Mohamad Reza Shahabian Alashti, PhD

Machine Learning Research Scientist | Robotics, AI & Computer Vision

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Google Scholar

Machine Learning and Computer Vision researcher with experience in real-time human activity recognition, video-based motion analysis, and biomechanical signal processing. Currently a Postdoctoral Research Fellow at the University of Hertfordshire, contributing to multidisciplinary projects such as SWAG (Soft Wearable Assistive Garment) and Hospital at Home. Expertise in deep learning model development, dataset design, and edge deployment. Passionate about translating academic research into impactful AI-driven and agentic solutions.

Professional Roles

Present – Aug 2024 | Postdoctoral Research Fellow — Deep Learning & Robotics, University of Hertfordshire, UK
- Developing AI-driven deep learning and sensor-fusion models for EMG–IMU–kinematic intent detection in the SWAG project.
- Advancing AI-driven video-based Human Activity Recognition (HAR) and Human–Robot Interaction (HRI) for the Hospital at Home project.

Present – Sep 2021 | Visiting Lecturer (Part-Time), Various Institutions, London & Hertfordshire
- Teaching Artificial Intelligence, Cloud Computing (AWS), Software Development, and Research Methods across multiple institutions.
- Supervising student projects and promoting applied learning in Computer Science and Engineering.

Feb 2024 – Oct 2022 | Robotics Engineer (Part-Time), University of Hertfordshire, Hatfield, UK
- Designed a human-sized mannequin robot for the eSAM project with distributed chemical sensors.
- Developed motor control with a web-based interface for real-time control and monitoring.

Nov 2020 – Feb 2015 | Senior Engineer & Project Lead, Arta Vision Ava Eng. Co., Tehran, Iran
- Led end-to-end development of integrated hardware–software systems at Arta Vision Ava.
- Managed the design of sensor boards, distributed control, and a 3D interactive DCIM platform.

Mar 2016 – Feb 2012 | Mechatronics Designer (Part-Time), SYNTECH Technology & Innovation Center, Qazvin, Iran
- Designed a 7-DoF robotic arm and ROS-based mobile platform for home robotics at SYNTECH.
- Developed embedded control and power-management systems for autonomous operation.

Projects & Experience

Present – Aug 2024 | SWAG — Soft Wearable Assistive Garment, University of Hertfordshire, Hatfield, UK
- Developing AI-driven intent-detection systems using multi-sensor biomechanical data (EMG, IMU, kinetics, kinematics) with meta-learning and Transformer architectures.
- Designed and implemented a deep learning–based sensor fusion framework for real-time motion recognition and adaptive human–robot interaction.
- Led data collection and dataset creation for wearable sensor signals and collaborated with European partners on system integration and evaluation.
- Published research papers on deep learning and activity recognition derived from project outcomes.
- More info : SWAG Project Website | Robotics Research Group, UH.

Python | PyTorch | CUDA | ROS2 | HRNet | YOLOv7 | Meta-Learning | Transformers | Edge AI

Present

Aug 2024

Hospital@Home / PRIME Study — AI-driven Virtual Ward for Assistive Care, University of Hertfordshire, Hatfield, UK

- Developing an AI-driven multimodal pipeline for ambient assistive technology in virtual wards supporting post-surgery and heart failure recovery.
- Designing multi-view Human Activity Recognition and sensor-fusion frameworks to enable adaptive assistance and real-time monitoring.
- Creating Human–Robot Interaction (HRI) scenarios to enhance patient engagement and bridge healthcare–social care integration.
- Collaborating with Princess Alexandra Hospital and European partners under the Dinwoodie Charitable Company Research Grant (2025–2027).
- More info : Robotics Research Group, UH.

Python | PyTorch | ROS2 | Deep Learning | Sensor Fusion | Multi-View HAR | HRI | Ambient Intelligence | Healthcare AI

Oct 2025

Feb 2025

EEG & Facial Emotion Data Collection Platform, Independent Project / Collaboration, Hatfield, UK

- Developed a web-based platform for synchronised multimodal emotion data collection, integrating EEG (MUSE 2), facial emotion recognition, and human feedback.
- Enabled real-time EEG streaming, ViT-based emotion inference for large-scale studies (250+ participants) on emotional video responses
- Applied Vision Transformer (ViT) classifiers fine-tuned on FER2013, RAF-DB, AffectNet, and CK+ datasets for robust emotion recognition.

Python | JavaScript | React | Node.js | PyTorch | MUSE 2 SDK | ViT | FER2013 | RAF-DB | AffectNet | CK+

Ongoing

Dec 2020

Multi-View Human Activity Recognition (RHM-HAR Series), University of Hertfordshire, Hatfield, UK

- Leading ongoing research in human activity recognition via multi-view camera systems, initiated during PhD and extended through postdoctoral collaborations.
- Created and expanded the RHM-HAR datasets (RHM-HAR-SK and RHM-HAR-1) for benchmarking multi-view skeleton-based recognition.
- Developing advanced AI architectures integrating Transformer-based models and emerging Agentic AI concepts for adaptive HAR.
- Published multiple papers on dataset design, multi-view recognition, and intelligent system architectures derived from this research.

