



E1.06 - Wayfinder

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Sponsor Names: Mr.Brown & Mr.Welker



Overview

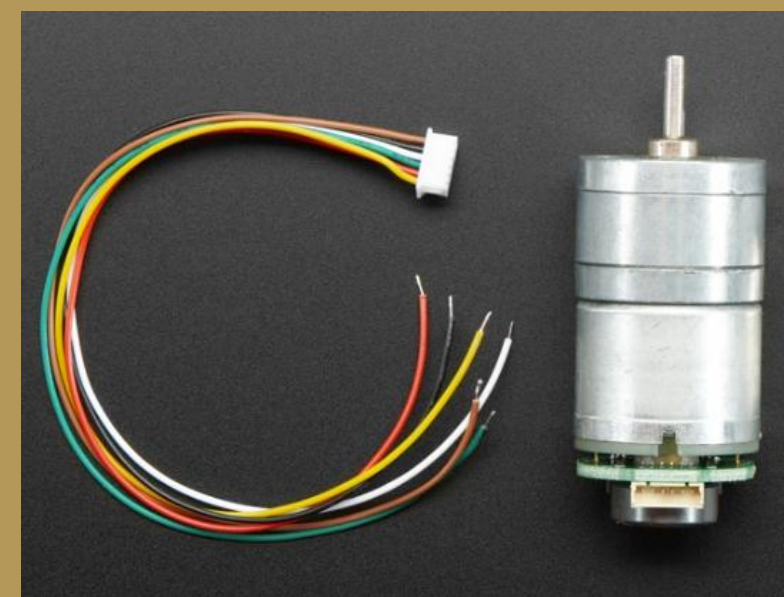
Our product is an autonomous robot engineered to navigate and map complex mazes using real-time sensor and localization data

D1 Objectives

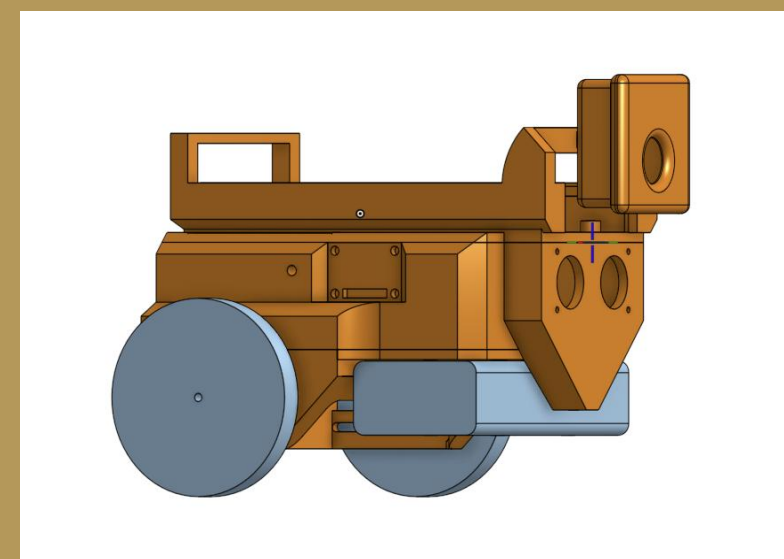
- Traverse the maze in less than 3 minutes.
- Demonstrate wall detection and direction indication capable of completing maze without contacting wall
- Schematic and PCB design complete

