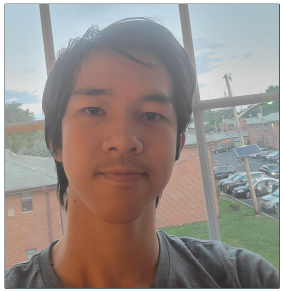
First Person View Self Driving Car Final Presentation

By: Adam Daniel Strub, Elliot Li, Mei Mei Castranova, and Divya Krishna
Directed by: Professor Rich Martin

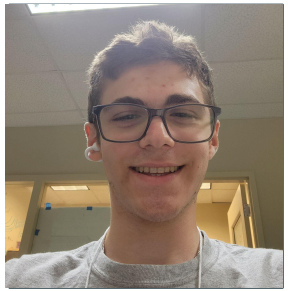
Introductions

Divya Krishna
–Edison High School STEM–



Elliot Li
–Highland Park High School–

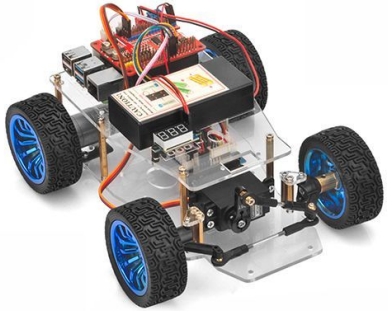
Mei Mei Castranova
-The Pennington School-



Adam Strub
–Rae Kushner Yeshiva High School–

Project Overview

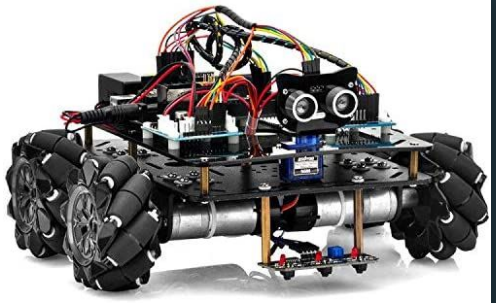
- Have the ability to remotely drive the car from anywhere on the internet (ex. If I was across the country I should still be able to drive the car)
- Able to use the car, sensors from Raspberry Pi, and 3D printing to optimize controllability of the car

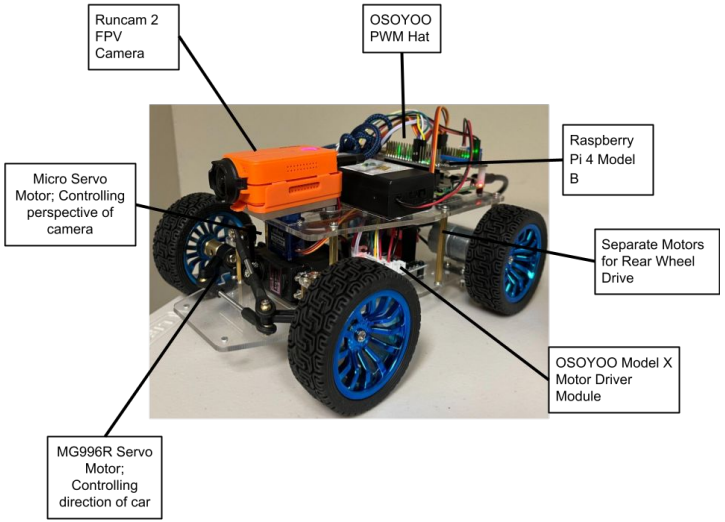


Motivation

- Be able to control car and other potential devices from anywhere on the internet
- Potential applications for other devices with long distances

Car/Hardware

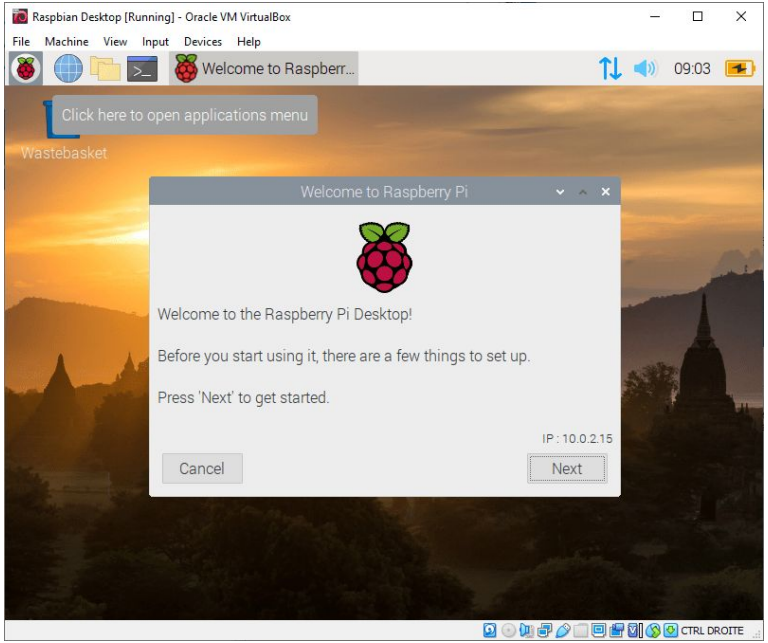




- Construction: same as regular car, with rear wheel drive opposed to the crabbing side-to-side and in-place turning enabled by the mecanum wheels used last year
- Also mounted camera so that it would be able to turn
- Control components: OSOYOO MODEL X motor driver module, OSOYOO PWM Hat, Raspberry Pi 4 Model B

