










# Pourya Shahverdi

« Robotics and AI/ML Engineer »

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## Summary

I am a generalist Robotics and AI/ML Engineer. My strategic perspective on the field empowers me to recognize loopholes and devise a plan to fill them efficiently. I specialized and accomplished projects in robot learning, dynamic/kinematics modeling and control, and human factor HRI design. I published my work in ICRA, IROS, RO-MAN, ICROM, etc.

## Research Experience

<b>Oakland University</b> , Graduate Research Assistant <ul style="list-style-type: none"> <li>In Real-Life Intelligent Robotics Laboratory (IRL<sup>2</sup>), PI: <a href="#">Prof. Wing-Yue Geoffrey Louie</a></li> </ul>	Michigan, USA 2021 – Present
<b>University of Tehran</b> , Research Assistant <ul style="list-style-type: none"> <li><a href="#">Taalab</a> Human-Robot Interaction Laboratory, PI: <a href="#">Prof. Mehdi Tale Masouleh</a></li> </ul>	Tehran, Iran 2012 – 2017
<b>Azad University of Qazvin</b> , Research Intern (part-time) <ul style="list-style-type: none"> <li><a href="#">Mechatronics Research Laboratory (MRL)</a></li> </ul>	Qazvin, Iran 2013 – 2015

## Education

<b>Ph.D. Oakland University</b> , Ph.D. Candidate in Electrical and Computer Engineering <ul style="list-style-type: none"> <li><i>Dissertation</i>: "Emotional Intelligence and Context Awareness in Social HRI"</li> <li><i>Advisor</i>: <a href="#">Prof. Wing-Yue Geoffrey Louie</a>,</li> <li><i>Selected Courses</i>: Human-Robot Interaction, Artificial Intelligence, Advanced Autonomous Vehicle, Engineering Project Management</li> </ul>	Jan 2021 – Apr 2025 (Expecting)
<b>M.Sc. Azad University of Qazvin</b> , Mechatronics Engineering <ul style="list-style-type: none"> <li><i>Thesis</i>: "Whole-Body Imitation of Human Movement by a Humanoid Robot"</li> <li><i>Advisor</i>: <a href="#">Prof. Mehdi Tale Masouleh</a></li> <li><i>Selected Courses</i>: Advanced Robotics, Mobile Robots (Navigation), Dynamic System Modeling, Mechatronics Design (I and II)</li> </ul>	2013 – 2016
<b>B.Sc. Hamedan University of Technology</b> , Robotics Engineering <ul style="list-style-type: none"> <li><i>Final project</i>: Balance Recovery Techniques in Humanoid Robots</li> <li><i>Advisor</i>: <a href="#">Prof. Behnam Miripour Fard</a></li> <li><i>Selected Courses</i>: Robotic Systems and Control, Robot Sensors, Artificial Neural Networks, Fuzzy Systems and Control, Embedded Programming</li> </ul>	2008 – 2013

## Skill Set

<b>Programming</b>	Python, C++, R, Kotlin, Matlab, Mathematica
<b>Robotic and Mechatronic Tools and Techniques</b>	ROS/ROS2, Gazebo, NVIDIA Isaac Sim, 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)
<b>AI Tools</b>	scikit-learn, PyTorch, TensorFlow, OpenCV, Hugging Face, LangChain

## AI Techniques

Natural Language Processing (NLP/NLU), Large Language Model (LLM) APIs, Chain-of-Thought (CoT) Prompting of LLMs, Supervised and Instructional Fine-Tuning, Parameter-Efficient Fine-Tuning (PEFT), Reinforcement Learning (Deep Q-Networks), Time-Series Machine Learning (LSTM)

## Miscellaneous

Linux, Docker, LaTeX, QT Creator (PyQt and C++), Git, SPSS, Network, Unreal Engine

## Projects

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### Emotional Intelligence and Context Awareness in Social Robot's Backchanneling Behavior

- Ongoing 2025-@IRL-Lead Researcher (My Ph.D. Dissertation Project)
- *Tasks:* Developed the Theory, Conducted a Systematic Survey on Embodied Conversational Agents' (ECAs) Affective Behavior, Prototyped the Model, Designed the Experiment, and Wrote the IRB, Running the Experiment Now
- *Tools Used:* PyTorch, Hugging Face, LangChain, Prompt Engineering Techniques on different LLMs, Kotlin, Furhat Robot API, ROS (Data Collection)

