E1.05 - Speedy Liners

Cristian Chavez Cruz, Octavio Chavez, Obi Isolokwu

Sponsor & Advisor: Jeff Stevens

TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

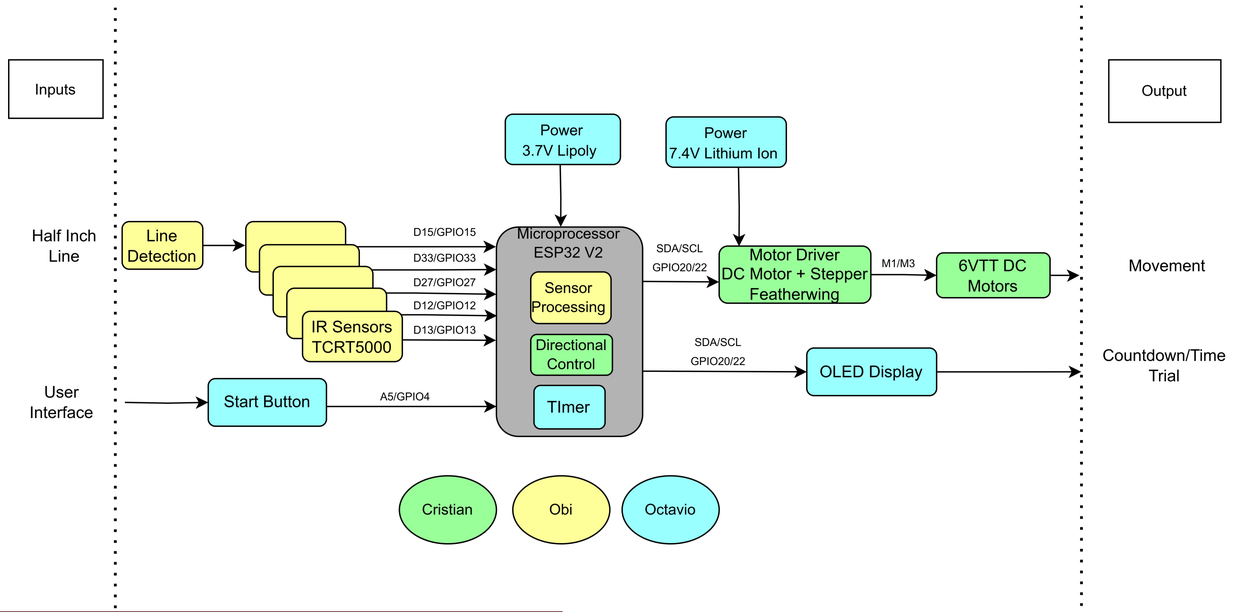
Overview

Autonomous battery-powered robot designed to follow a predetermined course in under 5 minutes

Requirements

- Autonomous
- 15x15x15 cm
- Budget of $125
- 600g max
- Track navigation under 5 minutes
- 5 seconds countdown/ elapsed timed
- 2 wheel-drive one or more free wheel

Overall Block Diagram



Meet The Team

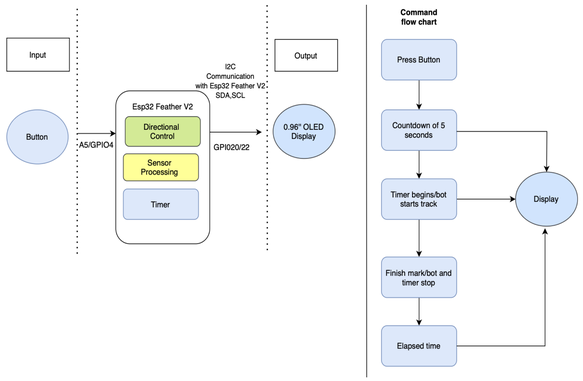
Octavio Cristian Obiajulu

- Cristian Chavez Cruz- PM, Motors and
- Directional control
- Octavio Chavez- Power, Timer/Countdown trial
- Obi Isolokwu- Line Detection, Sensor Processing

