

Pourya Shahverdi

« Robotics | AI/ML | HRI/HCI | Affective Computing »

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🌐 Website 📄 Google Scholar in LinkedIn 🏠 GitHub 📧 X.com 📺 YouTube

Summary

With over 12 years of experience delivering real-world robotics and AI/ML products, I specialize in context awareness and emotional intelligence for human-agent interaction to elevate the user experience to unseen levels. I build scalable pipelines that integrate social science with multimodal generative AI and affective computing to perceive and learn from sensory and behavioral data, generating verbal and nonverbal behaviors aligned with user emotions, goals, and norms.

Work Experience

Lead Researcher,

Oakland University,
Michigan, USA
2021 – Present

- In Real-Life Intelligent Robotics Laboratory (IRL² [🔗](#)), PI: Prof. Geoffrey Louie [🔗](#)

-MakiMate: A Socially Interactive Robot [🔗](#)

📅 2025-Present 📍 IRL² 🏠 Product Lead

- **Tasks:** Redesigned the open-platform Maki robot with a modular ROS2 interaction architecture, leading cross-functional teams to deliver a context-aware conversational AI system integrating real-time ASR, dialogue management, agentic LLM-based response generation, and neural TTS. Architected state-aware coordination of verbal, prosodic, and facial behaviors with multimodal perception for robust turn-taking, latency control, and live HRI validation.
- **Tools:** ROS2, Python, Docker, real-time ASR/TTS pipelines, agentic LLM orchestration frameworks, multimodal perception modules, GitHub CI/CD.

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

📅 2025-Present 📍 IRL² 🏠 Lead Researcher (My Ph.D. Dissertation Project)

- **Tasks:** Developed an End-to-End Emotion Regulation Framework (from Perception to Expression) Based on the Emotional Intelligence Theory, Conducted a Systematic Survey on Embodied Conversational Agents' (ECAs) Affective Behavior, Conducted User-Studies to Evaluate the Framework
- **Tools:** PyTorch, Hugging Face, LangChain, Fine-tuning and Prompt Engineering Techniques on different LLMs and VLMs, Kotlin, Furhat Robot API, ROS2

-Few-shot Learning from Human Demonstrations Framework on a Humanoid Robot

📅 2024-2025 📍 A Collaboration Between IRL² and Taarlab 🏠 Co-Advisor

- **Tasks:** Co-Advised a Team of Researchers on Framing the System with Emphasis on Feature Extraction and Evaluations for the Few-Shot Learning Algorithms
- **Tools:** PyTorch, Keras3, YOLO, CoppeliaSim

-Robot-mediated Read-aloud for Pre-K Children [🔗](#)

📅 2024 📍 IRL² 🏠 Engineering Team Leader

- **Tasks:** Designed the Behaviors of a Pepper Robot, Developed the Wizard of Oz (WoZ) Interface, Collected and Coded Data, Statistical Analysis
- **Tools:** Python (PyQt, NAOqi), R

-Robot-mediated STEM Vocabulary Training for Children [🔗](#)

📅 2024 📍 IRL² 🏠 Engineering Team Leader

- **Tasks:** Designed the Behaviors of a Pepper Robot, Developed the WoZ Interface, Collected and Coded Data, Statistical Analysis
- **Tools:** Python (PyQt, NAOqi), R

-Emotionally Specific Backchanneling in Social HRI and Human-Human Interaction

📅 2023 📍 IRL² 🧑‍🔬 Lead Researcher

- *Tasks:* Developed the Theory, Designed the Experiment, Wrote the IRB, Designed the Behaviors of a Furhat Robot, Collected and Coded Data, Statistical Analysis
- *Tools:* Python, Kotlin, Furhat Robot API, R



-Robot-mediated Physical Activity and Fall Prevention Exercises for Older Adults

📅 2023 📍 IRL² 🧑‍🔬 Engineering Team Leader

- *Tasks:* Designed Physical Therapy Behaviors for a NAO Robot, Developed a Teleoperation WoZ System through a Virtual Reality Headset and Kinect Camera for a Pepper Robot
- *Tools:* C++, Python, PyQt, ROS



-Robot-mediated Job Interview Training for Individuals with Autism Spectrum Disorder (ASD)

📅 2023 📍 IRL² 🧑‍🔬 Lead Researcher

- *Tasks:* Developed the Theory, Designed the Experiment, Wrote the IRB, Developed a Telepresence WoZ Interface, Collected and Coded Data, Statistical Analysis
- *Tools:* Python, Kotlin, SPSS



