DAVID YUCHEN WANG

Email: davidw0311@gmail.com **Mobile**: +65 9192 3429 **Website**: https://davidw0311.github.io/ **LinkedIn**

EDUCATION

National University of Singapore **Aug 2023 - Dec 2024 (expected)**
Master of Computing - Specialization in Artificial Intelligence

University of British Columbia, Canada **Sep 2018 - May 2023**
Bachelor of Applied Science - Major in Engineering Physics
- Minor in Commerce.
- Presidential Scholars Recipient, Dean's Honours List, GPA 86%.

SKILLS

Programing languages: Python, MATLAB, Java, C++, C, C#, Julia, R, HTML, CSS
Libraries: PyTorch, Tensorflow, Keras, OpenCV, Numpy, SciPy, Matplotlib, Weights & Biases
Frameworks: ROS, Gazebo, AWS, GIT, Docker, Conda, Arduino, Linux, Bash

LEADERSHIP EXPERIENCE

Captain - UBC AgroBot Design Team **(Sep. 2022 - May 2023)**
Grad Year Representative - UBC Engineering Students Council **(Sep. 2022 - May 2023)**
Teaching Assistant - UBC **(2020 - 2023)**
3rd year Machine Learning Project Course, 1st year Introductory Physics Course, 1st year Experimental Physics Course
Student Orientation Program Leader - UBC **(Jun. 2020 - Sep. 2020)**
President of Environment Club - Dover Bay Secondary School **(2015 - 2018)**

WORK EXPERIENCE

Machine Learning Research Assistant **May 2021 - Present**
TRIUMF - Canada's Particle Accelerator Centre - https://www.triumf.ca
- Developed model using **Bayesian Optimization** to optimizing tunes of particle accelerators and achieve 2400% speed improvement and 120% accuracy improvement compared to human operators.
- Built simulations for beamline physics to train policy gradient **reinforcement learning** models. Deployed and tested first AI-controlled interface on TRIUMF particle accelerators.
- Prepared experimental results to publish as first author in paper *Accelerator Tuning with Deep Reinforcement Learning* and gave video and poster presentation at **NeurIPS 2021** Workshop.

Machine Learning Engineer **May 2021 - Sep 2021**
Yakoa.io - Web3 Startup - https://www.yakoa.io
- Implemented **image segmentation** framework in PyTorch from state-of-the art research papers, to detect fraudulent features in NFT images with high accuracy.
- Deployed **self-supervised classification** models on AWS instances and fine-tuned models on a dataset of 8 million images, improving model run-times by over 300%.
- Employed **statistical analysis** of latent space of self-supervised models. Optimized hyperparameters and visualized results using Weights & Biases, leading to 150% improvement in validation accuracy.

AI Research Intern **Jan 2020 - May 2020**
Huawei Technologies Canada - Vancouver Big Data Lab
- Enhanced **data-preprocessing** speeds for image datasets by 300% through designing custom scripts in Python and Bash.
- Boosted team productivity by 500% through configuring **custom environments** in Docker to allow research models to be trained through Huawei cloud GPU APIs.
- Fine-tuned **deep-learning** models for **image classification** and **object detection** in TensorFlow and PyTorch. Documented and presented findings to team, leading to 120% improvements on model accuracy.

Captain and Navigation Sub-Team Lead **Sep 2019 - May 2023**

UBC AgroBot - Student Engineering Design Team - https://ubcagrobot.com

- Devised detailed project roadmaps, projected team budgeting for a 2-year time period, and utilized **Agile methodology** to manage a team of 70 members across 6 sub-teams to bring robot to the 2023 METRICS ACRE competition in Italy.
- Outreached to industry sponsors and promoted team initiatives through **presentations** to educational and industry audiences, improving team recruitment, and obtaining over $25,000 in funding.
- Led a group of 8 members to develop software architecture to integrate software and hardware systems onboard robot. Interfaced with camera, lidar, and gyro sensors and utilized **computer vision** algorithms and PID control to achieve fully **autonomous navigation** through corn-crop rows.

PROJECTS

Robotic Interface for Precision Bioprinting **Sep 2021 - Apr 2022**

UBC Capstone Project – with Aspect Biosystems

- Designed **graphical user interface** using Microsoft .NET platform in 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. Implemented and tested design prototype for over 1000 cycles without fail.

Numerical Analysis of Complex Physics Systems **Sep 2022 - Dec 2022**

UBC PHYS 410 – Computational Physics

- Derived **numerical solutions** to 2-D Schrödinger Partial Differential Equations to accurately model propagation and interference of waves in 3-dimensional space across barriers.
- Analyzed equilibrium distributions of electric charges on surface of a sphere and performed **numerical simulations** to accurately describe system's motion over time.
- Optimized MATLAB code to numerically solve differential equations with a 500% runtime boost, performed **error analysis**, and generated 3D visualizations of results. Achieved a grade of 95% in class.

Self-Driving and License Plate Detection **Jun 2020 - Sep 2020**

UBC ENPH 353 Project Course

- Utilized Robotic Operating System (**ROS**) with **computer vision** algorithms to steer an autonomous vehicle through a simulated world and avoid moving obstacles 0% collision rate.
- Generated custom datasets and trained **deep neural network** models in TensorFlow Keras to identify license plates in a noisy environment and classify their characters with 90% accuracy.
- Led labs and tutorials as a **Teaching Assistant** in next year for a class of 3rd year students and provided guidance in course concepts, software architecture, and working within **Linux** environments.

Autonomous Recycling Robot **Jul 2020 - Aug 2020**

UBC ENPH 253 Project Course

- Designed and soldered custom **PCBs** to interface with an STM32 micro-controller, with consideration of power limits, current distribution, and noise isolation.
- Investigated PCBs using an oscilloscope and a multimeter to discover and fix 100% of circuit issues.
- Implemented **PID control** system in C++ using reflectance sensors and employed sonar to collect and deposit soda cans with 80% accuracy.

PUBLICATIONS

Accelerator Tuning with Deep Reinforcement Learning - https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_125.pdf

NeurIPS 2021 - Workshop for Machine Learning and the Physical Sciences

LANGUAGES

English, Chinese (Mandarin)

HOBBIES

Badminton, Chess, Board Games, Hiking, Photography, Reading Sci-Fi, Cooking