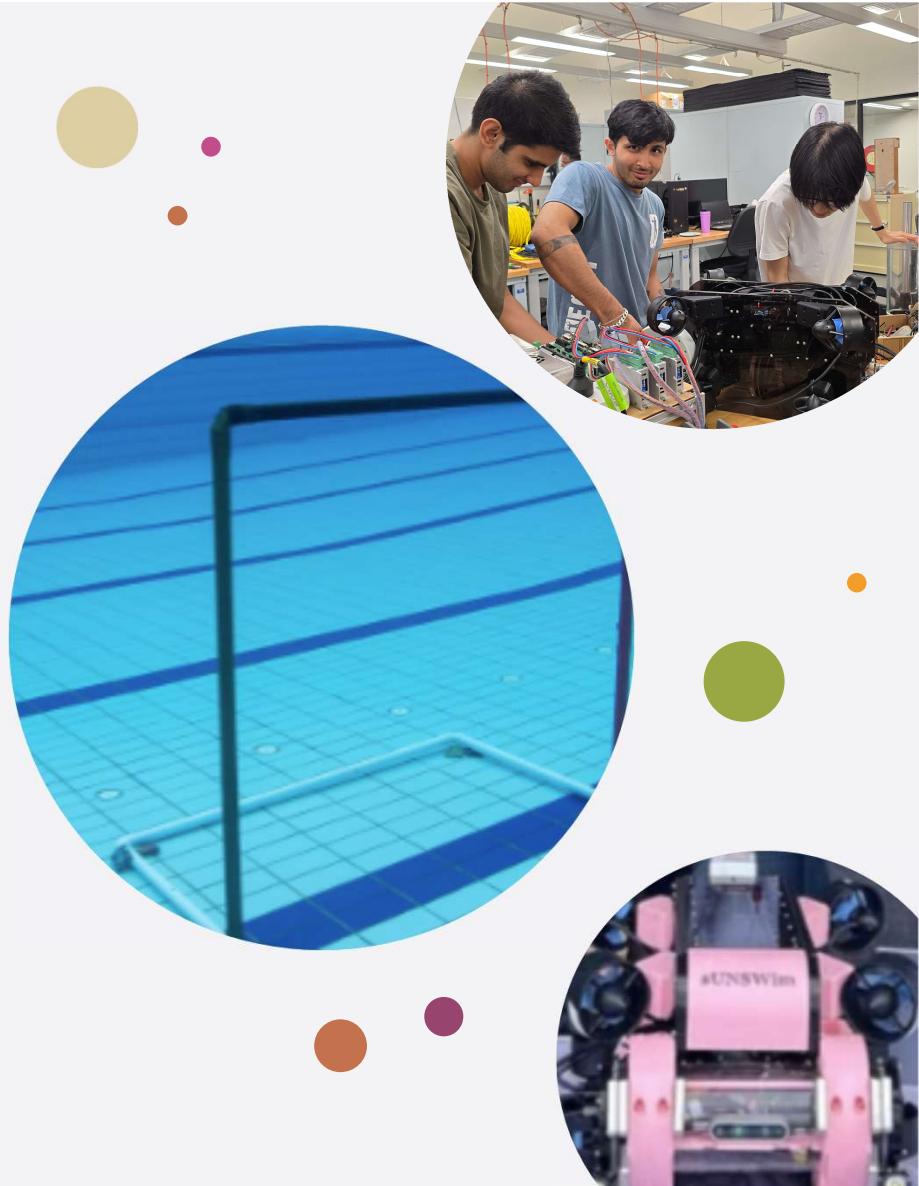


Projects Portfolio

Kushagra Javeri

Singapore Autonomous Underwater Vehicle Challenge (SAUVC)

- Team lead for Australia's first competitive underwater robotics team
- Contributed to every aspect of a custom AUV build.
- Developed ROS2 architecture for path planning and navigation.
- Worked with ArduSub firmware, Mavlink protocol and BlueOS.
- 2nd place in the qualifiers in Singapore in SAUVC 2025



Robocup@Work 2026 - Ongoing

- Designed a custom build for an industrial holonomic robot
- Working on control algorithms for workstation alignment
- Reinforcement learning, PID, sliding mode controllers and model predictive control



Battlebots

- Made 150g robots that fight each other
- Participated and hosted multiple battlebots competitions
- Remote controlled robots with spinning blades and flippers (or both)
- Repurposed my DRC robot after its competition.



DRC (Droid Racing Challenge) 2024

- Entered as a solo competitor representing UNSW
- Created my own new path planning algorithm inspired from artificial potential fields but without its downfalls
- Completely custom design, handmade wheels.
- Programmed on a Teensy and OpenMV Cam.
- Placed second in Australia. Mentored the winning team.



