Khalil Virji

✉ khalil.virji1@gmail.com | **in** linkedin.com/in/khalilvirji | ⊙ github.com/khalilv | ‹/› khalilv.github.io

EDUCATION

McGill University — Montreal, QC

M.Sc in Computer Science – supervised by Dr. Gregory Dudek — *Sep 2022 – Jun 2024*
- **Research**: Deep Learning, Robotics, Reinforcement Learning, Computer Vision, Planning & Navigation

B.Sc. in Mathematics and Computer Science — *Sep 2017 – May 2022*
- **Coursework**: Algorithms & Data Structures, Software Design, Numerical Analysis, Probability, Statistics

EXPERIENCE

Machine Learning Researcher | University of California, Irvine — Irvine, CA

Python, PyTorch Lightning, NumPy — *Jul 2024 – Present*
- Advancing deep learning models to extend atmospheric predictability beyond 14 days
- Developing novel spatio-temporal attention mechanisms to learn the complex dynamics governing the atmosphere
- Optimizing our data pipeline to efficiently train 300M+ parameter foundation weather models on limited hardware

Graduate Researcher | McGill Mobile Robotics Lab — Montreal, QC

Python, C++, PyTorch, ROS2, Unity, Docker — *Sep 2022 – Jun 2024*
- Advanced robust perception and control methods for autonomous robots operating in real-world environments
- Built a robotic system for scuba diver following and recovery by fusing real-time object detection, tracking, and adaptive control, achieving over 5 minutes of continuous following in harsh open-ocean conditions
- Trained an autonomous vehicle to safely navigate unmapped forest environments by using a transformer network to predict future terrain types from visual input and candidate action sequences

Lead Software Developer | Compost Montreal — Montreal, QC

JavaScript, HTML, CSS, Liquid, Shopify — *Jun 2022 – Jun 2024*
- Led in-house development of storefront features that boosted engagement and cut third-party costs by $100/month
- Restructured bilingual marketing and optimized SEO localization for English- and French-speaking customers

Software Developer Intern | CloudOps — Montreal, QC

Java, Spring Boot, Vue.js, MySQL, Spock, Jest — *May 2021 – Sep 2021*
- Delivered scalable multi-cloud data management by integrating the platform with AWS, Azure, and GCP
- Boosted client conversion and revenue by launching self-service API trials and automated invoice discounts/credits

Web Developer Intern | Sensequake — Montreal, QC

JavaScript, HTML, CSS, Node.js, Express.js, jQuery, MongoDB — *May 2020 – Sep 2020*
- Decreased data-visualization latency by over 50% by migrating the web platform from Django to Node.js, enabling clients to efficiently visualize and interpret raw sensor data
- Enabled real-time structural health monitoring by developing web commands to interface with vibration sensors

PROJECTS

Save a Minute | *JavaScript, HTML, CSS* — khalilv.github.io/saveaminute.html | *2024*
- Built a web app to navigate optimal exit points in the Montreal metro system, helping users cut commute time
- Collected data from all 68 stations and created interactive visualizations to identify optimal boarding positions

RFID Touchless Checkout System | *Java, Arduino, UHF RFID Technology* — khalilv.github.io/rfid.html | *2020*
- Engineered a system to scan entire grocery carts in a single pass, achieving 100% accuracy on carts up to 30 items
- Piloted the system in a hardware store with live inventory, validating feasibility under typical shopping conditions

Legends of Andor | *Java, XML, Spring Boot, Android Studio* — khalilv.github.io/legendsofandor.html | *2020*
- Collaborated with a cross-functional team to develop a multiplayer Android board game featuring in-game chat

PUBLICATIONS

Lotfi, F., **Virji, K.**, Faraji, F., Berry, L., Holliday, A., Meger, D., Dudek, G., *Uncertainty-aware hybrid paradigm of nonlinear MPC and model-based RL for offroad navigation: Exploration of transformers in the predictive model*. **2024 International Conference on Robotics and Automation (ICRA)**

Lotfi, F., **Virji, K.**, Dudek, G., *Robust Scuba Diver Tracking and Recovery in Open Water Using YOLOv7, SORT, and Spiral Search*. **2023 Conference on Robots and Vision (CRV)**