E2.13 - ZillaBot

TEXAS STATE UNIVERSITY
Ingram School of Engineering

PM: Eric Sides, Domingo Caban, Patrick Meurer, Roberto Macedo - Delgado
Dr. Fawzi Behmann/Texas State University

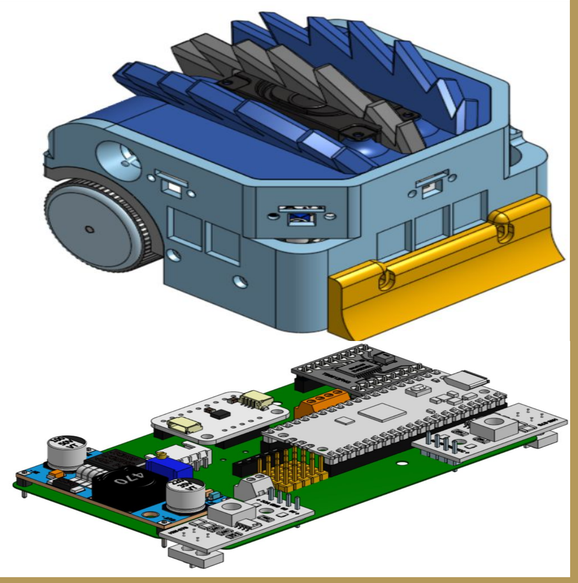
Project Overview

Our project is a sumo bot that will push competitors off an arena and pull competitors in a tug-of-war match. Our bot will detect the arena through floor facing IR sensors and will also detect our competitors and objects with outward facing ToF sensors.

D2 Requirements

- 13cm by 13cm
- $75 budget
- PCB chassis component required
- Successfully demonstrates the boundary detection/ object detection
- 1500g weight limits per competition

