



Autonomous RC Car

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Goal

Make an autonomous vehicle that can distinguish objects and lanes based on visual input and react accordingly.

Background

There are many car accidents that happen in today's society, most due to human error. Whether it's being distracted or not seeing a stop sign, we as humans are more error prone when it comes to driving. Autonomous vehicles provide a solution to this.

Milestones

- Connect the Arduino and the L293D chip to the car and have it move autonomously
- Design the car to respond to objects in an intended way as if it were driving on a real street.
 - Move forward on a green light, stop at a stop sign or red light, avoid obstacles
- Merge Input/Processing Units (in progress, need to debug)
- Merge Processing/RC Units

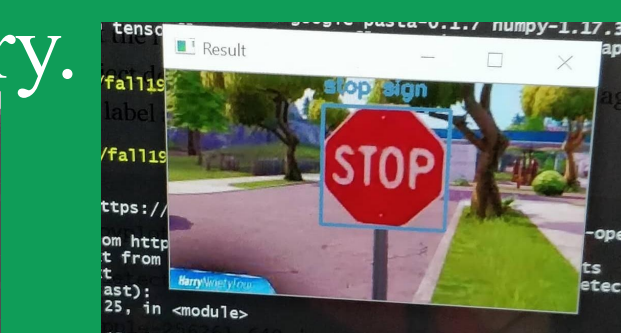
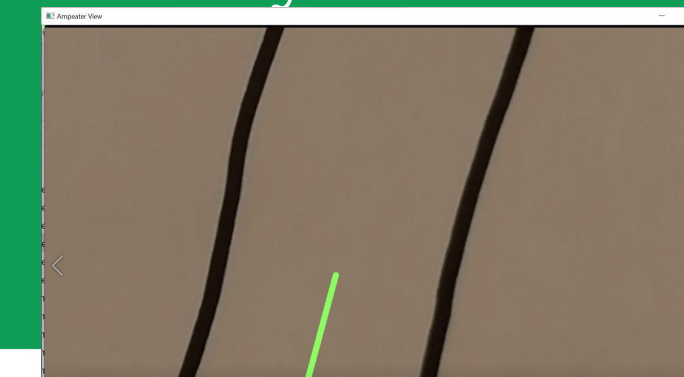
Input Unit

Raspberry Pi 3 B+ and one pi camera is utilized to gather a live video stream in 30 Fps.



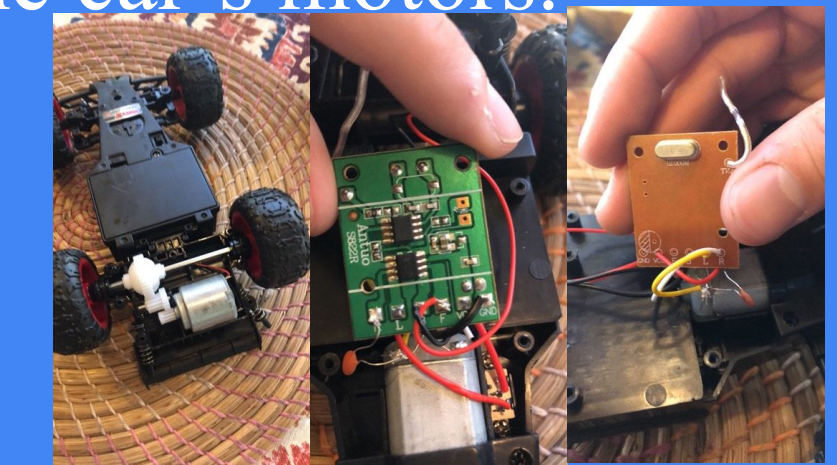
Processing Unit

Takes visual data from Raspberry Pi, process video with OpenCV to detect lane lines and sends corresponding instructions to Arduino using the Pyserial library.



RC Control Unit

An Arduino Uno Rev3 is utilized to control the movement of the RC car with a direct connection to the car's motors.



Accomplishments/Challenges:

- Live footage from Pi Camera
- Lane detection
- Merging Input/Processing Units

Future Work:

- Application to control remotely/summoning feature.

References

- [1]"Fatality Facts 2017: State by state", *IIHS-HLDI crash testing and highway safety*, 2019. [Online]. Available: <https://www.iihs.org/topics/fatality-statistics/detail/state-by-state>. [Accessed: 04- Nov- 2019].
- [2] A. Mordvintsev and A. K., "Hough Line Transform", *OpenCV*, 2013. [Online]. Available: https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_houghlines/py_houghlines.html. [Accessed: 03-Nov-2019].
- [3] A. Rosebrock, "Accessing the Raspberry Pi Camera with OpenCV and Python," *PyImageSearch*, 05-Feb-2019. [Online]. Available: <https://www.pyimagesearch.com/2015/03/30/accessing-the-raspberry-pi-camera-with-opencv-and-python/>. [Accessed: 29-Oct-2019].

