

The project aims to harness the power of computer vision and machine learning to detect dangerous and object on the road. The end project will utilize camera feed data, utilize Raspberry PI as platform and use Amazon Web Services to process image. Nowadays, the number of vehicles on road is increasing every day and there is a continuous increase in crashes over the years. However, there are barely any smart devices installed in vehicle to help driver recognized the dangerous on the road. For most people, they have to buy a completely new vehicle to obtain smart assistant. The project will help people get smart assistant by installing a low-cost and small size device in their current vehicles.

As a Computer Science major, the curriculum at UC has played an important role in gaining the necessary expertise to develop the project. Data Structures (CS 2028) helped me understand concepts such as Object-Oriented Programming. Linear Algebra (MATH2076) helped me understand vector and matrix operations which are very important in machine learning and computer vision. Software Engineering (EECE 3093) introduced me to concepts such as agile methodology. Design & Analysis of Algorithms (CS 4071) and Machine Learning (CS 6037) improved my programming through concepts such as complexity and using neural networks in the machine learning.

I have gained a lot of software development experience through four co-op rotations. During my first co-op rotation, I worked in the UC College of Engineering and Applied Science as a research assistant. I gained the skill to design and implement a digital circuit simulator and displayed excellent team work skill and communication skill. For my second rotation, I worked at Siemens Innovation Center. I was a web application developer and created a web application from scratch with teammates. I have gained hands-on development experience of software. I also learned how to use the database and connect database to software efficiently. For my third rotation, I worked at the Institute of Automation, Chinese Academy of Sciences. I was an embedded software developer. I completed a PDF reader application alone and it was used in a printer system. I was also brought on as the development lead for the programmable motion control software project. I designed a set of programming language and interrupter functions. During this co-op, I gained embedded software developer experience and better understanding on the Linux system. During my last co-op, I worked at UC as a research assistant, I learned new technology that might be used in the project.

I have always been interested in computer vision, cloud computing and machine learning. I really like this project because it will not only provide a cost-effective drive assistant option for drivers but also decrease the probability if crashed and injury as well as increase the awareness of the driver. Of cause, I was also seeking a project that would also help improve my career options by giving me experience valuable to employers.

This project will be divided into three main parts: getting data from camera and sending the data to Amazon Web Service; using machine learning to recognize objects in each image; detecting dangerous from that information. As a team, we will work through all

this task together. For my part, the focus will be on embedded development and machine learning. I will evaluate my contributions by measuring the accuracy and feedback received by teammate and advisors. The expected result of the project will be a small device with interface that can detect dangerous situations and objects on the road. I will know that I have done a good job if the device performance is well above baseline of our expectation.