David Yuchen Wang

5th year UBC Engineering Physics Student

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Education

BASc - Engineering Physics
University of British Columbia
Sept. 2018 – May. 2023 (expected)
(Presidential Scholars Recipient)
Deans Honor List, GPA **86%**

Publications

Accelerator Tuning with Deep Reinforcement Learning
2021 NeurIPS Workshop for Machine Learning and the Physical Sciences

Leadership Experience

Captain
UBC AgroBot Design Team
Apr. 2022 – present

Grad Year Representative
UBC Engineering Physics Student Council
Sep. 2022 – present

UBC Teaching Assistant
3rd year Machine Learning Project Course
Sep. 2021 – Dec. 2021
1st year Experimental Physics Course
Sep. 2020 – Dec. 2020

Summer Orientation Program Leader
UBC
Jun. 2020 – Sep. 2020

President of Environmental Club
Dover Bay Secondary School
2015 – 2018

Skills

Python, MATLAB, Java,
C++, C, C#, Julia, R
PyTorch, Tensorflow, OpenCV,
Numpy, SciPy, Matplotlib,
ROS, Gazebo, GIT, Docker, Conda
Arduino, Linux, Bash, HTML, CSS,
Altium Designer, Solidworks, FPGAs,
Machining, 3D-Printing, Soldering,
Circuit Design, Oscilloscope

Interests

Backpacking, Photography, Music,
Cooking, Martial Arts, Chess

Work Experience

Machine Learning Engineer
May. 2022 – Sep. 2022   **Yakoa - Web 3 startup**

- Implemented a state-of-the-art **image segmentation** framework using **PyTorch** based on research papers to detect fraudulent features in NFT images.
- Deployed **self-supervised classification models** on **AWS** instances and fine-tuned models on a dataset of 8 million images, boosting training speed and accuracy.
- Performed **statistical analysis** of the latent embedding space of self-supervised classification models to **optimize hyperparameters** and visualized results using **Weights & Biases** dashboards, leading to improved model validation accuracy.

Junior Machine Learning Engineer
May. 2021 – Jan. 2022   **TRIUMF – Particle Accelerator Center**

- Designed **simulations for beamline physics** in order to train state-of-the-art **policy gradient reinforcement learning** models. Successfully deployed and tested the first ever **AI-controlled beamline tuning interface** on the TRIUMF particle accelerators.
- Wrote and published paper *Accelerator Tuning with Deep Reinforcement Learning* and gave poster presentation at **NeurIPS 2021** Workshop.
- Utilized a combination of **object-oriented programming**, Python **multi-threading**, custom **shell scripting**, and **multi-GPU optimization** to boost training time and improve usability of **deep reinforcement learning** architecture.
- Built user interface in **Python** and **Tkinter** to communicate with the Experimental Physics and Industrial Control System (EPICS) for **real-time beamline data-transfer and tuning.**

AI Research Intern
Jan. 2020 – May. 2020   **Huawei – Vancouver Big Data Lab**

- Improved **data-preprocessing** speeds for image datasets by many orders of magnitude through designing custom scripts in **Python** and **Bash**.
- Boosted team productivity by configuring **custom environments in Docker** to allow for research models to be trained through Huawei cloud GPU APIs.
- Finetuned a myriad of **deep-learning models** for **image classification** and **object detection** in **TensorFlow** and **PyTorch**. Documented and presented findings to the team, leading to improvements on model accuracy.

Project Experience

Autonomous Agricultural Robot
Sep. 2019 – present   **UBC AgroBot – Engineering Design Team**

- Implemented **computer vision** techniques in **OpenCV** to detect crop lanes from various onboard cameras and utilized **PID control** for **autonomous navigation** through crop rows.
- **Developed code base** for the navigation controller from scratch and **deployed software architecture** to interface with camera and Lidar sensors on a Nvidia Jetson board.
- Built **robotic simulations** using **ROS** and **Gazebo** to test controller and algorithms.
- **Led a team** of 60+ students across 6 sub-teams and initiated the **first successful field test** of the team robot.

Robotic Interface for Precision Bioprinting
Sep. 2021 – Apr. 2022   **Capstone Project – Aspect Biosystems**

- Designed a **graphical user interface** using Microsoft **.NET** platform using **C#**, allowing for **real-time control** of robotic prototype.
- Built a **3-axis robot** to transport tissue samples for bioprinting. Interfaced with an **industrial controller** and wrote code connecting GUI to hardware for **sub-millimeter precision control** of robotic system.
- Analyzed associated mechanical risks and performed **CAD analysis in SolidWorks** to determine the best design.