Aryan Rai

Undergraduate
Mechatronics Engineer
The University of Sydney

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ACADEMIC DETAILS

Bachelors of Engineering	(Honours) Mechatronics, (Robotics & Intelligent systems)	The University of Sydney	2023-2027	70WAM
Year 12	Computer Science, Physics, Maths, Chemisty	Presidium Gurgaon Delhi	2022-2023	85%
Year 10		CBSE Board	2020-2021	93%

INTERN

Embedded Engineer: ANT61 Space Robotics Sytens · Intern **June 2025**

- **Embedded** Software/Hardware or **space systems**
- Worked on **Project Beacon**, **Satellite** diagnostic, and communication companion hardware.
- Collaborated with multi disciplinary team of 15
- **Utilized technologies**: STM32, Iridium, GNSS, ROS2

MISC WORK

Web Development (Paid): Technik India · Freelance **June 2023**

- General Website Development for a Youtuber using Google Firebase Realtime Database.

Web Development: Cloud Fondue Films · Freelance **2022**

- V Card sharing tool development using google cloud api's.

POSITIONS OF RESPONSIBILITY

Lead Electrical and Instrumentation Engineer: Sydney Interplanetary Rover Initiative (The University Of Sydney) **March 2024 - Present**

- **Team Lead** for **Electrical and Electronics** sub system, working with **Battery, Drive, Sensing/Cams and Communication Hardware** and **Low Level, ROS2 and Embedded Software** for the rover at the Sydney Interplanetary Rover initiative
- Designed and delivered the **Critical Design Review and Preliminary Design Review** the first rover at **Powerhouse Museum** and **Cicada Innovations**
- Manufacturing electronics at **the Australian Center for Field Robotics**
- **Leading** a **team of about 17 engineers** and collaborating with a whole team of about 60 people and other subsystems.
- **Utilized technologies:** Power Electronics, Battery systems, CANBUS, PCB Design(KiCad/Altium), CAD(Solidworks), 2.4/5Ghz Radio Systems and Network Design, ROS2, Teensy C++, Field Oriented Control (Odrive), Nvidia Jetson

Embedded Systems/Ground Control Engineer: USYD Rocketry Team (The University Of Sydney) **Feb 2024 - Jan 2-25**

- Ground Control member working with interfacing **embedded systems, microcontroller and sensors** on board and at the GroundStation.
- Designed **schematics/circuits** and **code t**he team's first inhouse **datalogger** on board to log pressure **transducers and thermocouple** data wired/wirelessly
- Worked on a **tank testing rig** interfacing **pressure transducers, valves and relays** to a **data aquisation System** and built **custom testing software**.
- Worked on current DAQ implementation at testing site
- **Utilized technologies:** STM32, Labjack/Data Aquisation, RS485, Python, HTML/CSS

Drone Flight Engineer: Sydney UAV Engineering (The University Of Sydney) **Feb 2024 - Sep 2024**

- Responsible **assembling** hardware, electronic systems and software integration for **autonomous drones** at Project FASTR
- Main **pilot** at the project with prior **drone** flight experience
- Built, wired & calibrated a **pxhawk4** based drone with a RasberryPi and a camera
- **Utilized technologies:** PixHawk, Python, OpenCV

PROJECTS

Click to open

Embedded/Robotics

DroidCore (Current) **Feb 2025 - Present**

- A fully custumizable robotics platfrom with Mecanum wheel locomotion, Depth Camera OpenCV ORB SLAM based vision, LLM based speach and language reasoning and robotic arm
- Utilizing technologies: **SLAM, LLM, TTS, STT, Python, Solidworks, KiCad, Power Electronics, Embedded, OpenCV, ROS2, C Arduino**

BlueLily **Nov 2024- Present**

- A High-Performance Sensing, Control, Communication and Realtime Logic Array, customizable for Robotics, Flight Computer, High-Powered Rocketry, Payloads, and CubeSats
- Utilizing technologies: **Teensy, RTOS, I2C, SPI, RS485, CAN, GPS, Bluetooth, SD, Lora**

