In restricted intralogistics hubs and production sites, fully autonomous L5 trucks are already in operation and are expected to be widespread in the near future and integrated into automated workspaces for loading and warehouse management [17]. A wide introduction of L5 autonomous vehicles could be achieved sooner in freight transport and logistics than in passenger transport, because

environments are more controllable and thus suitable for the operation of connected and automated vehicles within different parts of supply chains (e.g. factories, warehouse, airports, ports and other logistics hubs). Fewer vulnerable road users, low driving speeds and a well-defined layout of logistics areas are typical and useful characteristics of such areas. Furthermore, autonomous commercial vehicles aim at increasing freight transport capacity through 24/7 driverless operation.

2 WORKSHOP GOALS AND OUTCOME

Previous events have identified the following key topics to be investigated: *Non-driving related tasks* (which workplace tasks are suitable for the environment in and around vehicles or their remote management, and how should interfaces be designed to support productivity while maintaining safety?), *Technologies* (which particular technologies could be used to support work with automated vehicles, given the restrictions of the levels of automation?), *Ergonomics* (what are the requirements for vehicle interiors and exteriors, as well for remote operation, to support the respective work tasks?), *Evaluation Methods* (how can existing results from other environments and current tasks be transferred to the new setting, and which qualitative/quantitative methods can be used to assess the applicability of elaborated interfaces?), *Well-Being* (how do we also allow drivers to relax?), and *Interdisciplinarity* (what are the most important domains to be considered in design?). The proposed workshop should build upon these topics by:

- Elaborating concrete “user stories” on how working in future vehicles (considering suitable tasks, technologies, ergonomic constraints, as well as the levels of automation) could look like.

- Translating these user stories into experimental designs that allow a comparative evaluation.

- Providing interested researchers and practitioners a forum to connect and establish future cooperation.

3 WORKSHOP FORMAT

We plan to conduct the workshop in two 90-minute sessions. The first session will include brief presentations by the organizers and by other attendees. We will solicit position statements, and make time for all interested attendees to present their ideas briefly. Presentations will be between 2 and 5 minutes long, and we will allow plenty of time for discussion.

The second session will focus on generating ideas for future interaction designs and, more broadly, for future collaborative research efforts. Specifically, the organizers will identify 3-5 topics (depending on the number of workshop participants). Then, small groups of workshop participants will address the issues related to each of these topics. Topics will be related to work and well-being in and with automated vehicles. For example, one group might explore a particular work-task that can be performed in an L3 vehicle, while another group might explore how remote supervisors might remotely control L4 trucks when such intervention is needed. We will wrap up the second session with reports from the small groups and a joint discussion of next steps, focusing on two main topics. First, we will work to identify important scientific and technical

questions that our community should address. Second, we will identify opportunities for collaboration between workshop participants, and more broadly.

4 PROMOTION AND TARGET GROUP

The organizers will use their individual networks in the CHI and AutomotiveUI community to advertise for participation using mailing lists, social media, etc., with the aim to recruit participants with diverse backgrounds. Invited are all CHI-related professions in all career stages from both academia and industry. In addition, we will invite prospective participants to submit short video clips before the workshop, where they state their research interests, ongoing related projects and research questions to the community within 3 minutes or less. These will be shared and serve to kickstart participants' thoughts even before the first session.

5 CONCLUSION AND OUTLOOK

In summary, this workshop aims to realize two main goals: a) connect participants – an aspect that otherwise may be lacking in a virtual conference – and b) ideate and initiate significant cooperative efforts (such as joint publications, studies, project proposals, ...) based on a previously identified research agenda. These goals are accomplished by establishing a two-session format that prevents “ZOOM fatigue”, which allows to get to know each other (session 1), a recreative break (between sessions), and extended focused work (session 2). We believe this approach accounts best for packed and exhausting virtual conference days, provides a valuable iteration on previous related community activities, and thereby ultimately represents a significant contribution to advance on the path to a safe, productive and relaxing living space automated vehicle.

6 ORGANIZERS

The group of organizers consists of a wide range of researchers that has previously extensively cooperated in, amongst other projects, previous workshops addressing automation at the workplace or the “mobile office” or related fields at AutomotiveUI and CHI [1, 7, 11, 14, 19]. Orit Shaer, Andrew Kun, Peter Fröhlich and Stephen Brewster further lead funded research projects that investigate the topic from an HCI perspective in cooperation with industry and also regularly hold public online conversations about it (e.g. [8]).

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