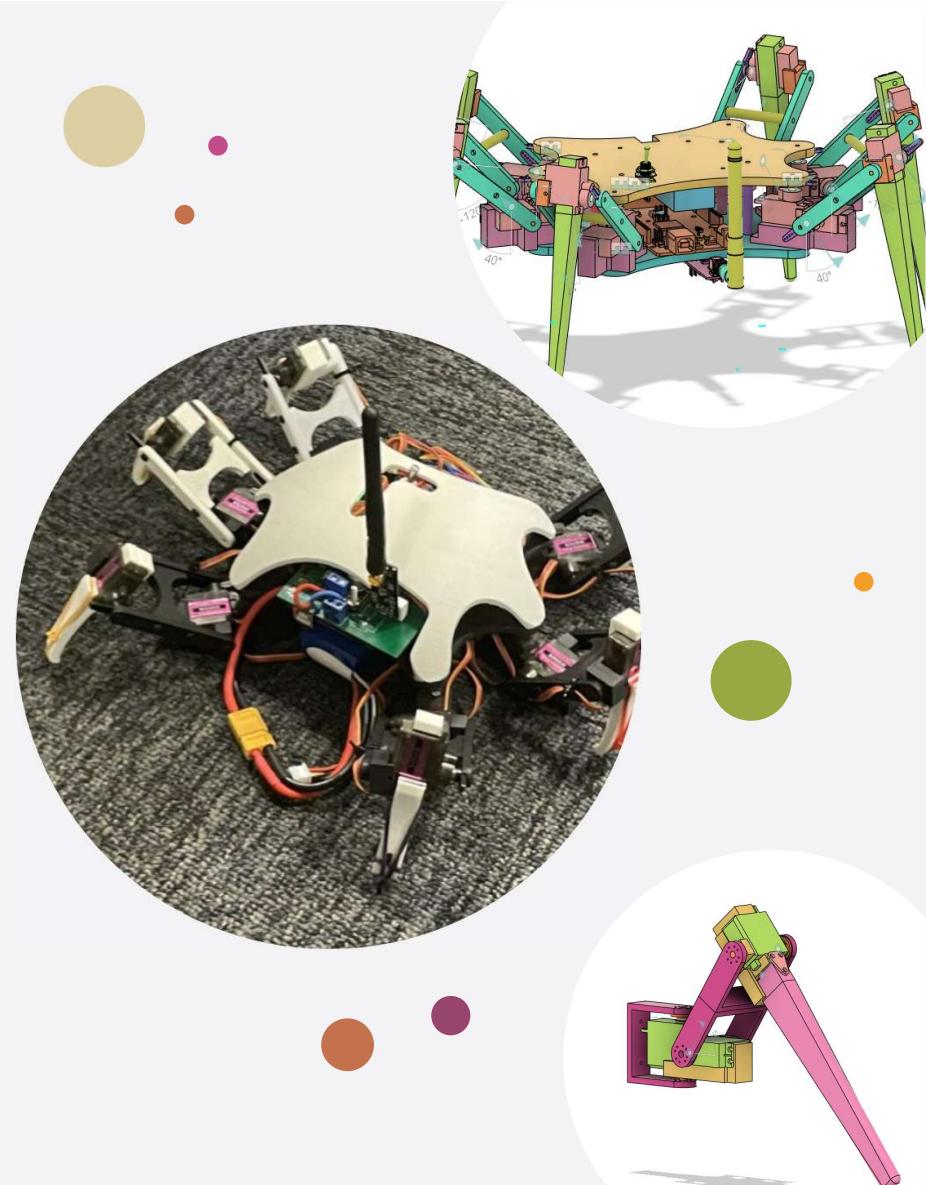
Contactile Pty Ltd (Engineering intern)

- Developed a first of its kind slip detection algorithm that detects and identifies translational and rotational incipient slip and provides an accurate friction estimate.
- Developed prototypes for dual axis sensor mounts and linear gripper arms.
- Worked on center of mass estimation algorithms using tactile sensor data, robotic arm and angular gripper manipulation.



SpiderBot (CREATErLABS team, ongoing)

- Six legged remotely controlled robot with functionality for omnidirectional walking (tripod, wave, ripple) and turning on the spot.
- 3 servos in each leg for control, multi-terrain movement, climbing small steps and obstacle avoidance
- Extensive use of OOP and inverse kinematics to develop a codebase for gaits and control in C++.



