

Introduction

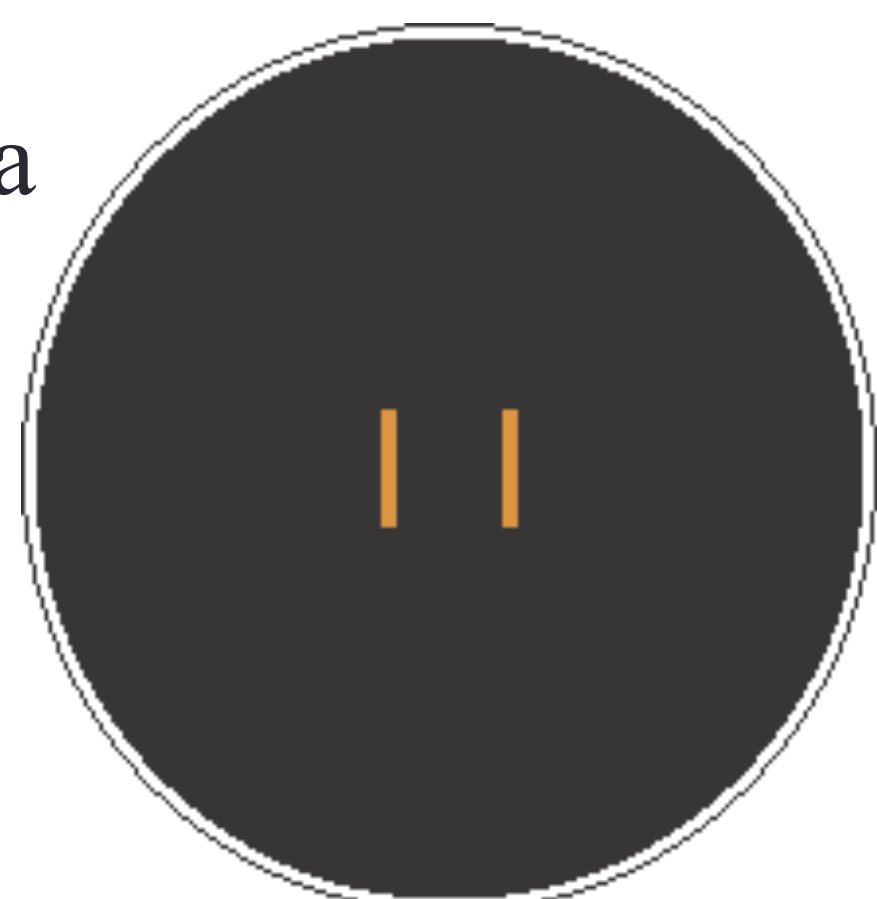
Our project is an autonomous vehicle built from a standard robot car kit designed and modified to compete through a series of challenges. A standard robot car kit was provided that includes an L298N motor driver, Arduino Uno, two TT motors, and an Ultrasonic Sensor. Additional materials are ordered as needed.

Challenges	
D1 Field Traversal	Successfully traverse a designated course.
D1 Block Push	Push a randomly placed block out of a 122cm diameter ring with a white border.
D2 Sumo-Bot Tournament	Round Robin Tournament with standard Unified Sumo Robot rules.

