
Taking CHI for a Drive: Interaction in the Car

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Abstract

With the increasing number of cars on the road, longer commutes, and the proliferation of complex information and entertainment features, there is a greater need for careful interaction design in the car. The automobile is a challenging environment for designing and deploying good user interfaces. Interaction designers must balance brand identity, safety, legislation, and manufacturability, among other issues. In this panel, practitioners and researchers from industry, industrial labs, and academia will discuss the challenges of interaction design in an automotive environment. While some members of the CHI community are active in the automotive field, the general CHI community may not be aware of this work, the open research issues, and opportunities for collaboration in this area. This panel will provide an introduction into HCI research in the automotive industry. Some successful examples of interaction design will be discussed, as well as a few not-so-successful examples. Questions and comments from the audience are welcomed.

Keywords

Automotive Industry, Driver Information Systems,
Driver Interaction, Interactive Panel.

ACM Classification Keywords

Categories and subject descriptors: H.5.2 [INFORMATION INTERFACES AND PRESENTATION (e.g., HCI)]: User Interfaces---Ergonomics, Input devices and strategies, Interaction styles, Voice I/O.

Introduction

With the increasing number of cars on the road, longer commutes, and the proliferation of complex information and entertainment features, there is a greater need for careful interaction design in the car.

New interaction modalities are being explored and introduced to the car. These include graphical user interfaces, command menus, speech interaction, gesture, and haptic feedback. A larger group of functions are also being included in the automotive experience. These include driver navigation systems, lane departure warnings, active cruise control, and multimedia systems, which can include DVD video, MP3 audio, and digital radio. It can be challenging to design effective access to these enhanced functions as the user of these functions may often be engaged in the primary driving task.

There are also other influences on interaction design in the car. Branding is a vital part of the design, marketing, and sales strategy for car manufacturers. The interaction design may need to follow the brand message and may need to differentiate itself from the offerings of other manufacturers. Industry standards, governmental regulations, liability, insurance, and safety issues also play a role in interaction design.

New approaches to automotive interaction design could include the development of interfaces and applications

that use context, apply user preferences, monitor workload, and handle imprecise and ambiguous input. Such interfaces could then dynamically adopt new strategies, styles, or personalities in response.

The goal of this interactive session is to introduce the challenges and opportunities of automotive interaction design to members of the CHI community who have not had the opportunity to work in the automotive field. Lessons of success and failure will be shared. Questions, suggestions, and comments from the audience are welcomed. The desired outcome would be to foster new research directions and new collaborations between companies in the automotive field as well as between academia and industry.

Panelists

The panelists bring a wide variety of academic and industrial experience in both human factors research and the automotive industry. They represent companies like Bosch, currently the largest supplier to the automotive industry, industry leaders like IBM and Ford, as well as Stanford University.

Dietrich Manstetten

Dr. Manstetten is a research director in the Corporate Research and Development Division of Robert Bosch GmbH in Stuttgart, Germany. He studied mathematics and computer science at the Technical University of Aachen where he received his MS in mathematics in 1985 and his PhD in 1988 from the department of computer science. He started his professional career with the French computer manufacturer Bull in 1986 and joined Bosch Corporate Research in 1989. After three years of working in the areas of software dependability and reliability theory, he became involved

with research on driver modeling and traffic simulation. He was part of a team developing traffic-simulation research environments and building a driving simulator for human-factors studies at Bosch. His current research interests are human factors in the automotive environment, driver assistance, and driving simulator technology.

Clifford Nass

Professor Nass is the Thomas M. Storke Professor of Communication and the Director of the Communication with Automobiles: Research on Safety, Information Technology, and Enjoyment (CARSITE) lab at Stanford University. The vision of the lab is: "Given that the car is becoming the fastest-growing provider and consumer of Internet and driver content, how can one understand, study, and design interactive technologies that leverage the unique car environment?" The lab specializes in issues of emotion, cognitive load, language and voice issues in the car, in-car vs. wireless, and ways that the car can adapt and describe that adaptation to drivers.

K. Venkatesh Prasad

Dr. Prasad is the founding leader of Ford Motor Company's Infotronics Technologies Group and is responsible for the global activities of the Infotronics technology cluster — one of twelve such clusters within the Ford Research and Advanced Engineering (R&AE) Organization. He is responsible for the research, architecture, standards, applications development and vehicle system integration of a broad spectrum of electrical, electronics, and embedded software technologies. In addition, for these areas, Prasad is responsible for personnel development, technical maturity management and shaping of organizational

competency. The functional spread of his activity covers body electronics, climate control electronics, infotainment, instrumental panels and clusters, and interior/exterior lighting. Prasad is on the advisory boards of several private-public-academic partnerships, involving academia, government and industry, including the Ford-Massachusetts Institute of Technology Strategic Alliance. From 1996 to 1998, he led research in the area of electronic imaging, pattern recognition and associated vehicle system integration to support active vehicle safety and security applications. Prasad joined Ford Motor Company in 1996.

Roberto Sicconi

Dr. Sicconi is the manager of Multimodal Conversational Solutions at IBM Watson Research. He joined IBM Italy in 1985 to work on multimedia PC and RISC/6000 workstations. In 1990 he became manager of the Multimedia Development Lab, leading speech recognition, satellite Internet data broadcasting, cryptographic systems and videoconferencing solutions. In 1998 he moved to the US to lead Speech-chip and Bluetooth projects. He currently manages development of prototypes of conversational and multimodal user interfaces in cars, both standalone and network-connected.

David M. Krum, Moderator

Dr. Krum is a project manager at the Bosch Research and Technology Center, the North American arm of the research and development organization of the Bosch Group. He joined Bosch in 2004 where he currently works on projects in user interaction and 3D visualization. He earned his PhD in computer science from the Georgia Institute of Technology where he investigated spatial cognition issues involving wearable

computers. His research explored how wearable computers can be used to provide contextual information which supports the development of mental models of the surrounding environment. His research interests include human-computer interaction, 3D interaction techniques, visualization, and virtual reality.

Conclusion

This session will allow the automotive HCI research community to share its challenges and issues with the general CHI community. Bringing these communities

together to discuss common areas of interest will foster personal connections and potential collaborations.

It is the hope of the panelists that this session will further encourage academic and industrial researchers to address the safety, manufacturability, and appeal of interactive systems in the automotive field. A better understanding of the automotive design space will create better partnerships and better products for the consumer.