



Semi-Autonomous Vehicle System

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Background:

- ❑ Semi Autonomous Vehicles are the big break through to come out of both the automobile industry and the field of Deep Learning.
- ❑ To completely take advantage of the benefits that come with having an autonomous roadway a large percentage of the U.S. vehicle fleet will need to have these intelligent systems.
- ❑ By making these systems accessible to the public, the transition to self driving cars will occur much faster.

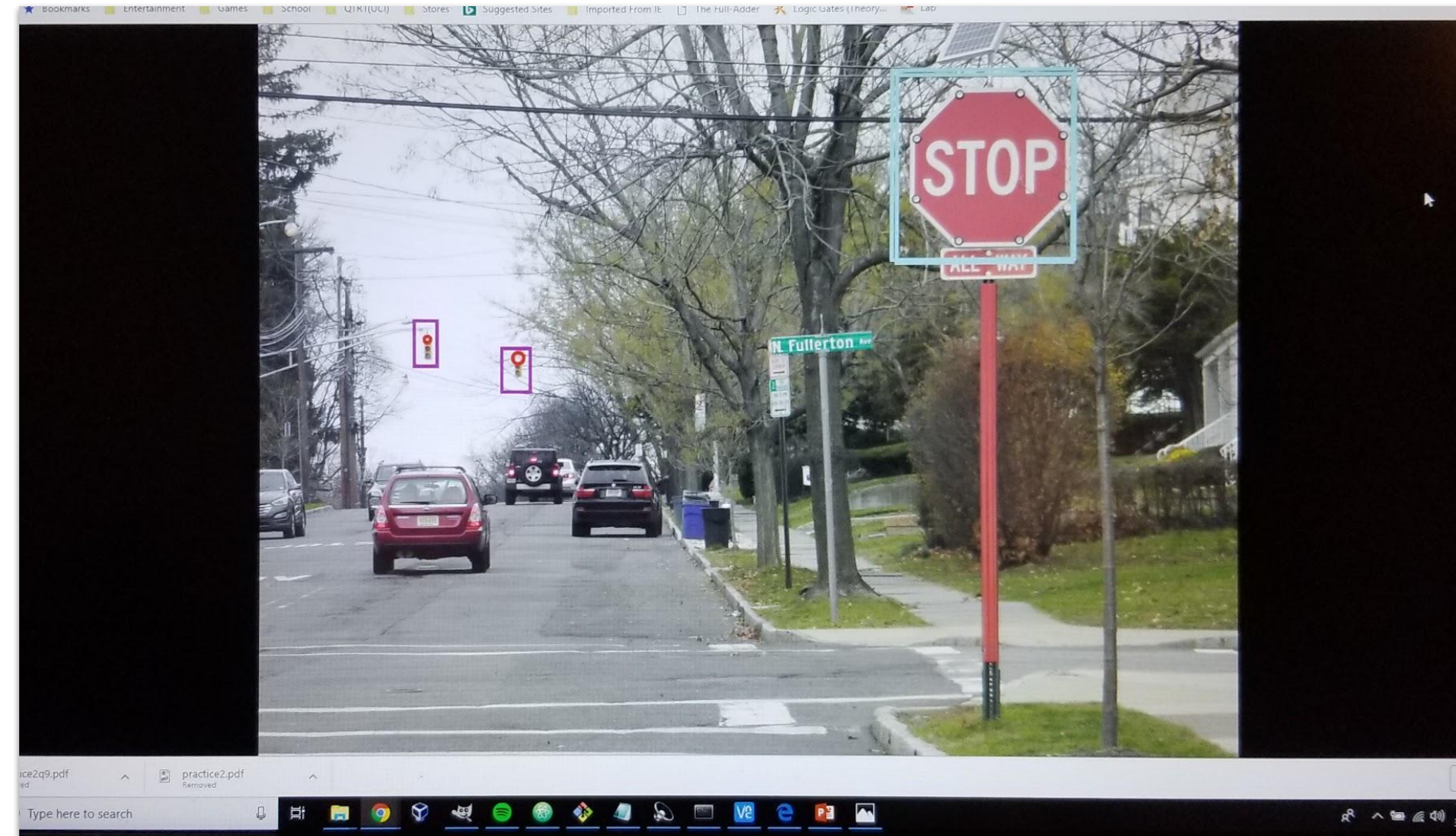


Figure 1 : Traffic Sign Detection

Objective:

- ❑ Create a semi autonomous vehicle that can be controlled from your computer.
- ❑ Provide intelligent onboard feedback mechanisms to maintain stable speeds and steering

