Pourya Shahverdi

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Summary

A Robotics and AI/ML Engineer Interested in Developing Context-Aware Behaviors for Robots and Autonomous Vehicles.

Education

Ph.D. **Oakland University**, *Michigan*, Ph.D. Candidate in Electrical and Computer Engineering — 2021 – 2025

M.Sc. **University of Tehran (Thesis)|Azad University of Qazvin**, Mechatronics Engineering — 2013 – 2016

B.Sc. **Hamedan University of Technology**, Robotics Engineering — 2008 – 2013

Selected Coursework (all A or A⁻): Robotic Systems and Control, Advanced Robotic, Mobile Robot Navigation, Robot Sensors, Embedded Programming, Artificial Intelligence, Artificial Neural Networks, Advanced Autonomous Vehicle, Engineering Project Management

Work Experience and Accomplished Projects

Research Assistant at IRL[2] and Lab Instructor (TA) at the ECE Department — Oakland University, MI, 2021 – Present

- Developed a 3D object tracking system for autonomous vehicles that could simultaneously fuse data from the vehicle's LIDAR and radar sensors, merging measurements into single object tracks.
- Led AI/ML Projects in Social Robots Learning Verbal and Nonverbal Behaviors at IRL[2]:
  - Developed an Imitation Learning Pipeline of Multimodal LSTM Networks to Learn Turn-Taking Behavior from Demonstration
  - Developed a VR-Teleoperation System for the Pepper Robot's Navigation, SLAM, and Gesture Imitation
  - Spearheaded Original Research and Developed Multiple ROS-Based Teleoperation Systems for Human User Studies [1], [2], [3]
  - Co-supervised a Project on Manipulation Few-shot Learning from Human Demonstrations
- Electromechanics System Design Lab Instructor at the ECE Department (Embedded Programming, Circuits, Sensors, and Actuators)

FIRA Education Department Manager — Tehran, 2018 – 2020

- Designed Syllabus, Educational Platforms, Content, and Competitions in Collaboration with FIRA-International

Research Assistant at Taarlab Human-Robot Interactoin Laboratory — Tehran, 2012 – 2017

- Developed Whole-Body Imitation of Human Motion by a NAO Humanoid Robot
  - Presented a Geometric Inverse Kinematics Solver Specific to the Humanoid Imitation
  - Presented a Solution to Detect the Balance Support Polygon and Robot's Support Leg From the Kinematics Data
  - Dynamically Modeled the Robot's Whole Body as a 1-DoF and 2-DoF Inverted Pendulum
  - Designed and Deployed a PID Controller to Maintain the Robot's Balance while Imitating the Human Whole Body Movements
- Designed and Integrated an Embedded Board to Torque-Control the Robot's AC-Servos using MODBUS Protocol through a GUI
- Developed an Embedded Board and Deployed an ML model to Classify Beam Widths Based on Ironworkers' Walking Patterns

Part-Time Research Intern At MRL-HSL, — Qazvin, 2013 – 2015

- Developed a Navigation System for the Humanoid Soccer Player Robot to Detect the Opponent's Gate by Fusing the IMU and Camera Data and Resolved the Robot's Friendly Kicks
- Contributed to the Design, Kinematics and Dynamic Modeling, and Motion Planning of a Humanoid Robot Designed by MRL-HSL
- Tuned the Walking Gate of the Robot to Maintain its Balance while Walking on the Carpet and Artificial Grass

Skill Set

Robotics and Mechatronics Tools and Techniques	ROS/ROS2, Gazebo, NVIDIA Isaac Sim, CoppeliaSim, Controller Design for Real-World, Hardware-in-the-Loop (HIL), Embedded System Design (ARM, AVR), Real-Time Operating System (RTOS), Single Board Programming, PLC SIMATIC Step 7, PCB Design (Altium Designer), CAD (Solidworks)
Programming	Proficient with C++, Python, Matlab; Widely used Simulink, Mathematica, R; Familiar with Kotlin
AI Tools	Widely used OpenCV, PyTorch, scikit-learn; Familiar with TensorFlow, Keras, JAX, Hugging Face
AI Techniques	Accomplished Robot Manipulation, Imitation, and Navigation Projects with Reinforcement Learning (DQN, PPO), Computer Vision (CNNs, YOLO), Time-Series ML (LSTM), Multimodal Learning (Vision-Radar-LiDAR Fusion), and Bayesian AI (Kalman & Particle Filters, uncertainty modeling); Familiarity with Generative AI (VAEs, ViTs) and Learning about Diffusion Models
Miscellaneous	Agile Scrum Master, Linux, Git, Docker, QT Creator (PyQt and C++), SPSS, LaTeX, Network

I don't need visa sponsorship