



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

- What parts are we getting? (Complete)
- Have the camera gather visual data (Complete)
- Have the camera distinguish specific objects
 - Lane detection: straight and curved lines (Complete)
- Design the car to respond to those objects in an intended way as if it were driving on a real street.
 - Have toy car be able to move on it's own
 - Move forward on a green light, stop at a stop sign or red light

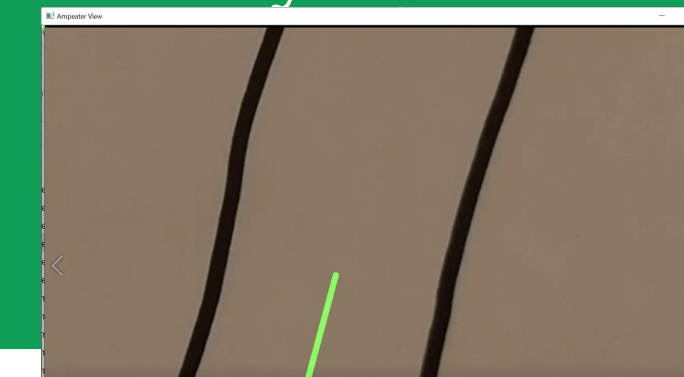
Input Unit

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



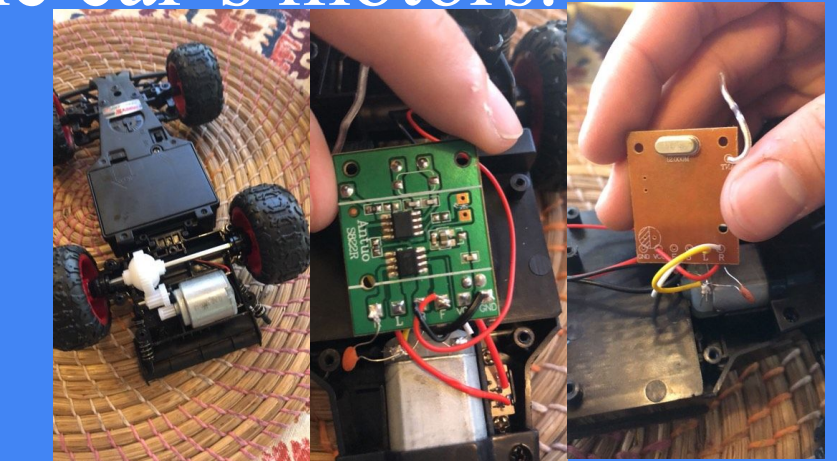
Processing Unit

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:

- **Finished:** live footage from Pi Camera, Lane detection
- **Learned that you dont know what youre working on until you actually start doing it.**

Future Work:

- **object detection.**
- **app - 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].





props



\$3.95
USB 2.0 Cable Type A/B



\$22.00
Arduino Uno Rev3

UCI

