Luke Birchenough

Mechatronics Engineer

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Summary

Mechatronics Engineer with 5 years of industrial measurement systems experience transitioning to full-stack web development. Experienced in systems software development, complex troubleshooting, testing, and hardware integration through work on railway measurement products, now applying these skills to modern web technologies including React, Next.js, and cloud platforms. A background in education provides a unique advantage in communicating technical concepts clearly to diverse stakeholders and collaborating effectively across teams. Proven ability to analyse requirements, deliver solutions under pressure, and quickly adapt to new technologies. Eager to contribute to challenging projects in this rapidly evolving landscape.

Skills

- Programming: Python, C, C++, JavaScript, TypeScript
- **Web:** React, Next.js, HTML, CSS, Node.js, Express, MongoDB, PostgreSQL, SQLite, Tailwind, Shadcn/ui, Bootstrap, MUI, REST, GraphQl, gRPC
- Al & Machine Learning: TensorFlow, Keras, Object Detection, Image Segmentation, YOLO, MobileNet
- Computer Vision: Camera/Laser Measurement, Camera Calibration, OpenCV
- Robotics & Embedded: ROS, Arduino, Raspberry Pi, ESP32
- Cloud and DevOps: AWS, Docker, CI/CD Pipelines
- Tools and Platforms: Jira, Confluence, Kanban, Git, Linux

Professional Experience

Solutions Engineer | Siemens Mobility, Perth

2020 - 2025

Software measurement team member and subject matter expert supporting camera/laser-based Vehicle Equipment Measurement Systems (VEMS) and ML-focused Visual Inspection Systems (VIS) products for accurate measurement of train components

Responsibilities

- **Supported** legacy (VEMS1) and next-generation (NxG) product development.
- Developed React SPAs to improve system usability and troubleshooting capabilities.
- Maintained and developed measurement software to improve system accuracy and reliability.
- Created Python and shell scripts to aid system troubleshooting and automate workflows.
- Orchestrated deployment of NxG containerised microservices using Docker and CI/CD pipelines.
- **Managed** NxG site configurations, resolving inter-service communication and backend integration challenges during initial deployments
- **Handled** NxG hardware/software system integration to achieve full end-to-end functionality from data capture to measurement reporting in front end.
- **Delivered** remote technical support for VEMS1 systems, resolving critical field issues across international deployments.
- Trained object detection and segmentation deep learning models for integration into VIS products.
- **Performed** hands-on camera calibration, sensor alignment and measurement validation for a range of systems.
- **Executed** Factory Acceptance Testing (FAT) on a range of NxG products authoring technical documentation to standardise and streamline the process accross product lines.
- **Completed** Site Acceptance Testing (SAT) and generated comprehensive customer reporting for Legacy VEMS1 sites.
- Produced 3D models, assemblies and renders for simulating measurement images.

Achievements

- Developed a proof of concept React UI addressing low-bandwidth usability issues in the legacy VIS
 interface. Implemented configurable eager and lazy loading for stitched-image displays, enabling
 customer performance optimisation. Delivered a prototype meeting customer requirements.
- Built a Python/Qt UI for visualising and debugging NxG WPMS results. Expanded the solution into a prototype React SPA designed to integrate with the backend for debug data retrieval and provide a more extensible pathway for supporting additional measurement subsystems.
- Contributed to NxG WPMS development from prototype through first product delivery. Validated system functionality through experimental testing and resolved critical issues threatening delivery timelines.
- Took ownership of factory acceptance testing for initial NxG Wheel Profile, Collector Shoe, Brake
 Disc and Brake Pad systems. Developed calibration, validation, and FAT procedures, collaborating
 with production and customer service teams to refine documentation and enable smooth handover
 for future builds.
- Worked closely with VEMS1 product owner to complete WPMS site acceptance testing and reporting across multiple international locations, achieving customer acceptance milestones triggering additional payments.

- Assumed technical leadership role on short notice for project with 2-month delivery timeline.
 Identified critical software incompatibility during requirements assessment with customer and management. Led small software team on solution development while performing FAT duties, delivering on product on time.
- Identified operational and safety issues during remote support of the first on-site NxG WPMS
 validation. Designed and retrofitted a physical attachment for the equipment that simplified the
 validation process, reducing operation time during track access windows and improving laser safety.
- Rapidly onboarded to the VIS team while maintaining existing VEMS support duties. Made
 immediate contributions by assuming site commissioning responsibilities across multiple projects
 and identifying the root cause of a previously unresolved site issue, unblocking critical data capture
 processes and accelerating commissioning timelines.

Robotics Intern | Woodside Energy, Perth

2019 – 2020

- **Developed** python-based ROS nodes to interface with an embedded microcontroller, enabling dynamic LED pattern control for real-time robot status indication and operational safety.
- **Integrated** a roller door controller with an IP camera to enable remote operation and visual verification. Implemented control logic enabling autonomous robot facility access.

Technical Support Officer | South Coogee Primary School, Perth

2017 – 2018

- Co-led an extracurricular program teaching Python scripting, 3d printing and robotics to advanced students.
- Mentored students competing in RoboCup and managed educational robotics resources.

Digital Imaging Support Officer | Henry Schein Halas, Perth

2013 - 2015

- **Provided** technical support for installation and troubleshooting of dental x-ray imaging systems across Western and South Australia.
- **Executed** preventive maintenance programs including routine calibrations increasing system reliability.

High School Teacher | Darling Range Sports College, Perth

2011 – 2012

- **Delivered** IT curriculum for Years 9–12, teaching computing and digital technologies to secondary students.
- **Collaborated** with teaching staff to develop and enhance learning programs.

Education

Bachelor of Engineering (Honours, First Class) – Mechatronic Engineering

Curtin University, 2016 – 2020

Bachelor of Arts / Bachelor of Communications (Education & Interactive Multimedia)

Edith Cowan University, 2007 – 2011

Projects

See Website

Certificates

- AWS Certified Cloud Practitioner Developed cloud fluency and foundational AWS knowledge.
- <u>The Web Developer Bootcamp 2025</u> Reinforced dynamic site delivery fundamentals with Node.js and Express.
- <u>React The Complete Guide 2025</u> Deep dive into React and Next.js, solidifying SPA and SSR foundations.
- Robotics Software Engineer Localization, mapping, and navigation using ROS.

References

Available upon request.