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Ben Huckell

Engineering Physics
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TECHNICAL SKILLS

Computer Skills
- Python, C#, C++, Java, Git
- SQL, MATLAB
- OpenCV, Keras, TensorFlow
- 3DExperience Robot Simulation
- OnShape, AutoCAD, SolidWorks

Automation Skills
- Allen-Bradley, Siemens, Beckhoff PLC Development
- Ignition, C-More HMI Design
- Industrial Electrical Panel Design/Construction

Robotic/Electrical Skills
- Analog and Digital Circuits
- Arduino, Raspberry Pi, STM32
- Fanuc, Kuka Robots
- Oscilloscope, Function Generator, Multimeter, Breadboard, etc.

TECHNICAL WORK EXPERIENCE

Tesla Motors • Fremont, California **January, 2019 – April, 2019**
Automation Controls Engineering Intern
- Implemented Structured Text, SCL, Ladder Logic on Allen-Bradley, Siemens, and Beckhoff PLCs to interface with various production components, with a focus on code modularity, reusability, and documentation
- Used 3DExperience Robot Simulation platform to develop a manufacturing digital twin; investigated virtual commissioning which would allow for significantly reduced commissioning and production downtime
- Introduced unit/regression testing in the software development process of Robot Function Blocks resulting in the early detection of bugs and the verification of their functionality
- Expedited the validation process for new production components by creating a dedicated testing area
- Developed a cost-efficient demonstration production cell using Fanuc and Kuka robots with the capabilities of an operating production cell

Steel-Craft Door Products Ltd. • Edmonton, Alberta **May, 2018 – August, 2018**
Software Developer | Automation Engineering Intern
- Drafted electrical schematics for new facility HVAC system using AutoCAD Electrical, designed CE Code Compliant industrial electrical panel, built physical prototype including mounting and wiring PLC, Power Source, HMI, Sensors, Circuit Breakers, VFDs
- Developed PLC Ladder Logic for HVAC system control that was organized, maintainable, and documented
- Built a visually appealing HMI where controls are neat and organized, and system errors are easy to diagnose
- Created software using Visual Studio and C# to increase the ease with which repetitive tasks are managed
- Integrated Python scripts on a Raspberry Pi to export PLC data to Node-RED dashboard for remote monitoring purposes, and SQL database to log system data

University of Alberta – Department of Computer Science • Edmonton, Alberta **July, 2016 – August, 2016**
Intern
- Researched how different programming languages are used to solve the same problem, conducted a thorough analysis that looked at code runtime, readability, structure
- Delivered a poster presentation with my research results to over 100 students, colleagues, and faculty
- Collaborated with faculty supervisors to assess the current course material for a first-year computer science course, created and presented enhanced course material to be used in the following academic year

STUDENT TEAMS/TECHNICAL PROJECTS

UBC Rocket – Whistler/Blackcomb Sub-Team • Vancouver, BC **September, 2018 - Present**
Avionics Lead
- Currently pursuing the Base 11 Space Challenge, which offers a prize to the first student-led design team to design, build, and launch a rocket to an altitude of 100 km
- In charge of overseeing all electronics work for vehicle and test stand, including meeting safety requirements
- Responsible for the successful integration of hardware and software, including custom PCB design with Altium Designer software and embedded C++ development with Teensy 4.0 microcontroller

Machine Learning Self-Driving Car Simulation **September, 2019 – Present**

- Integrated ROS framework within Linux OS and Gazebo simulation environment to navigate virtual world
- Processed machine vision camera output with OpenCV, TensorFlow Keras API to detect, and place bounding boxes around objects of interest such as other cars, pedestrians, and road signs using region-based CNN
- Trained and validated CNN to correctly detect and read license plates of passing cars with 99.7% accuracy

Autonomous Robot Competition **May, 2019 – August, 2019**

- Designed full robot assembly with OnShape CAD platform, fabricated parts using Laser Cutter, Water-Jet Cutter, hand tools, and constructed entire robot capable of accurately maneuvering competition surface
- Developed embedded C++ firmware using STM32 ARM Blue Pill microcontroller. Implemented robust object-oriented state machine dictating program flow, modular line-following PID algorithm to handle navigation
- Placed 1st out of 15 teams in competition that attracted over 300 spectators

Self-Balancing Robot **September, 2017 – December, 2017**

- Assembled two-wheel robot with dual gearbox and gyro sensor allowing for autonomous balance
- Utilized Arduino with PID algorithm to constantly monitor and correct for any errors in standing angle to maintain robot in a balanced, 90-degree position
- Robot was able to successfully withstand external influences for two minutes, thirty seconds – one of the longest standing times from over 60 student submitted robots

Fantasy Baseball Draft Optimization Software **January, 2017 - Present**

- Developed Python algorithm which integrates user-defined custom league specifications, future performance estimates, and statistical metrics to assign each player and optimized evaluation Z-Score
- Created an interactive user interface using Visual C# allowing users to custom-define all aspects of their fantasy baseball league and observe program-generated results
- Program generated teams have achieved two first place finishes and one second place finish in the three leagues it has been tested in, each composed of 15-20 participants

EDUCATION

University of British Columbia **April, 2021**
Bachelor of Applied Science – Engineering Physics

- Mechatronics Specialization, Minor in Commerce
- Fourth-year Student
- 3.8 Cumulative GPA

AWARDS

UBC Engineering Dean's List	**2018, 2019**
Alexander Rutherford Scholarship Recipient	**2016, 2017, 2018**
Summa Cum Laude Award Recipient	**2016, 2017, 2018**
High School MVP Award – Volleyball (Grade 12), Basketball (Grade 11)	**2016, 2017**

ACTIVITIES/INTERESTS

Volunteering: City of Edmonton River Watch, Volleyball Referee, Edmonton Food Bank, UBC Move-In Day
Activities: Basketball, Volleyball, Hockey, Golf, Skiing
Interests: Reading, Theoretical Physics, Machine Learning, Financial Analysis, Artificial Intelligence