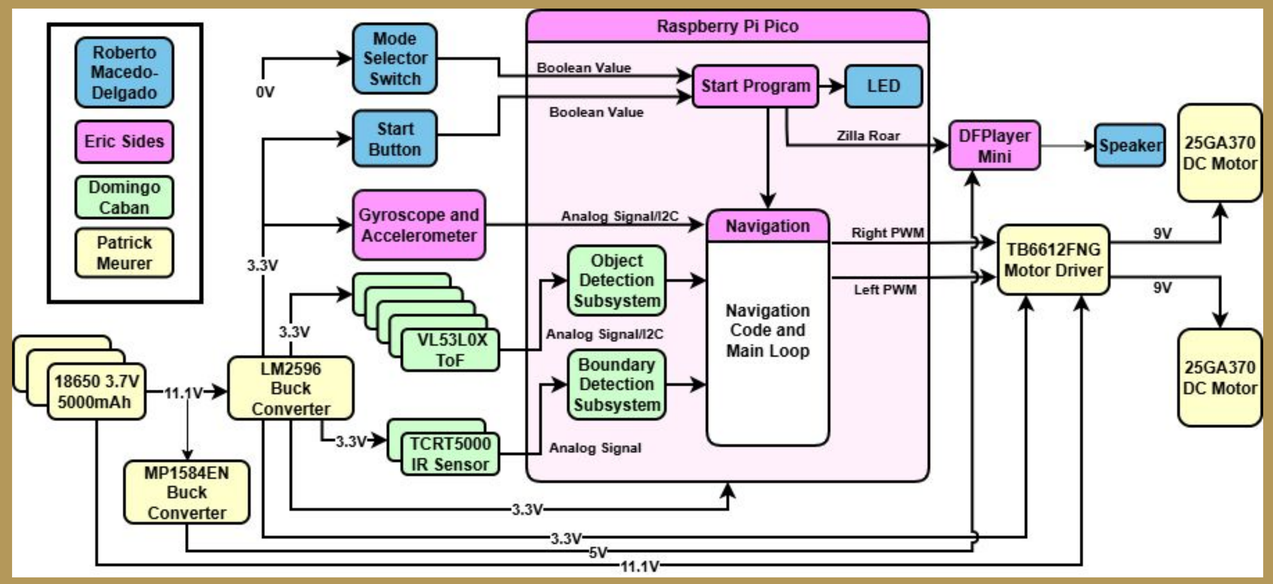
PCB/Chassis



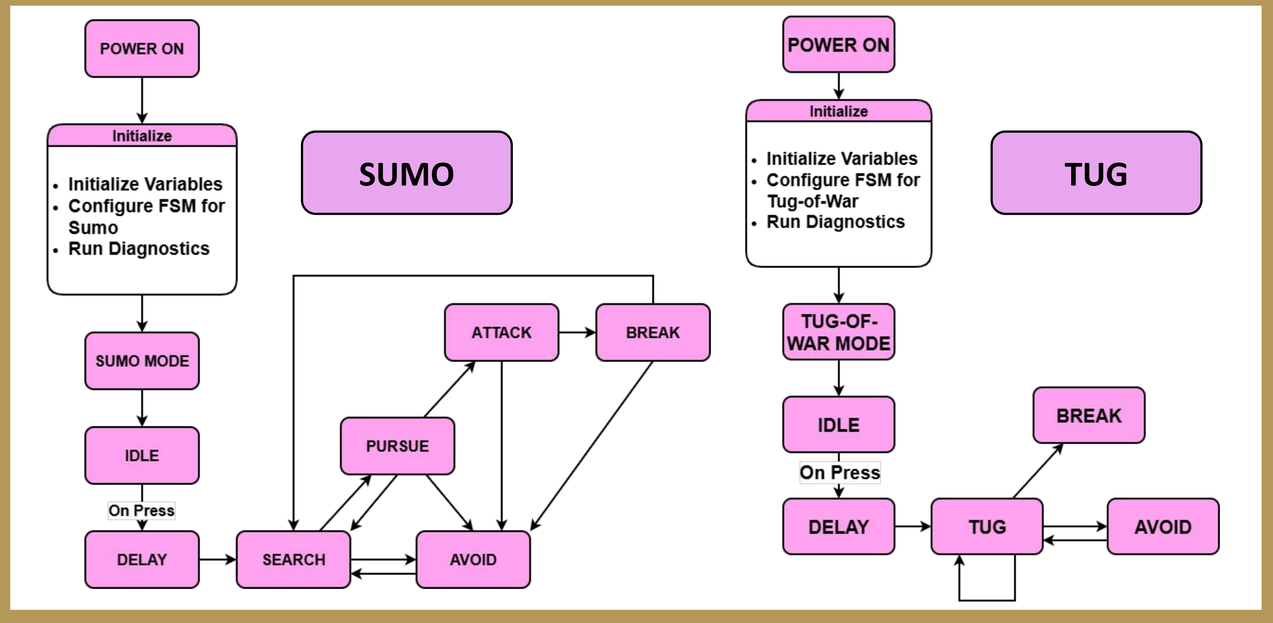
Material Cost

Component	Quantity	Price Each	Subtotal Cost
TCRT5000 IR Sensor	2	$1.58	$3.16
VL53L0X ToF Sensor	5	$2.97	$14.85
25GA-370 DC 12V Motor	2	$12.99	$25.98
Raspberry PI Pico	1	$5.00	$5.00
Batteries	3	$1.12	$3.36
Buck Convertor	1	$4.23	$4.23
TB6612FNG Motor Driver	1	$5.95	$5.95
Battery Holder	1	$0.60	$0.60
DFPlayer Mini & Speaker	1	$6.00	$6.00
Silicone Wheels	4	$0.45	$1.80
LSM6DS3 Gyro	1	$6.00	$4.00
		Total Unit Cost	74.93

Top Level Diagram



Behavioral/Navigation State Diagrams



Senior Design Deliverables

- Sumo Demonstration
- Tug of War Demonstration
- Block Pull Demonstration
- Live Telemetry
- Video Showcase
- Brochure Handout

Acknowledgements

Sponsor: Dr. Fawzi Behmann
Faculty Advisor: Dr. Larson
Special Thanks to Dr. Steve Awoniyi

Team Pictures

Domingo Caban
Object/Boundary Detection

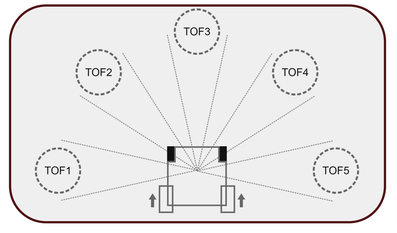
Eric Sides
Navigation

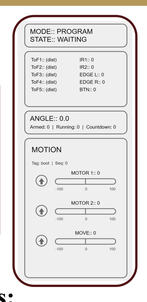
Roberto Macedo-Delgado
PCB/Chassis

Patrick Meurer
Power/Motor Driver

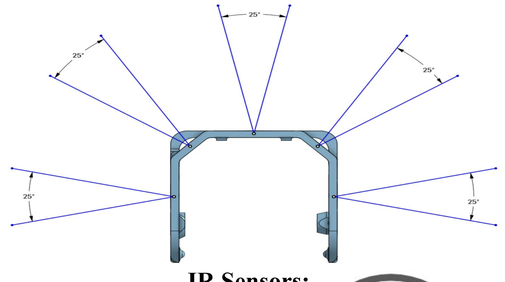
Sensor Layout

Telemetry Model:

