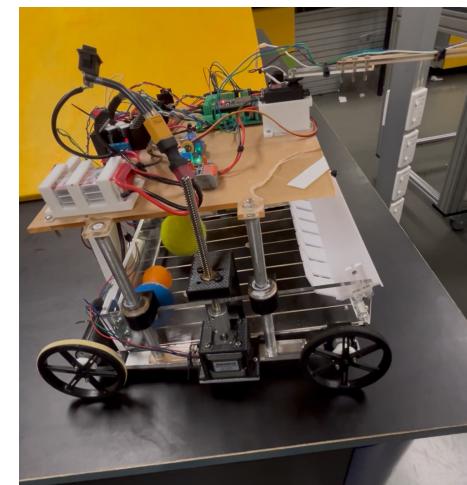
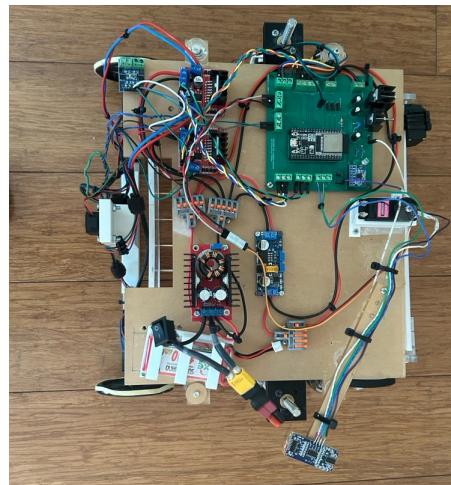


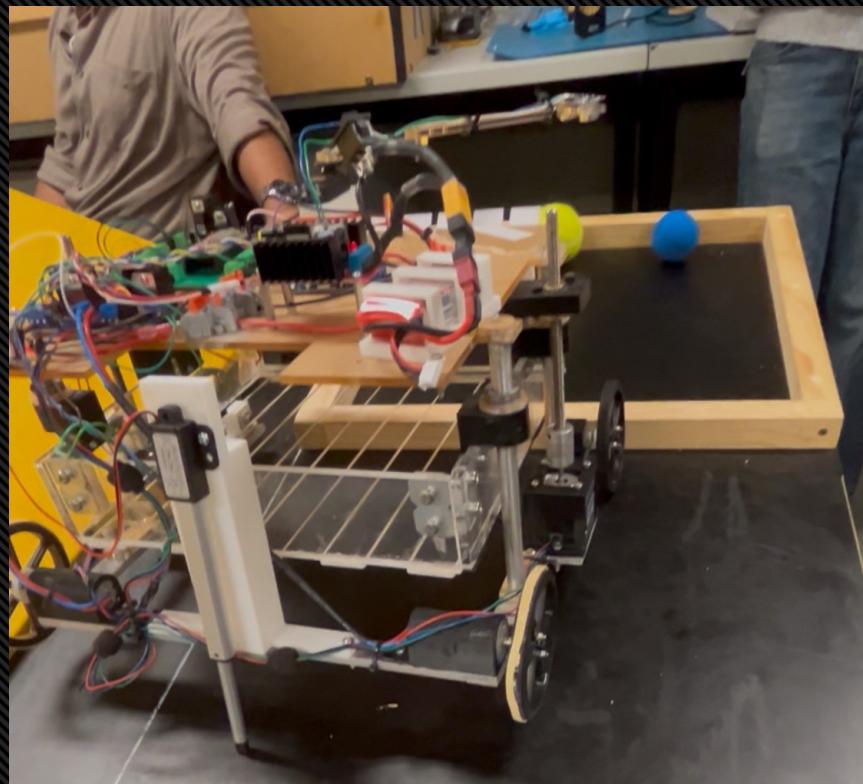
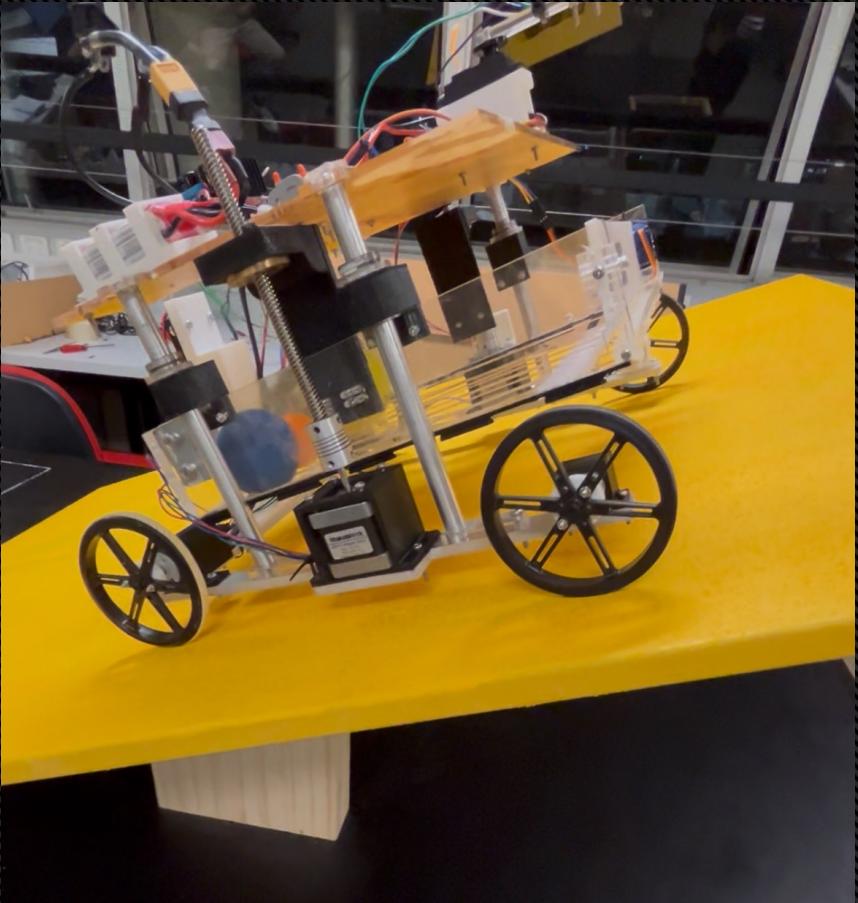
Engineering Project Portfolio

