

Udana Jayasekara

Mechatronics Engineer | Robotics, Control & Automation | Embedded Systems

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

Mechatronics engineer with an honours degree in robotics and mechatronics from RMIT and two further master's degrees. My project work covers a self-balancing robot for which I derived the system model and tuned the controller against it, an autonomous transport robot on Raspberry Pi with vision-based destination sorting, offline RAPID programming for an ABB IRB120, and the control software for a three-station pneumatic sorting cell. Alongside this I worked at Aptinex delivering embedded hardware and firmware through to production-ready design. I work across mechanical design, sensing, control and firmware integration. I am seeking a mechatronics, robotics or automation role.

TECHNICAL SKILLS

Robotics: ABB RobotStudio, RAPID programming, offline programming, tool and workobject frames, external mechanism integration, path generation and validation, workspace and reachability analysis, OpenCV vision, Raspberry Pi, mechatronic prototyping

Control and Automation: Transfer function derivation and linearisation, PD and PID design and tuning, inverted pendulum control, MATLAB/Simulink modelling, simulation-to-hardware validation, PLC ladder logic, Structured Text, OpenPLC, e!COCKPIT, pneumatic actuation, vacuum handling, emergency-stop and fault handling

Embedded Systems: C and C++, Arduino, AVR, ATtiny, Atmel Studio, ESP8266, motor drivers (L298N, DRV8833), IMU (MPU-6050), IR arrays, ultrasonic sensing, UART, SPI, I2C

Electronics: PCB and PCBA development, schematic capture, layout, circuit debugging, prototyping, bench testing, component selection, voltage regulation

CAD and Simulation: SolidWorks, AutoCAD, Inventor, Fusion 360, MATLAB, FEA, motion analysis, 3D printing, Proteus

Programming and Platforms: C, C++, Python, Java, OpenCV, Linux, Node-RED, Android, Git

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 I2C bus extender as a matched transmitter and receiver board pair, together with a compact SIM800 GSM module, both within defined cost and board-space constraints.
- Developed ATtiny13 firmware for an AC dimmer using zero-cross detection and TRIAC firing control, and an Arduino driver library for the AM1805/AM1815 ultra-low-power RTC.
- Specified the hardware architecture for a customisable BLDC e-bike controller 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, Manufacturing Systems Modelling

SELECTED ROBOTICS AND MECHATRONICS PROJECTS

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, lithium batteries 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, 3D printing

Smart Transportation Robot

Advanced Robotics Project

- Co-developed an autonomous transport robot for warehouse-style load transfer 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, supported an Android Bluetooth control application, and tuned the line-following and sensing behaviour on the prototype.

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

Industrial Robot Offline Programming and Simulation

Industrial Robotics Project

- Developed and validated offline programs for an ABB IRB120 in RobotStudio covering welding, deburring, milling and drilling, setting up tool and workobject frames, positioning CAD workpieces in the cell and generating RAPID code.
- Evaluated reachability, tool orientation, collision risk and workspace constraints, and addressed a workpiece extending beyond the standard envelope by incorporating an external positioning mechanism.

Tools: ABB RobotStudio, RAPID, ABB IRB120, external positioner, CAD-based process setup

Automated Sorting System Design and Build

Automated System Design Project

- Delivered the software and control system for a three-station PLC sorting cell comprising a falling magazine for queuing and identification, a vacuum pick-and-place swivel unit and a linear sorting station, categorising cylindrical components by material and surface properties.
- 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 to support reliable continuous operation.

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

Portable Air Quality Monitoring Device

Engineering Capstone

- Co-developed a handheld monitor for CO, NO₂, PM2.5 and PM10 on an Arduino Nano 33 IoT, with a local display, LED warning indicators, rechargeable power and ThingSpeak connectivity.
- Contributed sensor interfacing, hardware and software integration, CAD enclosure development, PCB fabrication and calibration, then validated readings indoors and outdoors against reference sources.

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

Industrial Monitoring and Control System

Industry 4.0 Project

- Programmed virtual PLC logic in Structured Text with OpenPLC and e!COCKPIT, configuring digital and analogue I/O and implementing temperature-based control.
- Integrated the PLC with Node-RED over Modbus and developed the dashboard, 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

ADDITIONAL PROJECTS

- AVR Traffic Light Controller.** Bare-metal C finite state machine with timers, interrupts, right-turn sensing, 7-segment countdowns and a 16×2 LCD.
- Wheel Changing Device DFA Redesign.** Boothroyd–Dewhurst analysis cutting assembly time from 285.5 to 90.47 seconds and cost by 68%.
- Gearbox Design and FEA.** SolidWorks 8:1 reduction gearbox with motion analysis and shaft FEA that identified the keyway as critical.

PROFESSIONAL RECOGNITION

Member, Engineers Australia

Dec 2021 – Present

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