

AREZOO ALIPANAH

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RESEARCH PROFILE

Machine learning researcher (MASC, University of Waterloo) specializing in Reinforcement Learning, AI Safety, and Large Language Models. Currently focused on combining knowledge graphs with LLMs for alignment-oriented applications. Strong interest in theory-driven research with practical implementation and clear scientific communication.

EDUCATION

- Master of Applied Science, Electrical & Computer Engineering (Pattern Analysis and Machine Intelligence)** Sep 2025
University of Waterloo Waterloo, ON
- Cumulative GPA: **92.2 / 100.0**
 - Thesis: Focused on Safety and Robustness in Inverse Reinforcement Learning.
- Master of Science, Mechanical Engineering (Dynamics & Control)** Sep 2022
K. N. Toosi University of Technology Tehran, Iran
- GPA: 17.87/20
- Bachelor of Science, Mechanical Engineering** Sep 2019
Shahid Beheshti University Tehran, Iran

RESEARCH EXPERIENCE

- Research Associate** Sep 2025 – Present
Cheriton School of Computer Science, University of Waterloo Waterloo, ON
- Advisor: Prof. Pascal Poupart**
 - Investigating Knowledge Acquisition and Knowledge Graph (KG) structures to enhance the reasoning capabilities of Large Language Models (LLMs) in the domain of AI for Education.
 - Developing pipelines to structure unstructured data into graph representations to reduce LLM hallucinations and improve factual retrieval (RAG).
 - Research on AI agent safety and orchestration, specifically focusing on the reliable and secure execution of tool-use by autonomous agents.
- Graduate Research Assistant** Sep 2023 – Sep 2025
CL2-Group, University of Waterloo Waterloo, ON
- Advisor: Prof. Yash Vardhan Pant**
 - Conducted research on enhancing the safety and robustness of Inverse Reinforcement Learning (IRL) algorithms.
 - Developed an algorithm for generating malicious demonstration policies to identify vulnerabilities in IRL agents.
 - Authored a first-author publication accepted to the Canadian Conference on Artificial Intelligence (2025).
- Graduate Research Assistant** Feb 2020 – Sep 2022
Advanced Robotics and Automated Systems (ARAS) Lab Tehran, Iran
- Proposed a novel Deep Reinforcement Learning method (reward shaping approach) for robot path planning in dynamic environments.
 - Achieved faster convergence and smoother navigation compared to baseline DRL methods; published results in ICRoM.

TEACHING & MENTORSHIP EXPERIENCE

- Teaching Assistant** Jan 2024 – Sep 2025
University of Waterloo, Dept. of ECE Waterloo, ON
- ECE 657 Machine Intelligence (Graduate Level):** Delivered lectures on Transformers and Large Language Models (LLMs). Managed course projects and graded technical papers.
 - ECE 406|606 Algorithm Design:** Mentored students on algorithm analysis and complexity.
- Associate, AI Career Accelerator Program (AICaps)** 2024 – Present
Alberta Machine Intelligence Institute (Amii) Edmonton, AB
- Collaborated directly with the Amii Training Team through Work-Integrated Learning Opportunities (WILO).
 - Helped design, organize, and facilitate hands-on technical workshops on AI Ethics
- Section Leader (Volunteer)** Apr 2021 – May 2024
Code in Place, Stanford University Online Remote
- Selected as a Section Leader for Stanford's global introductory Python course (CS106A equivalent).
 - Facilitated weekly interactive discussion sections for students worldwide, debugging code and teaching core CS concepts.

PUBLICATIONS

- Generating Malicious Demonstration Policies to Exploit Vulnerabilities in Inverse Reinforcement Learning** **2025**
Alipanah A., & Pant, Y. *Canadian Conference on Artificial Intelligence (Canadian AI)*
- An Improvement on Mapless Navigation with Deep Reinforcement Learning: A Reward Shaping Approach** **2022**
Alipanah A., S. Ali A. Moosavian *10th RSI Int. Conf. on Robotics and Mechatronics (ICRoM)*
- A Novel Intelligent Parallel Parking System Based on Fuzzy Logic Without Using Sensor** **2020**
Tavakoli E., Ibrahimi F., Alipanah A., Delrobaei M. *6th Iranian Conf. on Signal Processing and Intelligent Systems (ICSPIS), IEEE*
- Easy-GT: Open-Source Software to Facilitate Making the Ground Truth for White Blood Cells Nucleus** **2021**
Kouzehkhanan Z.M., Tavakoli E., Alipanah A. *arXiv Pre-print: 2101.11654*

TECHNICAL SKILLS

Deep Learning & AI	PyTorch, TensorFlow, LLMs (Transformers), Knowledge Graphs, Reinforcement Learning (RL), Inverse RL, AI Safety
Languages	Python (Expert), MATLAB, C++, SQL
Libraries & Tools	OpenAI Gym, HuggingFace, Pandas, NumPy, Scikit-learn, Git, L ^A T _E X, ROS

HONORS & AWARDS

- Flight PS752 Commemorative Scholarship** **2025**
Global Affairs Canada *Value: High Prestige*
 - Awarded for academic excellence and research potential in memory of the victims of flight PS752.
- Research Grant & Spotlight Presentation** **2024**
Cybersecurity and Privacy Institute (CPI), University of Waterloo
 - Secured funding for research on "Exploiting Demonstration Vulnerabilities in IRL". Selected for a spotlight presentation at the annual CPI Symposium.
- Top BSc Student Award** **2019**
K. N. Toosi University of Technology
 - Awarded full exemption from entrance exams and tuition for M.Sc. studies due to superior academic performance.

SELECTED PROJECTS

- Adversarial Attacks in Imitation Learning (AIRL)** **2025**
University of Waterloo
 - Developed a black-box adversarial attack framework targeting AIRL agents to induce unsafe behavior.
 - Implemented custom Gym environments to study train-test divergence and policy vulnerability.
- Categorical DQN (C51) & GAIL Implementation** **2025**
Course Projects
 - Implemented C51 (Distributional RL) and Generative Adversarial Imitation Learning (GAIL) from scratch using PyTorch to master the fundamentals of advanced RL algorithms.

RELEVANT COURSEWORK

University of Waterloo	Previous Studies
<ul style="list-style-type: none">Advanced Reinforcement Learning (96%)Data & Knowledge Modeling (97%)Intro to Artificial Intelligence (92%)	<ul style="list-style-type: none">Control in Robotics (18.5/20)Fuzzy Logic & Neural Fuzzy ControlMachine Learning

REFERENCES

Pascal Poupart Professor Cheriton School of CS, UWaterloo ppoupart@uwaterloo.ca	Yash Vardhan Pant Assistant Professor Dept. of ECE, UWaterloo yash.pant@uwaterloo.ca
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