Pourya Shahverdi

Applied Researcher in
Humanoid and Social Robotics | Human-Robot Interaction | Conversational and Affective AI
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Portfolio Google Scholar ORCID LinkedIn GitHub YouTube

Summary

Human-robot interaction researcher and robotics engineer with over a decade of experience building humanoid and social robots, from embedded control and whole-body motion imitation to LLM-enabled robot interaction and emerging VLA policy workflows. I build artificial emotional intelligence for social robots and virtual agents, connecting robotics, AI, and human science: I design and run studies with real users, build the perception, data, and on-premises LLM systems they run on, and analyze the results. 17 papers, including first- and co-first-author *IEEE IROS, RO-MAN,* and *ICRA* papers.

Seeking: Applied AI and Robotics Scientist | AI Solutions Architect | Forward-Deployed Robotics Engineer | related roles

Experience

Ph.D. Researcher

Jan 2021 – Present
Rochester, MI

Oakland University, In Real-Life Intelligent Robotics Laboratory [IRL]^2

SELECTED RESEARCH AND ENGINEERING PROJECTS

Emotional intelligence and context awareness in social HRI (Ph.D. dissertation)

2025–Present Lead Researcher

- Developed an end-to-end emotion-regulation framework, from perception to expression, for conversational robots and embodied conversational agents, grounded in emotional-intelligence theory and evaluated in user studies.
- Exploring pretrained Vision-Language-Action (VLA) policies for language-conditioned robot gesturing behavior, with an emphasis on policy adaptation, action representations, and simulation-based evaluation.

Human emotion during robot-mediated behavioral skills training

IEEE TAFFC, under review Video
HRI 2027, submitted

Jan 2026–Present Lead Researcher HRI study, 66 participants

- Designed and led a mixed-design study in which 66 adults rehearsed autism interventions with two Furhat robots: a simulated child with routine or challenging behaviors and a trainer giving LLM-generated feedback; scenarios were reviewed by a Board Certified Behavior Analyst.
- Analyzed 396 rehearsals and 1,188 affect reports with mixed-effects and ordinal models in R: challenging rehearsals showed lower pleasure (—1.73) and dominance (—1.30) and higher arousal, confusion, and frustration (all Holm-corrected $p < .001$).
- Built a 10-service Docker Compose platform for real-time perception (streaming ASR with NVIDIA Riva and faster-whisper, facial affect, MediaPipe gestures) served to the robots via FastAPI over a GStreamer/WebRTC pipeline with per-stage latency monitoring (emotion inference about 18 ms).
- Built the study's data platform (FastAPI, SQLAlchemy, SQLite) synchronizing robot trials, a self-report tablet, and audio/video recording, logging 4.19 million perception events; resolved write-lock failures that crashed pilot sessions. Deployed Llama 3.3 70B on-premises across three NVIDIA RTX 6000 Ada GPUs (Ollama) as a shared lab inference service to keep participant data local; served perception models with NVIDIA Triton.

MakiMate: open-source conversational robot

2026 Graduate Students Showcase Award

May 2025–Apr 2026 Technical Lead and Mentor

- Rebuilt the open-platform Maki robot's software as modular ROS 2 packages and led integration of a real-time conversation loop: on-device speech recognition (Vosk), an Ollama-served LLM, and Piper neural TTS, with sentence-level streaming to shorten response delay.
- Led three interdisciplinary senior-design teams (15 students) through development, integration, and live testing; added face tracking and active speaker detection with live head movement.

Robot-mediated behavioral skills training

RO-MAN 2026 Paper

2024–2025 Lead Researcher, first author HRI study: multiple-baseline design

- Co-designed a two-robot trainer with expert behavior analysts (Furhat as the trainer, NAO as a child with autism); in a multiple-baseline user study, all participants reached the 80% mastery criterion.
- Compared ASR and LLM models and evaluated LLM-generated feedback in 135 autonomous trials across five teaching skills, separating trainee mistakes from errors in speech recognition, gesture, facial expression, and performance assessment.

Emotionally specific backchanneling in social HRI

IROS 2023 Paper ICRA 2024* Paper
Demo

2023 Lead Researcher, first author (*co-first on ICRA 2024) HRI study: 2 × 2 mixed design

- Led a 28-participant study comparing verbal and nonverbal listener backchannels during human vs. Furhat robot storytelling in happy and sad contexts; designed the robot's expressive behaviors and coded and analyzed the interaction data.
- Participants produced 2.4 times as many emotional backchannels with the robot storyteller as with the human ($p < .001$).