Srijit Mukherjee – 2nd year Mechatronics Engineering Student at the University of Queensland

MECHATRONICS TEAM PROJECT (UQ Project) – Year 2 Semester 1

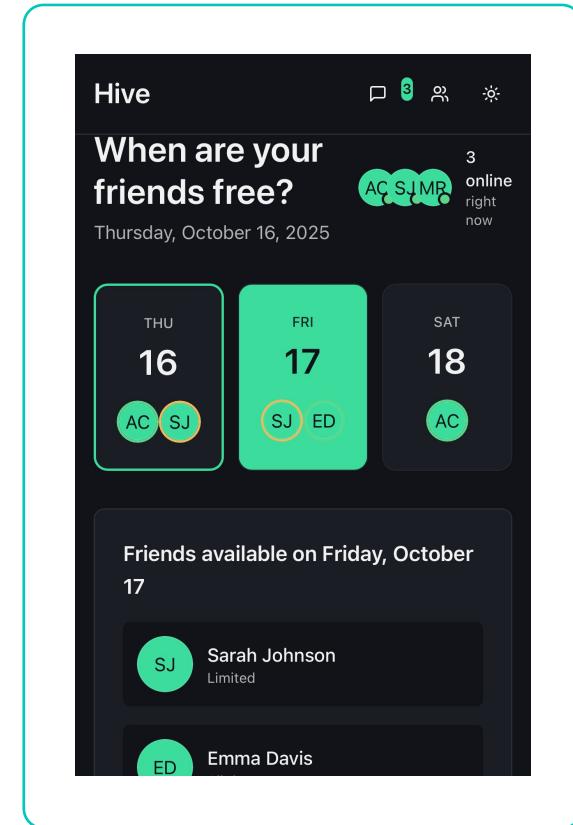
- Objective: To build a robot that successfully collects 3 balls, traverses a seesaw and deposits those 3 balls. This task must be completed autonomously.
- Specifications:
 - The robot used a lead-screw mechanism and a basket with rubber bands to pick up the balls
 - Implemented an IMU and used it to find the tipping point of the seesaw and balance effectively
 - Custom breakout board PCB housing an ESP32 and providing relevant pinouts for peripherals
 - Laser cut aluminium chassis and laser cut acrylic basket
 - 3D printed motor mounts and casing
 - Effective power management through one battery powering motor drivers, the PCB and a buck converter

