Patrick **Prell**

Mechatronic Engineer

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Hi there! I'm a creative Mechatronics Engineer, talented at finding novel solutions to difficult problems. I offer innovative solutions for embedded systems, hardware design and control systems design. I strive to create robust workflows and exceptional final products.

Professional Experience

Current – Aug 2019 | **Mechatronic Engineer** | CORDEL - Australia

- Developing pose and velocity estimation using optic flow and machine learning for more accurate point clouds. Where I utilised many features of the Open CV library in C++ and created many data visualisations for verification and evaluation.
- Implementing an Extended Kalman Filter to fuse sensor data, (IMU, RTK GPS, LiDAR) for pose estimation and localisation. This project requires expert knowledge about Bayesian filtering techniques and linear algebra.
- Spent a year in New York working remotely developing 3D point extraction from 2D camera footage on a train. I demonstrated my ability to work effectively outside of the office environment and without intervention.

Python | C++ | Embedded C | C# | Rust | GraphQL | OpenCV | Cloud Compare | 3D Reshaper | Jira | Confluence | Bitbucket | VSCode | Visual Studio

Aug 2019 – Apr 2018 | **Technical Officer** | Airsight - Australia

- Implemented pseudo-RTOS to arbitrate commands over the serial port with tasks running in the background.
- Designed PCB and wrote C/assembly code for status indicator board.
- Re-designed Base station housing and layout using CAD software. I learned fusion 360 for this task and dramatically improved my industrial design skills.
- Manufactured aluminium and carbon fibre components on a CNC using CAM software. This is where I fostered many practical skills in material properties, machinist theory and CNC operations/path planning.

Embedded C | AVR Assembly | Fusion 360 | STM32 Cube IDE | KiCAD | VSCode | Git Hub

Current – Sep 2019 | **Founding Member** | Borne Clothing - Australia

- Built parts of our website and fulfilment workflow. This has required me to utilise basic web development skills as well as integrate many different online services.
- Formulated an algorithm to calculate the distribution of our product range styles to most efficiently order product styles. For this, I calculated the "velocity" of our products selling and used it to determine the required restock rate.
- jointly responsible for running the business day to day. I am continually learning how to best run a business and social enterprise in the leanest way possible.

Excel | Squarespace | Shopify | Asana

Aug 2018 – Nov 2018 | **ELEC3850 Lab Demonstrator** | University of Newcastle

- This course was the 3rd year major project for Electrical Engineering students.
- Gave guidance on hardware choices and best practices for electrical/PCB design.
- Aided students with troubleshooting embedded C code and logic circuits.
- Helped students consolidate their progress into a final report.

STM32 | Eagle | PCB Design | Embedded C

Aug 2018 – Nov 2018 | **ENGG1003 Lab Demonstrator** | University of Newcastle

- Introduction to Procedural Programming course tutor.
- Explained concepts to students that they didn't understand from the lectures.
- Aided students with troubleshooting C and MATLAB code.
- Invigilated course exams and graided students' submissions.

C | MATLAB

Apr 2018 – Feb 2018 | **Creative Technologist** | CORE ELECTRONICS - Adamstown

- Composed maker product review articles (PyCom, Makeblock) where I was required to combine communication excitement and interest with education and information.
- Documented video tutorials and product overviews Maker community education. Here I improved my public speaking ability and communications in tech.

MicroPyhton | PyCom | ESP - Esspressive | MakeBlock | Scratch

Skills

Hardware Design	**3D CAD design (PTC Creo, Fusion 360)**, PCB CAD design (KiCad, Eagle)
Hardware Manufacturing	**Soldering(SMD)**, Prototype Modeling, **3D Printing(FDM, SLA)**, CNC (Router, Laser cutter)
Embedded Development	AtMega23, STM32Fx, Makefile, **Embedded C**, System Verilog
Software Development	**Linux (main development environment)**, Windows, Test Driven Development, Git
Interpersonal Skills	Clear communication, enjoy collaboration, inviting to mentorship and constructive criticism

Programming Languages

C	●●●●●	Matlab	●●●●○
Python	●●●●●	Javascript	●●●○○
Rust	●●●●○	System Verilog	●●○○○
C++	●●●●○		

Personal Projects

Advent Of Code - 2021 2021

github.com/Prelly95/AOC2021 Day01 -> Day15 in rust

I have long since been interested in the Rust paradigm and I've dabbled with a few projects here and there. I decided to have a crack at some advent of code problems over the Christmas break.

Rust | Logic

Two-wheeled balancing robot 2017

github.com/Prelly95/MCHA3K

Design and development of a self-balancing two-wheeled robot – this required implementation of full state feedback control with a Kalman filter observer @50Hz and was constrained by the hardware of an Atmel ATMega32.

PCB / Circuit Design | Embedded C | Matlab | State Feedback | Eagle

Borne Clothing 2019 - Current

borneclothing.com

Co-founder and Chief Technical Officer of Borne Clothing, an e-commerce social enterprise that creates sustainably sourced and ethically made mosquito-repellent clothing. We commit to donating 50% of our profit to fund public health interventions that tackle mosquito-borne diseases. My role includes back-end website development and interpreting customer and marketing data to facilitate lean growth

Business Management | Community Development | Social Impact

Education

30/1/2022 – 2/2/2022 | **Vision-Based Navigation** | Industry Short Course - Dr Chris Renton

Jul 2019 – Feb 2015 | **B.Eng. Mechatronics (Honors)** | University of Newcastle

Jan 2008 – Nov 2013 | **High School Certificate** | The Kings School

References

Aaron Hoye
Chief Technology Officer, Cordel
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