-LIDAR, Radar, and Vision Data Fusion and Classification-Autonomous Vehicle Course

📅 2022 📍 Oakland University 🧑‍🔬 Team Member

- *Tasks:* Merged Measurements into Single-Object Track, Object Annotation by YOLO Image Classification, Filtered Noises by Extended Kalman Filter (EKF)
- *Tools:* ROS, C++, YOLO, PCL, EKF



-Learning Turn-Taking Behavior from Human Demonstrations for Social HRI

📅 2022 📍 IRL² 🧑‍🔬 Lead Researcher

- *Tasks:* Developed the Theory, Designed the Experiment, Wrote the IRB, Collected and Annotated Data, Trained and Tested an LSTM RNN Model
- *Tools:* TensorFlow, ROS (Data Collection)



-Robot-Mediated Group Instruction for Children with ASD

📅 2022 📍 IRL² 🧑‍🔬 Lead Researcher

- *Tasks:* Contributed in Developing the Theory, Designed the Experiment, Wrote the IRB, Designed the Behaviors of a Pepper Robot, Developed the WoZ Interface, Collected and Coded Data, Statistical Analysis
- *Tools:* Python (PyQt, NAOqi), SPSS



-Augmented Reality for Assisting End-User Development For Social Robot Applications

📅 2021 📍 IRL² 🧑‍🔬 Co-Advisor

- 2021-@IRL²- Co-Advisor
- *Tasks:* Helped Undergraduate Students with Modeling a NAO Robot in Microsoft HoloLens 2 and How to Choreograph this Robot Through a Representative Virtual Hologram. (Abstract Submission to Mid-SURE)
- *Tools:* Unreal Engine 4, Blueprint

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R&D Lead, Federation of International Robot Sports Association (FIRA)

- Designed and Organized the Innovation and Business League
- Led Syllabus and Educational Platform Products
- Led the Content Production Team for Online Trainings
- Trained Educators

FIRA , Taiwan
2018-2020

Researcher,

- Taarlab Human-Robot Interactoin Laboratory, PI: Prof. Mehdi Tale Masouleh

University of Tehran,
Iran

-Whole-Body Imitation of Human Motion by a NAO Humanoid Robot

 2016  Taarlab  Lead Researcher (My M.Sc. Thesis)



- *Tasks:* Developed the Motion Capture Framework, Modeled the whole body of a NAO Robot Kinematically and Dynamically, Presented a Geometric Solution for the Inverse Kinematics with the Imitation Goal
- *Tools:* Python (OpenNI, NAOqi), ROS, Mathematica

-Tripteron: a 3-DoF Parallel Manipulator

 2013  Taarlab  Team Member

- *Tasks:* Designed a PCB and Programmed an AVR Micro Controller to Communicate Under the MODBUS Protocol with the three AC Servo Motor Drivers in the Torque-Control Mode, Designed a Graphical User Interface (GUI) to Control the Robot in Different Modes (e.g., Position, Speed, Torque)
- *Tools:* Altium Designer, AVR Codevision, C, C++, Qt Creator

Research Intern,

- Mechatronics Research Laboratory (MRL [↗](#))

Azad University of
Qazvin, Iran
2013 – 2015

-Humanoid Robot Push Recovery

 2015  MRL  Team Member

- *Tasks:* Developed a Push Recovery Model Using an Inverted Pendulum Model and a PID Controller
- *Tools:* Matlab, Webots

-Humanoid Robot Navigation

 2015  MRL  Team Member

- *Tasks:* Developed a Navigation Model Towards the Opponent's Gate Utilizing Compass Data
- *Tools:* Matlab, Webots

Education

Ph.D. Oakland University, Ph.D. Candidate in Electrical and Computer Engineering Jan 2021 – 2026 (Expecting)

- *Dissertation:* "Emotional Intelligence and Context Awareness in Social HRI"
- *Advisor:* Prof. Wing-Yue Geoffrey Louie [↗](#),

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

- *Thesis:* "Whole-Body Imitation of Human Movement by a Humanoid Robot"
- *Advisor:* Prof. Mehdi Tale Masouleh [↗](#)

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

- *Final project:* Balance Recovery Techniques in Humanoid Robots
- *Advisor:* Prof. Behnam Miripour Fard [↗](#)

