

Udana Jayasekara

Electronics Engineer | Embedded Systems & Firmware | PCB / PCBA Design

su.jayasekara@outlook.com | udanajayasekara.com | linkedin.com/in/su-jayasekara

Melbourne, VIC | Open to relocation Australia-wide

Full Australian working rights, Temporary Graduate visa (subclass 485) valid to March 2028. No sponsorship required.

PROFESSIONAL SUMMARY

Electronics engineer with commercial experience at Aptinex, where I delivered five hardware and firmware modules from initial requirements through to production-ready design. These included an I2C bus extender, a SIM800 GSM module, ATtiny13 dimmer firmware, an ultra-low-power RTC driver library and the hardware architecture for a BLDC motor controller. My qualifications are in robotics and mechatronics, followed by manufacturing and information technology, all from RMIT. I work primarily in C and C++ across Arduino and AVR toolchains, with particular strength in board-level fault diagnosis. I am seeking an electronics or embedded firmware role.

TECHNICAL SKILLS

Embedded and Firmware: C and C++ (bare-metal and Arduino), AVR, ATtiny13, ESP8266, Atmel Studio, interrupt and timer-driven design, finite state machines, zero-cross detection, TRIAC and PWM control, low-power sleep/wake design, driver and library development

Electronics Development: PCB and PCBA design, schematic capture, layout and routing, virtual testing, circuit debugging, prototyping, bench validation, soldering, component selection, BOM development, voltage regulation

Sensors and Communication: I2C including P82B715 bus extension, UART, SPI, GSM (SIM800), RTC modules (AM1805/AM1815), gas and particulate sensors, IMU, ultrasonic and IR sensing, ThingSpeak, IoT telemetry

Programming: C, C++, Python, Java

Tools and Platforms: Proteus, Fritzing, MATLAB, Linux, Git, PyCharm

Mechanical CAD: SolidWorks, AutoCAD, Inventor, PTC Creo, 3D printing for enclosures and fixtures

ENGINEERING EXPERIENCE

Embedded System Development Engineer

Feb 2021 – Aug 2021

Aptinex (Pvt) Ltd., Sri Lanka

- Delivered five hardware and firmware modules from initial requirements through to production-ready design, covering component selection, schematic work, PCB layout, bring-up and debugging.
- Designed a P82B715-based I2C bus extender as a matched pair of transmitter and receiver boards, taking it from requirements through schematic capture, layout and routing to virtual testing, within the cost and board-space constraints set for the product.
- Developed ATtiny13 firmware for an AC dimmer using zero-cross detection and TRIAC firing control. Diagnosed and resolved cut-off instability and flicker, then extended the firmware to accept both potentiometer and PWM brightness input.
- Developed an Arduino library for the AM1805/AM1815 ultra-low-power RTC directly from the device datasheet. The library covers date and time read/write, alarm-triggered interrupts and sleep/wake control, and was validated on ESP8266 hardware to enable integration by other developers without reference to the datasheet.
- Designed a compact SIM800 GSM module, integrating voltage regulation within a constrained PCB layout following hands-on characterisation of the existing SIM800 hardware.
- Researched and specified the hardware architecture for a customisable BLDC e-bike controller, selecting the microcontroller, gate driver, MOSFETs and regulation stage against client and brake-system requirements.
- Performed circuit-level troubleshooting and prototype validation throughout the role.

ADDITIONAL EXPERIENCE

Team Member

Jan 2023 – Present

Woolworths Group, Melbourne VIC

- Maintained continuous part-time employment for over three years while completing two full-time master's degrees, working across grocery, nightfill and fresh food departments.

Electronics and Design Engineer (Trainee)

Sep 2021 – May 2022

Nemark Technologies (Pvt) Ltd., Sri Lanka

- Supported the design and configuration of solar power generation systems, assisting with component selection and system layout.
- Assisted senior engineers with practical electrical and electronic engineering tasks.

