E1.09 - Autonomous Prime (AutoBot)

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Ingram School of Engineering

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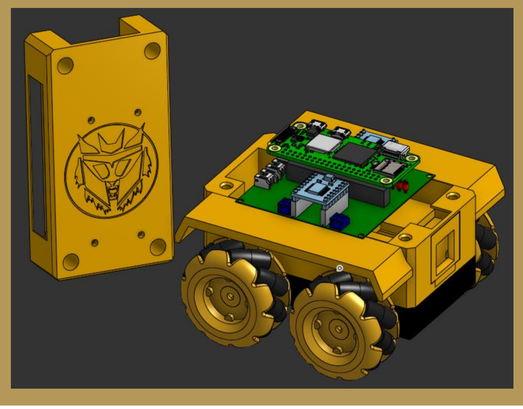
Project Overview

Our product is an autonomous robot that navigates a grid of four-way intersections while staying in the proper lanes and obeying street laws. The bot will follow these regulations by using a conjunction of sensors and cameras

D1 Objectives

- Motor functionality
- Detect stop signs and traffic lights
- Detect lanes and surrounding objects
- Final chassis and PCB design

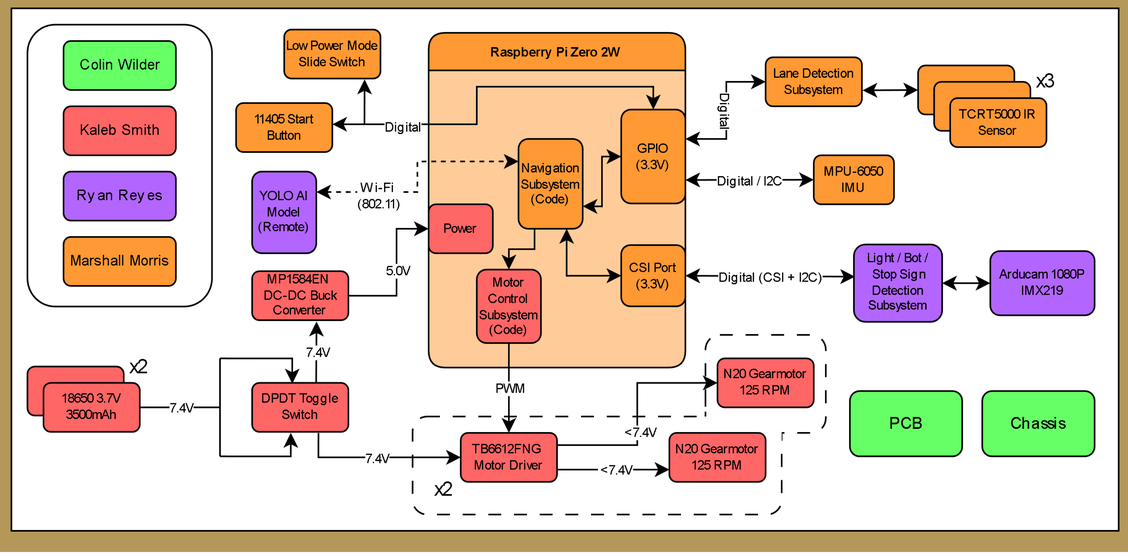
PCB And Chassis



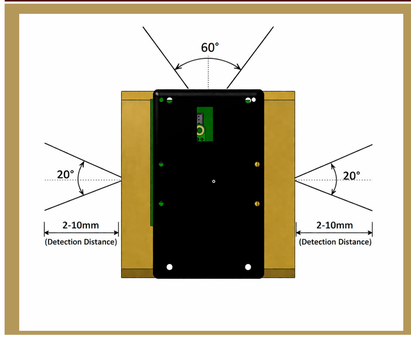
Material Cost

Component	Quantity	Price
Rubber Omni Wheels 48mm	1	$14.29
TB6612FBNG dual motor drivers	2	$3.99
Gearmotor 200 rpm 3-6 VDC	4	$4.99
Li-Ion Battery 7.4V 2000mAh	2	$8.49
MP1584EN Buck Converter	1	$1.11
DPDT Toggle Switch	1	$1.22
Slider Switch	1	$0.39
Arducam1080P IMX219 Camera	1	$12.99
MPU-6050 IMU	1	$2.55
Funspark 7segment	1	$2.79
11405 button	1	$0.11
TCRT5000 IR sensor	3	$2.39
Mini Breadboard	1	$1.08
Raspberry Pi Zero 2 w	1	$15.00
	Total Cost:	$71.39