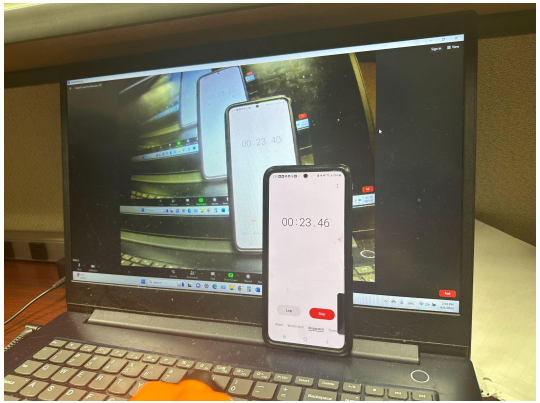
Software

- Raspberry Pi is a series of small single-board computers that we're using to run the commands on our car
- On the pi, we install and update important packages and libraries such as OpenCV and libatlas using PuTTY
- PuTTY is a terminal that can be used to change and insert commands that can be used to change the behavior of the car itself



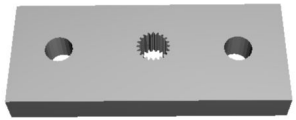
Latency Camera

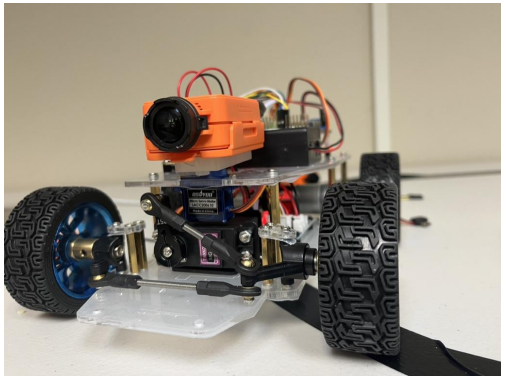
- Latency is a time measurement between the camera sending the image to the computer and seeing what is presented
- Connect a camera through both phone and computer, measured latency and delay of the camera
- Tested camera latency → Camera capturing phone timer, external phone taking picture recording difference
- 0.06 seconds on Windows
- 0.2 seconds on Pi



3D Printing

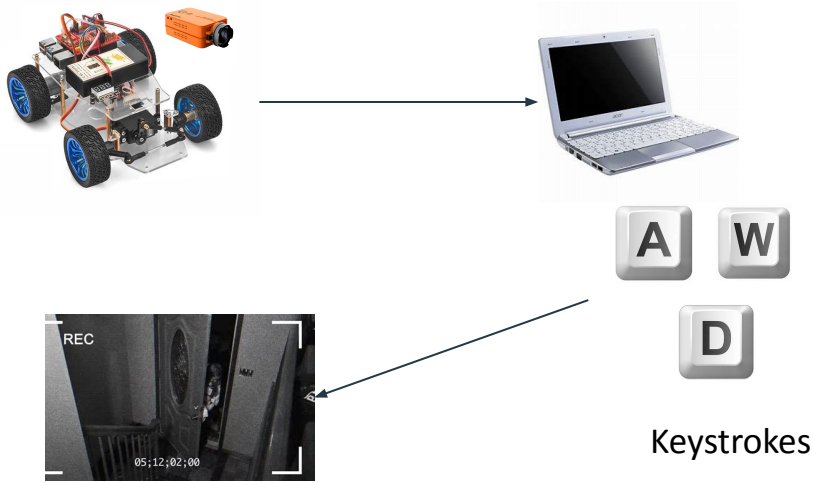
- Wanted a camera that can rotate to get a larger field of view, so we needed a platform to connect camera to a motor.
- Designed 3D printed platform for the camera.
- Multiple versions
  - Reconfigured the holes
  - Made thicker so 3D printing wouldn’t affect how platform fit onto the motor





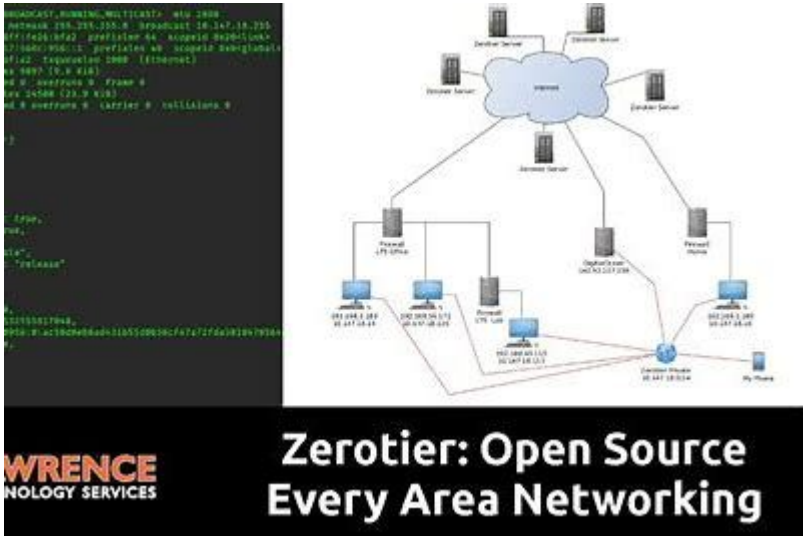
Code/Connections

- Data from the computer and Raspberry pi (car) exchange
- Keystrokes from the computer transmitted to the car, car receives compressed camera data
- Use of a socket or way to bind both devices together and receive packets of data



Networking

- Creating Virtual Private Network (VPN) and Land Area Network (LAN) to facilitate connection from anywhere on the internet
- Network usually created on the web application, using network ID to connect devices such as the Pi
- In initial testing able to “ping” two computers and send packets of data



Any Questions?