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

Honors, Awards, and Services

- Graduate Students Showcase (GSS 2026) Award: First Place and Public Vote for Presenting the MakiMate
- Member of the Institute of Electrical and Electronics Engineers Honor Society, IEEE-Eta Kappa Nu
- Received the Highest Student Evaluation Score for Teaching the Electromechanics System Design Lab (EGR-2800) in the Electrical and Computer Engineering Department at Oakland University (2023-2024)
- Outstanding Early Career Scientist Paper Award, 31st IEEE International Conference on Robot & Human Interactive Communication, RO-MAN 2022, Naples, Italy
- Approved for Permanent Residency (Green Card) in the US Based on National Interest Waiver (NIW), No Need for VISA Sponsorship to Work in the US
- National Science Foundation (NSF) Fully-funded Ph.D. Student
- Multiple International Awards from Robotic Competitions such as Robocup (e.g., 2013 Eindhoven, 2014 Brazil, 2015 IranOpen) and FIRACup (2016, 2017 Iran)

Reviewer

- International Journal of Social Robotics (IJSR AKA SORO)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Neural Systems & Rehabilitation Engineering
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robot & Human Interactive Communication (RO-MAN)
- Association for the Advancement of Artificial Intelligence (AAAI) Symposium Series
- Journal of Intelligent Systems
- International Conference on Reconfigurable Mechanisms and Robots
- SICE Journal of Control, Measurement, and System Integration

Oakland University's SECS Day Representative

Presented a Warm and Welcoming Demonstration of our Lab (IRL²) and Robots to Showcase Oakland University's School of Engineering and Computer Science (SECS) Potential to Prospective Students and their Families in the SECS Days

2022-Present
Oakland University,
Michigan

International OASIS's Ambassador

Empowering International Students to Embrace Their New Life in the US

2022-Present
Rochester, Michigan

FIRA World Cup Innovation and Business League's Chair

2019-2021
Changwon, South
Korea

Technical Committee (TC) Member of the International RoboCup Competitions

Humanoid Soccer, Demonstration, Junior Rescue

2010-2018
Tehran, Iran

Executive Administrator of the Robotics Engineering Students' Scientific Association

Organized Workshops, Talks, Competitions, and STEM Tours for the Robotics Engineering Students at Hamedan University of Technology

2009-2011
Hamedan, Iran

Skill Set

Research Tools and Techniques

Interdisciplinary Experimental Design for Social HRI/HCI; Psychological and Physiological Social Behavior Data Collection; Advanced Statistical Analysis and Qualitative Analysis

Programming	Proficient with Python, C++; Widely used Matlab, Simulink, Mathematica, R; Familiar with Kotlin
AI Tools	Widely used OpenCV, PyTorch, scikit-learn; Familiar with TensorFlow, Keras, JAX, Hugging Face
AI Techniques	Generative AI (VAEs, ViTs); Developed Multimodal (text, audio, video) Emotion, Cognitive, and Task Perception Frameworks Using Computer Vision (CNNs, YOLO), Time-Series ML (LSTM), and Transformers; Agent's Social Behavior Modeling and Planning; Imitation Learning for Manipulation; Multimodal Navigation (Vision-Radar-LiDAR Fusion), and Bayesian AI (Kalman and Particle Filters, uncertainty modeling);
Robotic and Mechatronic Tools and Techniques	ROS/ROS2, Gazebo, NVIDIA Isaac Sim, CoppeliaSim, Point Cloud Libraries (PCL), Controller Design and Real-World Implementation, Embedded System Design (AVR, ARM) and Real-Time Operating System (RTOS), Single Board Microcontroller/Computer Programming (Arduino, Raspberry Pi), CAD (Solidworks)
Miscellaneous	Agile Scrum Master, Linux, Git, Docker, QT Creator (PyQt and C++), SPSS, LaTeX

