



# Vehicle Intersection Control

McMASTER UNIVERSITY

Proof of Concept Demonstration

SE 4G06

GROUP 6

Alex Jackson  
Jean Lucas Ferreira  
Justin Kapinski  
Mathew Hober  
Radhika Sharma  
Zachary Bazen

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## 1 Challenges

### 1.1 Lane Following

Follow existing software solutions and modify it to suit the needs of the project requirements

To capture images in real time we plan to attach a webcam to each vehicle.

Proceeding through the intersection: we intend the vehicle to proceed at slow speeds in a straight line until sufficient data is available to follow lanes again

### 1.2 Car to Intersection Controller Communication

Vehicles will communicate to the intersection controller via Bluetooth.

### 1.3 Overall Power Supply

Each vehicle will be fitted with various sensors, microcontrollers, and a webcam. All of these electronic components will be a strain on the power supply. Thus, we will buy an additional power supply to be used while the other is charging.

### 1.4 How far the car has traveled

Knowing the distance each car has travelled will allow us to perform various calculations, such as velocity control.

This will be accomplished by implementing a Hall effect sensor on each car.

### 1.5 Obstacle Detection

Obstacles may be present on track, and collision with such obstacles must be avoided.

We can define an obstacle as any foreign object that cannot be safely driven over by the car.

Obstacle detection will be possible through a sensor in front of the car. The sensor will be limited to detect obstacles only within the current driving lane. A viable sensor to implement is an infrared sensor.

## 2 Software Challenges

### 2.1 Processing speed

Some code will be critical to the performance and it might not be possible to write this code in a high level language like Python.

We will consult how past groups dealt with this problem, and consider an optimal language to satisfy the processing requirements of the vehicle.

## 3 Open Issues

### 3.1 Intersection Computer and Microcontroller

- What programming languages should be used and how to interface between them

- How will the algorithms access the data from the sensors
- Will the processing power of the Raspberry Pi be good enough to run image processing algorithms in real time