

I build software and the systems it runs on, from **Volt**, an Android app on Google Play, to embedded vision pipelines, flight control and C++ firmware. I work mainly in Python, TypeScript, Java and C++.

Education

Sep 2023 – May 2027 **BSc Robotics and Intelligent Devices** — Maynooth University

Maynooth

Software: Data Structures & Algorithms, Object-Oriented Programming, Operating Systems

AI & data: Machine Learning & Neural Networks, Computer Vision, Signal Processing

Robotics: Robotics & Automation, Actuation & Sensing, Control Systems, Embedded Systems

Sep 2022 – Jun 2023 **QQI Level 5, Computer Systems and Networks** — Tullamore FET Centre

Tullamore

Graduated with Distinction

Projects

2026

Solo

Volt — Electronics toolkit for Android • Live on Google Play

TypeScript · React Native · Expo Router · Jest · EAS Build / github.com/nordrift/volt

- Built and published under my developer name, Nordrift: five offline bench tools (resistor colour codes, Ohm's law, voltage divider, LED resistor, E-series lookup) with **zero Android permissions**.
- Kept all maths in pure, typed functions under **75 Jest unit tests**, including round-trip and cross-check properties, so screens stay thin layers over tested logic.
- Cut the reverse voltage-divider search from **n^2 pairs to n candidates** by solving for the ideal R_2 for each R_1 and snapping it to the nearest E12/E24/E96 value.
- Fixed a dark-mode white flash by deriving React Navigation's theme from the app's design tokens; wrote Expo config plugins for R8 minification and Android 12+ splash branding.

Dec 2024

Team of 8

CanBot — Autonomous waste-sorting rover

Python · OpenCV · YOLOv3 · Raspberry Pi · Arduino / github.com/rayhanalrabby/canbot-waste-sorter

- Drove the move from YOLOv2 to YOLOv3 after v2 failed under poor lighting and occlusion; led dataset collection and labelling.
- Deployed inference on a Raspberry Pi with an Intel NCS2, reaching **92% precision and 88% recall at 30 fps** and sending target coordinates over serial to an Arduino-driven 6-DoF arm.
- Co-built the rover base: plywood chassis, servo drive and a fused 4×18650 power system with a 12→5 V buck converter.

2025

Team of 5

QuadX — 6-DoF quadcopter flight control

MATLAB · Simulink · Unreal Engine / github.com/rayhanalrabby/quadcopter-pid-simulation

- Modelled Newton-Euler dynamics as modular Simulink subsystems and validated each one before integration.
- Linearised the model about hover and tuned cascaded PID (outer position loop, inner attitude loop) with step response and root locus, so four setpoints control all six degrees of freedom.
- Chaired weekly team meetings and handled liaison with the project facilitator.

2024 – 2026

More

Ultrasonic crack detector — Arduino firmware and enclosure; 2.1 mm error vs a ± 3 mm spec.

Smart home automation — five Arduino subsystems; traced alarm lag to a blocking loop.

Wall-following robot — C++ bang-bang controller holding a 39–42 cm band ~85% of the time.

rayhanalrabby.com — portfolio and blog in Astro, with an in-browser PID drone simulation.

Experience

Sep 2026 – Present

Maynooth

Laboratory Demonstrator — Maynooth University

EE108 Computing for Engineers, Department of Electronic Engineering

- Support weekly undergraduate labs on Arduino circuit building and embedded C++, debugging students' circuits and code one-to-one.

May – Jul 2026

Maynooth

Lead Demonstrator — Maynooth University

Advanced Summer Camp and Transition Year Week

- Designed and led two full-day workshops for secondary-school students, **Circuitry & Analog Electronics** and **ESP32 Smart Home Engineering**, and built both slide decks.
- Demonstrated TY Week labs on Snap Circuits, breadboards and Makeblock robots.

Feb – May 2026

Maynooth

Professional Placement — Maynooth University

Department of Electronic Engineering

- Researched and co-wrote the department's 33-page **VNA User Guide** and lab sheets for a new undergraduate RF module, as one of seven authors.
- Covered S-parameters, SOLT calibration, S11/S21 measurement and data export to PC.

Jan – Apr 2023

Athlone

Work Placement — Technological University of the Shannon

- Configured Raspberry Pi devices in Python feeding live Power BI dashboards via AWS EC2.

Skills

Languages

Python, C++, Java, TypeScript, JavaScript, C, MATLAB, HTML/CSS

Software

React Native, Expo, Jest, Astro, Tailwind CSS, Git, GitHub, Linux

AI & vision

OpenCV, YOLO, TensorFlow, Jupyter

Robotics & control

Cascaded PID, dynamics modelling, sensor integration, MATLAB, Simulink, Unreal Engine

Embedded

Arduino, ESP32, Raspberry Pi, Intel NCS2, NanoVNA, EAGLE PCB

CAD

Fusion 360, SolidWorks, Tinkercad, 3D printing

Spoken

English, Bengali, Hindi/Urdu

Interests

Badminton (Maynooth University club), writing poetry in three languages