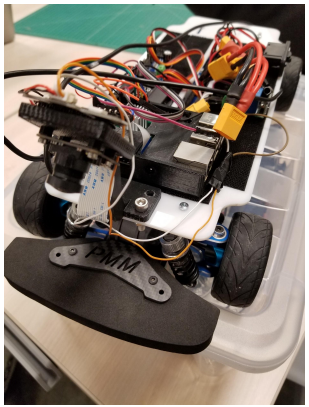
Autonomous Squad



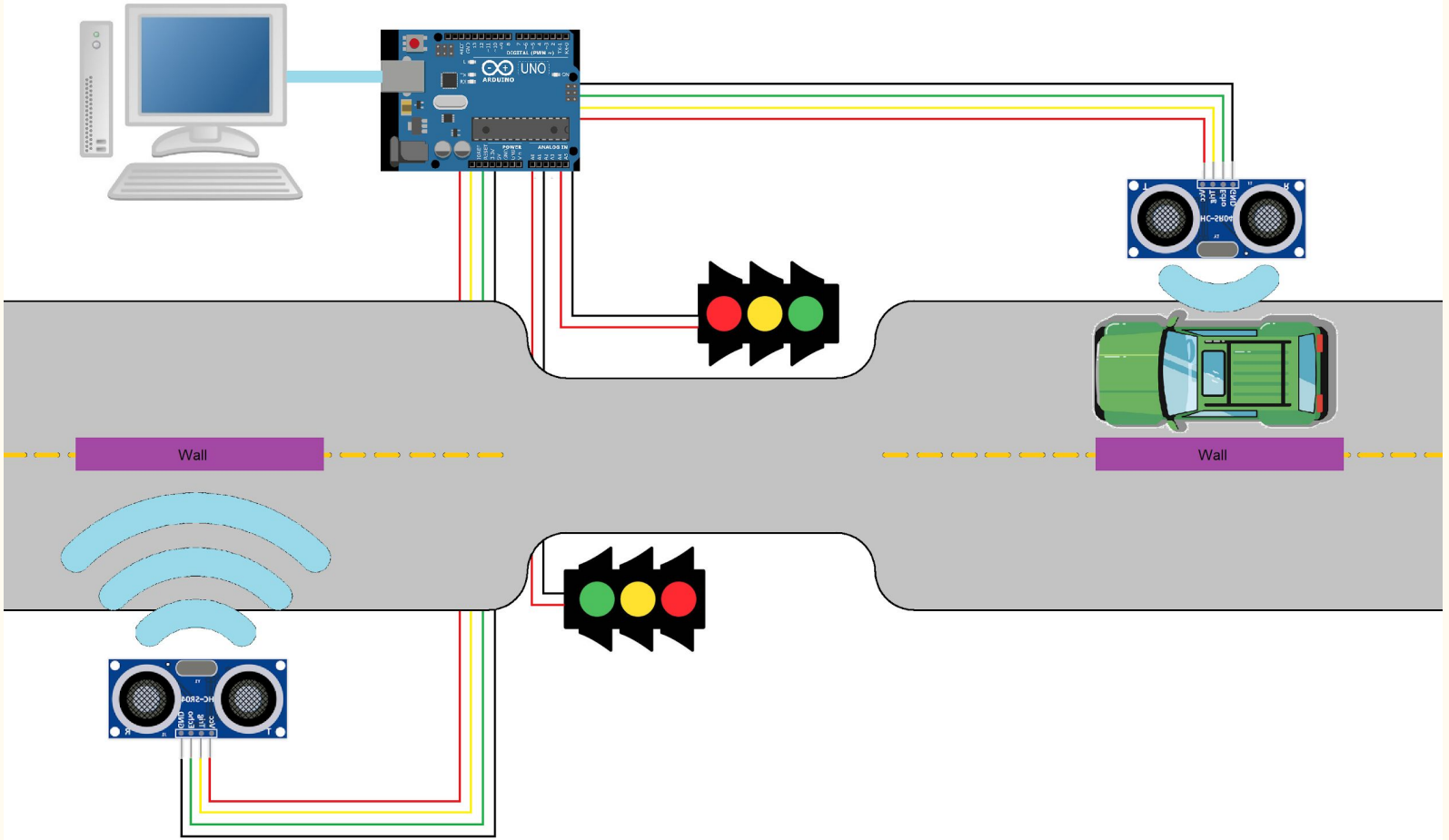
UCSD Robocar 04

Kaj Kuchina, Mihir Sathe, Justine Lee

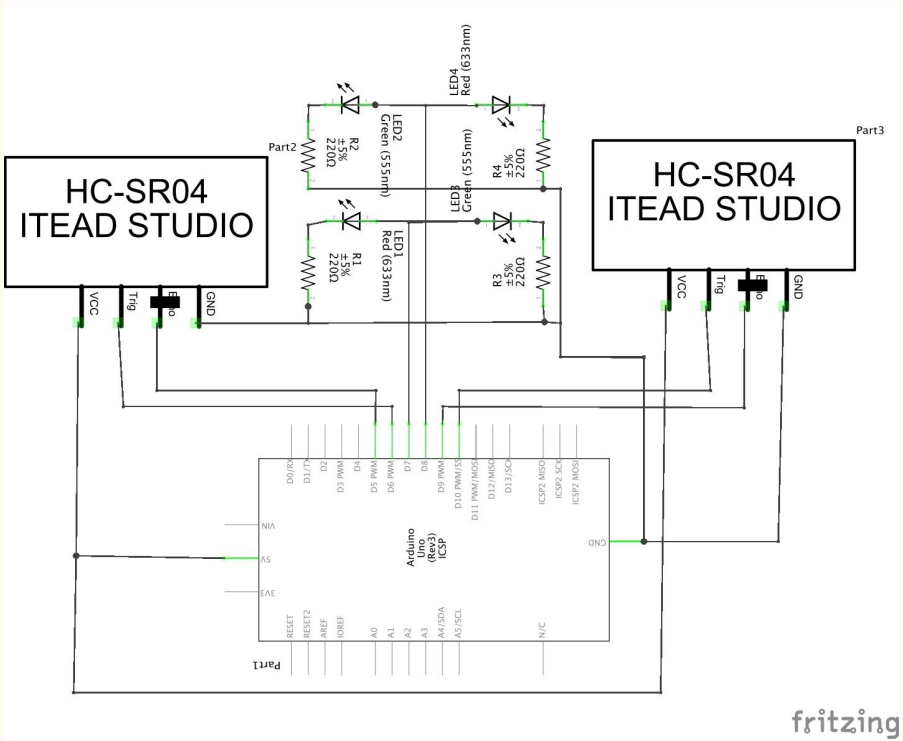
ECE MAE 148 Winter 2019

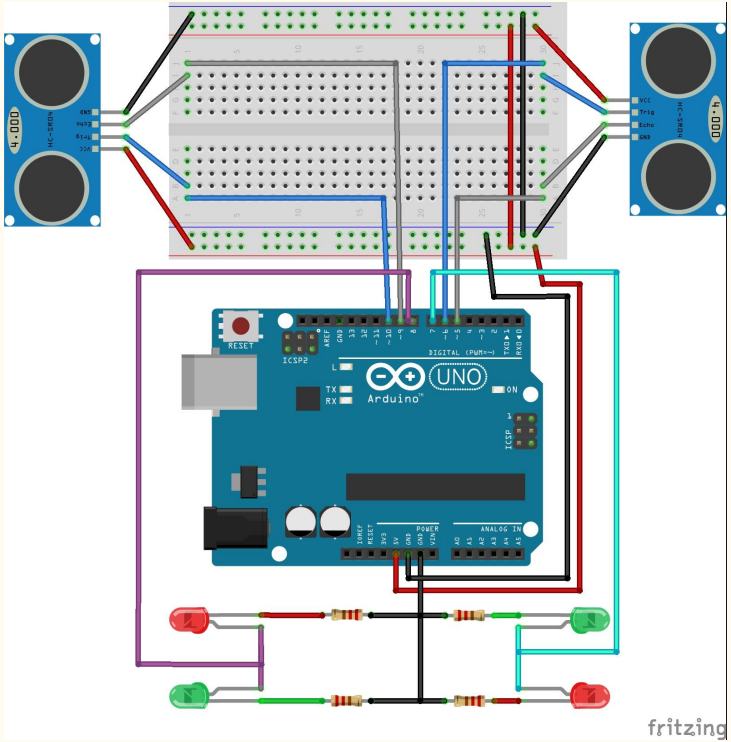
Smart Traffic Light

- Detects car presence and manages traffic