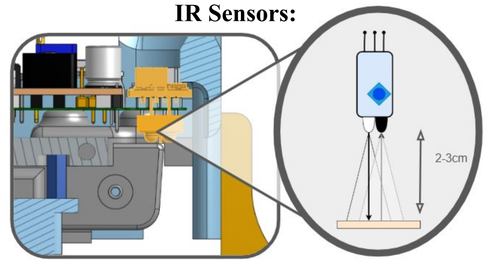




Time-of-Flight Sensors:



IR Sensors:



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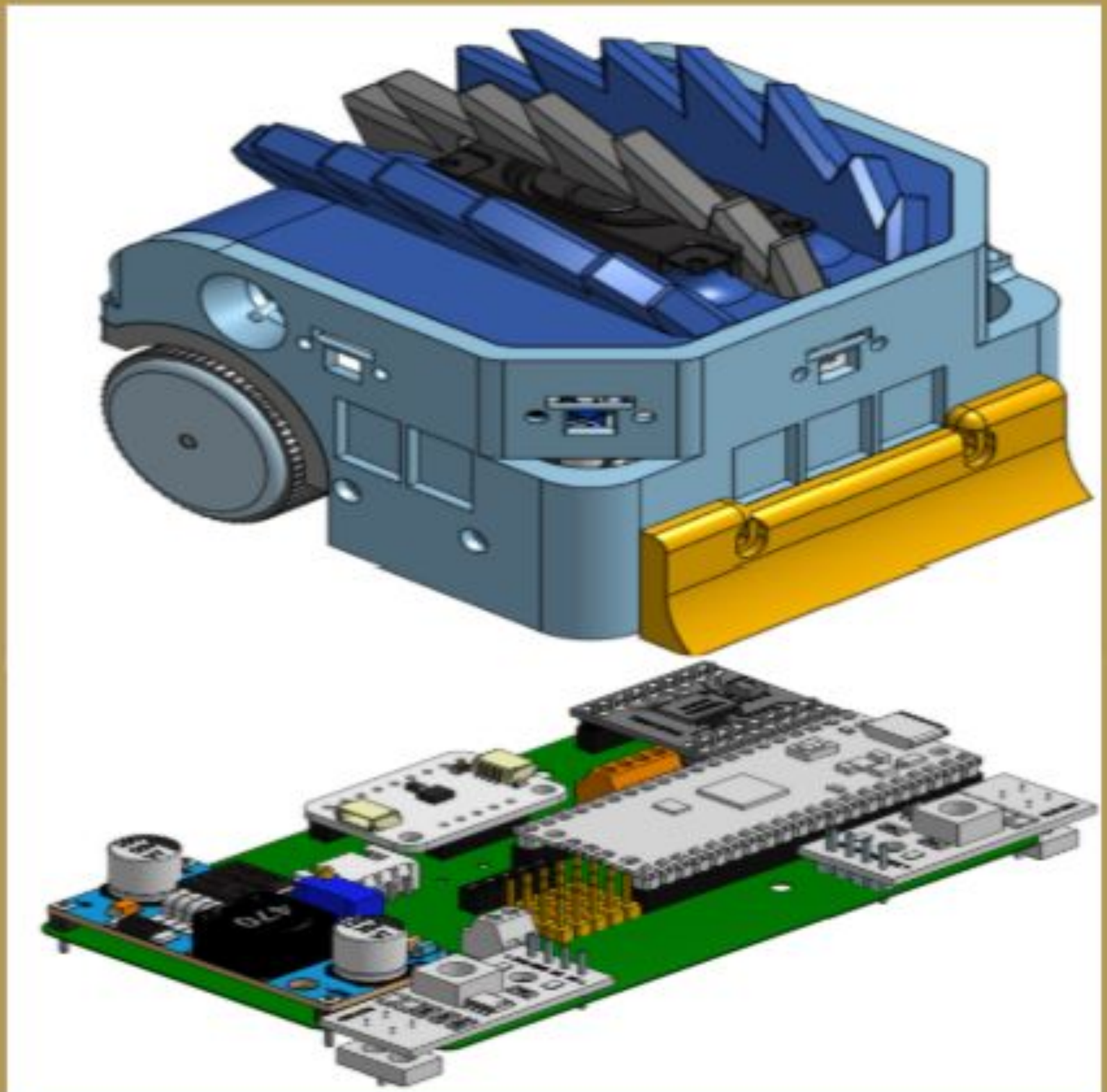

