CHI 2016 Workshop Application:
HCI and Autonomous Vehicles

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Motivation and Experience with Autonomous Vehicle Research

User interface research for autonomous driving is in its infancies. While ongoing research within the CHI and AutoUI communities is mainly concerned with immediate issues such as the handover between car and driver, the paradigm shift will open up an exciting design space for human computer interaction in the car and even beyond.

The core of automotive research at Synaptics embraces fundamental technology such as touch and interactive surfaces, novel input dimensions (e.g. force) and biometrics. These relate to issues of input, display, access, security and privacy within a car. With the advent of autonomous driving, these technologies will become enabling technologies for in-car interfaces that expand beyond the central console.

While we have no immediate track record in autonomous vehicle research, we strongly believe that we can provide our expertise from the realms of input device technologies and of course from ongoing automotive research at Synaptics. In addition, Synaptics' has a substantial product portfolio for automotive[1]. We will contribute our years of expertise

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[1] See also http://www.synaptics.com/en/auto.php for an overview of our product portfolio for automotive.

in adjacent markets such as touch technology for phones, tablets and notebooks. We are positive that this will spur relevant and exciting interdisciplinary discussions at the workshop. Topics within our core interest comprise:

- Novel input technology for autonomous vehicles
- The role of touch input in autonomous cars, specifically force touch and related approaches
- Interactive surfaces in autonomous cars
    - For Driver-car-interaction and
    - Co-located passenger interaction
- Novel information displays
- Role of biometrics and authentication methods
- Gaze-based interaction
- Experimental and study methods for autonomous driving (e.g. in driving simulators)

Beyond our core research interests, we are interested in fundamental problems of autonomous driving such as (i) sketching the design space of autonomous driving and vehicles, (ii) UX factors, (iii) understanding autonomous driving from a contextual and experience-based perspective and (iv) exploring applications.

Personal Information and Experience
All authors have a strong background in HCI, interaction design, user experience design, engineering and rapid prototyping. Individual experience is presented in the following.

Jochen Huber is a Senior User Experience Researcher within the User Experience Design team at Synaptics. His work focuses on automotive user interfaces with a focus on novel input technology. Prior to joining

Synaptics, Jochen was a postdoctoral researcher at the MIT Media Lab, working on assistive technology, mobile interaction, CSCW and interactive surfaces. He has 10+ years of experience in interaction design and HCI, within both academia and industry. Also, he was a lecturer in interaction and user experience design for 5+ years. He holds a PhD in HCI and degrees in Computer Science and Mathematics from Technische Universitaet Darmstadt, Germany. More information available at http://jochenhuber.com.

Mohamed Sheik-Nainar is a Senior Usability Research Scientist at Synaptics. He has been involved in touch input device UX for more than 9 years and currently focusing on Biometrics. As an automotive enthusiast he is interested in making in-car interaction user friendly and efficient. Prior to Synaptics he tinkered with Virtual Reality and Locomotion as part of his graduate research. He holds a PhD in Industrial Engineering and MS in Computer Engineering from North Carolina State University.

Andrew Hsu is the Director of Concept Prototyping at Synaptics. He leads the company's efforts in developing high fidelity prototypes for demonstrating and investigating user interface technology. Dr. Hsu has been with the company for 20 years. Since that time, he has played an instrumental role in the development and adoption of Synaptics' key products, including the world's first single chip touch controller and the ClearPad capacitive touchscreen for mobile phones.

Andrew received his PhD in Neuroscience, and an MS in Computer and Information Sciences from the University of Pennsylvania. He received his BS in Electrical Engineering from the California Institute of Technology.