Panel Proposal
After the Handoff: Machine Learning Methods for UX in Autonomous Drive Systems

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Abstract

Machine learning has changed the automotive industry. As the quest to enable cars to navigate roads autonomously rockets forward, we find a newer–possibly tougher–challenge: how best to navigate the relationship with the people in and around autonomous cars? This question brings together the concerns and opportunities for machine learning and user experience in a context that everyone can understand - their drive.

In this frontier industry, myriad players are competing to establish their own vision for what future of autonomous vehicle experience will be. AI and machine learning researchers led the charge into automotive autonomy, but are less prepared to address the question of human behavior, preference, and services. Established car manufacturers are determined through acquisition and in-house innovation to lead the transition to high-volume autonomous vehicle world. The startup community perceives automation as a disruptive force: automation makes the physical car a commodity platform on which startups can compete to design the most valuable consumer-facing experiences. Federal regulation is just as fast-moving, and currently hinges on the prospect that predictive systems in autonomous vehicles are potentially life-saving. At the center of this dialog is the driver, now passenger. What will their experience be? How will it be rooted in the understandable translation of underlying autonomy systems, if it all?

This panel will bring together representatives from very different perspectives. Each panelist will showcase different visions of what autonomous car UX will be, and highlight different opinions of how machine learning is implicated in that experience. Our goal is to cultivate a nuanced and targeted discussion from practitioners pushing the boundaries of the field as a way of highlighting key issues at the intersection of machine learning and user experience.

Format

The panel will feature four panelists. Each panelist will begin with a short 5 minute introduction, and then we will proceed to facilitate discussion [See example Discussion Topics, below]. Panelists have been purposely chosen for their divergent perspectives on how autonomous machine-learning systems can and should directly impact the driver's

experience. The moderation challenge will be to focus discussion on the connection between UX and ML, without being overly distracted by the debate on how self-driving cars will enter the market, and who will be driving the business. One potential outcome would be an elucidation of where and how the translation of machine-learning systems into UX can positively reinforce the evolving UX of autonomous driving platforms.

Panelists

Adam Boulanger

The world's time-table for when autonomous vehicles will be mass produced is roughly 5 years from now. The big question at this inflection point hinges on UX: what are people going to do in these things? The implicit question then becomes, what is the relationship between an emerging service platform in the car and the autonomous machine learning systems that make it possible. The Harman Future Experience Group is tasked to develop prototypes and conduct research illuminating what our experience will be in emerging autonomous vehicles. We work closely with established manufacturers and startups alike to incorporate state-of-the-art methods and business insights into our own development.

Bio Dr. Adam Boulanger is Director of UX Prototyping and Research in Harman International's Future Experience Team. His HCI work spans diverse fields from autonomous vehicle UX, to consumer audio products, ARVR, and cognitive analytics. He has a PhD from the MIT Media Lab in rehabilitation interfaces, audio-based Alzheimer's diagnostics, and hospital deployed creativity tools.

Wendy Ju

While many prominent AI researchers in the autonomous vehicle space have stated that people are just obstacles to be avoided or "human cargo" for intelligent vehicles, we human-machine interaction researchers have embraced the challenges of understanding how people interacting with automation as a critical step in producing real-world-ready autonomous cars. Just as Google has driven millions of miles to collect data to train its self-driving cars, interaction researchers may need to collect millions of hours with millions of people to understand what makes people trust a car, what makes people pay attention to how the car is performing, and

how a car can work with people to create positive journeys together. My research group is undertaking a broad initiative to address human interaction with automation in limited, partial, semi-autonomous and full-automation vehicles. We empirically test future scenarios both in simulators and on the road to better the dynamics of human attention, behavior and desire. Moreover, we have been collecting hours upon hours of user-centered data for machine learning, to enable machine understanding of in-car dialogue, driving emotions, and physiological response to a wide range of driving conditions.

Bio   Dr. Wendy Ju is Executive Director for Interaction Design Research at the Center for Design Research at Stanford University, and Associate Professor of Interaction Design in the Design MFA program at California College of the Arts. Her work in the areas of human-robot interaction and automated vehicle interfaces highlights the ways that interactive devices can communicate and engage people without interrupting or intruding. She has innovated numerous methods for early-stage prototyping of automated systems to understand how people will respond to systems before the systems are built. She has a PhD in Mechanical Engineering from Stanford, and a Masters in Media Arts and Sciences from MIT. Her monograph on The Design of Implicit Interactions was published in 2015.

Anthony Prozzi

By releasing the driver from all responsibilities from point A to point B, the entire experience of transit is suddenly given carte blanche. The commute is no longer measured by time lost but rather how you choose to spend your time. And with that a major revolution begins. What questions might YOU ask a driverless vehicle to better understand how your journey should be customized? How long will you be in the vehicle? Will you return? How do you spend your day? What tasks, entertainment or communication do you do most regularly? The vehicle can then respond appropriately. Self-driven vehicles will delve into this new realm of possibility. The potential passenger will choose a journey from point A to point B. The time needed for this journey will create options for how the passenger chooses to spend that time. The time may be focused work, wellness, or play, and every journey will rest on the shoulders of machine-learning and AI.

Bio   Anthony Prozzi is a senior design strategist at the Ford Motor Company's Research and Innovation Center in Palo Alto. Prozzi began his career in design through fashion first in luxury menswear in retail, then designing menswear for Donna Karan. He joined Ford in 1999 as a senior interior designer, going on to work on Ford Flex, Fusion, F-150 and Focus, as well as Lincoln MKZ and MKX. In 2014, he transitioned to senior design strategist seamlessly shifting from designer to sociologist to scientist to philosopher. Prozzi creates cutting-edge approaches to research at the intersection of social and natural sciences, design and technology. He measures the impact of his work by breaking down the boundaries between design, technology, science and the humanities on Ford's most innovative automotive platforms including autonomous vehicles.

Discussion topics

- Will users ever accept "black-box" autonomy, where underlying machine learning layer is ubiquitous and opaque to their experience?

- Is there stigma against machine-learning in cars? If so, why and will it persist into the future?

- If you simply trust that a system will succeed, do you ever need to understand what's going on under the hood?

- What are best practices to present machine learning results in real-time in perceptually demanding environments?

- How is interior and industrial automotive design changing to incorporate the central importance of autonomous systems?

- How does one reconcile complex and many agent systems in and out of the car?

- Is there an ethical obligation to relate machine learning systems to drivers when the value proposition is that the technology will save lives?