Bijan Mehralizadeh

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Google Scholar: https://scholar.google.com/citations?user=KOba2dsAAAAJ
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Research Interests

System Resiliency | System Engineering | Autonomous Systems
Applied Machine learning | Cyber-physical Systems | Robotics

Education

- **George Washington University** — Washington DC, USA
  Ph.D. - Computer Science — *Jan 2025 - Present*
- **University of Tehran** — Tehran, Iran
  Master of Science - Mechatronics Engineering — *Sep 2017 - Sep 2021*
- **Shahrood University of Technology** — Shahrood, Iran
  Bachelor of Science - Mechatronics Engineering — *Sep 2012 - Jun 2017*

Publications

- **International Conference on Robotics and Mechatronics (ICRoM 2023)** — Published, 2023

  Mehralizadeh, B.; Soleiman, P.; Nikkhoo, S.; Rahimi, M.; Kargar, A.; Masoumi, F.; Moradi, H. *Multi-modal ASD screening system, A preliminary study.*

- **Sustainability Journal** — Published, 2023

  Mehralizadeh, B.; Baradaran, B.; Nikkhoo, S.; Soleiman, P.; Moradi, H. *A Sensorized Toy Car for Autism Screening Using Multi-Modal Features.* Sustainability 2023, 15, 7790. https://doi.org/10.3390/su15107790

- **Frontiers in Robotics and AI** — Published, 2023

  Soleiman P, Moradi H, **Mehralizadeh B**, Ameri H, Arriaga RI, Pouretemad HR, Baghbanzadeh N and Vahid LK (2023) *Fully robotic social environment for teaching and practicing affective interaction: Case of teaching emotion recognition skills to children with autism spectrum disorder, a pilot study.* Front. Robot. AI 10:1088582. doi: 10.3389/frobt.2023.1088582

- **International Conference on Social Robotics (ICSR 2020)** — Published, 2020

  Soleiman, P., Moradi, H., **Mehralizadeh, B.**, Azizi, N., Anjidani, F., Pouretemad, H. R., Arriaga, R. I. (2020, November). *Robotic Social Environments: A Promising Platform for Autism Therapy.* In: , et al. Social Robotics. ICSR 2020. Lecture Notes in Computer Science(), vol 12483. Springer, Cham. https://doi.org/10.1007/978-3-030-62056-1_20

Research Experience

- **Systems Security Research Group** — George Washington university
  Research Assistant — *Jan 2025 - Present*
  - Integrating Vicon's motion capture system into PX4's EKF via MAVLink to test the Requiem for a Drone stealth attack framework in autonomous quadrotors, allowing quantitative resiliency assessments of state estimation algorithms under adversarial spoofing.
  - Conducting a PRISMA-guided systematic review of resilience in autonomous cyber-physical systems (2020–2025), with emphasis on explainable AI, generative/agentic AI approaches.

- **Advanced Robotics and Intelligent Systems Lab** — University of Tehran
  Research Assistant - Graduate Researcher — *Sep 2017 - Oct 2024*
  - Designed a sub-50ms ROS/ROS2 communication pipeline that lets the webapp console, social robots, and on-board ML modules exchange synchronized log data and messages in near real time for IoT-augmented behavioral experiments.
  - Built a Sensorised toy-car (3-axis IMU + dual wheel encoders) and a multi-modal Machine learning pipeline based on Tensorflow and Pytorch that improved autism-screening accuracy by more than 10 % points over single-modality baselines; validated on a cohort of 50 children
  - Developed a web-based dashboard that launches multi-robot protocols and synchronized data capture via task sequencing, improving clinical experiment setup time.

- Implemented an event-driven Rosbag + SQLite logger for multi-machine ROS deployments; event markers keep all sensor streams time-aligned for reproducible offline behavioral analysis.
- Deployed computer-vision analytics for ASD research: Google MediaPipe tracks posture and gait frame-by-frame, while a lightweight scikit-learn and SciPy pipeline detects affective cues with minimal latency.
- Engineered the BAMS mobile social-robot platform on NVIDIA Jetson hardware, designing ROS-based control, vision, and ML pipelines, and implementing a vision-driven child-proximity safety layer; deployed in 30 + ASD - screening sessions.