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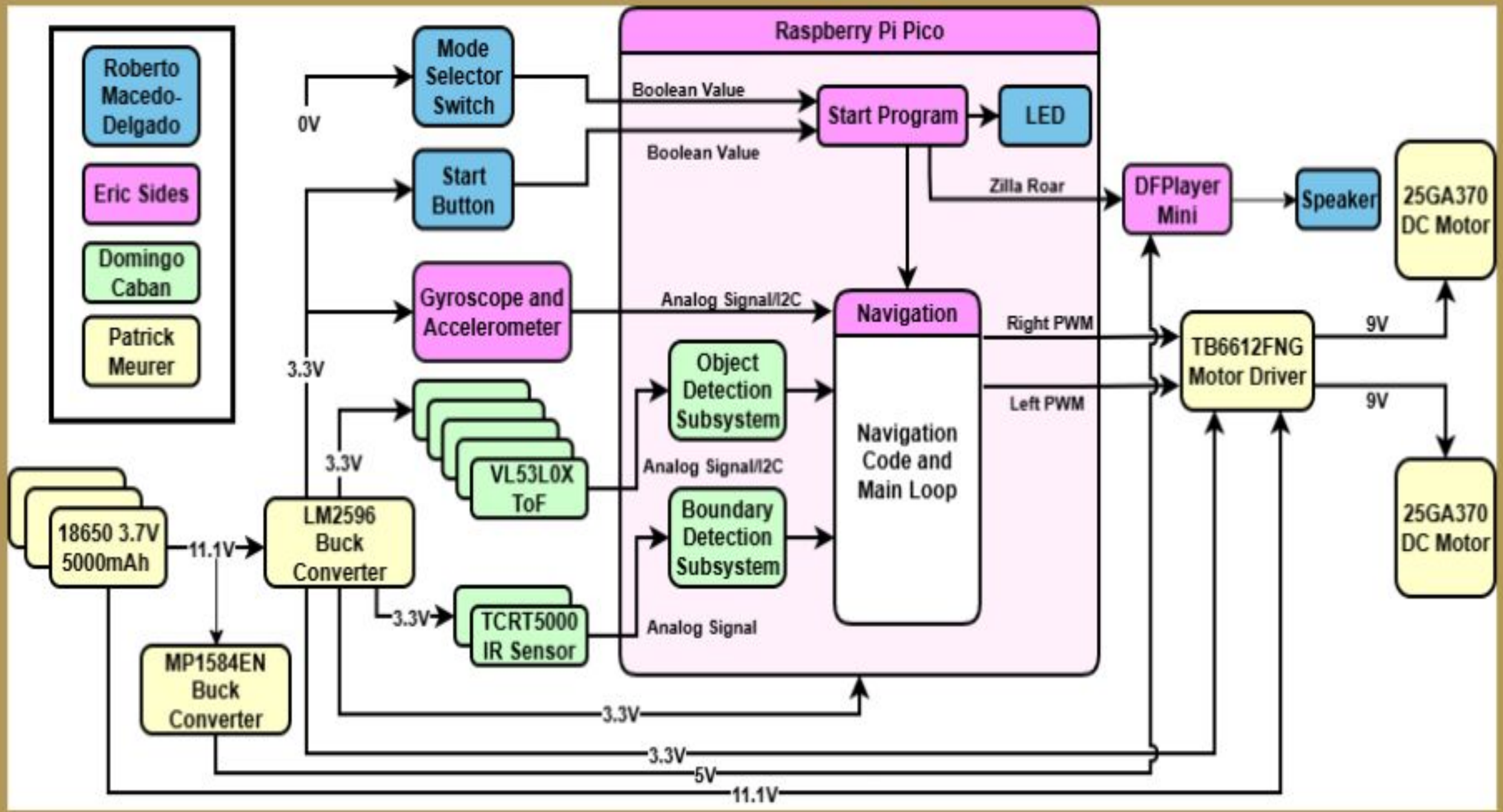