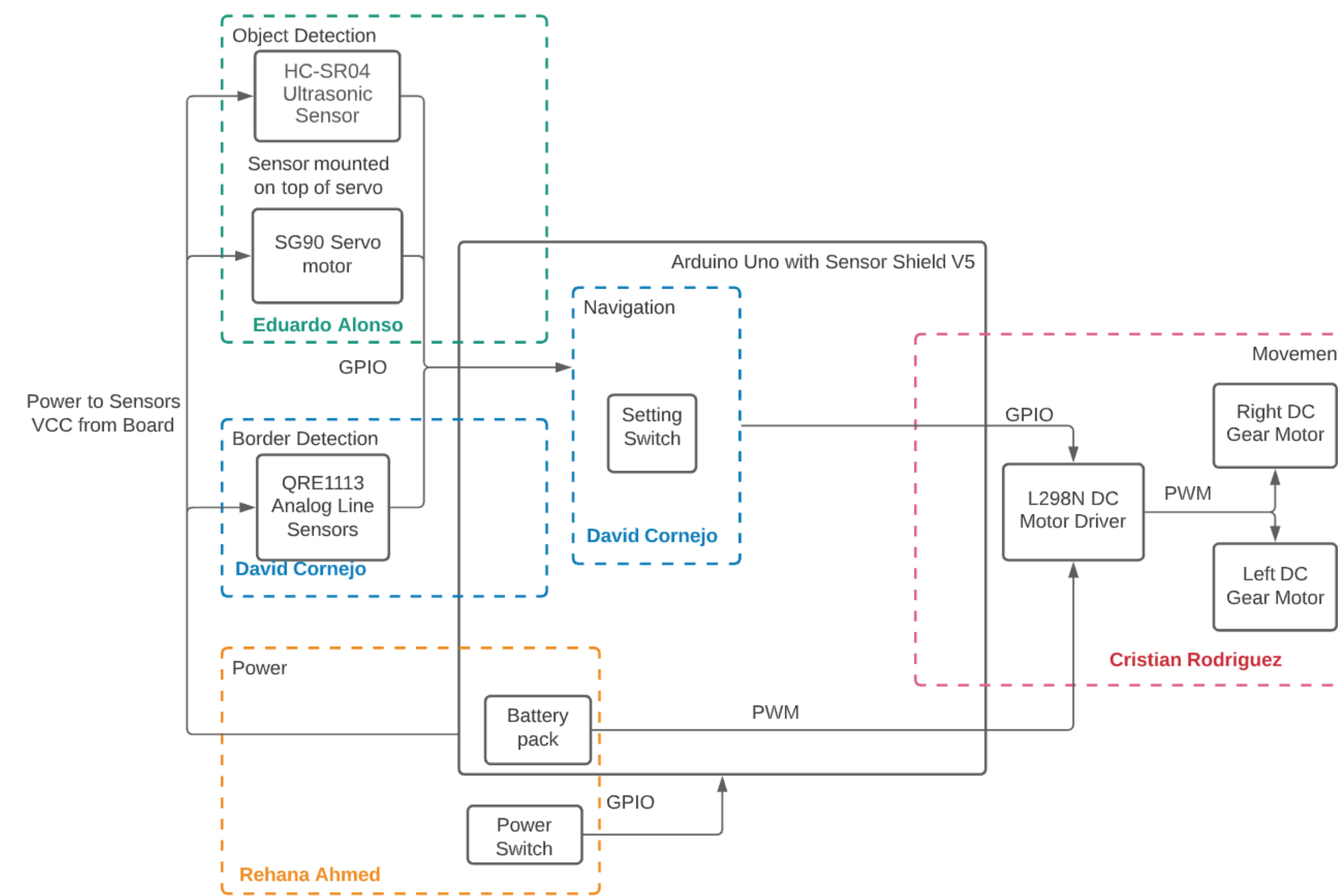
Robust logic was the main design focus for D1. Budget was only used for IR sensors since no component in the base kit was able to detect white or black lines, something required to complete all challenges.

