

MEAM 5100 Lab 4

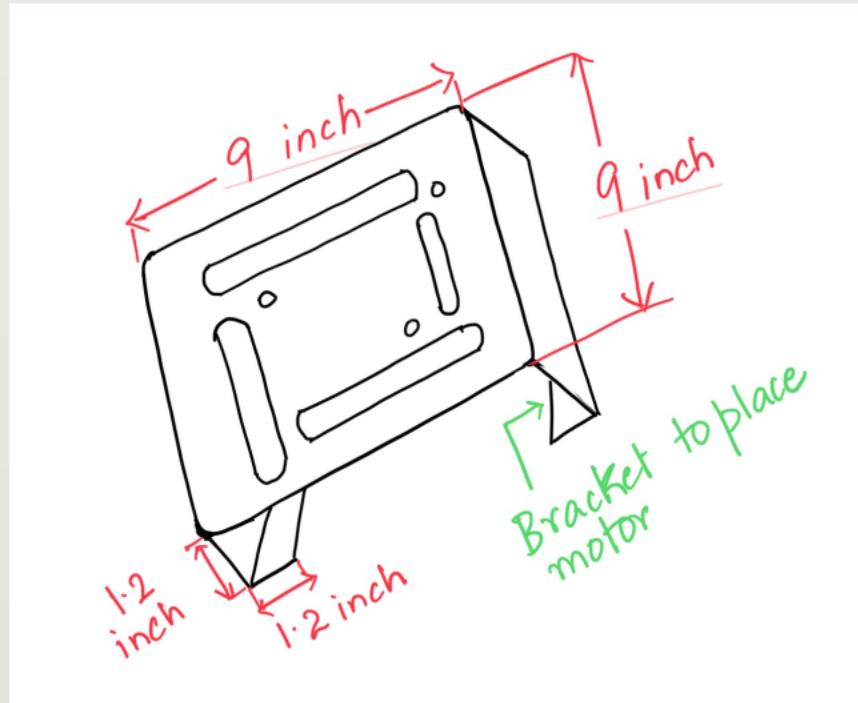
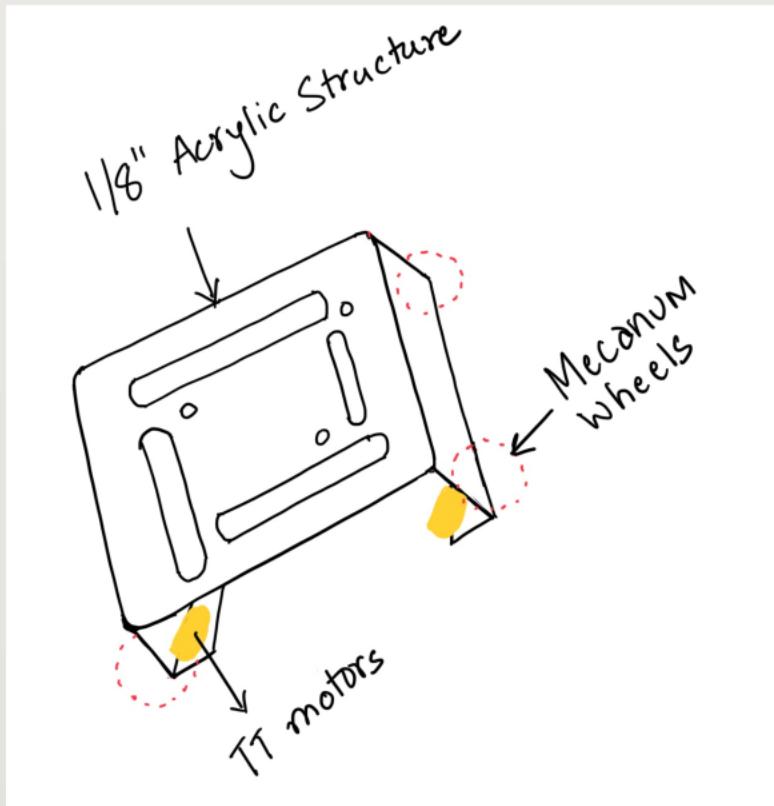
Gia Dcosta | Saayuj Deshpande | Samhitha Vedire

MOBILE BASE ARCHITECTURE

Drive chosen: **Holonomic Drive**

- Holonomic drives offer a very **high maneuverability** and **precision** with respect to speed and direction.
- **Flexibility in diagonal and sideway movements** - Unlike differential or tank-style drives, here we can easily navigate these movements while maintaining a constant speed.

STRUCTURE



BILL OF MATERIALS

Component	Quantity	Material	Cost
Motor	4	TT motors	NA (lab)
Battery	4	LiFePo4	\$4.25
Wheels	4	Mecanum	\$4-5
Motor driver	4	IRLB8721	NA (lab)
Acrylic sheet	1	Acrylic	NA (RPL)

MOTOR & MOTOR DRIVER

- Motor: DC Gearbox Motor - "TT Motor" - 200RPM - 3 to 6VDC
 - Dimensions - 70x22x18 mm



Motor driver: IRLB8721 N-channel MOSFET



BATTERIES

Chosen battery: LiFePo4

- High energy density
- Safer to use
- Longer life cycle



WHEELS

We have decided to opt for **Mecanum Wheels**.

- 45 degree rollers
- Omnidirectional movements

Diameter: **48mm**

Material: **ABS, rubber**

Coupling type: **TT Coupling**

Amazon link: <https://tinyurl.com/meam510lab4>



SOFTWARE PLAN

The main aim of the software in this project is to consistently monitor the mobile robot and send frequent commands to it, with minimal loss of data.

There are four components to this part of the plan: the webpage, WiFi setup, microcontroller functions, and feedback loop control.

Webpage

- Buttons as directions
- Conditional statements to control motor drivers based on webpage input sent to ESP
- Directions: Left, Right, Forward, Backward

Microcontroller

- ESP controls motor drivers
- Different PWM signals based on the direction command sent from the webpage

WiFi Setup:

- Mode: Station Mode
- IP Addressing: Static IP

Feedback Loop

- PD control for angular position control of the motor
- No I term needed since no "history" needed

Webpage

- Buttons as directions
- Conditional statements to control motor drivers based on webpage input sent to ESP
- Directions: Left, Right, Forward, Backward

Microcontroller

- ESP controls motor drivers
- Different PWM signals based on the direction command sent from the webpage

WiFi Setup:

- Mode: Station Mode
- IP Addressing: Static IP

Feedback Loop

- PD control for angular position control of the motor
- No I term needed since no "history" needed

THANK YOU