Nicholas Bratvold

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Education

University of British Columbia BASc Engineering Physics - Class of 2024
UBC Envision Brewing Instrumentation Member
Student Council Vice President Events

Experience

Zen Maker Lab May. 2021 - Dec. 2021
Engineer Project Designer *Python, C++, Unity, Fusion 360, 3D printing*

- Developed a Battle-Bot design kit with laser cut MDF, modular C++ interface, and hobbyist electronics.
- Lead a project-based learning program to empower student's ambitious ideas and equip them with the skillset to realize them, such as; a Tesla coil, RL minecraft agent, and a wildlife camera website.

MCW Group of Companies Jan. 2020 - Apr. 2020
Electrical Distribution Design Assistant *GIS, SKM Powertools, AutoCAD, Excel*

- Evaluated power distribution assets throughout BC in order to recommend new asset design.
- Conducted arc flash studies on contracted airport electrical circuits in western Canada, including YVR's new LiDAR Tower. Recommended optimal breaker and fuse settings, created arc flash safety labels, and produced formal reports.

Projects

EleutherAI Sep. 2023 - Apr. 2024
Generative AI Video Model *Python, JAX, OpenCV*

- An open source model that generates video through a two-stage architecture consisting of a variational autoencoder and diffusion transformer, supporting a 500x312 resolution at various video lengths.
- Achieved 500x training speed improvement through fully sharded data parallelism and data preprocessing.
- Finetuned hyperparameters to improve generated video quality and prove model scalability.

University of British Columbia Astronomy Jan. 2023 - Apr. 2024
Classification of Fast Radio Bursts for the CHIME Telescope *Python, TensorFlow, Keras*

- Designed CNN model that classified fast radio bursts from radio frequency interference with perfect accuracy, precision, and recall.
- Reviewed literature to preprocess 100GB of data using physics models.

University of British Columbia Sep. 2021 - Apr. 2022
Portable Fentanyl Quantification Device *Python, OnShape, PCB Design, Microfluidics*

- Integrated a proven three-stage process of chromatography, voltammetry, and computational analysis to produce precise readings of fentanyl and other drug concentrations. Capable of detecting 100x below the lethal dose of fentanyl.
- Designed and validated a 50µL electrochemical flow cell to ensure accurate results. Prioritized a portable design with a GUI to allow ease of transport and increase investor interest in the product.

University of British Columbia Jan. 2021 - Apr. 2021
License Detection AI *Python, Tensorflow, Keras, OpenCV, ROS*

- Combined computer vision and a CNN to accurately identify license plate characters from a simulated race course.
- Driving was controlled by a reinforcement learning model. Drove 35% faster than its competitors.

University of British Columbia May. 2020 - Aug. 2020
Autonomous Recycling Robot - 1st Place *C++, SolidWorks*

- Created a STM32 controlled autonomous robot from scratch that could move cans into a recycling box.
- Designed and constructed electrical circuit with noise cancellation, ADC, and H-bridge motor control.

Skills

Languages: Python, C++, Java, MATLAB, HTML/CSS
Technologies & Tools: CV2, JAX, TensorFlow, PyTorch, Keras, ROS, Git, Linux, Cadence, SolidWorks, 3D Printing