PyTorch | MMPOSE | YOLOv7 | GPU Cluster | Transformer | Agentic AI | Multi-View HAR

Present

Sep 2021

Visiting Lecturer (Part-Time), Various Institutions, London & Hertfordshire

- Delivering undergraduate and postgraduate teaching at Coventry University London, University of Hertfordshire, and Uxbridge College.
- Teaching modules in Artificial Intelligence, Cloud Computing (AWS), Software Development, Databases, and Research Methods.
- Supervising BSc and MSc projects, supporting students in applied research and technical implementation.

Teaching | AI | Cloud Computing | Software Engineering | Research Methods | Databases

Feb 2024

Sep 2022

eSAM — Exposure Sensing Animated Mannequin, University of Hertfordshire, Hatfield, UK

- Designed and developed a human-sized robotic mannequin for chemical exposure testing and environmental sensing.
- Developed motor control systems, distributed chemical sensor integration, and a web-based interface for real-time monitoring and actuation.
- Implemented embedded communication using Modbus RTU across Arduino and Raspberry Pi modules with Maxon motor drivers.

Python | Arduino | Raspberry Pi | Modbus RTU | Maxon | Control Systems | Distributed Sensors | Web Interface

Dec 2022

Data Study Group (DSG) — Facilitator, Alan Turing Institute | AMRC, London, UK

- Facilitated a collaborative research sprint with multidisciplinary teams, tackling industrial challenges in advanced manufacturing using data-driven approaches.
- Applied data augmentation and synthetic data generation techniques to improve analysis robustness in low-frequency and sparse datasets.
- Contributed to final outcomes and co-authored the published report for the Advanced Manufacturing Research Centre (AMRC) — Project Link.

Python | Data Analysis | PCA | SVD | Data Augmentation | Synthetic Data

Nov 2020 – Jan 2017

Senior Software Design & Development Engineer | Project Lead, Arta Vision Ava Eng. Co., Tehran, Iran

- Led multiple software development projects from concept to deployment, managing design, integration, and delivery cycles.
- Coordinated cross-functional teams across system design, verification, and client-facing stages, ensuring quality and timely execution.
- Directed a small engineering team, applying agile methods for efficient project tracking and reporting.
- Developed and deployed web-based monitoring and visualisation platforms for data centre and infrastructure management.

Key Projects :

- Designed and deployed the IVMS data-centre monitoring system.
- Built an interactive 3D visualisation dashboard and analytical trend interface.

Python | Django | Docker | PostgreSQL | Grafana | ReactJS | Linux | Project Leadership

Nov 2020 – Feb 2015

Senior Hardware Design Engineer | Project Lead, Arta Vision Ava Eng. Co., Tehran, Iran

- Designed and developed embedded electronic systems for industrial automation and renewable energy applications.
- Led PCB design, prototyping, and hardware–software integration for sensor and control modules.
- Managed small technical teams, ensuring progress alignment and meeting design verification standards.
- Delivered robust solutions for power infrastructure monitoring and communication converters.

Key Projects :

- Designed environmental transducers and lead-acid battery monitoring hardware.
- Developed SNMP–Modbus protocol converter for industrial communication systems.

Embedded Systems | PCB Design | Microcontrollers | Modbus | SNMP | Industrial Automation | Team Leadership

Nov 2016 – Feb 2012

Mechatronics Designer — @Home Robot Lab, SYNTECH Technology & Innovation Center, Tehran, Iran

- Contributed to R&D in assistive and domestic robotics, participating in RoboCup and IranOpen competitions.
- Led the design and implementation of a 7-DoF robotic arm, control architecture, and embedded power management system.
- Integrated mobile robot platforms with ROS, developing C++ software modules on Linux for perception and navigation.
- Designed and manufactured a robotic lifting system for home-assistive applications.