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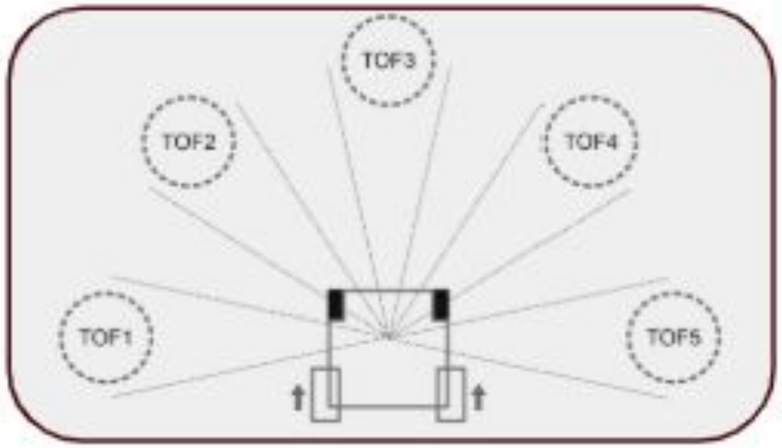

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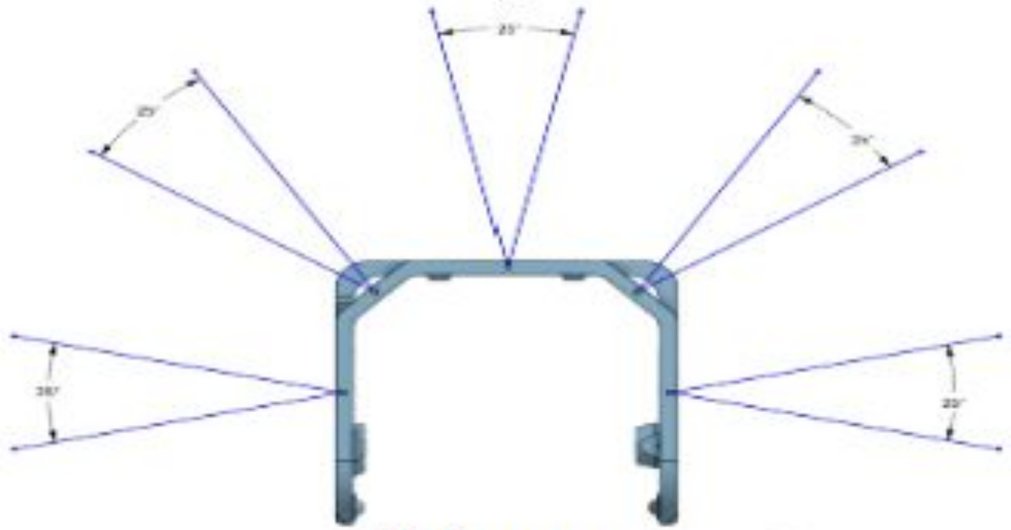

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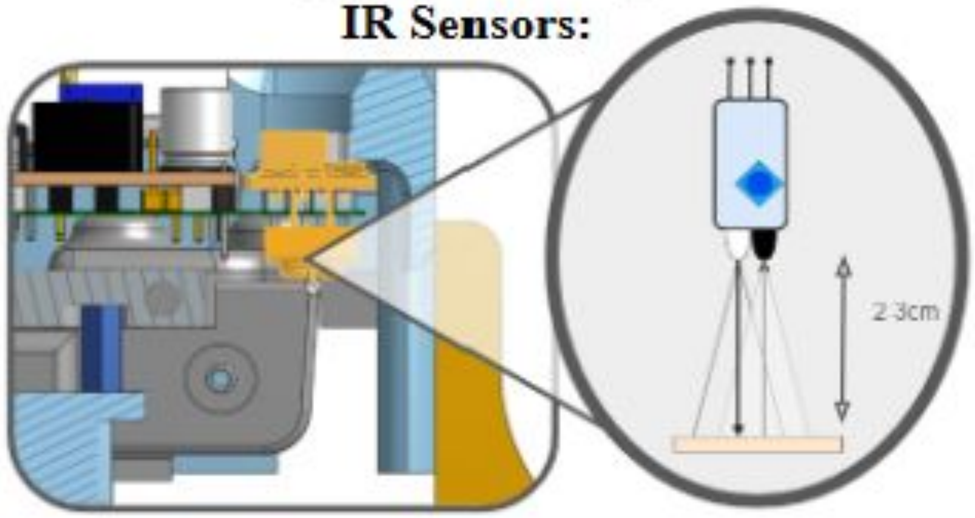