Selected Publications

Journal Articles

- **P. Shahverdi**, S.Walker, W.-Y. G.Louie, “Embodied conversational agent’s affective interaction: A survey,” *IEEE Transactions on Affective Computing*, 2025, **Submitting**.
- **P. Shahverdi**, N.Huang, K.Rouso, M.Trombly, R.Berger, Q.Chen, J.Korneder, W.-Y. G.Louie, “Robot-mediated group instruction for children with asd: A longitudinal study,” *Frontiers in Robotics and AI*, 2025, **Under Review**.
- K.Rayati, A.Beigy, A.Saadati, **P. Shahverdi**, M. T.Masouleh, A.Kalhor, W.-Y. G.Louie, “Few-shot learning from human demonstrations framework on a humanoid robot,” *Advanced Robotics*, 2025, **Under Review**.
- I.Bakhoda, **P. Shahverdi**, K.Rouso, E.Dallas, W. G.Louie, “Robot-mediated read-aloud context of reading comprehension,” *Computer Assisted Language Learning*, pp. 1–28, 2026.
- C. M.Wilson, L.Boright, W.-Y. G.Louie, **P. Shahverdi**, S. K.Arena, R.Benbow, J. R.Wilson, Q.Chen, K.Rouso, N.Huang, “Effect of robotic delivery of physical activity and fall prevention exercise in older adults: A pilot cohort study,” *Cureus*, vol. 15, no. 8, 2023. doi: 10.7759/cureus.44264 [↗](#).
- M.Sharifzadeh, M. T.Masouleh, A.Kalhor, **P. Shahverdi**, “An experimental dynamic identification & control of an over-constrained 3-dof parallel mechanism in presence of variable friction and feedback delay,” *Robotics and autonomous systems*, vol. 102, pp. 27–43, 2018. doi: <https://doi.org/10.1016/j.robot.2018.01.003> [↗](#).
- **P. Shahverdi** and M.Tale Masouleh, “Imitation of human motion by a nao humanoid robot using an analytical method and considering balance of the robot,” *Modares Mechanical Engineering*, vol. 17, no. 7, pp. 386–396, 2017. [Online]. Available: https://mme.modares.ac.ir/browse.php?a_id=4583&sid=15&slc_lang=en.

Conference Proceedings

- W.-Y. G.Louie, T.Christ, **P. Shahverdi**, K.Rouso, E.Dallas, A.Tyshka, A.Wowra, K.Barnett, I.Bakhoda, “Exploring task-level contingent mediations for vocabulary instruction across robot, virtual, and human teachers,” in *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (ROMAN)*, 2024, pp. 1048–1055. doi: 10.1109/RO-MAN60168.2024.10731230 [↗](#).
- **P. Shahverdi**, I.Bakhoda, K.Rouso, J.Klotz, W.-Y. G.Louie, “Exploring the impact of narrator type on response latency and utterance length during interactive storytelling,” in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024, pp. 5499–5504. doi: 10.1109/ICRA57147.2024.10610817 [↗](#).
- K.Rayati, A.Feizi, A.Beigy, **P. Shahverdi**, M. T.Masouleh, A.Kalhor, W.-Y. G.Louie, “Real-time imitation of human head motions, blinks and emotions by nao robot: A closed-loop approach,” in *2023 11th RSI International Conference on Robotics and Mechatronics (ICRoM)*, 2023, pp. 794–800. doi: 10.1109/ICRoM60803.2023.10412471 [↗](#).
- **P. Shahverdi**, K.Rouso, J.Klotz, I.Bakhoda, M.Zribi, W.-Y. G.Louie, “Emotionally specific backchanneling in social human-robot interaction and human-human interaction,” in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023, pp. 4059–4064. doi: 10.1109/IROS55552.2023.10341823 [↗](#).

- **P. Shahverdi**, K.Rousso, I.Bakhoda, N.Huang, K.Rohrbeck, W.-Y. G.Louie, “Robot-mediated job interview training for individuals with asd: A pilot study,” in *2023 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2023, pp. 564–570. doi: 10.1109/RO-MAN57019.2023.10309611 [↗](#).
- **P. Shahverdi**, A.Tyshka, M.Trombly, W.-Y. G.Louie, “Learning turn-taking behavior from human demonstrations for social human-robot interactions,” in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022, pp. 7643–7649. doi: 10.1109/IROS47612.2022.9981243 [↗](#).
- **P. Shahverdi**, M.Trombly, N.Huang, Q.Chen, J.Korneder, W.-Y. G.Louie, “Robot-mediated group instruction for children with asd: A pilot study,” in *2022 31st IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2022, pp. 1506–1513. doi: 10.1109/RO-MAN53752.2022.9900584 [↗](#).
- **P. Shahverdi**, M. J.Ansari, M. T.Masouleh, “Balance strategy for human imitation by a nao humanoid robot,” in *2017 5th RSI International Conference on Robotics and Mechatronics (ICRoM)*, 2017, pp. 138–143. doi: 10.1109/ICRoM.2017.8466225 [↗](#).
- **P. Shahverdi** and M. T.Masouleh, “A simple and fast geometric kinematic solution for imitation of human arms by a nao humanoid robot,” in *2016 4th International Conference on Robotics and Mechatronics (ICROM)*, 2016, pp. 572–577. doi: 10.1109/ICRoM.2016.7886806 [↗](#).