D2 Tournament Info

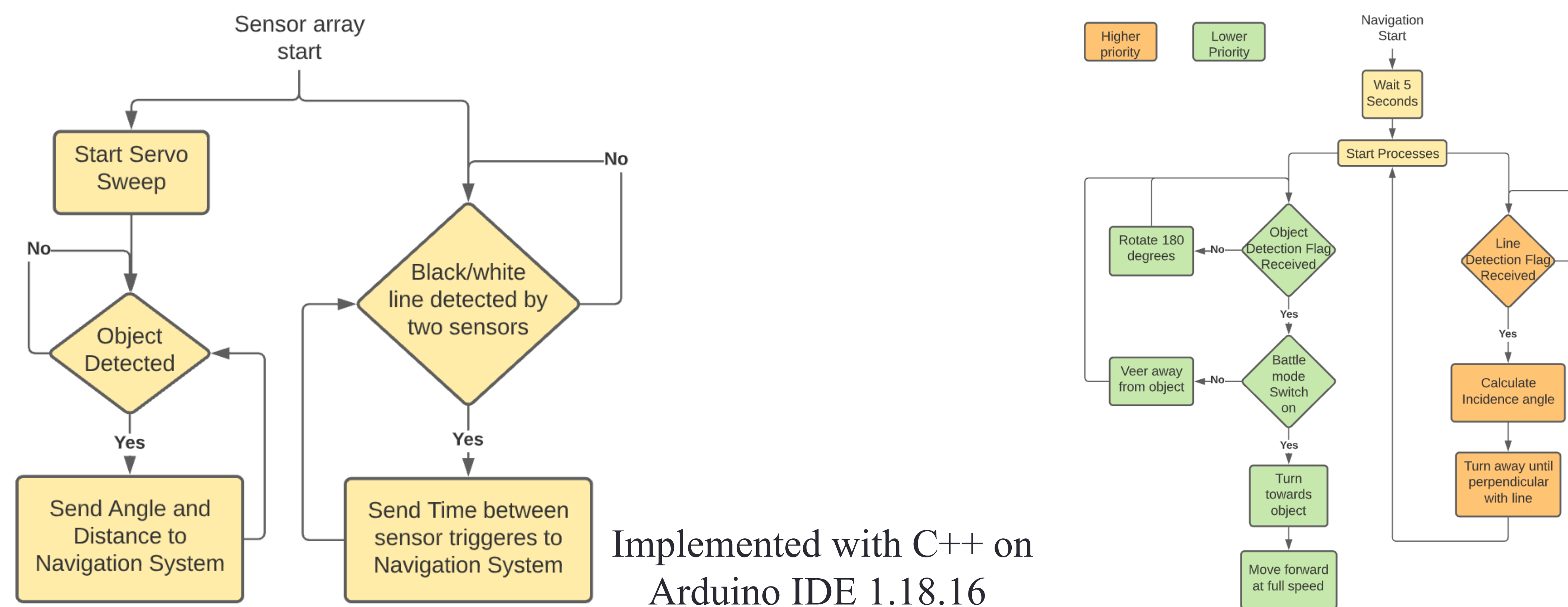
The D2 tournament matches take place on a sumo bot ring that has a diameter of 122 cm and a white border line on the outer edge of the ring. The winner is declared when the team successfully pushes out the opposing robot outside the ring.