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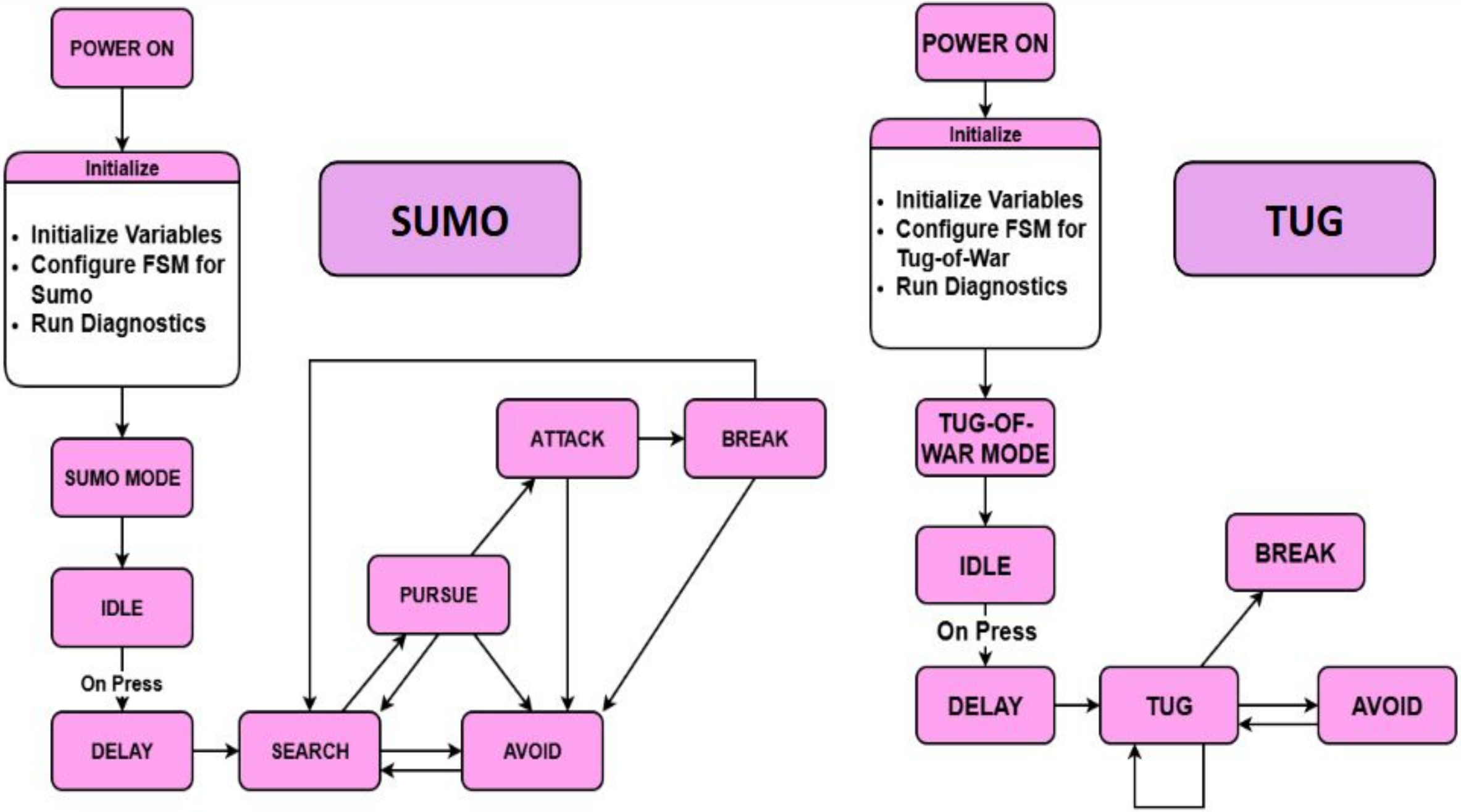

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