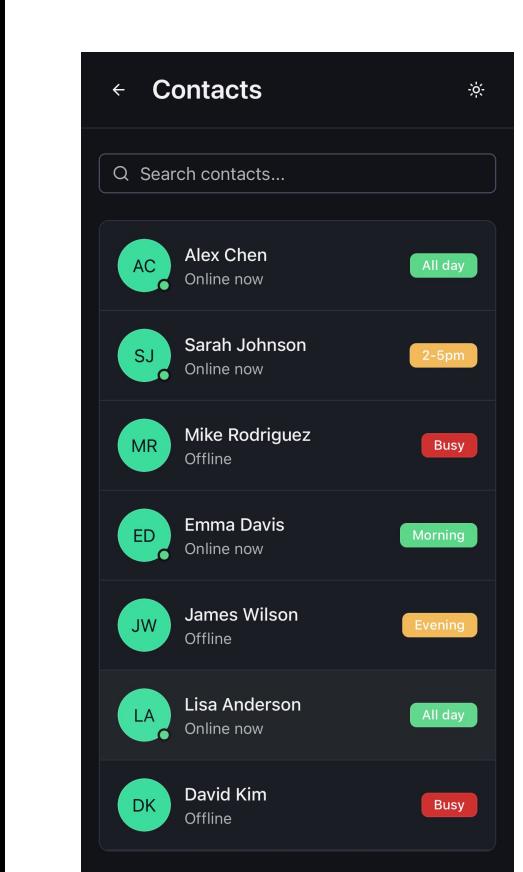
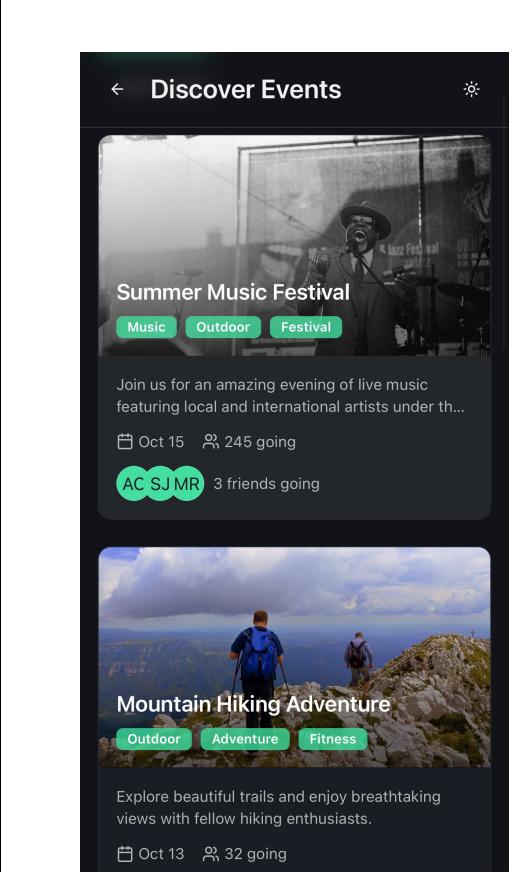




Weekend of Startups Hackathon (October 10-12 2025)

- Objective: To come up with an idea that is the “Next Normal” of society, i.e. something that seems futuristic/new now but will be commonplace in the future
- Created a proof of concept app called Hive that focuses on face to face social interaction and bringing people together
- Conducted competitor analysis as well as considering a monetization strategy and roadmap
- Focused on creating a product that hinges on integrity, emotional connection as well as fixing existing issues with social media e.g. addiction and loneliness
- A link to the app/website is here:
https://oltm7.github.io/hive_web_version/



