E2.12 - Kong

TEXAS STATE UNIVERSITY
Ingram School of Engineering

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Sponsor: Fawzi Behmann

Project **Overview**

Autonomous battery-powered robot engineered to push or pull a 1000-gram block and perform in a Sumobot competition.

Requirements

- Autonomous
- Up to 1500 gram weight limit
- 13cm x 13cm
- $75 budget includes PCB
- No cameras allowed
- Requires start button with a 5 second countdown delay
- Must shut down at 3 seconds when motors are stalled
- Battery powered, ≤ 12VDC

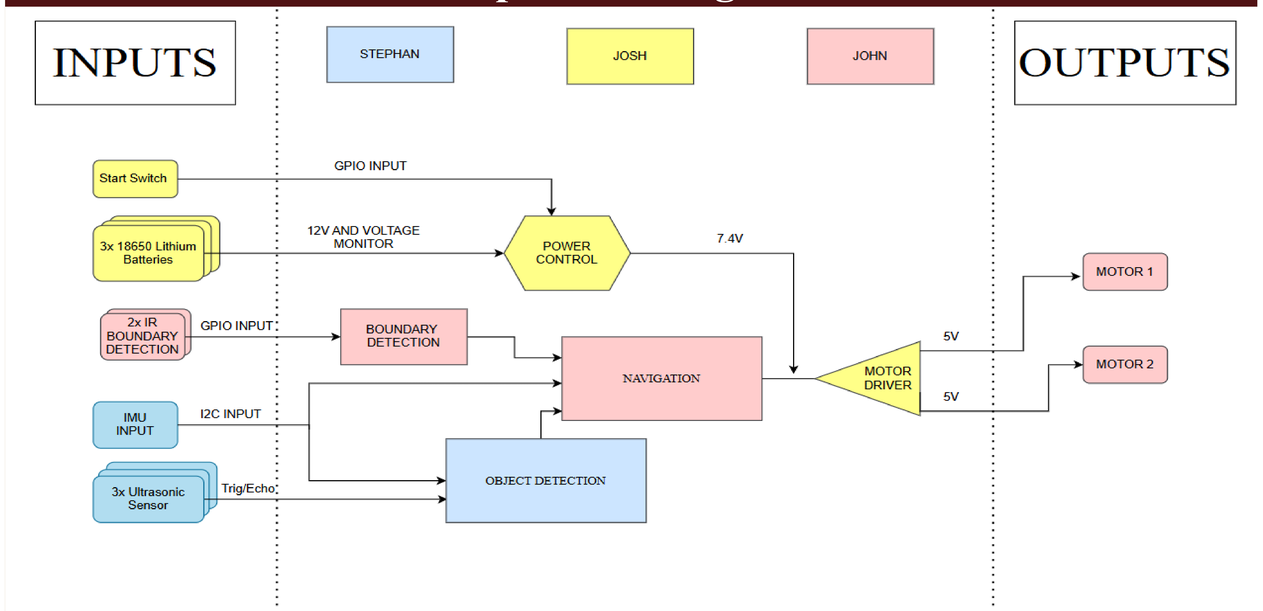
Bill of Materials

Component	Quanity	Price Each	Subtotal Cost
ESP-32	1	$ 5.00	$ 5.00
HC-SOR4 Ultrasonic Sensor	3	$ 1.20	$ 3.60
DRV8833 Motor Driver	1	$ 1.33	$ 1.33
18650 Batteries	3	$ 6.33	$ 18.99
HW 870 IR Sensors	2	$ 2.00	$ 4.00
Jumper Cables	1	$ 6.00	$ 6.00
TT motors 3-6V and Tires	2	$ 5.00	$ 10.00
DROK Buck Converter	1	$ 1.67	$ 1.67
Start Switch	1	$ 0.50	$ 0.50
PCB	1	$ 5.00	$ 5.00
MPU6050 IMU	1	$ 3.00	$ 3.00
Total			$ 59.09