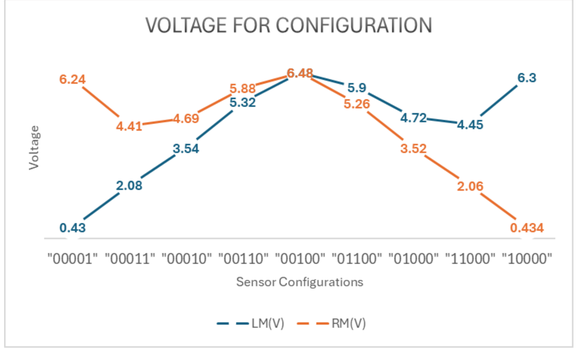
Components

- Sensors- TCRT5000
- Microprocessor- ESP32 V2 Feather
- Motordriver- DC Motor+Stepper Featherwing
- Power- 3.7V LiPoly, 2x3.7V Lithium Ion
- Button-TS02
- Display- Monochrome OLED Graphic Display
- Motors- 3-6VTT DC Motors 1:90 Gear Ratio

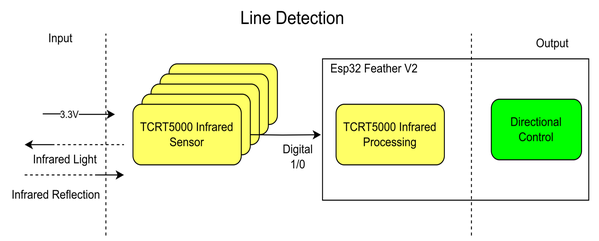
Time Display



Motor Driver Logic



Line Detection



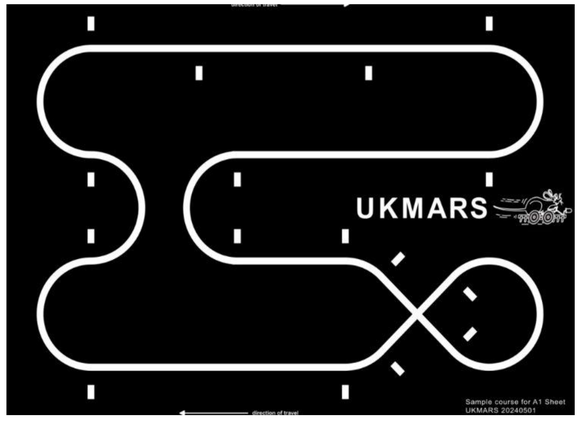
Design 1 Achievements

- Integration of subsystems
- Chassis completed
- Line detection
- Completion of course under 5 minutes
- Battery life of at least 40 minutes
- PCB design
- Integration of button and display

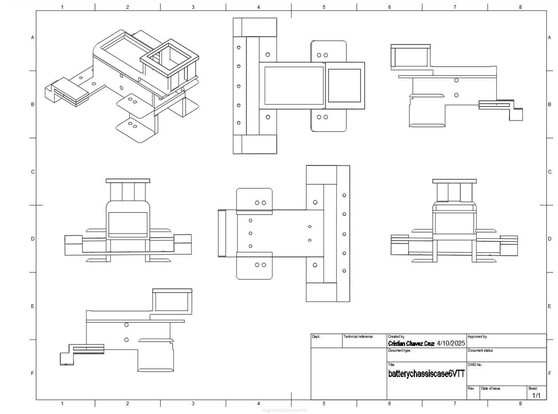
Cost & Budget

Component	Price	Quantity	Total
ESP32.V2	19.95	1	19.95
DC Stepper + Motor Driver Featherwing	19.95	1	19.95
3.7 Lithium Ion	10	2	20
3.7 Lithium Polymer	6.95	1	6.95
7V DC Motors	13.5	2	27
TCRT5000(Sensors)	0.978	5	4.39
OLED Display	17.5	1	17.5
Button	0.1	1	0.1
Total			115.84

Course Layout



Chassis Drawing



Design 2 Plan

- Implementation of a new Sensor Array
- Improvement of Printed Circuit Board
- Implementation of a new Chassis
- Encoder Implementation

Acknowledgements

- Sponsor- Jeff Stevens
- Faculty Advisor- Jeff Stevens
- Mentor Team 1- Musa, Sarah, Anna, Nick
- Mentor Team 2-Sam, Nadia, Rogelio