- Smart cars are more effective with smart infrastructure
  - Traffic can be optimized
  - Street lighting can be turned off when unused
  - Emergency Vehicle Prioritization
- Simple model minimizes cost and complexity
  - “Mountain Road” Model

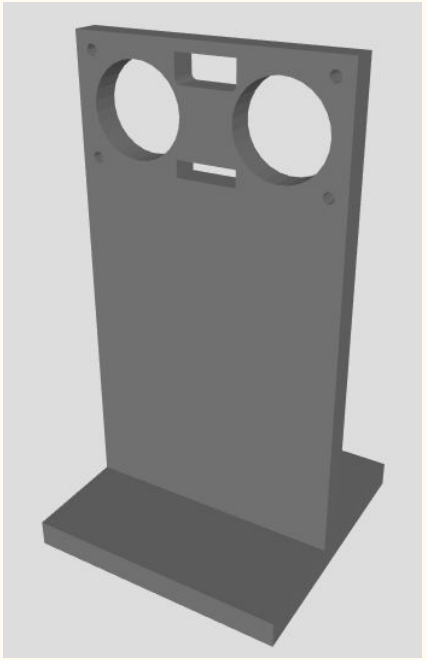

UNO
ARDUINO
Wall
Wall

Circuit Schematic





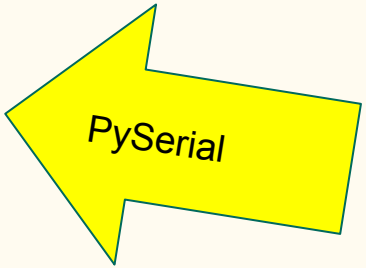
Traffic Light/Ultrasonic Mount



Decreasing Ultrasonic Variability

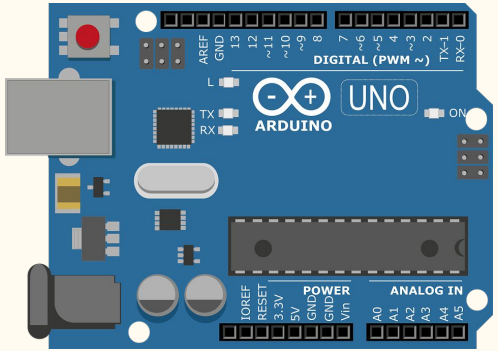
- Car Detection
  - If range is less than baseline, car present
- Real world objects aren't flat or stationary
- Flat acrylic plates placed across track helps with consistency