USYD Reocketry: Datalogger **April 2024 - Sep 2024**

- Designed and coded Stm32 based on rocket data aqusation system for critical thermocouple and pressure transducer data
- Wired on pad (RS485) and Wireless communication (Lora)
- Utilizing technologies: **Stm32, kicad, arduino, Lora, RS485, C STM**

Iot Door Unlock/Iot Smart Light **Feb 2022**

- A local door unlock and smart light system based on esp8266's local web server hosting capabilities
- Utilized technologies: **Arduino/ESP32, Google Cloud, Google Firebase, Hereku, OpenHAB, Blynk Cloud**

CarCanCant **Jan 2021 - Jan 2022**

- Initially started as a project to access cars CAN bus network to transmit data over LTE to an app to create an opensourse tool to retrieve car data
- Now used as a central PCB to build a modular CAN transmitting of plug play HATs to a connect a wider network for rovers etc
- Utilized technologies: **CAN, PCB Design, Linux**

RGBeatz **Jan 2021 - Jan 2022**

- RGBeatz is an open source project for addressable RGB strips using ESP8266s with its own desktop app
- It reacts to music from your currently playing track on Spotify using the Spotify audio analytics api(no microphones involved)
- It uses google firebase realtime database to communicate between the app and the MCU
- Utilized technologies: **Arduino/ESP32, Google Firebase, Blynk Cloud, Flutter, Python**, JS CSS HTML

Software

StarSim + ParsecCore (Current) **Aug 2024 - Present**

- A complete physics engine consiting of tools,models, algoriths and software for real world physics simulations and real time calculatiions based on live, past and predicted data.
- Utilised Technologies: **C++, Numerical Methods, Engineering Physics, Python**

Comms **Aug 2024 - Present**

- .A customizable communication and control dashboard for embedded hardware sensors and custom built Robotics, Drones, CubeSats etc.
- Divided into 3 modules Engine + DynamicModules, StreamHandler, AriesUI
- Utilized: **Python** for Engine + DynamicModules & **Websockets** as main communication with the **NodeJS, Electron, React, Tailwind, Css frontend**

Simplywise **Aug 2022 - Jan 2023**

- .Inventory Management Software/Web App using **Python, eel and Javascript & SQL**
- Implement a multipage customizable inventory management software for small businesses with admin authentication, CSS and HTML frontend and SQL backend

AcademicTestingSoftware

- Testing System Development for an IELTS coaching company GlobalEduCareers
- Utilizing technologies: **Google Firebase and NodeJS.** **June 2023 - July**

TestGame

- A multiplayer pvp game built in unity that showcases how a multiplayer backend can be built with Google's firebase realtime database and **unity**
- Implement multiplayer using google cloud, heath, day-night cycle and a damage system. **Sep 2021 - Jan 2022**
- Utilizing technologies: **Unity, Firebase, C#**

Hardware

Quadcoper **2016**

- Designed and Assembled a Multiwii based multirotor with GPS and live telemetry

E-skateboard & EBike **2018**

- Machined and assembeled circuitry for an e skateboard.
- Later converted to a bike

TECHNICAL SKILLS

- OS: Linux, Windows
- Languages: C/C++, Python, JavaScript/TypeScript, C#, Flutter (Partly), MATLAB
- Platform: STM32, ESP32/8266, Microcontrollers, Nvidia Jetson, Raspberry Pi, Arduino
- Protocols: I2C, SPI, CAN, RS485, LORa, Wifi, Bluetooth, BLE
- Database/Protocols/Cloud: websockets, SQL, Firebase, Google Cloud, Suprabase, Rest, MQTT
- Power Electronics: Motors (Brushless FOC/ESC, Brushed, Servos, Stepper), Battery Systems (LIPo, Liion), Latex, Unity, Linear Actuators, Relays/Switching Methods
- Skills: Digital Logic, Engineering Physics, Soldering, Hand tools, Power tools/machining
- Software Concepts: OpenCV, LLMs, Git
- UI: Figma, CSS, Tailwind, Bootstrap, DaisyUI
- Tools: KiCad, SolidWorks, Latex, Unity

Note: Some projects are a bit undocumented, I have been trying to update them. Please send me a mail if u find something intriguing I have pics/demos/videos