- **Lego Education Center** — Shahrood University of Technology
  Undergraduate Researcher — *Sep 2015 - Jun 2017*
  - Benchmarked VISP- and ArUco-based visual-servoing pipelines on Raspberry Pi 2/3/Zero, exploring how swap-memory configurations affect frame-rate and control-loop stability.
  - Developed a sampling-based motion planner for a quadcopter competition, guiding it through obstacle-dense arenas with an 80 % waypoint-reach rate across 20 indoor flights.
  - Built a ROS action-server task sequencer to coordinate navigation and arm motions on a mobile manipulator.
  - Implemented a monocular auto-landing algorithm in python using OpenCV and ArUco tags, achieving ± 5 cm horizontal precision under varying lighting scenarios.
  - Bridged ROS and MATLAB for PID tuning, automating software-in-the-loop gain optimization and logging performance metrics for rapid controller refinement.

Teaching & Mentoring Experience

- **Advanced Robotics and Intelligent Systems Lab** — University of Tehran
  Mentor and Teaching assistant — *Sep 2019 - Sep 2023*
  - **Machine learning**: Mentored a graduate student on time-series signal processing, implementing an IMU-data upscaling calibration to align consumer accelerometer outputs with seismometer-grade precision.
  - **ROS2 - Robotics 101**: Focused on developing Robot vision pipeline using OpenCV and Scipy libraries
  - **Python programming**: Python 101, Image Processing, OpenCV
  - **Advanced Robotics TA**: ROS 101, Gazebo simulation, Simulate Anki's VECTOR robot
  - **Introduction to robotics**: Python 101, ROS 101, Linux 101
  - **System engineering mentorship**: Focused on data acquisition pipeline design, with low latency Sensor fusion
- **Lego Education Center** — Shahrood University of Technology
  Mentor — *Sep 2015 - Jun 2017*
  - **Python programming**: Python 101, Image Processing Introduction
  - **Matlab programming**: Matlab 101, Simulink
  - **Arduino programming**: Arduino, C programming, IoT systems development using Espressif ecosystem

Selected Work Experience

- **Robotic rehabilitation system**: Designed and implemented a multi-sensor data acquisition system for modeling palm stiffness.
- **Earthquake simulator**: P-wave earthquakes modeling, Designed a low-cost sensor solution to study their vibration effects on truss structures.
- **Vortex Killer**: Engineered a machine-vision–guided robotic water-jet system that detects vortices during tank drainage and fires targeted jets to collapse them, accelerating discharge cycles and boosting food-industry mixer throughput.
- **Construction Robots Modeling**: Built a ROS2 pipeline that converts IFC building models into collision-checked drill sequences, enabling safer automated demolition.

Skills Summary

- **Programming**: Python, C, C++, Matlab, Bash, Fortran
- **Frameworks**: ROS/ ROS2, Scikit, PyTorch, Numpy, OpenCV, TensorFlow, Keras, Mediapipe
- **Tools**: Gazebo, Moveit, Rviz, SimuLink, GIT, Solidworks, AutoCAD
- **Platforms**: Linux, Arduino, Raspberry Pi, Nvidia Jetson, STM32
- **Soft Skills**: Critical thinking, R&D team leadership, autonomous learning, problem solving
- **Language**: English (TOEFL iBT: 100, R=28, L=27, S=20, W=25), Farsi (Native)

Volunteer Experience

- **Lego Education Center** — Shahrood, Iran
  Speak on teaching children robotics and its impact on problem-solving skills. — *Oct 2021*
- **Brain's week exhibition** — Tehran, Iran
  Present the application of machine learning in autism screening — *Nov 2019*
- **Tehran annual digital art exhibition** — Tehran, Iran
  Present smart screening and rehabilitating systems for children with Autism. — *Oct 2018*

References

References available upon request