# Pourya Shahverdi

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

Rochester, Michigan    pourya.shahverdi@gmail.com    +1 (248) 805 9101

Website    Google Scholar    LinkedIn    GitHub    X.com    YouTube

## Summary

With over 10 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 (IRL[2] ), PI: Prof. Geoffrey Louie

-Emotional Intelligence and Context Awareness in Social Human-Robot Interaction
2025    IRL[2]    Lead Researcher (My Ph.D. Dissertation Project)
- *Tasks:* Proposed a Theoretical Framework Based on the Emotional Intelligence Theory, Conducted a Systematic Survey on Embodied Conversational Agents' (ECAs) Affective Behavior, Prototyping the Social HRI Framework and Designing the Experiment Now
- *Tools Used:* PyTorch, Hugging Face, LangChain, Prompt Engineering Techniques on different LLMs and VLMs, Kotlin, Furhat Robot API, ROS (Data Collection)

-Few-shot Learning from Human Demonstrations Framework on a Humanoid Robot
2024/2025    A Collaboration Between IRL[2] 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 Used:* PyTorch, Keras3, YOLO, CoppeliaSim

-Robot-mediated Read-aloud for Pre-K Children
2024    IRL[2]    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 Used:* Python (PyQt, NAOqi), R

-Robot-mediated STEM Vocabulary Training for Children
2024    IRL[2]    Engineering Team Leader
- *Tasks:* Designed the Behaviors of a Pepper Robot, Developed the WoZ Interface, Collected and Coded Data, Statistical Analysis
- *Tools Used:* Python (PyQt, NAOqi), R

-Emotionally Specific Backchanneling in Social HRI and Human-Human Interaction
2023    IRL[2]    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 Used:* Python, Kotlin, Furhat Robot API, R

-Robot-mediated Physical Activity and Fall Prevention Exercises for Older Adults
2023    IRL[2]    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 Used:* C++, Python, PyQt, ROS

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

📅 2023    📍 IRL[2]    ⚙ Lead Researcher

- *Tasks:* Developed the Theory, Designed the Experiment, Wrote the IRB, Developed a Telepresence WoZ Interface, Collected and Coded Data, Statistical Analysis
- *Tools Used:* 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 Used:* ROS, C++, YOLO, PCL, EKF

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

📅 2022    📍 IRL[2]    ⚙ Lead Researcher

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

-Robot-Mediated Group Instruction for Children with ASD

📅 2022    📍 IRL[2]    ⚙ 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 Used:* Python (PyQt, NAOqi), SPSS

-Augmented Reality for Assisting End-User Development For Social Robot Applications    Page 62

📅 2021    📍 IRL[2]    ⚙ Co-Advisor

- 2021-@IRL[2]- 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 Used:* Unreal Engine 4, Blueprint

**R&D Lead**, Iran Chapter Based in Amirkabir University of Tech.    FIRA, Iran   2018-2020

- Developed the Innovation and Business Competition League for the FIRA-International
- Conducted Research and Developed Syllabus and Educational Platforms in Collaboration with FIRA-International
- Developed Educational Content for Online Courses

**Research Assistant**,    University of Tehran, Iran   2012 – 2017

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

-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 Used:* 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 Used:* Altium Designer, AVR Codevision, C, C++, Qt Creator

**Research Intern (part-time)** ,                                          Azad University of
  - Mechatronics Research Laboratory (MRL ↗)                               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 Used:* Matlab, Webots

-Humanoid Robot Navigation
📅 2015    📍 MRL    ⌘ Team Member
  - *Tasks:* Developed a Navigation Model Towards the Opponent's Gate Utilizing Compass Data
  - *Tools Used:* Matlab, Webots

## Education

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

  - 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**                                         2022-Present
Presented a Warm and Welcoming Demonstration of our Lab (IRL[2]) and Robots to Show-      Oakland University,
case Oakland University's School of Engineering and Computer Science (SECS) Potential              Michigan
to Prospective Students and their Families in the SECS Days

**International OASIS's ☑ Ambassador**                                                   2022-Present
Empowering International Students to Embrace Their New Life in the US                   Rochester, Michigan

**Co-Chair of the FIRA World Cup Innovation and Business League**                          2019-2021
                                                                                    Changwon, South Korea

**Technical Committee (TC) Member of the International RoboCup Competitions**               2010-2018
Humanoid Soccer, Demonstration, Junior Rescue                                              Tehran, Iran

**Executive Administrator of the Robotics Engineering Students' Scientific Association**   2009-2011
Organized Workshops, Talks, Competitions, and STEM Tours for the Robotics Engineering      Hamedan, Iran
Students at Hamedan University of Technology

## 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** | 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); Familiar with Generative AI (VAEs, ViTs) |
| **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 |

# 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.Rousso, 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," *Robotics and Autonomous Systems*, 2025, **Under Review**.

- I.Bakhoda, **P. Shahverdi**, K.Rousso, E.Dallas, W.-Y. G.Louie, "Robot-mediated read-aloud context of reading comprehension and vocabulary development," *Computers & Education*, 2025, **Under Review**.

- C. M.Wilson, L.Boright, W.-Y. G.Louie, **P. Shahverdi**, S. K.Arena, R.Benbow, J. R.Wilson, Q.Chen, K.Rousso, 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.Rousso, 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` ⬈.

- W.-Y. G.Louie, T.Christ, A.Wowra, D.Alexander, I.Bakhoda, **P. Shahverdi**, ""if a robot was teaching, then everybody would definitely like school better": An analysis of grade 3-5 children's perceptions of learning stem vocabulary with an educational social robot," in *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (ROMAN)*, 2024, pp. 1675–1680. DOI: `10.1109/RO-MAN60168.2024.10731322` ⬈.

- **P. Shahverdi**, I.Bakhoda, K.Rousso, 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.Rousso, 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` ⬈.

- Q.Chen, E.Dallas, **P. Shahverdi**, J.Korneder, O. A.Rawashdeh, W.-Y.Geoffrey Louie, "A sample efficiency improved method via hierarchical reinforcement learning networks," in *2022 31st IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2022, pp. 1498–1505. DOI: `10.1109/RO-MAN53752.2022.9900738` ⬈.

- **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` ☑.