Design Selection

- 3-D Printed Unibody Chassis for discrete wiring



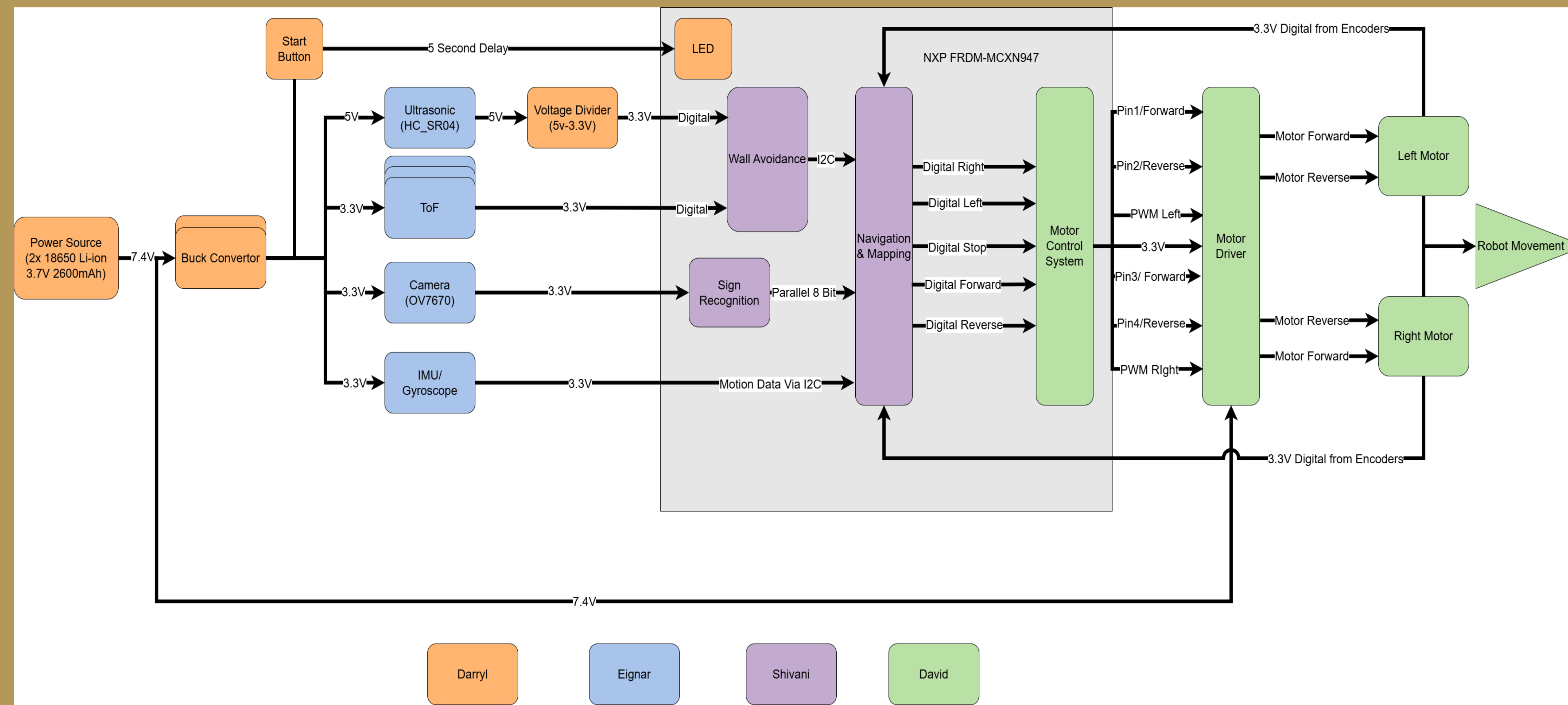
- Metal Motors with built in encoders



Cost & Budget

Component	Quantity	Price Each	Subtotal Cost
NXP FRDM-MCXN947	1	\$25	\$25
Dual DC Motor Driver (TB6612FNG)	1	\$2.61	\$2.61
Motors (Geared 7 VDC with Magnetic Encoders)	2	\$13.5	\$27
Battery (Li-ion 18650 3.7V 2600mA)	2	\$5.99	\$11.98
Buck Converter (LM2596)	2	\$1.20	\$2.40
Battery Mount	1	\$1.99	\$1.99
Camera (OV7670)	1	\$2.30	\$2.30
Time of Flight (VL53L0X)	3	\$14.95	\$44.85
Ultrasonic (HC-SR04)	1	\$1.30	\$1.30
IMU (LSM6DS3)	1	\$11.95	\$11.95
Total Unit Cost			\$131.38