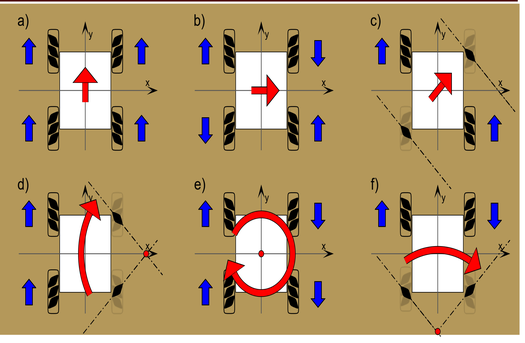
Top Level Block Diagram



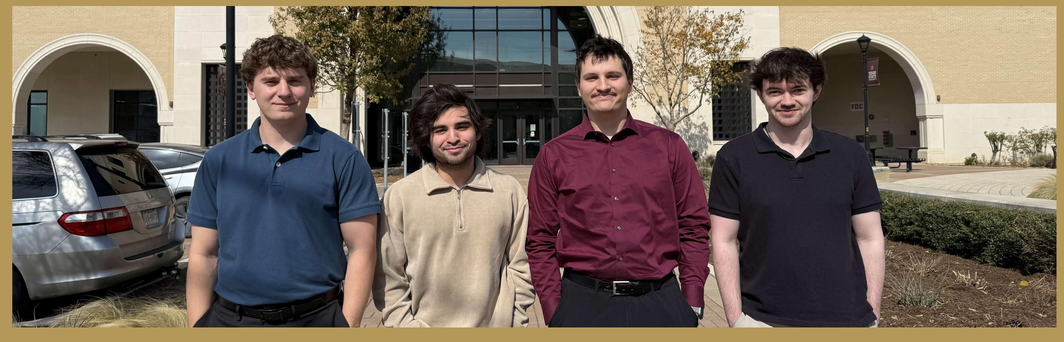
Sensors, Camera, and Movement



- Left: IR sensor detects lane markings
- Middle: Camera detects lights, stop signs, and other bots / IR sensor detects intersection marking
- Right: IR sensor detects course boundary



Meet The Team



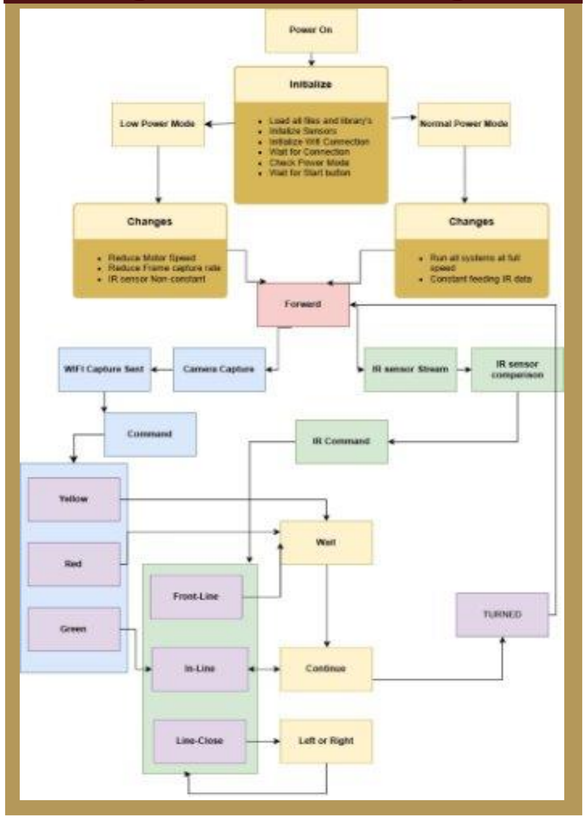
Kaleb Smith
Motor Control / Power System

Ryan Reyes
Object / Light Detection

Marshall Morris
Navigation

Colin Wilder
PCB / Chassis Design

Navigation Block Diagram



D2 Plans

- Parallel parking
- Zero-turn functionality
- Full course navigation
- Working blinker and signal lights
- Finalized code optimizations
- Speaker system
- Speed testing
- Object detection optimizations

Acknowledgements

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D2 Mentor Team: Eric Sides, Domingo Caban, Patrick Meurer, Roberto Macedo - Delgado