Mechatronics | Robotics | C++ | ROS | Linux | Embedded Systems | Altium | Keil uVision

Skills

AI & Machine Learning	Deep Learning, Computer Vision, Facial Emotion Recognition, Video-Based Human Activity Recognition, Pose Estimation, Sensor Fusion, Meta-Learning, Agentic AI, Vision Transformers (ViT), GANs.
Programming & Development	Python, C, C++, JavaScript, ReactJS, Node.js, HTML/CSS.
Frameworks & Libraries	PyTorch, TensorFlow, Keras, OpenCV, Scikit-Learn, NumPy, Pandas, Streamlit, QT, Docker, ROS1/ROS2.
Video & Signal Processing	Multi-View Camera Systems, EEG/EMG Signal Processing, Real-Time Video Analytics, Biomechanical Data Analysis, Motion Tracking.
Cloud & Data Infrastructure	Cloud Computing (AWS), Edge AI Deployment, Data Pipelines, Secure Cloud Storage, and Scalable Web-Based Data Collection Systems.
Data & Experimentation	Dataset Design, Data Collection, Augmentation, Synthetic Data Generation, Annotation Pipelines, Benchmarking, Evaluation Metrics.
Robotics & Embedded Systems	ROS2, MoveIt, Navigation, Arduino, Raspberry Pi, Maxon Motor Control, Modbus RTU, Mechatronics Integration.
Software Engineering & Tools	PyCharm, Jupyter Notebook, VS Code, WebStorm, Git, GitHub, GitLab, CPU/GPU Cluster Setup.
PM & Collaboration	Agile, Scrum, Kanban, Cross-Disciplinary Research Coordination, Academic Writing, Technical Documentation.

Education

2020–2024 **PhD in Computer Science** (Fully Funded), University of Hertfordshire, UK
- Dissertation : Human Activity Recognition in Ambient Assisted Living Scenarios.

2011–2015 **MSc in Mechatronics Engineering** (Scholarship Awarded), Azad University (IAU), Qazvin, Iran
- Dissertation : Intelligent System for Estimating Spinal Cord Injury using Medical Image Segmentation.

2006–2011 **BSc in Electronic Engineering**, Hadaf University, Sary, Iran
- Dissertation : Design and Implementation of an Advanced Path-Following Robot.

Honors & Awards

- Member of the Technical Committee in @Home League, International Robotic Competition, Iran, Apr 2015.
- Participant in the International RoboCup competition in Brazil, August 2014.
- Participant in the International RoboCup competition in Eindhoven, The Netherlands, July 2013.
- 1st place in @Home League at IranOpen, International Robotic Competition, Iran, 2012, 2013, 2014, 2015, 2017.
- Participant in @Work League, International Robotic Competition, Iran, Apr 2015.

Professional Development & Training

- REAP – Research and Enterprise Training Programme, University of Hertfordshire (June–July 2025)
- Build Basic Generative Adversarial Networks (GANs), September 2022.
- PyTorch Essential Training : Deep Learning, August 2022.
- Python Object-Oriented Programming, August 2022.
- Affective computing and social robots in the therapy of children with autism, 30th May to the 3rd of June 2022.
- Research integrity Summer school, 14-18 June 2021.
- Attended Data Science Course at Tosee, Open Higher Education Institute, June 2019 - April 2020.
- Internet of Things, IEEE Student Branch of Iran University of Science and Technology, 2018.
- Deep Learning for Self-Driving Cars, The 6th RSI International Conference on Robotics & Mechatronics, Oct 2018.
- Internet of Things Workshop, The First International Congress on Smart Technologies, August 2018.
- Machine Learning Online Course Certificate from STANFORD UNIVERSITY, June 2014.
- Image and Video Processing Online Course Certificate from DUKE UNIVERSITY, March 2014.
- Statistical Analysis of fMRI Data with Martin Lindquist, Johns Hopkins University, 2014.
- Technician of Network Equipment, The Technical and Vocational Organization, Oct 2011.
- Network Technician, The Technical and Vocational Organization, Oct 2011.

Selected Publications

- A Modular, Wireless and Wearable Biosignal Acquisition Platform, ICRA 2026 (Under review)
- Towards Memory-Driven Agentic AI for Human Activity Recognition, ICSR 2025
- Efficient Skeleton-based Human Activity Recognition in Ambient Assisted Living Scenarios with Multi-view CNN, BioRob 2024
- Robotic Vision and Multi-View Synergy : Action and Activity Recognition in Assisted Living Scenarios, BioRob 2024
- Lightweight Human Activity Recognition for Ambient Assisted Living, 2023
- RHM-HAR-SK : A multi-view dataset with skeleton data for Ambient Assisted Living Research, 2023
- RHM : Robot House Multi-view Human Activity Recognition Dataset, 2023
- Data augmentation and synthetic data generation for low-frequency and sparse data problems
- Human Activity Recognition at Home : Benchmarks and Competition, 2021
- Affordable Robot Mapping using Omnidirectional Vision, 2021
- Automatic ROI Detection in Lumbar Spine MRI, 2018
- FARAT1 : An Upper Body Exoskeleton Robot, 2017
- Mechanical Basic and Detailed Design for the Redundant Arm SAAM applied on a Domestic Service Robot, 2017

Additional Information

- **Visa Status :** UK Global Talent Visa – Academic Exceptional Promise, endorsed by the Royal Academy of Engineering (no sponsorship required).

References

Available upon request.