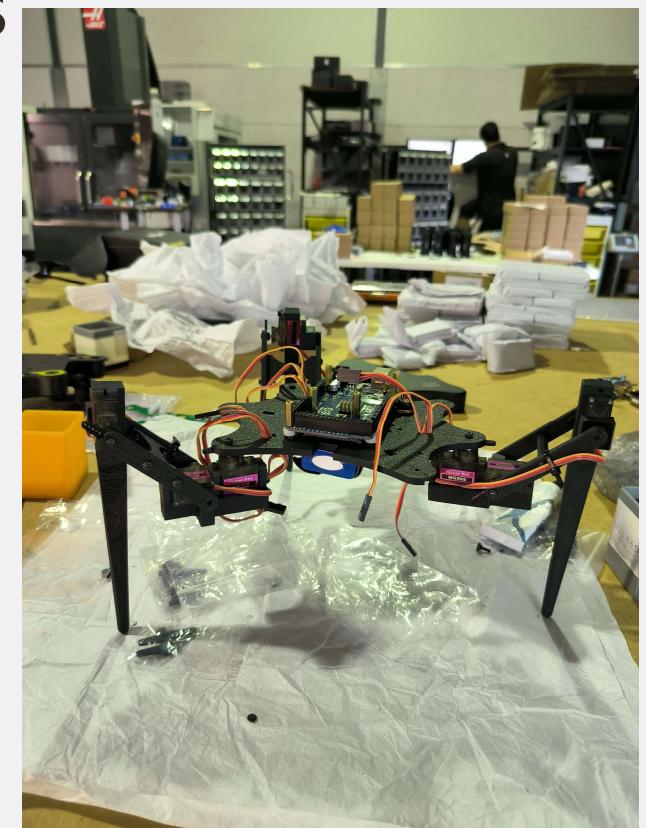
Spiderbot Prototyping Pictures



Frame prototype



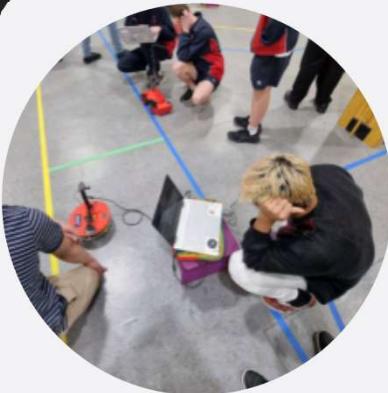
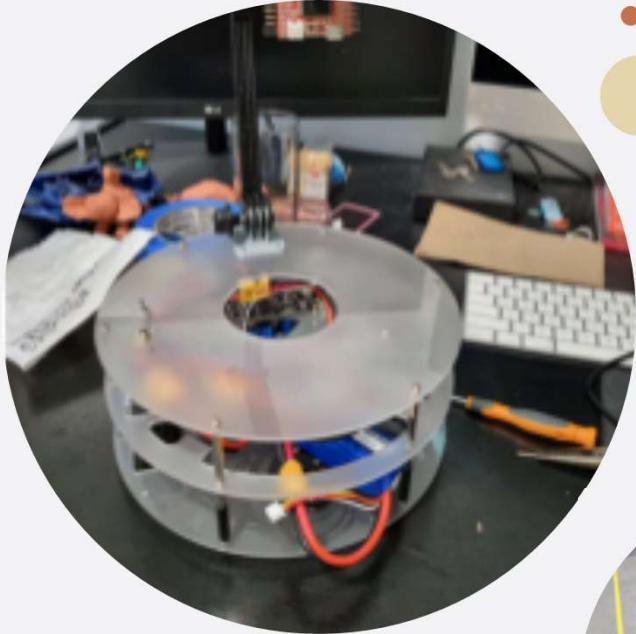
Leg prototype