Functionality:

- ❑ Initiate the server on the computer, and turn on the Raspberry Pi to start the smart vehicle system
- ❑ Set initial vehicle parameters on the server for it to begin moving
- ❑ Load the Programs on the Raspberry pi that sets the car into moving mode
- ❑ Sensors measure the to be controlled parameters such as speed and direction and maintain them using a feedback system
- ❑ Shutdown the server to kill the car, and end stream transmission

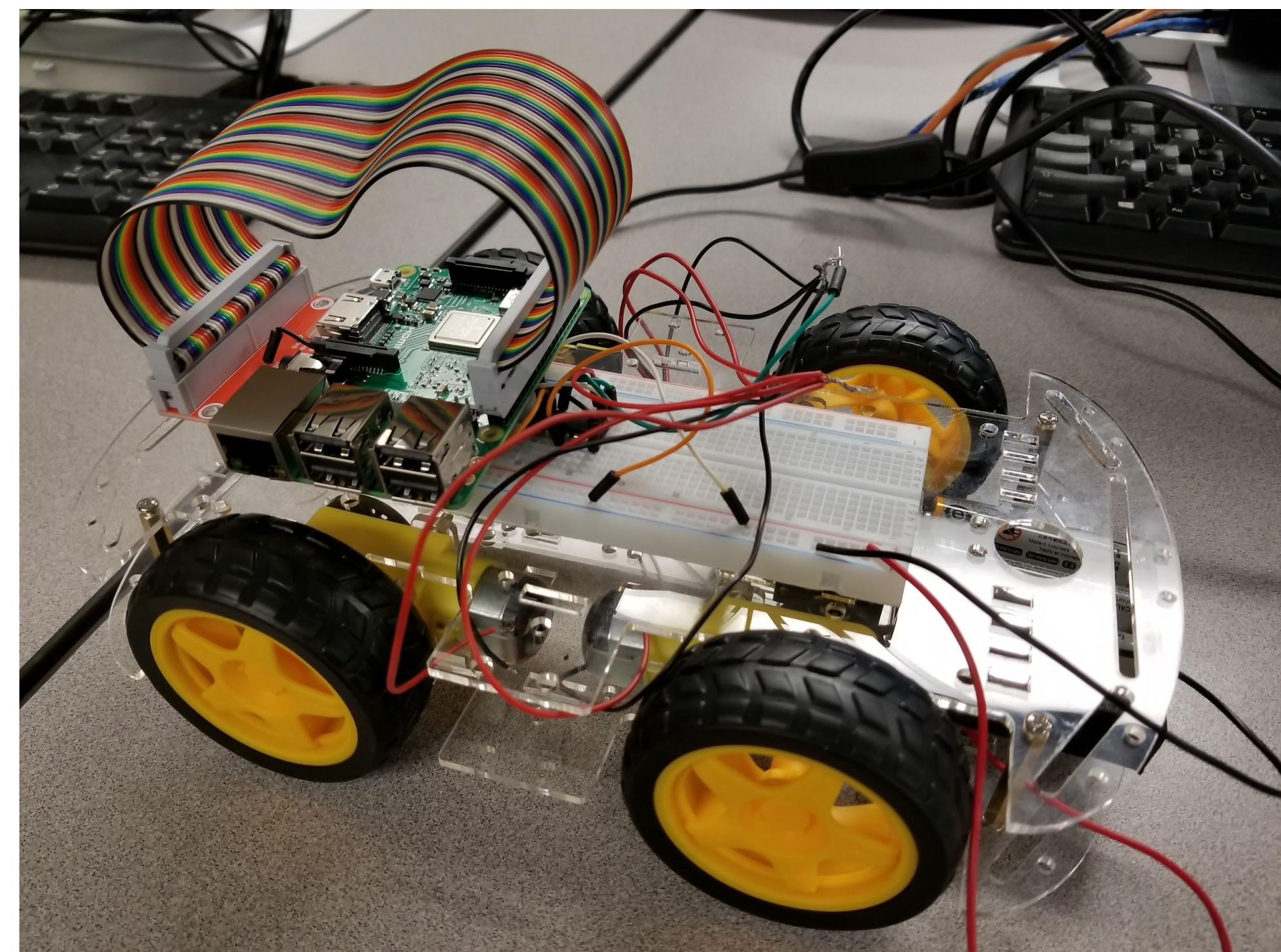


Figure 2 : Assembled Vehicle

