

Master thesis proposal: A handheld vehicle detector

Project description:

The ability to reliably detect vehicles and identify a safe crossing opportunity is critical to road safety and reducing mobility-related accidents. For many years major intersections have been developed or redesigned to include “slip” lanes that require the traveler to cross an uncontrolled lane to get to an island from which to cross a major roadway. The crossing of the uncontrolled slip lane is daunting and risky. Similarly, roundabouts require determination of whether a vehicle is traveling around the circle or exiting and accelerating towards the crosswalk it intends to use. The rapid adoption of ultra-quiet electric vehicles is likely to make the street crossing task even more difficult. The acoustic noise from an electric motor is much lower than that of a conventional engine, making electric vehicles hard to detect by sound.

This research project aims to develop a handheld device that detects approaching vehicles and provides warning depending on their distance and approach speed. A variety of sensors, sensor fusion, signal processing and machine learning will be applied and integrated to create an intelligent sensing platform that can provide critical traffic information to the traveler in order to identify a safe crossing opportunity. The research outcome of this project can be translational to robotic navigation and autonomous vehicles. It can lead to technical publications in journals or conferences. Please contact Dr. Philip Pong (philip.pong@njit.edu) with your CV to discuss further in order to apply.

Requirements:

1. Computer programming
2. MATLAB and Simulink
3. Hardware experience with electronics
4. Regular research progress meeting every week
5. Suitable for students who like research and plan to pursue for a PhD degree