Personal Contributions

Tanzim Mokammel

My overall responsibility was to develop the obstacle anticipation and detection module. Initially, I researched various models of ultrasonic sensors, as well as types of microcontrollers. Once a sensor and microcontroller were chosen, I implemented the circuitry, and wrote the software required to drive the sensor, and gather distance data from it. With the help of Valikhan Kuparov, I have developed the software required to use the distance data in performing relative speed, as well as time remaining calculations. Developing the speed and time calculation algorithms took multiple iterations due to noise issues from the sensor. In the end, I was able to fine tune the algorithm to achieve satisfactory results as demonstrated by the test results.

In addition to working on the obstacle detection module, I recognized that the initially planned implementation of the output module was not sufficient. Therefore, I worked on developing the external GUI using Processing. The GUI is used to gives the user real-time control of the user vehicle, while displaying real-time plots of the distance, speed, and time calculations. The GUI’s main purpose is meant to demonstrate the project, but it has also been instrumental in debug, and testing.

I have also contributed to certain components of the automation module. The GUI I developed communicates with Hani Hadidi’s control mechanism to provide remote control of the user vehicle using a personal computer (PC). I had assisted in the initial development of the automation module by designing a transistor driven circuitry to control the speed of the motor. Although a better design was later used, the initial design helped us move on the final design using a half-bridge motor driver. I had also assisted Hani debug the motor driver code, and assisted in implementing the steering lock feature by designing the danger look-up table, and integrating the motor driver code with the obstacle detection/anticipation code.

In summary, my main contributions were the obstacle detection/anticipation module, and the external GUI. In addition to this, I have assisted with the automation module, and the overall integration of the final design.