

Sepideh Etaati

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Education

M.Sc. in Mechatronics, Robotics, and Automation Engineering,	Sep 2022 – Feb 2025
K. N. Toosi University of Technology, Tehran, Iran	GPA: 3.87/4.0 (18.99/20)
Thesis: "Data Collection and Developing of an Algorithm to Evaluate Human Attention Based on Movement Patterns"	
Supervisor: Dr. Mehdi Delrobaei	
B.Sc. in Mechanical Engineering,	Sep 2018 – Sep 2022
K. N. Toosi University of Technology, Tehran, Iran	GPA: 3.66/4.0 (17.48/20)
Thesis: "Intelligent Inspection of Agricultural Crops with Computer Vision Methods Using a Mobile Robot"	
Supervisor: Dr. Esmail Najafi	

Publications

Journal Articles

Steel Surface Defect Detection and Segmentation using Deep Neural Networks	2025
Sara Ashrafi, Sobhan Teymouri, <i>Sepideh Etaati</i> , Javad Khoramdel, Yasamin Borhani, Esmail Najafi	
<i>Results in Engineering</i> , 25, p.103972.	
Assessment of Individuals' Attention Levels Using Machine Learning and Analysis of Eye and Hand Movement Patterns in the Trail-Making Test	Under review
<i>Sepideh Etaati</i> , Mehdi Delrobaei	
<i>Journal of Control</i>	
Robust Tube MPC for Position Control of a Three-Arm Anthropomorphic Manipulator	Under review
Fatemeh Javaherat, <i>Sepideh Etaati</i> , Amirhossein Nikoofard	
<i>Journal of Mechanical Science and Technology</i>	

Conference Proceedings

Development of a Lower Limb Gait Asymmetry Index with Cyclogram Analysis Using Image Processing	2024
<i>Sepideh Etaati</i> , Fatemeh Javaherat, Mehdi Delrobaei	
<i>12th RSI International Conference on Robotics and Mechatronics (ICRoM) (pp. 008-013). IEEE.</i>	
Automated Wheat Disease Detection using Deep Learning: an Object Detection and Classification Approach	2023
<i>Sepideh Etaati</i> , Javad Khoramdel, Esmail Najafi	
<i>11th RSI International Conference on Robotics and Mechatronics (ICRoM) (pp. 116-121). IEEE.</i>	

Teaching Assistance

Machine Learning	Mar 2024 – Jun 2024
<ul style="list-style-type: none">Designed and evaluated homework assignments on regression techniques.Under the supervision of Dr. Mahdi Aliyari Shoorehdeli (Faculty of Electrical Engineering).	
Computer Vision	Mar 2023 – Jun 2023
<ul style="list-style-type: none">Provided instructional support on image processing techniques, CNNs, object detection, classification, and regression models.Assisted in designing assignments and evaluating final projects.	

- Under the supervision of Dr. Esmail Najafi (Faculty of Mechanical Engineering).

Mechatronics

Mar 2023 – Jun 2023

- Conducted tutorials on image processing techniques and guided students on practical implementations.
- Evaluated final mechatronics projects, ensuring proper integration of hardware and software.
- Under the supervision of Dr. Ali Najafi Ardekany (Faculty of Mechanical Engineering).

Robotics

Nov 2022 – Jan 2023

- Evaluated students' final robotics projects, assessing hardware functionality and software performance.
- Under the supervision of Dr. Ali Najafi Ardekany (Faculty of Mechanical Engineering).

Neural Networks

Oct 2022 – Jan 2023

- Delivered lectures on Linear Regression, MLP, CNN, RNN, and object detection using Python.
- Assisted students with homework assignments and evaluated final projects.
- Under the supervision of Dr. Esmail Najafi (Faculty of Mechanical Engineering).

Engineering Mathematics

Oct 2022 – Jan 2023

- Designed homework questions and assessed student submissions.
- Explained key mathematical concepts related to course material.
- Under the supervision of Dr. Amir Taghavipour (Faculty of Mechanical Engineering).

Python Programming

Sep 2020 – Feb 2021

- Designed and evaluated homework and project assignments on Python programming.
- Provided in-class explanations and debugging support for students.
- Under the supervision of Dr. Ali Najafi Ardekany (Faculty of Mechanical Engineering).

Research Experience

Research Assistant, Biomechatronics Laboratory, K. N. Toosi University of Technology

Feb 2025 – Present

- Conducting research under the supervision of Dr. Mehdi Delrobaei.
- Preparing journal articles based on thesis findings.

Research Assistant, K. N. Toosi University of Technology

Oct 2022 – Nov 2023

- Supervised two undergraduate students on their bachelor's theses in computer vision and image processing under the supervision of Dr. Esmail Najafi.
- Assisted in research on computer vision applications.
- Co-authored articles on machine learning and automation.

Research Assistant, Mechlab KNTU, K. N. Toosi University of Technology

Jun 2019 – Aug 2021

- Worked under the supervision of Dr. Ali Najafi Ardekany on AI-driven projects, including computer vision applications.

Course Projects

Global Wheat Detection with YOLONAS

github.com

- Developed an object detection model to identify wheat heads in images using the YOLONAS framework on Kaggle dataset.
- Tools Used: Python, PyTorch, Object Detection.

Control of Cable-Driven Robot

- Designed and simulated control strategies (PID, fuzzy logic, and fuzzy PID controllers) for a cable-driven robot to improve performance under disturbances and noise.
- Applied optimization methods including ANFIS, genetic algorithms, and PSO in MATLAB Simscape.
- Tools Used: MATLAB, Simulink, Simscape.

RSNA Screening Mammography: Breast Cancer Detection

- Developed classification models (VGG19, VGG16, CNN, ResNet50, EfficientNet50) to detect cancerous and non-cancerous mammography images using Kaggle dataset.

- Tools Used: Python, TensorFlow, Classification.

Reinforcement Learning for Maze Solving Agent

- Created a reinforcement learning environment where the agent navigates a maze, avoiding obstacles and finding optimal paths to reach the goal.
- Designed policies for agent movement (right, left, up, and down) and implemented custom reward functions.
- Tools Used: Python, Reinforcement Learning.

Model Predictive Control of a Nonlinear Stirred Tank Reactor

- Designed and implemented PID, linear MPC, and nonlinear MPC controllers to maintain output concentration in a Continuous Stirred Tank Reactor (CSTR).
- Simulated and analyzed control performance using MATLAB and Simulink.
- Tools Used: MATLAB, Simulink.

Awards and Activities

- Received best presentation award in seminar course.
- Completed Kaggle 5-Day Gen AI Intensive by Google, focusing on Generative AI concepts and applications.
- Member of the student committee for the 12th RSI International Conference on Robotics and Mechatronics (ICRoM 2024), assisting with conference organization and logistics.
- Member of the university swimming team (Master's), representing K. N. Toosi University of Technology in competitions.
- Achieved a medal in a competitive swimming event.
- Member of the university running team (Bachelor's), participating in inter-university track events.

Technical Skills

Programming: Python, MATLAB, HTML

Machine Learning: Scikit-learn, TensorFlow, PyTorch, OpenCV

Computer Vision: Image Processing, Object Detection, Classification, Feature Extraction

Hardware & Robotics: Raspberry Pi, Arduino, ROS

Simulation & Modeling: SolidWorks, Simulink

Soft Skills: Problem-solving, Research, Technical Writing, Presentation