System Block Diagram



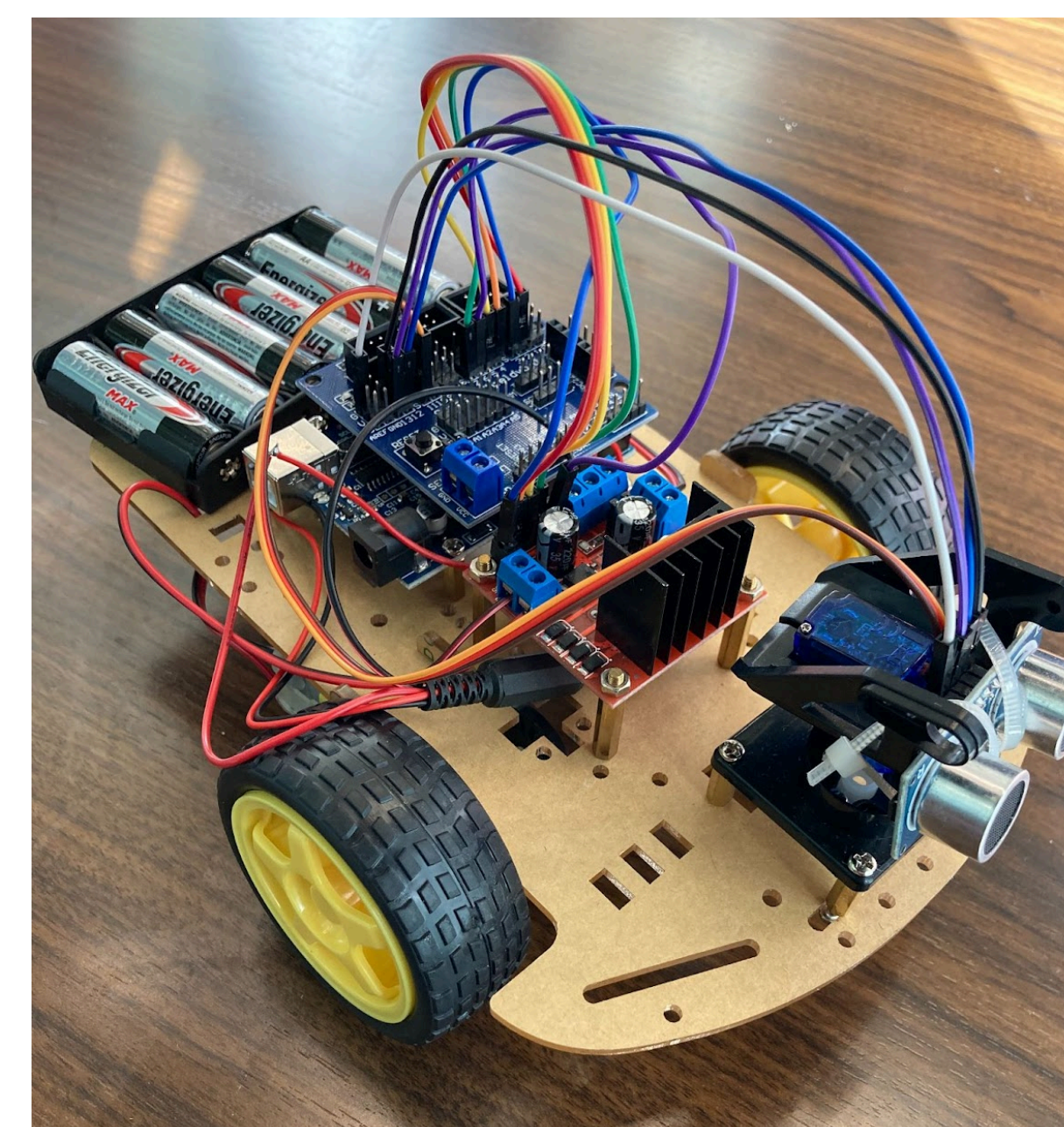
Logic Overview



Implemented with C++ on Arduino IDE 1.18.16

Base Kit Components

- Car chassis 1
- Car Wheels 2
- DC Gear Motor 1 48: a deceleration DC motor (otherwise 120: 1 Optional)
- 20 line gun code disk 2
- Fasteners (high intensity black acrylic) 4
- Caster 1



- Six battery box 1
- Quality Rocker Switch 1
- Assembly drawing 1
- Several screw nut
- V5 shield 1
- UNO R3 1
- SG90 1
- FPV 1
- L298N 1

Team Members



Rehana David Cristian Eduardo

Restrictions & Constraints

- \$50 Max Budget (excluding kit Cost)
- Cannot use cameras
- Max Width: 17.0 cm
- Max Length: 24.0 cm
- Max Weight: 2000 g
- Must remain stationary for 5 seconds after activation
- Sub-systems have a limit of 120V AC
- Must use a two wheel drive
- Misc. Sumo Bot Safety Restrictions

D2 Plans

Data obtained from other competing bots during D1 challenges will be used to improve the logic for our navigation system and prepare for the D2 tournament. We plan to test the following features:

- Vehicle stability and Speed
- Push and object detection
- Border detection and power
- Logic test/spar

Acknowledgments

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- D2 Mentors: Team 2.03