Learning turn-taking from human demonstrations IROS 2022 Paper Talk Code

2022 Lead Researcher, first author

- Built a learning-from-demonstration system that teaches a robot when to take the turn: an LSTM on verbal (ASR/TurnGPT), prosodic, and gestural cues from 150 job-interview turns reached 0.258 MAE vs. 0.270 for a silence-only baseline.
- Also co-authored hierarchical RL for sample-efficient learning from demonstration (RO-MAN 2022). Paper

Multimodal affect recognition Code

Jan–Sep 2026 Mentor

- Defined the problem and mentored undergraduates building continuous pleasure–arousal–dominance (PAD) recognition from text, speech, and facial video with RoBERTa, HuBERT, and HSEmotion features and cross-modal transformer fusion on IEMOCAP. In an initial single split, text-audio fusion reached a CCC of 0.56 vs. 0.40 (text) and 0.46 (audio).

Earlier robot-mediated HRI studies

2022–2025 Pepper, NAO, and Furhat studies with children, autistic adults, and older adults

- **Group instruction for children with autism** (RO-MAN 2022, co-first author) and **job-interview training for autistic individuals** (RO-MAN 2023, first author), lead researcher: study design, IRB protocols, and Pepper and Furhat Wizard-of-Oz (WoZ) interfaces.
- **Exercise and fall prevention for older adults** (Cureus 2023), lead developer and data analyst: NAO physical-activity behaviors and a VR-headset and Kinect teleoperation interface for Pepper. Paper Demo
- **STEM vocabulary instruction** (RO-MAN 2024) and **read-aloud for preschool children** (CALL 2026), lead developer and data analyst: Pepper behaviors, WoZ interfaces, data coding, and analysis in R. RO-MAN CALL

Mentoring and teaching

- Mentored or co-advised 24 students in master's theses, undergraduate research, senior design, and honors projects.
- Co-advised a team on humanoid imitation learning: 78% pick-and-place success from 16 demonstrations (arXiv 2026). Paper
- Received the ECE department's highest student evaluation score for teaching the Sophomore Design Lab (EGR-2800), 2022–2025.

Education Department Chair

2018 – 2020

Federation of International Robot Sports Association (FIRA), Iran Section

- Led online robotics training for 20+ mentors serving 570+ students; co-organized the FIRA Innovation and Business League.

Researcher

2015 – 2017

University of Tehran, Taarlab Human-Robot Interaction Laboratory — Tehran, Iran

- **Whole-body human motion imitation by a NAO humanoid** (M.Sc. thesis, first author): a geometric inverse-kinematics solution and closed-loop PID balance control. ICRoM 2016 ICRoM 2017 Demo Code
- **Tripteron three-DOF parallel robot**: AVR firmware driving three AC servo drives, controller PCB, MODBUS torque control, and a control GUI; the platform supported a published dynamic-identification study (RAS 2018). Paper

Technical Skills

AI and ML: PyTorch, TensorFlow/Keras, Hugging Face, scikit-learn, LangChain; transformers, LSTMs, CNNs/YOLO; LLM/VLM prompting and fine-tuning; multimodal fusion; learning from demonstration

AI infrastructure: on-premises LLM serving (Ollama, multi-GPU), NVIDIA Triton and Riva; Docker Compose; FastAPI REST/WebSocket APIs; GStreamer/WebRTC; SQLAlchemy/SQLite; Linux, Git, GitHub CI/CD

Robotics and perception: ROS/ROS 2, NVIDIA Isaac Sim, CoppeliaSim, Gazebo; ASR/TTS (Riva, faster-whisper, Vosk, Piper), facial affect, MediaPipe, OpenCV; Furhat, Pepper, NAO, and Maki robots

Deployment: co-design with domain experts, live user sessions, cross-team integration, root-cause debugging, mentoring

Programming and controls: Python, C++, C, R, SQL, Java, Kotlin, MATLAB/Simulink; PID control, AVR/ARM, MODBUS

Research methods: user-study design, IRB protocols, Wizard-of-Oz studies, mixed-effects and ordinal models in R, SPSS

Education

Ph.D., Electrical and Computer Engineering | Oakland University — 2021 – Dec 2026 (defense scheduled)

Dissertation: Emotional Intelligence and Context Awareness in Social Human-Robot Interaction

M.Sc., Mechatronics Engineering | University of Tehran / Azad University of Qazvin — 2013 – 2016

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

Honors, Awards, and Service

Recognition: IEEE RO-MAN 2022 Outstanding Early Career Scientist Paper Award; 2026 Graduate Students Showcase first place and public vote; NSF-funded Ph.D.; IEEE Eta Kappa Nu; RoboCup Humanoid League championships with MRL.

Service: Reviewer for ACM/IEEE HRI, IEEE RO-MAN, ICRA, IROS, IEEE RA-L, and the International Journal of Social Robotics.

Advisory: Member of the AI Advisory Board to the Dean of the School of Business, Oakland University (2025–2026).