Designing Voice-Based Interfaces to Support Blind People in Autonomous Vehicles

Background:
Driverless vehicles have typically been studied in the context of military use or everyday use by people who currently own cars. Yet, driverless cars also have the potential to significantly impact the lives of people with disabilities, particularly people with vision impairments. Enabling access to driverless vehicles is a challenge for many reasons, but the largest concern is how to convey information to people who are unable to navigate such a dynamic and high-risk visual space. However, we have not been able to study how people with vision impairments interact in an automotive environment since they are unable to operate vehicles or own driver’s licenses. As such, this project will allow a student the unique opportunity to design voice-based system to inclusively support people with disabilities, namely people with vision impairments.

Project Goals:
The main goals of this project are to 1) design and implement focus groups with people with vision impairments to understand perceived challenges of autonomous vehicles use and brainstorm design solutions to these problems, and 2) design voice-based prototypes to key challenges.

Student Role:
The student’s contributions to the project will result in several innovative design ideas for using voice-based interfaces in autonomous vehicles. The student should have basic experience programming in Java, Python, or JavaScript. Specifically, the student will:

- Explore existing literature in accessibility, voice-based interfaces, and challenges of autonomous vehicles
- Design and help lead accessible focus groups/design sessions for people with vision impairments
- Transcribe and use NVivo to transcribe to analyze the content of these recordings
- Prototype 1-3 voice-based interface designs to help people with vision impairments navigate challenges identified in the focus groups

Mentorship Plan:
I will meet with the student weekly for individual meetings. These meetings will cover both academic and professional skills needed to be a successful researcher. I will work closely with the student to not only address the research goals, but give them the intellectual freedom to prototype and design their own ideas for voice-based interfaces in autonomous vehicles. I will give the student constructive feedback on each phase of the research. Lastly, I will help the student write the results of this project for a poster at a top HCI venue.