Nicholas Carr UBC Engineering Physics

Science Co-op

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Portfolio — GitHub — LinkedIn

Skills

Software Tools	Altium, EasyEDA, SolidWorks, OnShape, MATLAB, Jupyter, LaTeX
Prototyping Skills	Soldering, Electrical Testing, Crimping, Hand Tools
Languages	Python, TypeScript, JavaScript, C, Java, VHDL, Assembly
Libraries	Arduino, ROS, OpenCV, TensorFlow, NumPy, Angular, Node.js, Vue, React

Technical Experience

Robotics Software Engineer Intern – Neupeak — Jul – Aug 2022

- Built a web-based 3D visualization using THREE.js and live data from ROS to visualize the robot's pose in real time, allowing operators to see the state of the robot remotely
- Built a 3D viewer to review previous point clouds and robot actions, allowing developers to debug reported errors from the field in depth

Control Systems Intern – Bioform — May – Jun 2022

- Designed and wired sensor circuits for industrial control systems, allowing signals to be read by a controller and data acquisition system
- Configured and tuned PID control for R&D production facility
- Specified and ordered wiring using component datasheets and application requirements
- Wrote an application using Python and Qt to collect experiment data and control the facility
- Processed and generated plots for data from dozens of experiments using MATLAB
- Successfully operated facility for a test run with the new control systems

Comms Sub-Team Member – UBC Orbit Student Design Team — 2019 – 2021

- Used software-defined radio to test prototype satellite radio hardware, successfully verified that it was transmitting at the correct frequency using spectrum analyzer
- Worked on a Python-based serial test client to automate 24/7 reliability testing of radio hardware
- Tested client using an Arduino sending mock data back to the test client over serial

Software Developer Co-op – TickTrade Systems — Jan – Apr 2021

- Migrated a currency trading page from Angular.js 1.x to Angular 11
- Advocated for and created interactive documentation on internal web components for developer reference and to demo development progress during design meetings

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Education

Engineering Physics – 4th Year – University of British Columbia **2019 – 2024**
Course selection includes automatic control, signals and systems, software construction, machine design, quantum mechanics, and partial differential equations

Exchange – Technical University of Denmark **Aug – Dec 2022**
Took masters courses in robotics, ML & DSP, image analysis, and spacecraft design

Projects

Autonomous Can Collecting Robot **May – Aug 2021**

- Designed an autonomous robot to collect and drop off soda cans in a design course
- Created electrical schematics and designed perfboard circuit using EasyEDA
- Contributed to PID line-following algorithm and robot controller code, written in C
- Created an animation of robot arm in Blender, and a website to demonstrate it in AR

Autonomous Parking Enforcement Competition **Sep – Dec 2021**

- Wrote an autonomous robot controller in Python using ROS framework to drive around a track and read license plates from parked cars in Gazebo simulation
- Processed camera images using OpenCV
- Created a license plate character recognition model using Keras and TensorFlow
- Wrote PID line-following algorithm using image of road markings

Video Doorbell Project **Aug 2020**

- Wrote Arduino firmware to stream video from an off the shelf ESP32 camera module
- Implemented MJPEG video streaming and MQTT telemetry and control
- Integrated camera into Home Assistant home automation platform

Hackathon Experience

Faucet Drip Detector – MasseyHacks V **Mar 2019**

- Built an internet-connected device to detect faucet leaks
- Wrote Arduino firmware to read a water sensor and log drip events to a Node.js server
- Created a custom water sensor using water droplets as a conductive path
- Won third place and the Great Lakes category prize

Co-founder – Cursor **Sep 2017 – Jun 2019**

- Helped Toronto-area youth learn to code through introductory workshops
- Managed 9 volunteers and hosted 2 technology-related events
- Co-lead a 3-hour React Native workshop for 20 attendees aged 12-16 Jul 2018
- Organized a 12-hour hackathon for 18 participants Feb 2019