MERAJ MAMMADOV

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EDUCATION

Ulsan National Institute of Science and Technology (UNIST), South Korea

Masters of Engineering in Mechanical Engineering, GPA: 96.00	Jun 2025
Bachelor of Engineering in Mechanical and Aerospace Engineering, GPA: 92.30 (Magna Cum Laude)	Jun 2023

Minor in Computer Science and Engineering

SKILLS

Software	ROS 2, Gazebo, Docker, SolidWorks, CATIA, REFPROP, Aspen HYSYS, LabVIEW
Hardware	UAVs, 3D Printer, Arduino, Oscilloscope, Soldering
Programming languages	Python, C++, C, MATLAB, Simulink, Modelica, JavaScript, Scala
Spoken Languages	Azerbaijani (N), Turkish (C1), English (C1), German (A2), Korean (A1)

EXPERIENCE

Autonomous Systems Laboratory, UNIST - Research Assistant   Mar 2022 — Jun 2023
Project: Autonomous landing of UAVs on moving targets using end-to-end Reinforcement Learning
- Developed the simulation environments in PyBullet and Gazebo for vision-based UAV autonomous landing task
- Conducted extensive experiments using Crazyflie drones to evaluate the real-world performance of the trained RL agents
- Implemented and compared conventional landing algorithms against learning-based approaches
- Mentored a team of three students in their project focused on object detection from onboard UAV cameras

BP, Rig Engineering Team, Baku Office - Summer Intern   Jul 2022 — Sep 2022
Project: Technical evaluation of Red Zone Management (RZM) technologies for local deployment
- Conducted technical and economic assessments of RZM safety systems, delivered detailed reports to the management team
- Organized meetings with OEMs to discuss the technical details and the vulnerabilities of the deployed drilling equipment
- Visited oil drilling platforms and warehouses to identify the major safety hazards for the rig workers
- Researched employed safety critical equipment maintenance pipelines and presented to the engineering squad

Innovative Thermal Engineering Laboratory, UNIST - Research Assistant   Jun 2021 — Jan 2022
Project: Enhancing Organic Rankine Cycle (ORC) system efficiency with hydrogen fuel cells (Collaboration with LG)
- Developed a library in Modelica from scratch for dynamic simulation of turbines, heat exchangers and pumps in ORC systems
- Researched and implemented fuel cell models and compared the efficiency to the traditional boiler-based ORCs
- Developed a MATLAB tool to visualize dynamic fluid behavior in active components in real-time, improving system understanding
- Designed and 3D printed a scroll pump and fuel cell prototype for presenting the project at a cooperative project exhibition

Brain to Society, InMobix team - Team Member   Jul 2021 — Dec 2021
Project: Development of a novel mechanical device for assisting elderly with indoor mobility
- Analyzed the limitations of the existing mobility devices by contacting relevant companies and attending medical exhibitions
- Conducted interviews with elderly and their physicians to pinpoint key indoor mobility challenges for the elderly of South Korea
- Presented two novel designs addressing frequent fall accidents in the elderly population at the 2021 U-Challengers Festival

Selected Personal Projects (more on github and my website)
- Trained a Reinforcement Learning agent for self-driving racing cars in simulation and deployed on a physical F1TENTH car
- Developed a novel movie search engine algorithm by training a Large Language Model (LLM) on movie descriptions
- Implemented and trained several language models from scratch and wrote javascript interface that inferences fully on web browser
- Developed and simulated a mathematical model for pandemics, forecasted COVID-19 transmission by using demographic data

Teaching Assistance
- Spring 2023- Introduction to AI Programming I, Fall 2023- Introduction to AI Programming II, Discrete Mathematics

ACHIEVEMENTS

Robotics: Science and Systems (RSS) Inclusion Fellowship, Delft University, Netherlands	Jul 2024
Global UniStar Scholarship for Academic Excellence, UNIST, South Korea	Sep 2019 — Aug 2023
Bronze Medalist in the 50th International Physics Olympiad, Tel-Aviv, Israel	Jul 2019
Gold Medalist in the National Physics Olympiad, Azerbaijan	Jun 2019
Participant in the 49th International Physics Olympiad, Lisbon, Portugal	Jul 2018
Silver Medalist in the National Physics Olympiad, Azerbaijan	May 2018
3rd Place in the 3rd International Metropolises Olympiad, Moscow, Russia	Sep 2018

RESEARCH INTERESTS

I am mainly interested in the learning algorithms for sequential decision-making problems, which is mainly covered by the reinforcement learning field. My current work focuses on learning based collision avoidance systems for autonomous robots.

I am also interested in the reverse problem, or imitation learning: the possibility of the agents to understand the human intentions and imitate them in a matter of as few demonstrations as possible.

In a broader perspective, I am interested in information compression and neural architecture design aiming more targeted representation of data with small sample size.

PUBLICATIONS

T. Park, W. Shin, **M. Mammadov**, H. Oh (2024). "'ButterflyTag': Rapid detection of fiducial markers in occluded environments", Journal of Robotics And Automation Letters.   Under review

P. Ladosz, **M. Mammadov**, H. Shin, W. Shin, H. Oh (2024). "Autonomous Landing on a Moving Platform Using Vision-Based Deep Reinforcement Learning", Journal of Robotics And Automation Letters, IROS option.   Mar 2024

M. Mammadov, H. Oh (2024). "End-to-end Lidar-Driven Reinforcement Learning for Autonomous Racing", Conference of Korea Robotics Society (KRoS),   Feb 2024