David Yuchen Wang



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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 Al-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.

Al 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.