### Robot-mediated Read-aloud for Pre-K Children



- 2024-@IRL-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-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-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-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-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



- 2022-Autonomous Vehicle Course Project
- *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-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-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 (AR) for Assisting End-User Development For Social Robot Applications

Page 62

- 2021-@IRL- 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

### A Health, Safety, and Environment (HSE) Data Logger Device for Iron Workers

- 2018-@Freelancing
- *Tasks:* Designed an Embedded Electronic Board to Collect Gate Pattern Data from an IMU Module Connected to Iron Workers, Collected Hours of Data from 35 Iron Workers Walking on 5 Types of Beams with Different Widths, Trained a K-NN Model to Classify the Beams from the IMU Data
- *Tools Used:* Altium Designer, Arduino, scikit-learn

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



- 2017-@Taalab-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

### Humanoid Robot Push Recovery

- 2015-at [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

### Tripteron: a 3-DoF Parallel Manipulator

- 2013-@Taalab-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

## Publications

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- 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**.
- **P. Shahverdi**, I.Bakhoda, K.Rousso, J.Klotz, W.-Y. G.Louie, “The dynamics of story internalization: A pathway to deeper interaction with social robots,” in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, **Under Review**, 2025.
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1109/ICRoM60803.2023.10412471) .
- **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](https://doi.org/10.1109/RO-MAN57019.2023.10309611) .
- **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](https://doi.org/10.1109/IROS55552.2023.10341823) .
- 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](https://doi.org/10.7759/cureus.44264) .
- 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](https://doi.org/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](https://doi.org/10.1109/RO-MAN53752.2022.9900584) .
- **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](https://doi.org/10.1109/IROS47612.2022.9981243) .
- 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**, 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](https://doi.org/10.1109/ICRoM.2017.8466225) .
- **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](https://mme.modares.ac.ir/browse.php?a_id=4583&sid=15&slc_lang=en).
- **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](https://doi.org/10.1109/ICRoM.2016.7886806) .

## Teaching Experience

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### Lab Instructor, EGR2800: Electromechanics System Design Lab

Oakland University, MI  
2021-Present

- Course Lecturer: [Prof. Osamah A. Rawashdeh](#), ECE Chair
- Instructing the Lab's Experiments: Arduino Programming, Electronic Circuit Design, Sensors and Actuators
- Leading and Training Graduate Teacher Assistants
- Mentoring Sophomore Design Project Team Works

### Education Department Chair, Iran Chapter Based in Amirkabir University of Tech.

[FIRA](#), Iran  
2018-2020

- Designed Syllabus and Educational Platforms in Collaboration with FIRA-International
- Trained Teachers
- Created Educational Content for Online Courses
- Designed Competitions for FIRA-Iran and FIRA-International

### Teaching Assistant, Rapid Prototyping in Embedded Systems

University of Tehran,  
Iran  
2016-2017

- *Professor:* [Dr. Mostafa Ersali](#)
- Designed a Modular Educational Robot Platform Based on Raspberry Pi and Arduino Capable of Interfacing with Different Sensor and Actuator Modules
- Taught Lab Experiments of the Course
- Supervised the Students' Final Projects

### Robotics Mentor,

[NOET](#), Iran  
2012-2018

- Directed a Team of Robotics Mentors from Top-Ranked Iranian Universities to Teach Robotics in Middle Schools and High Schools
- Designed Syllabus and Educational Platforms
- Participated in National and International Robotics Competitions such as [RoboCup](#) and FIRACup

## Honors and Awards

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- 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)

## Service

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### 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

### International OASIS's Ambassador

Empowering International Students to Embrace Their New Life in the US

2022-Present  
Rochester, Michigan

### Chair and Referee of the FIRA Innovation and Business League

2019  
Changwon, South Korea

### Technical Committee (TC) Member of Different RoboCup Competition Leagues

Humanoid Soccer, Demonstration, Junior Rescue

2010-2018  
Tehran, Iran

### Headboard of the Student Scientific Association of Robotics Engineering

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

2009-2011  
Hamedan, Iran