Overall Block Diagram



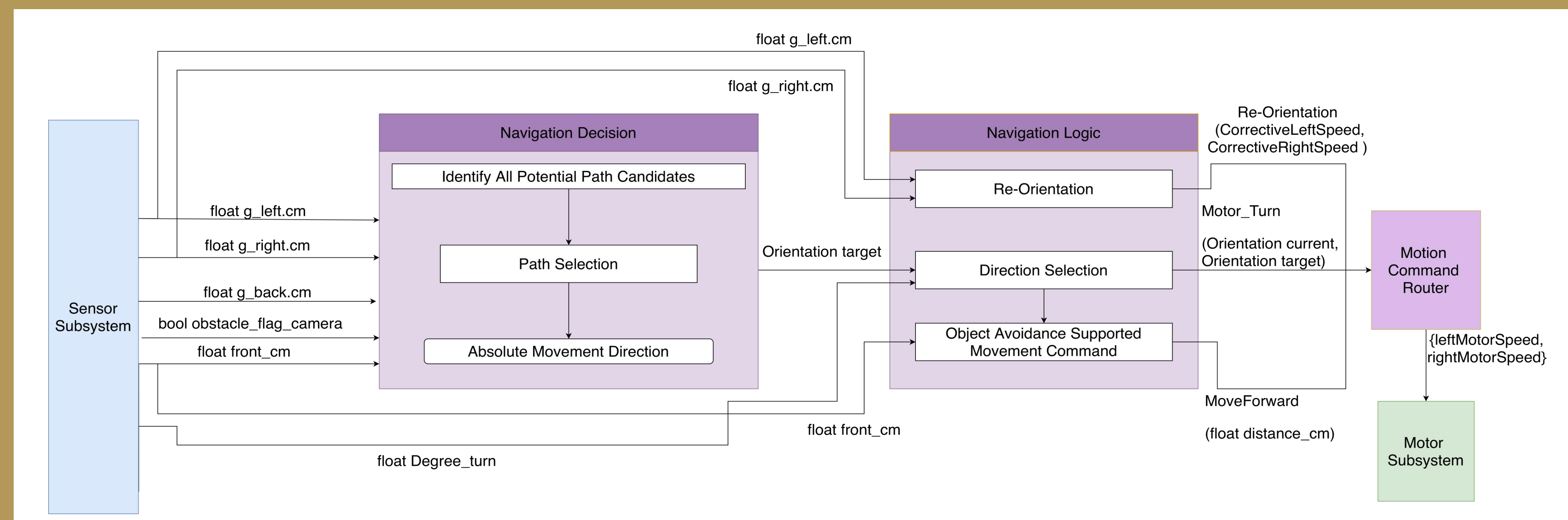
D1 Accomplishments

- 5 second delay before initialization
- Successfully integrated the sensor, motor, and navigation subsystems
- Optimized D1 chassis design for easier implementation in D2
- Completed PCB for D2
- Outlined System navigation process for D2
- Selected optimal mapping algorithm for D2

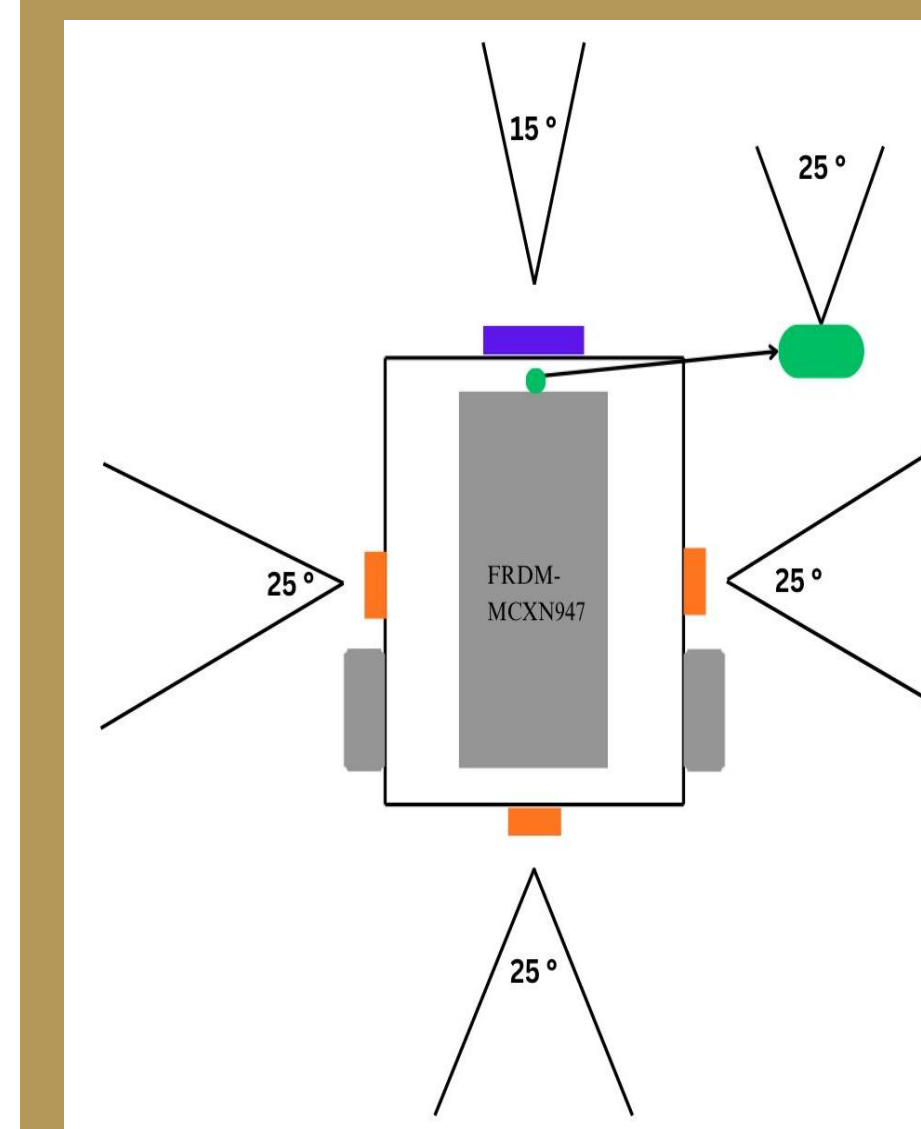
D2 Plan

- A functional PCB based design
- Complete a more complicated maze to be revealed on Senior Design Day
- Map the maze in 5 minutes followed by a speed run
- Full supporting subsystem validation details
- Add camera module for face recognition

System Architecture



Sensors



The sensors are oriented around the Mazebot for visual input

- Ultrasonic (front)
- Time of Flights (rear, left, right)
- IMU (inside)
- Camera (front)

Meet The Team



David Tavarez
Motor Lead



Darryl Murray
Power & Hardware Lead



Shivani Mruthyunjaya
Navigation Lead



Eignar Cienfuegos
Sensor Lead

The Bot and The Maze



Acknowledgements

Sponsor:

- Chris Brown & Mark Welker

Faculty Advisor:

- Mark Welker

D2 Mentor Team:

- Obi, Christian, and Octavio