Code Walkthrough



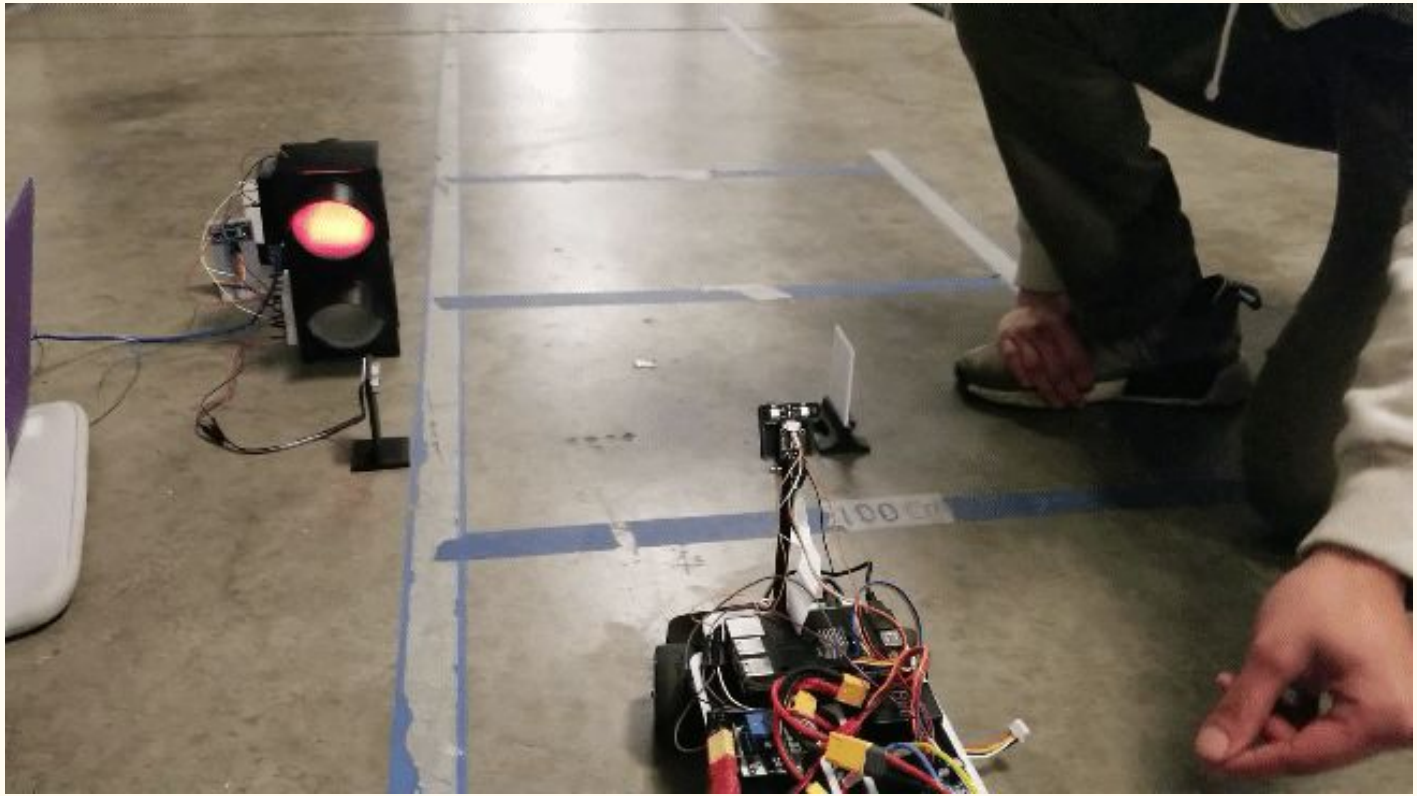
- Donkey Part (MQTT Client)

- MQTT Server
- Serial Interface



- Arduino Script

Car Detection Demo



Deliverables

- ✓ Design and print sensor mounts
- ✓ Design and print traffic light model
- ✓ Circuit and code to drive LEDs
- ✓ Circuit and code to read sensors
- ✓ MQTT Server
- ✓ MQTT Client
- ✓ Control Logic
- □ Donkey Part

Resources

- Traffic Light STL
  - https://www.thingiverse.com/thing:2826057
- NewPing Arduino Library
  - https://playground.arduino.cc/Code/NewPing