Mo Saeidi

Robotics & Control Engineer

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I'm a robotics engineer with a passion for integrating control theory with reinforcement learning. My interests lie in engineering innovations that simplify and enhance everyday life, with a strong focus on robotics, automation, control, and machine learning. Through my experience as a research assistant in various university laboratories during my BSc and MSc, I've developed a solid foundation in these fields. Now, as I prepare to enter the workforce, I'm eager to apply my knowledge and take a meaningful step toward making society a better place.

Education

M.Sc. in Automation and Control Engineering
Polytechnic University of Milan (POLIMI), Italy *2023 – Present*
GPA: 27.11/30
Thesis: Learning Policies from Human Demonstrations for Testing Optimization

B.Sc. in Mechanical Engineering
KNTU University, Tehran, Iran *2017 – 2022*
GPA: 3.88/4.0
Thesis: Pattern Recognition of Unbalanced Rigid Rotor Bearing Forces

Publications

Homaeinezhad, M. R. & Saeidi Mostaghim, M. H.
"Nonlinear Tracking Control Algorithm for Dynamical Output Systems Manipulated by the Hardly Constrained Oscillatory Actuator," *Structural Control and Health Monitoring.* View Paper **2023**

Homaeinezhad, M. R. & Saeidi Mostaghim, M. H.
"Synthetic Lyapunov Stabilization Technique for Designing Actuation-Constrained Multi-Input Multi-Output Control Systems," *Journal of the Franklin Institute.* View Paper **2022**

Homaeinezhad, M. R. & Saeidi Mostaghim, M. H.
"Constrained Control of Moving Base Robotic System with Cooperative Arms," *30th Annual International Conference of the Iranian Association of Mechanical Engineers*, Tehran, Iran. **2022**

Homaeinezhad, M. R. & Saeidi Mostaghim, M. H.
"Pattern Recognition of Unbalanced Rigid Rotor Bearing Forces," *Amirkabir Journal of Mechanical Engineering*, 54(12), pp. 3591–3606. View Paper **2022**

Homaeinezhad, M. R. & Saeidi Mostaghim, M. H.
"Pattern Recognition of Unbalanced Rigid Rotor Bearing Forces," *18th National Conference and 7th International Conference on Manufacturing Engineering in Iran (ICME 2022).* **2022**

Experience

Researcher, MERLIN Laboratory - POLIMI
October 2024 – Present *Milan, Italy*
Conducting my master's thesis (ARTO Project): Applying a PbD algorithm on a UR5e robot, generalizing human demonstrations and extracting patterns while satisfying constraints. The skill set is manipulating cockpit interfaces (levers, thrusters, buttons, switches and etc.)

Researcher, AIRLAB Drone Team - POLIMI
April 2023 – July 2024 *Milan, Italy*
ROS1 to ROS2 translation of navigation and filtering nodes. Developed a high-level navigation (A* algorithm) from scratch in a limited time. Drone Contest of 2023 held in Torino for three days, held by Leonardo.

Researcher, FALCO Project - AEA Association - POLIMI
December 2023 – July 2024 *Milan, Italy*
Polimi's Automation and Control Association: Weekly meeting in order to discuss FALCO project: discussions regarding design of a visual odometry eliminating the need of expensive sensors (high-res GPS, MoCap).

Research Assistant, Mechatronics Laboratory - KNTU
2021 – 2022 *Tehran, Iran*
Participated in Autonomous Emergency Braking system: computer vision team. Benchmarking monocular depth estimation algorithms, object detection and fusing them. Participated in *ChessTrack* project: gathering and labeling more than 10000 images of chess pieces and training a YOLO; the program used in chess tournaments.

Research Assistant, Vibration and Control Laboratory - KNTU
2019 – 2022 *Tehran, Iran*
Conducted my BSc thesis, simulating a rigid rotor with imbalance disturbution of mass and developing a fault diagnosis NN to detect the where to place the balancing masses, and ultimately reducing the number of required snesors to 2. Further Published 3 journal articles and 2 conference papers in the fields of control, vibration analysis and condition monitoring.

Junior Graphic Designer (Volunteer), Student Science Community - KNTU
2018 – 2020 *Tehran, Iran*
Designed promotional materials for student events using Adobe Illustrator and Photoshop.

Selected Projects

Robotic Calibration of Device Interfaces via Probing *2025*
Implemented a UR5e robot probe-based calibration pipeline for device interfaces (buttons, switches). Leveraged gripper state for data segmentation, ArUco markers for referencing, and statistical analysis (mean, confidence ellipsoids) to compute and store relative SE(3) poses in YAML.

Optimal Path Planning for Building Scanning with 360 Laser Scanner *2025*
Designed and implemented a multi-stage heuristic pipeline (viewpoint generation, penalized TSP, pruning, A*) to compute optimal, collision-free paths for 360° laser scanning of building exteriors, considering sensor constraints and optimizing for path length and scanning efficiency.

Reinforcement Learning for Robot Path Planning *2025*
Developed RL-based planning algorithm with custom reward functions for obstacle avoidance. Implemented CNN preprocessing for voxelized obstacles. Formulated manipulability metrics to avoid singularities.

Hand Pose Estimation with IMU Sensor Fusion *2025*
Integrated MPU6050 accelerometer network for hand motion tracking. Developed quaternion estimation algorithms for spatial orientation. Implemented optimization-based pose estimation with kinematic constraints. Engineered 7-DOF hand model addressing 6-DOF correspondence problem.

Computer-Aided Manufacturing Optimization *2024*
Optimized CNC machining processes in Fusion 360 for tool wear and production time. Analyzed manufacturing manuals for optimal tooling configurations.

HVAC System Modeling and Control *2024*
Applied system identification for HVAC dynamics modeling. Implemented Model Predictive Control using SQP. Compared ODE modeling with neural network techniques (prediction vs real models).

Technical Skills

Robotics & Control	**Software & Programming**	**Design & Analysis**
ROS/ROS2	Python	SolidWorks
Motion Planning	C/C++	CATIA
Trajectory Optimization	MATLAB/Simulink	Fusion 360
Human-Robot Interaction	CasADi	ANSYS
Model Predictive Control	TensorFlow/PyTorch	Fluent
Nonlinear Control	Linux/Git	COMSOL
Optimal Control	Data Analysis (R, Pandas)	Mujoco
Sensor Fusion	Computer Vision (OpenCV)	Adobe Illustrator/Photoshop
Kalman Filtering	Embedded Systems	Raspberry Pi/Jetson/Arduino
	SCADA (Learning)	
	TIA Portal (Learning)	

Achievements

Top 1% in Konkur National University Entrance Exam *2017*
Ranked among the top 1% of participants in Iran's national university entrance examination.
Second Place, National Egg Drop Competition *2018*
Led a team of 4 students to design an innovative impact-resistant enclosure, securing 2nd place among 40 university teams across Iran.
Top 3% of Graduates, B.Sc. in Mechanical Engineering *2022*
Graduated with distinction in the top 3% of students in the Mechanical Engineering department at KNTU.

Certificates

DeepLearning.AI *August 2021*
Neural Networks and Deep Learning
Stanford University *August 2021*
Machine Learning
University of Alberta *November 2021*
Fundamentals of Reinforcement Learning

Languages

Persian (Native) English (C2, TOEFL: 113) Azerbaijani (B1) Italian (A2)

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