

Vindula Jayawardana

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Education

Massachusetts Institute of Technology

Ph.D. in Computer Science, minor in Robotics

GPA: **4.9/5.0**

June 2025

M.S. in Electrical Engineering and Computer Science

GPA: **4.9/5.0**

September 2022

University of Moratuwa, Sri Lanka

B.S. in Computer Science and Engineering

GPA: **4.1/4.2**

December 2017

Selected Research

MIT – PhD Candidate, advised by Prof. Cathy Wu

Sep 2019 – June 2025

- .. Focus: **Reinforcement learning** and **generative modeling** for **multi-agent autonomous driving** that **generalize**.
- .. Integrated **machine learning** and **reinforcement learning** (**Python, PyTorch**) to control multiple traffic agents in **real-world conditions** and **generative modeling** (**LLMs**) to model traffic scenarios and human driving behaviors at scale.

V Jayawardana, et al. IntersectionZoo: Eco-driving for Benchmarking Multi-Agent Contextual Reinforcement Learning. *ICLR 2025*. [GitHub](#)

J. Cho, V Jayawardana, S Li, C Wu. Model-Based Transfer Learning for Contextual Reinforcement Learning. *NeurIPS 2024*.

V Jayawardana, S Li, C Wu, Y Farid, K Oguchi. Generalizing Cooperative Eco-driving via Multi-residual Task Learning. *ICRA 2024*.

V Jayawardana, et al. Learning to Mitigate Metropolitan Carbon Emissions with Dynamic Eco-driving at Scale. *ECC 2022* and *TR-C*. [Webpage](#)

V Jayawardana, C Tang, S Li, D Suo, C Wu. The Impact of Task Underspecification in Evaluating Deep Reinforcement Learning. *NeurIPS 2022*.

V Jayawardana*, D Suo*, C Wu, Model-free Learning of Corridor Clearance: A Near-term Deployment Perspective, *IEEE T-ITS 2023*.

Cornell University – Visiting Research Scholar, advised by Prof. Samitha Samaranayake

June 2018 – Aug 2018

- .. Designed and developed a **real-world data-driven** ride-sharing simulator (**C++, threading**) and Integer programming models (**C++, Gurobi, Mosek**) for ridesharing. Improved ride service rate by 13.4%. [GitHub](#)
- .. Designed a learning-guided ride-pooling algorithm with passenger choice modeling. Improved ride revenue by 22%.

Y Kim, V Jayawardana, S Samaranayake. Learning-Augmented Vehicle Dispatching with Slack Times for High-Capacity Ride-Pooling. *TR-C 2025*. Conditional Acceptance.

University of Moratuwa – Undergraduate Researcher, advised by Dr. Shehan Perera

Jan 2017 – Dec 2017

- .. Trained **machine learning** models for **language modeling, ontology modeling, information and document retrieval**.

V Jayawardana, et al. Word Vector Embeddings and Domain Specific Semantic-based Semi-supervised Ontology Instance Population, *ICTer 2017*.

V Jayawardana, et al. Deriving a Representative Vector for Ontology Classes with Instance Word Vector Embeddings, *INTECH 2017*.

Work Experience (5 total: 3 research + 1 engineering + 1 data science)

Toyota Research Institute – Research Scientist

July 2025 – Present

- .. Research on human behavior modeling with generative AI to enable carbon-neutral behaviors.

NVIDIA – Research Scientist Intern (Hosted by Sanja Fidler, Jonah Philion, and Jason Peng)

June 2024 – Aug 2024

- .. Built tokenized driving datasets and designed **GPT-style token-prediction models** and task-specialized loss functions to model **multi-agent autonomous driving (sim-agent)** as a **language modeling** task – to be submitted for publication.
- .. Designed and developed a **residual reinforcement learning** method and a **gym** environment to efficiently **fine-tune** a **pre-trained large transformer** vehicle control model with Waymo vehicle motion data in **closed-loop (alignment)**.

Toyota Motor North America – Research Intern (Hosted by Kentaro Oguchi and Yashar Farid)

June 2023 – Aug 2023

- .. Designed and implemented a **multi-agent reinforcement learning** algorithm that **generalize** across traffic scenarios for coordinated **planning** of hundreds of **autonomous vehicles** to **optimize energy efficiency** in driving.
- .. Demonstrated improved performance over heuristically designed (37%) and learning-based (64%) baselines. Results were published in ICRA 2024, and a patent was filed for the invention.

PickMe – Research Engineer (Colombo, Sri Lanka)

Jan 2018 – June 2019

- .. Designed and developed driver-passenger matching algorithms for mobility-on-demand systems (**Integer programs**).
- .. Designed and developed a state-of-the-art ride-sharing simulator to simulate New York Yellow taxi data (**C++, Gurobi, Mosek**).

Others: Software Engineering Intern at WSO2 2016, Research Assistant at University of Moratuwa 2018-2019

Other

- Co-organizer: Autonomous Vehicle Across Scales Workshop, RSS 2024 [AVAS](#)
- 2024 Rising Star in Cyber-Physical Systems Research, University of Virginia, NSF [CPS Rising Stars](#)
- Teaching: MIT 1.200 Transportation: Foundations and Methods, UoM CS4622 Machine Learning
 - 2022 Harold L. Hazen Award for Teaching Excellence, MIT EECS
- 2017 Gold Award at National Best Quality ICT Awards, Sri Lanka Sector of British Computer Society
- 2017 Google Summer of Code [GitHub](#)