Mark Do

+1 647-766-6794 | mdo@uwaterloo.com | github.com/hepromark | linkedin.com/in/markdouw/

Education

University of Waterloo - *Candidate for* ***Bachelor of Mechatronics Engineering*** 2022 - 2027

- 4.0 Cumulative GPA | 3 x Dean's Honours List

Work Experience

Algorithms Software Developer| *Python, SimPy* Sep 2024 – Dec 2024
Rapyuta Robotics Tokyo, Japan

- Created an end-to-end pipeline that generates optimized Robotic Storage System layouts based on customer requirements.
- Designed and implemented a custom event-based simulation platform with SimPy using spatial-temporal grids, achieving 12× speedup and lower memory usage; deployed to evaluate 5 new system improvements.
- Utilized Genetic Algorithms for non-convex optimization, resulting in 10% higher storage density without performance drops.

Robotics Software Developer| *Python, Django, SQL, ROS* May 2024 – Sep 2024
Rapyuta Robotics Tokyo, Japan

- Developed a Task Planner component to reactively schedule tasks for robots in a Multi-Agent Robotic Storage System, which translates customer warehouse operations into back-end task trees appropriate for parallelized robot execution.
- Scaled Task Planner & world model database to work with 10 times more robots (6 → 60) by using caches & lighter queries.
- Created 5+ robot error recovery behaviours to reduce MTBF from hours to days, enabling the system's initial rollouts.
- Oncalled for startup's first field deployment at a live warehouse, debugged 20+ critical issues across the stack in real-time.

Test Automation Developer | *Java, Docker, TestNG* Sep 2023 – Dec 2023
Definity Financial Waterloo, Canada

- Overhauled Java test suite with > 120 test cases for company's mobile app, reducing false positive bug detections by > 95%.
- Created a new automated CI pipeline for regression tests, executing & reporting results daily to save >12 dev hrs./week.

Related Experience

Computer Vision Researcher | 3D Reconstruction Apr 2025 - Present

- Researching novel Structure-from-Motion models with Vision Transformer (ViT) backbones for visual SLAM & 3D reconstruction of construction sites using drone-based imagery at Waterloo's Vision and Image Processing Lab.

Autonomous Racing Team Lead | *C++, Docker, ROS2, Linux* Jan 2025 - Present
F1Tenth Autonomous Racing Team

- Leading a team of 15+ undergraduates to develop a self-driving software stack for F1Tenth Autonomous Racing Competition.
- Led the design & implementation of pure pursuit control, lattice motion planner, offline & online SLAM algorithms.
- Built a dockerized dev environment integrating ROS2, Foxglove and AutoDRIVE physics simulator for testing algorithms.

Autonomous Vehicles Developer | *C++, Casadi, Kubernetes, Terraform, PyTree* Nov 2023 – Jul 2024
WATONOMOUS (Waterloo Autonomous Vehicles Design Team)

- Designed a dual-model MPC system, joining a Multi-Layer Perceptron with a traditional kinematics model for car navigation.
- Designed a high-level car navigation controller that uses behaviour trees to take driving actions based on GPS data.
- Maintained SLURM & SSH server infrastructure for over 400 developers across 3 universities for ML research & development.
- Created an Asset Manager that manages website assets using self-hosted Ceph S3 Buckets & deployed on a Kubernetes Cluster.

Technical Skills

Languages: Python, C, C++, Java, JavaScript, Bash, Arduino, MATLAB, Assembly

Libraries & Frameworks: ROS, Gazebo, Foxglove, RVIZ, PyTorch, OpenCV, Scikit-learn, PyTree, PostgreSQL

DevOps: Docker, Kubernetes, Terraform, Ansible, Git, GitHub, BitBucket, AWS

Notable Courses: Operating Systems, Data Structure & Algorithms, Advance Linear Algebra, Numerical Method