Bruce (Shouyue) Hu

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SKILLS

Programming Languages: Python(work experience), C/C++, Bash, Matlab, Java, JavaScript
Libraries/Frameworks: PyTorch, Tensorflow, OpenCV, Scikit-learn, Matplotlib, Threading, XGBoost
Tools: ROS(work experience), Git(work experience), Docker, AWS EC2, GCP

EDUCATION

Master of Science (Robotics) In-coming Sept. 2025

Bachelor of Computing (Science, Honours) Sep. 2018 – Jun. 2022
Queen's University, Kingston, ON, Canada
Artificial Intelligence Specialization, Minor in Mathematics, third/fourth year GPA: 3.9/4.3
Course taken: **Reinforcement learning**, Artificial Intelligence, Robotics

ACADEMIC

Research Intern Jun. 2024 – Present
University of Pennsylvania, USA
- Creating an open-source structured question-answer text dataset by processing transcripts of 103k texts
- Designing a method that automatically labels text, based on definitions of labels, achieving ~76% accuracy compared to manual annotation

Research Assistant *[Link]* Feb. 2023 – Aug. 2023
Part-time, École de technologie supérieure, Canada
- The project aimed to assess drone operators' cognitive loads by monitoring their physical data
- Integrated data from sensors including IMU, cameras, microphones, and pupil trackers
- Implemented and experimented with filters, interpolation methods, and data visualization
- Proposed a efficient real-time blink detection method (embedded 50Hz) and audio classification CNN
- Collaborated with other researchers for timestamp synchronization among different devices
- Assisted mechanical engineering students with coding and network configuration; presented project demonstrations to lab visitors

Undergraduate Research *[Link]* Sep. 2021 – Apr. 2022
Queen's University, Canada
- Created a novel melody generator using an Evolutionary Algorithm that extracts, combines, and iterates features based on user selections

PROFESSIONAL

Research Developer Jan. 2023 – Mar. 2024
Supervisor: Dr. Jayson Bursill, Full-time, Delta Controls Inc., Canada
- Developed web-based services for industrial automation
- Built REST APIs in Python, designed interfaces using JavaScript integrated with PostgreSQL database
- Diagnosed inefficiencies in an existing queue function and developed a concurrent processing mechanism, reducing request times by 58% for a queue size of ~6000

Robotics Engineer Jul. 2021 – Aug. 2021
Internship, R&D, Shuangyuan Optoelectronics Tech Co., Ltd., China
- Developed a vision-aimed robotic arm system that performs pick-place tasks for industrial automation
- Designed a object detection algorithm, utilizing dynamic project lights and fusing bright pixels from multiple images, based on the roughness difference between the objects and desktop surface
- Engineered calibration (matrix), segmentation (smooth filter, Sobel operator), edge detection (Morphological and Hough Transformations), and edge clustering (K-Means)
- Handled signals via Modbus/USB, developed multi-tread control software for sensors and actuators
- Designed navigation trackers and calibration methods using affine transformation; fine-tuned PID
- Achieved repeatability of 0.15 mm with 5 DoF

PROJECTS

Realtime Hand Gesture Classification using ResNet *[Link]* Jun. 2024
- Adjusted ResNet structure for time-series data of SHREC 2021 Gesture Benchmark
- Applied weight decay, tuned hyper-parameters, added a learning rate scheduler, and adjusted model size
- Achieved 93% validation accuracy and addressed overfitting
- Wrote a report the analyzes and compares online and offline detection methods

Reinforcement Learning in a Physics Simulation Environment *[Link]* Apr. 2021
- Implemented Q-learning for the cart-pole problem, converted action space from continuous to discrete
- Improved policy structure for multi-tasking
- Simulated 2D physics using OpenAI/gym