Bahador Beigomi

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Summary

Passionate robotics engineer with a strong background in reinforcement learning, deep learning, and computer vision. Skilled in Python, TensorFlow, PyTorch, and various ML libraries. Excellent problem-solving, research, and collaboration abilities. Seeking a challenging role to develop cutting-edge AI and more specifically RL solutions.

Education

York University — Toronto, Canada
Ph.D. in Mechanical Eng, Artificial Intelligence and Deep Reinforcement Learning — *Sep 2020 – Current*
Thesis: Using AI for Autonomous Visual Detection, Tracking and Capturing of Non-cooperative Target by Robotic Manipulator

Sharif University of Technology — Tehran, Iran
M.S. in Aerospace Eng, Flight Dynamics, and Control — *Sep 2016 – Apr 2018*
Thesis: A novel design for underactuated aerial robots to enhance flight performance

Sharif University of Technology — Tehran, Iran
B.S. in Aerospace Eng — *Sep 2011 – Apr 2016*

Technical Skills

Programming Languages: Python, C++, ROS, Shell, Rust, MATLAB

Deep Learning Frameworks: PyTorch, TensorFlow, Keras

Libraries & Tools: NumPy, Pandas, Scikit-learn, OpenCV, CUDA, Modbus, Git, Docker

Experience

Visiting Researcher — Jun 2024 – Sep 2024
University of Luxembourg — *Luxembourg, Luxembourg*
- Designed a curriculum-based RL agent for mastering complex 6DoF tasks in dynamic environments
- Created a precise tracking algorithm using OptiTrack
- Implemented the trained agent into UR10 with ROS for real-world applications

RL Research Intern — Jan 2023 – Sep 2023
MDA Space — *Toronto, Canada*
- Conducted research on different deep RL algorithms for robotics
- Implemented and evaluated deep RL models using PyTorch and SB3
- Presented findings at monthly research meetings and discussed the next steps

Machine Learning Intern — Jan 2022 – Dec 2022
ERain Co — *Toronto, Canada*
- Developed and deployed machine learning models for various industries
- Optimized model performance and ensured data quality
- Collaborated with cross-functional teams to deliver AI solutions

Robotics Design Engineer — Sep 2019 – Sep 2020
Peyk — *London, UK*
- Designed a novel aerial robot to deliver customers packages
- Applied various path-planning control algorithms
- Manufactured a fully functional prototype for real-world testing

Projects

Fanuc Robotiq Grasp Jan 2022 – current
RL Agent Training for Capturing Tumbling Target *Python, PyTorch, TensorFlow, CUDA*
- Created an accurate simulation environment in PyBullet and Isaac Sim
- Adjusted several hyperparameters to improve the training results
- Employed domain randomization to reduce Sim2Real gap

Hardware-in-the-Loop API May 2023 – Jan 2024
Robotics Motion Control *Python, ROS, Docker, Fieldbus*
- Real-Time socket communication and data transmission for robotic systems
- Implemented closed-loop control framework for robots
- Deployed the API on ROS for easy integration

Object Detection System Jan 2023 – Apr 2023
Deep Learning Project *TensorFlow, OpenCV, UnrealEngine, YOLO*
- Developed an end-to-end system for generating labeled images for training
- Utilized CNN and LSTM models for image feature extraction
- Achieved great precision to identify target

Journal Papers and Conferences

Bahador Beigomi, Zheng Hong (George) Zhu
"Improving Soft-Capture Phase Success in Space Debris Removal Missions: Leveraging Deep Reinforcement Learning and Tactile Feedback", IEEE 20th International Conference on Automation Science and Engineering (CASE) 2024

"Towards Real-World Efficiency: Domain Randomization in Reinforcement Learning for Pre-Capture of Free-Floating Moving Targets by Autonomous Robots", IEEE International Conference on Robotics and Automation (ICRA) 2024

"Adapting to Inaccurate Observation Data with SAC-Based Path-Planning Control of Gripper in Micro-Gravity", Canadian Society for Mechanical Engineering International Congress (CSME) 2024

"Enhancing Robotic Grasping of Floating Targets with Deep Reinforcement Learning Algorithms: A Focus on the Pre-Grasp Stage", AIAA SCITECH Forum 2024

"Utilizing deep reinforcement learning for tactile-based autonomous capture of non-cooperative objects in space", Aerospace Systems, 1-10. 2023

"Deep Reinforcement Learning for Robotic Grasping with Tactile Sensor Feedback", Canadian Society for Mechanical Engineering International Congress (CSME) 2023

"Artificial Intelligent Tactile Feedback Control for Autonomous Robotic Capture of Non-Cooperative Space Target", AAS/AIAA Space Flight Mechanics Meeting 2023

Bahador Beigomi, Dan Zhang
"Mechanical Design of a Novel 4DOF Serial Manipulator", IEEE International Conference on Mechanical Engineering and Automation Science 2021

Bahador Beigomi, Afshin Banazadeh
"A Novel Design for Aerial Robots to Enhance Flight Performance", International Journal of Modeling and Optimization 2020

Honors and Certifications

- Awarded Mitacs Globalink Research Award 2024
- Awarded UKRI Research Award 2023
- Awarded Academic Excellence Fund (AEF) YorkU 2023
- Member of IEEE Robotics and Automation Society (RAS) 2022
- Member of Smart Autonomous Robotic Technology for Space Exploration 2022
- Member of Additive Manufacturing: Engineering Design and Global Entrepreneurship 2021
- Member of Canadian Society of Mechanical Engineering (CSME) 2021
- Awarded YorkU Graduate Fellowship Doctoral 2020
- PyTorch Essential Training: Deep Learning 2020
- Ranked 18th in Aerospace Graduate University Entrance Exam 2016
- Internship at MehrAbad International Airport 2014