EDUCATION

Master of Information Technology (GPA 3.6 / 4.0)

Feb 2024 – Dec 2025

RMIT University, Melbourne, Australia

Key modules: Cloud Computing, Practical Data Science with Python

Master of Engineering, Manufacturing (GPA 3.8 / 4.0)

Feb 2023 – Dec 2023

RMIT University, Melbourne, Australia

Key modules: Industry 4.0 Technologies, Biomedical Manufacturing

Bachelor of Engineering, Robotics and Mechatronics (Honours) (GPA 3.3 / 4.0)

Feb 2019 – Dec 2021

RMIT University, Vietnam

Key modules: Introduction to Embedded Systems, Advanced Robotics

SELECTED ELECTRONICS AND EMBEDDED PROJECTS

Portable Air Quality Monitoring Device

Engineering Capstone

- Co-developed a handheld monitor for CO, NO₂, PM2.5 and PM10, built on an Arduino Nano 33 IoT with a local display, LED warning indicators, rechargeable power and ThingSpeak connectivity for remote access.
- Delivered PCB fabrication, CAD enclosure design, sensor calibration and field testing in indoor and outdoor environments, validating readings against reference sources.

Tools: Arduino Nano 33 IoT, C/C++, gas and particulate sensors, ThingSpeak, PCB design, CAD

AVR Traffic Light Controller

Embedded Systems Project

- Implemented an intersection controller in bare-metal C on AVR, structured as a finite state machine and driving 7-segment countdown displays and a 16x2 LCD through hardware timers and interrupts.
- Extended the basic four-way design to handle right-turn sensing with dedicated signals, then analysed timing performance and worst-case vehicle wait to confirm correct operation.

Tools: AVR, Atmel Studio, C, FSM design, timers, interrupts, 7-segment, 16x2 LCD

Self-Balancing Robot Design and Control

Control Systems Project

- Derived and linearised the model for a two-wheeled inverted pendulum, obtained the transfer function, and compared PD and PID controllers against the specified transient response in MATLAB/Simulink.
- Built the prototype on an Arduino Uno with an MPU-6050 IMU, L298N driver, DC motors and a 3D-printed limiter, then tuned the controller on hardware and analysed the divergence between measured and simulated behaviour.

Tools: Arduino Uno, C/C++, MPU-6050, L298N, PID/PD control, MATLAB/Simulink

Smart Transportation Robot

Advanced Robotics Project

- Co-developed an autonomous transport robot on a Raspberry Pi 3 B+, combining a DRV8833 motor driver, a QTR-5RC IR array for line following, HC-SR04 ultrasonic obstacle detection and a Pi camera running OpenCV colour recognition to sort by destination.
- Designed the mechanical structure and circuitry, implemented the embedded control logic, and supported an Android application for manual Bluetooth override.

Tools: Raspberry Pi 3 B+, Python, OpenCV, DRV8833, QTR-5RC, HC-SR04, Bluetooth, Android

Industrial Monitoring and Control System

Industry 4.0 Project

- Programmed virtual PLC logic in Structured Text using OpenPLC and e!COCKPIT, configuring digital and analogue I/O addressing and implementing temperature-based control behaviour.
- Integrated the controller with Node-RED over Modbus and developed a dashboard of gauges, charts and controls, using sensor emulation and MQTT-style data flow to demonstrate the full path from acquisition to display.

Tools: OpenPLC, e!COCKPIT, Structured Text, Modbus, MQTT, Node-RED

Automated Sorting System Design and Build

Automated System Design Project

- Delivered the software and control system for a three-station PLC sorting cell using pneumatic actuators, vacuum handling and sensor-based identification to transfer and categorise cylindrical components.
- Developed and debugged the sequence logic, resolved hardware and software interaction issues, and implemented overflow and vacant-space detection, emergency-stop behaviour and status indication.

Tools: PLC, ladder logic, pneumatics, vacuum handling, sensors, safety interlocks

ADDITIONAL PROJECTS

- **Industrial Robot Offline Programming.** RAPID programs for an ABB IRB120 generated and validated in RobotStudio across welding, deburring, milling and drilling.
- **Optical Mouse DFMA Redesign.** Product teardown and component analysis reducing the assembly from 18 parts to 7 and assembly time from 287 to 29 seconds.
- **Gearbox Design and FEA.** SolidWorks 8:1 reduction gearbox validated with motion analysis and shaft FEA.

PROFESSIONAL RECOGNITION

Member, Engineers Australia

Dec 2021 – Present

Engineers Australia skills assessment: Engineering Professionals NEC (Mechatronics Engineer)