DAVID YUCHEN WANG

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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 Award Recipient, Dean's Honors List, GPA 86%.

WORK EXPERIENCE

Cutting-Edge AI Developer **Aug 2023 - Present**
Pensees Singapore - https://www.pensees.sg
- Utilized Apple CoreML to optimized inference times for latent diffusion models mobile devices through model pruning, palletization, and optimization on Apple Neural Engine.
- Designed and built fully working iOS app using SwiftUI to allow high quality image generation locally on-device.
- Reviewed state-of-the-art papers and conducted market research to guide company towards innovation on the market.

Machine Learning Research Assistant **May 2021 - Aug 2023**
TRIUMF - Canada's Particle Accelerator Centre - https://www.triumf.ca
- Developed **Bayesian Optimization** model to optimize particle beamlines and boost speed by 2400% and accuracy by 120% compared to human operators.
- Designed efficient physics simulations for use on policy gradient **reinforcement learning** models. Integrated first AI-controlled interface on particle accelerators.
- Published experimental findings 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 2022 - Sep 2022**
Yakoa.io - Web3 Startup - https://www.yakoa.io
- Implemented **image segmentation** framework in PyTorch from 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 large image datasets by 300% through designing scripts in Python and Bash.
- Boosted team productivity by 500% through configuring **custom environments** in Docker to allow parallelization of model training through cloud GPU clusters.
- Fine-tuned **deep-learning** models for **image classification** and **object detection** in TensorFlow and PyTorch. Organized documentation 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 project roadmaps, established a 2-year budgeting timeline, and utilized **Agile methodology** to manage a team of 70 members across 6 sub-teams to bring robot to the 2023 METRICS ACRE international competition.
- Led a team of 8 members to integrate software codebase with 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 crop fields.

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

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

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.
- 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 2021 - Sep 2021**
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 with 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.

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)**

LANGUAGES

English, Chinese (Mandarin)