

ABSTRACT

This senior project aims to provide blind persons with the ability to effectively experience driving. This report includes the project background, literature review, designs, methodologies, results, and conclusions with project management, human factors engineering, and electronic manufacturing focuses. Other universities and professionals have accepted the Blind Driver Challenge presented by the National Federation of the Blind (NFB) or studied systems to improve vehicle feedback. The Virginia Tech vehicle, named “Odin”, includes tactile and audio interfaces in order to relay information to a blind driver about vehicle heading and speed. The QFD results reveal that the amount of available information from the feedback systems ranks the most important aspect of this project’s designs. The QFD also shows the importance of both speed and acceleration. The final feedback designs of the vibrating vest, steering wheel, and audio provide commands, statuses, and speed updates. The programs packaged with the SICK LIDAR sensor as well as LabVIEW will serve to accomplish the necessary programming. This project contains two expensive items that push its total cost fairly high, the dune buggy and the laser scanner. Considering the over 1000 feet of electrical wire, electrical safety signifies a very large safety concern. Innovative sensor and tactile feedback technology provide the backbone for this advancement for the visually impaired.

INTRODUCTION AND BACKGROUND

This senior project aims to provide blind persons with the ability to effectively experience driving. The Quality of Life Plus (QL+) organization allows the unique opportunity to research and produce such a product and experience within a team. Since this is a multidisciplinary senior project, the department senior project timelines differ. The project officially ends in December 2011 with an event. This industrial engineering senior project report only covers the progress up to June 2011. Therefore, the report will focus mostly on the final feedback design of the tactile vest, rather than the impending event. This report includes the project background, literature review, designs, methodologies, results, and conclusions with project management, human factors engineering, and electronic manufacturing focuses.

Problem Statement

Blind persons aspire to drive independently without the assistance of another individual. Currently, their lack of sight prevents them from safely and effectively maneuvering a vehicle. The introduction of innovative vehicle technology that adequately captures and transmits real-time data about road conditions to the blind could solve this problem.