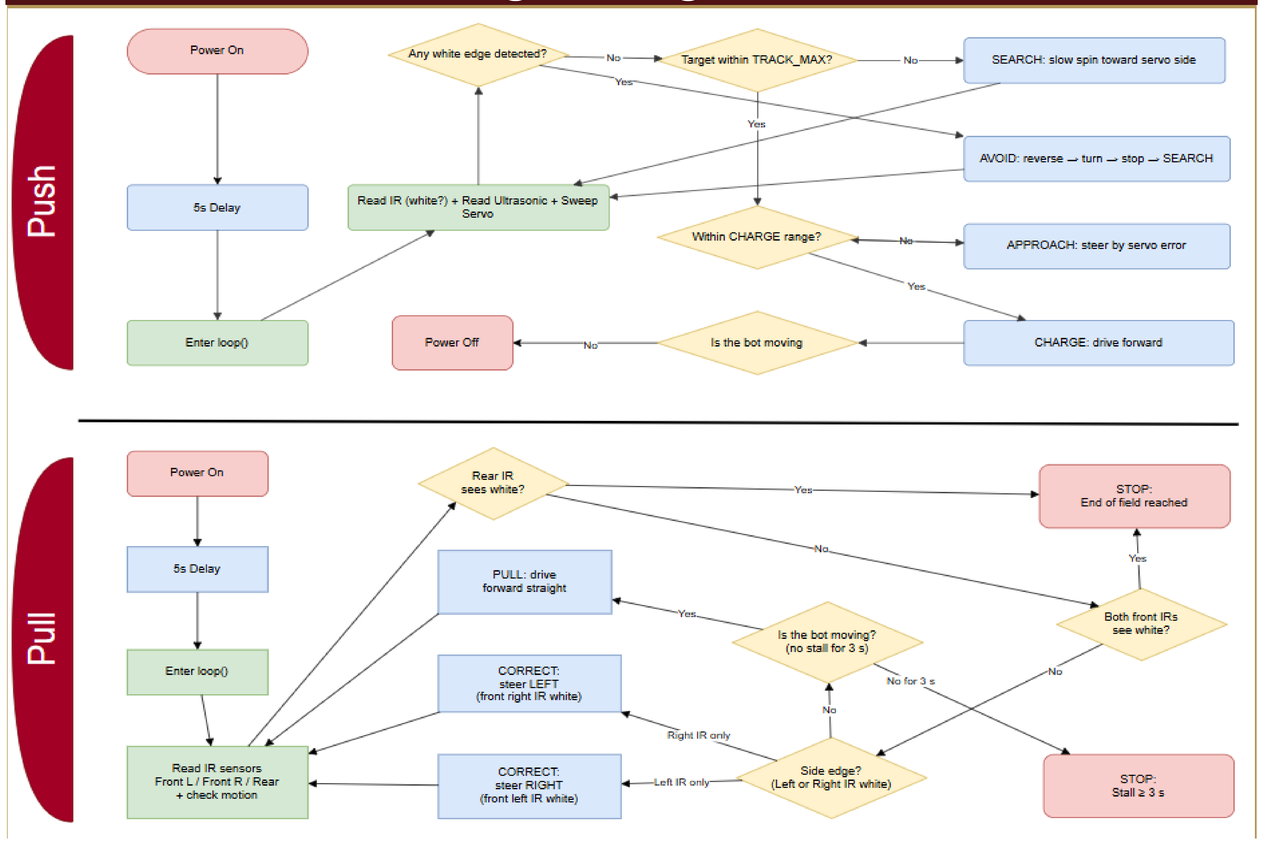
Design 2 Achievements

- Functional PCB
- Debugging software
- Integrated PCB into the Chassis for Sumobot
- Testing validation for each subsystem

Top Level Diagram



Navigation Algorithms



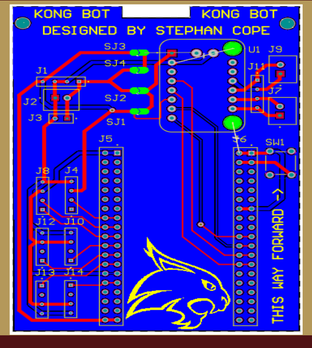
Meet the Team

Stephan	Josh	John
➢ Chassis ➢ PCB	➢ Power ➢ Motor control	➢ Boundary /Object detection

Major Changes since D1

- Changed the following:
  - Design of Chassis
  - Added IMU sensor
  - Removed servo and added 3 ultrasonic sensors
  - Adjusted navigation code for the following hardware changes
  - Moved front IR sensors forward a cm, for faster boundary detection

PCB schematic



Acknowledgments

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