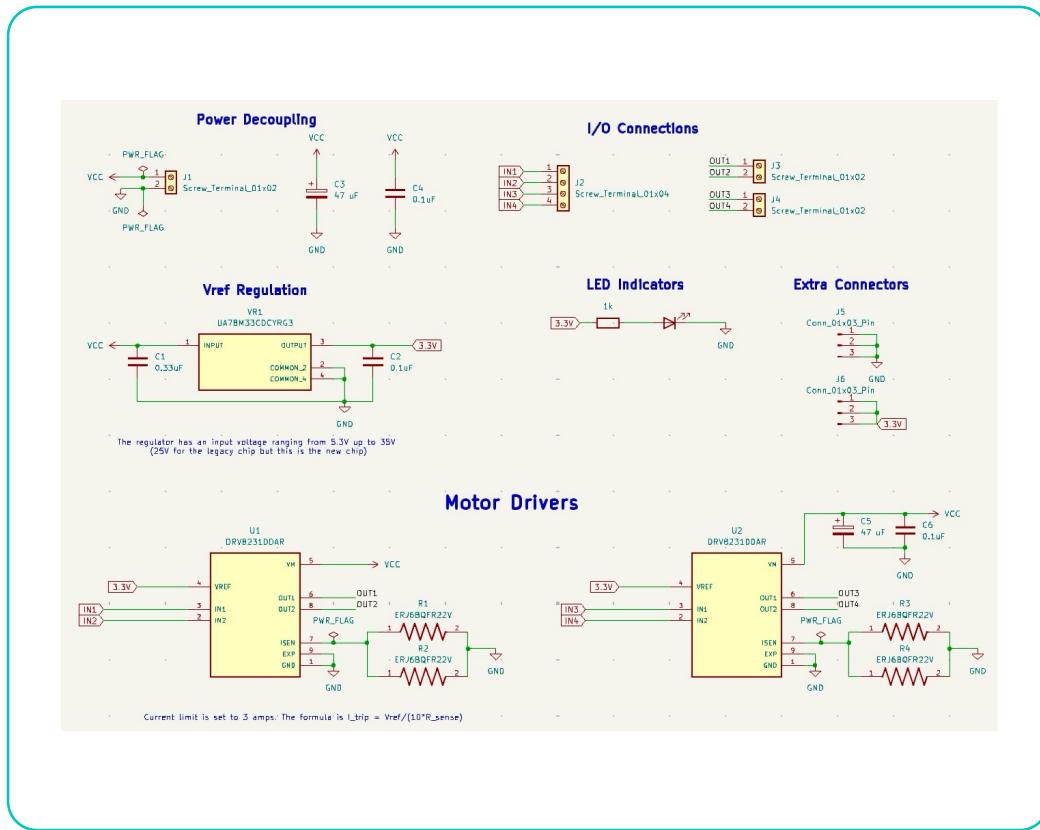


Motor Driver PCB (Personal Project) – Year 2 Winter Break

- Objective: To design a custom motor driver that is compact and can drive high torque motors
- Used the DRV8231DDAR integrated circuit
- Used IPC standards for calculating trace widths
- Consulted datasheets for capacitor and resistor values as well as PCB layout
- Used design rules from JLCPCB's website to ensure the routing complied with the manufacturer's standards



Schematic



Cell Management Unit Testing Rig – UQ Racing

- Objective: To design a testing rig board to simulate cell voltages for a Cell Management Unit
- Specifications:
- Used professional terminal block connectors to adapt the battery emulation module to the cell management unit
- Documented work regularly and presented progress updates to leads and alumni of the society
- Related testing and validation to higher level goals for the competition
- Followed rules regulation for trace distances due to the board handling up to 80 volts



Bluetooth-Controlled Forklift – Year 1 Summer Break Personal Project

- Objective: To design a forklift capable of picking up small objects
- Specifications:
 - Timing belt and pulley system controlled by a 360-degree servo for lifting
 - Laser-cut acrylic chassis
 - Modular design with all mounts and components screwed together with nuts and bolts
 - Demonstrated proficiency in Fusion 360 and 3D printing
 - Used an Arduino UNO, L298N motor driver and HC-05 module for Bluetooth control

