Luke Antonyshyn, MSc

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Education

Queen's University, Kingston, Ontario Sept. 2020–October 2022
MSc, Computer Science with Field of Study in Artificial Intelligence (GPA: 4.24 / 4.3) *Kingston, Ontario*

Queen's University, Kingston, Ontario Sept. 2015–May 2020
BASc, Computer Engineering w/ Professional Internship (GPA: 3.55 / 4.3) *Kingston, Ontario*

Experience

Royal Military College Apr. 2024–Present
Research Assistant *Kingston, Ontario*

- Working on a research project involving deep learning and MPC on manifolds for no-communication autonomous vehicle convoys.
- Developing a neural network-based approach to vehicle navigation.

Queen's University Sept. 2020–Aug. 2022
Teacher's Assistant *Kingston, Ontario*

- Assisted teaching classes on image processing and computer vision, and reinforcement learning.

Honeywell Aerospace May 2018 – August 2019
Embedded Systems Engineer Intern *Ottawa, Ontario*

- Worked within a scrum team for the development of satellite communications software on a Linux system, utilizing the Atlassian tool set and CI/CD.
- Participated in regular standups, sprints, retrospectives within agile team, using Kanban for task tracking and estimation.
- Acted as primary application owner and developer for several embedded system applications, including central system control, built-in testing, system configuration, and physical environment monitoring.
- Translated user requirements into internal system control logic using FSM patterns, built-in full system tests and corresponding error logging, environmental temperature logging and control, and configuration parsing in C and C++.
- Developed internal system integration testing tools using Python, reducing detection time for bugs.
- Maintained and improved an internal debugging application for an FPGA-based system configuration module in Visual C++.

Projects and Publications

Multiple Mobile Robot Task and Motion Planning: A Survey | **ACM Surveys** DOI

- Co-first author on a survey of combined Task-and-Motion Planning (TAMP) for mobile robot teams.
- Developed and utilized a novel taxonomy for the classification of TAMP algorithms.
- Read, summarized and classified over 100 papers in the space of TAMP for Mobile Robots.

Motion Planning Library | *Python*, *NumPy*, *PyGame* github.com/motion-planning

- Developed a modular library for the implementation and testing of various motion planning algorithms in Python.
- Developed a framework for specification of maps with obstacles, collision checking, and vehicle dynamics.
- Implemented motion planning algorithms(RRT, RRT*, FMT, Bidirectional-RRT, etc.).

MADDPG-Based Collision Avoidance | *Python*, *NumPy*, *TensorFlow*, *OpenAI-Gym*, *matplotlib* github.com/MADDPG

- Designed and implemented a novel environment for decentralized multi-agent reinforcement learning with continuous action spaces using the OpenAI-Gym framework, Python and NumPy.
- Implemented and evaluated multiple deep reinforcement learning algorithms(DDPG, MADDPG, etc.) using TensorFlow, Python and NumPy.

Technical Skills

Programming Languages: C, C++, Python, Bash
Frameworks and Libraries: scikit-learn, TensorFlow, PyTorch, NumPy, Keras, pandas, matplotlib, openai-gym, stable-baselines3, Visual C++, Robot Operating System (ROS)
Tools and Operating Systems: Git, Linux, Windows, Jira, LaTeX
Concepts: Agile Methodology, CI/CD, Reinforcement Learning, Machine Learning, Deep Neural Networks, Artificial Intelligence, Embedded Systems, Motion Planning, Adaptive Control, Sensor Fusion