Implementation

- ❑ Raspberry Pi 3 B+
- ❑ Pi Cam V2
- ❑ OpenCV
- ❑ Haar Cascade

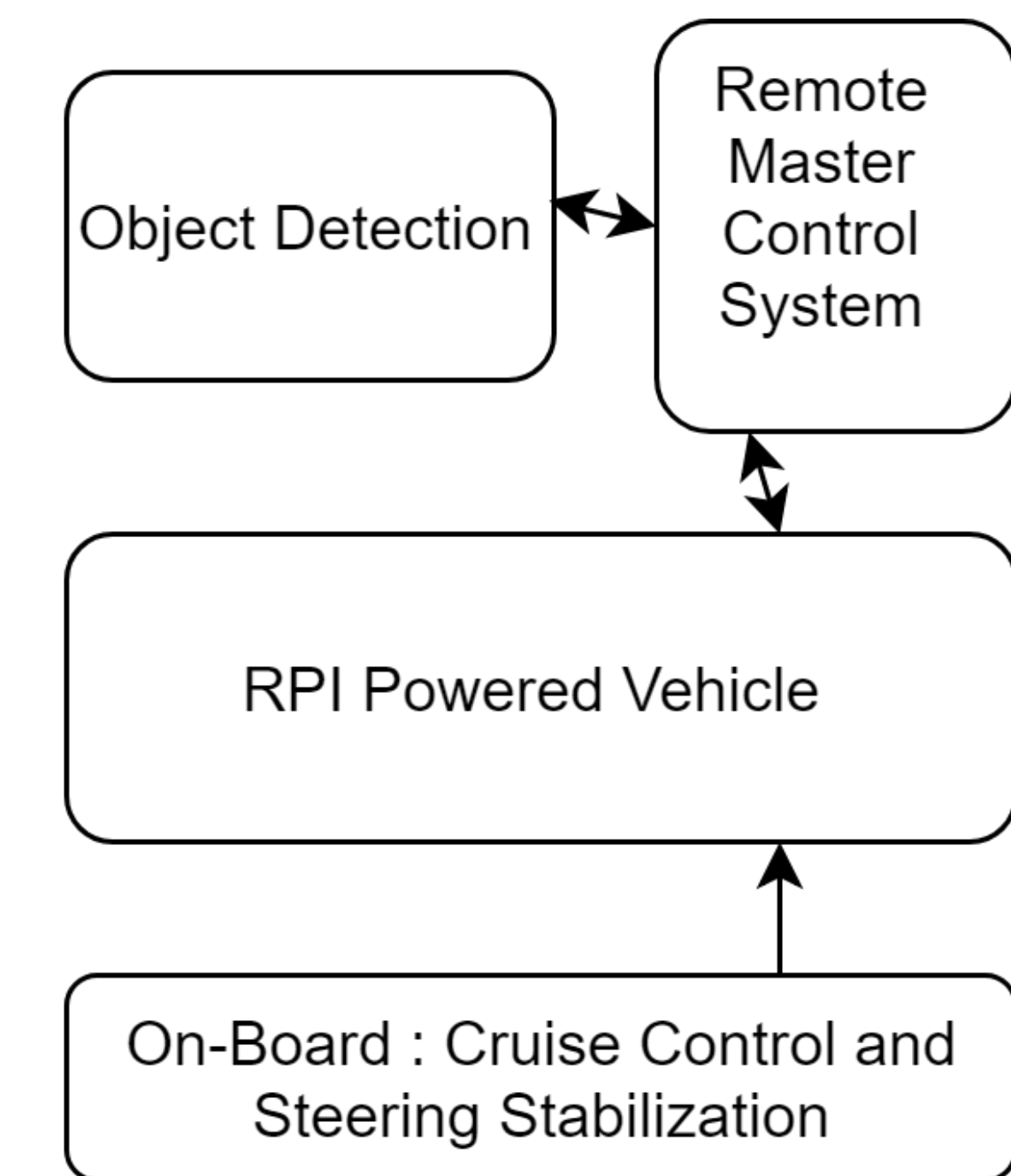


Figure 3 : Control Flow

References:

- ❑ Michael Jones , Paul Viola . “Rapid Object Detection using a Boosted Cascade of Simple Features”
- ❑ Nguyen, Alenazi, Cetinkaya, Sterbenz . “Introduction to Socket Programming”
- ❑ ESP32 With DC Motor and L298N Motor Driver - Control Speed and Direction.” *Random Nerd Tutorials*, randomnerdtutorials.com/esp32-dc-motor-l298n-motor-driver-control-speed-direction/.