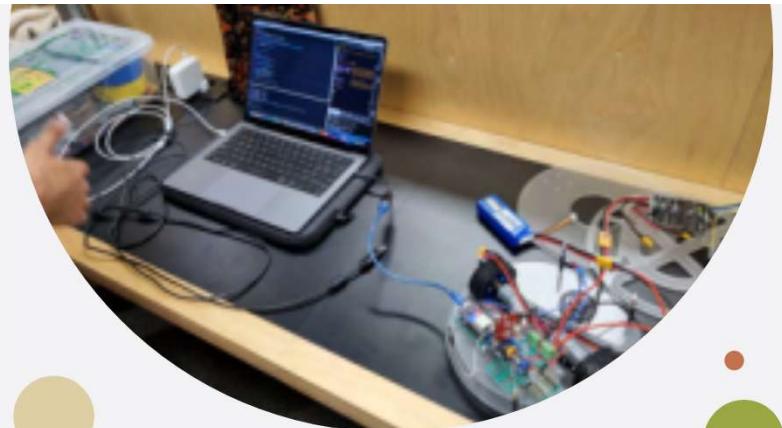
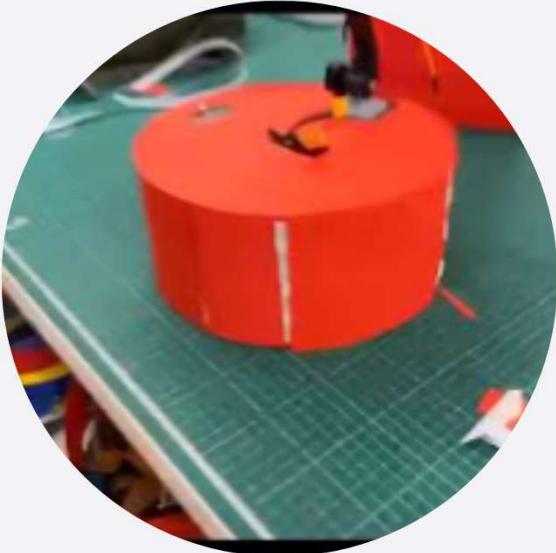
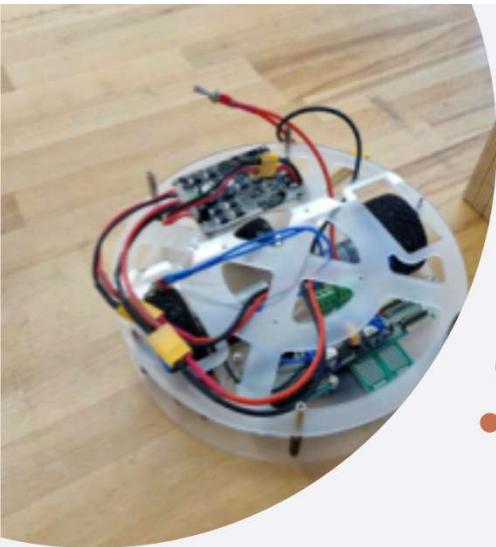


Half assembled body

DRC (DROID RACING COMPETITION)2022 UNSW team

- Worked on creating a bang-bang algorithm for our droid to autonomously navigate a track with just computer vision.
- Made design decisions regarding shape and structure of the droid for software to run smoothly.
- Debugging UART configuration issues with logic converters
- Lots of testing and playing around with the ESP32





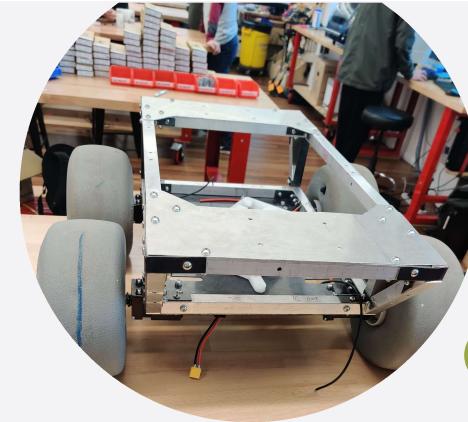
More DRC pictures

- Modular design using laser cut acrylic plates for efficient testing and troubleshooting
- Used OpenMV camera for blob detection and logic decisions
- Winners of Best droid as well as second in race
- Named the droid KannonBolt for its ability to perfectly roll when placed in a perpendicular alignment to the ground



OFF WORLD ROBOTICS

- Worked on embedded systems team with a TM4C.
- Introduced to ROS and Raspberry Pi.
- I have no pictures for this since it was mostly research and code so here is a picture of the TM4C I worked with and the rover we were working on.



Solar powered car

- Part of a uni course, nothing to do with software but explored energy efficiency, PV curves for solar panels, a massive amount of testing and interesting mechanical design concepts.
- Laser cutting grooves in balsa wood to bend it securely.



BIG 2 BOT and bit::bot

In my early stages of learning Python, I created a bot that plays the card game big two against other bots.

I received a High Distinction in the NCSS advanced challenge for it and a Perfect score 2 years in a row for the NCSS intermediate challenge.

Unfortunately, I can't access my NSW education account anymore since I graduated so I don't have any pictures for this as well.

In NCSS Summer camp, I programmed an Arduino based bit::bot to run a space invaders like game that encourages physical activity. We used LED strips to create a shooting effect and aliens and touch sensors for people to shoot aliens.

Other stuff I've worked on

When I was in India I had a lot of time on my hands in boarding school and worked on a bunch of projects that have helped me develop my understanding and curiosity for robotics.

I created basic four-wheeled cars that are remotely controlled using a DPDT switch, upgraded them to be solar powered as well (very inefficiently but eventually figured it out later on)

When I got more into aerodynamics I worked on rubber band planes and ways to make funky paper planes like ones that return back (like boomerangs) and ones that flap their wings like birds.

In my experience tutoring programming, I've also created lots of games in openprocessing
<https://openprocessing.org/user/314343?o=40&view=sketches>