Hossein Khayami

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About Me — PhD student at the University of Maryland (expected graduation: May 2026), specializing in applying AI/ML to accessibility and assistive technology. My research focuses on Human Activity Recognition (HAR) using sensor data to monitor the daily activities of older adults, aiming to enhance their well-being and independence. I bring 5 years of professional experience in embedded systems, signal processing, and data science, including developing wearable devices for health monitoring. My PhD work further builds on this foundation, focusing on machine learning and signal processing.

Education

University of Maryland, College Park, MD, USA **Sep 2021 – May 2026**
PhD Student in Electrical Engineering - Communication and Signal Processing
- **GPA (up to now): 3.67/4.0**

Sharif University of Technology, Tehran, Iran **Sep 2013 – Sep 2015**
Master of Science in Electrical Engineering - Communication Systems
- **Average: 17.59/20 (4.0/4.0)**

University of Tehran, Tehran, Iran **Sep 2008 – Feb 2013**
Bachelor of Science in Electrical Engineering - Telecommunications
- **Average: 16.64/20 (3.5/4.0)**

Research Experience

Intelligent Assistive Machines (IAM) Lab, University of Maryland, *College Park, MD, USA* **Jun 2023 – present**
Research Assistant

- Under the supervision of Dr. Hernisa Kacorri, I investigated novel activity data collection methods combining self-reports and sensor-based monitoring to understand real-world physical activity patterns better. This research has been submitted to IMWUT.
- My current work centers on making activity-tracking technologies more personalized, interactive and accessible for older adults.

Research Interests

- Human-Centered Machine Learning
- AI for Accessibility and Disability
- Signal Processing and Machine Learning
- Embedded Systems: IoT and Health Monitoring Devices
- Distributed Computing: Federated Learning

Skills

Machine Learning TensorFlow, PyTorch, Scikit-learn, Keras
Data Analysis SQL, Pandas, Numpy

Embedded Systems RTOS and bare-metal firmware
Circuit Altium schematic and PCB

Languages Python, MATLAB, C/C++, Assembly
Signal Processing MATLAB, Simulink, TI DSPs

IoT Developed devices with various sensing and communications

Publications

H. Khayami, L. Wang, Y. Kim, B. Lee, D. Conroy, A. Lazar, E. Choe, H. Kacorri, "From Verbal Reports to Personalized Activity Trackers: Understanding the Challenges of Ground Truth Data Collection with Older Adults in the Wild," *submitted to IMWUT* (2024).

V. Ramani, **H. Khayami**, Y. Bai, N. Garg, N. Roy, "IMUOptimize: A Data-Driven Approach to Optimal IMU Placement for Human Pose Estimation with Transformer Architecture," *arXiv preprint arXiv:2402.08923 (2024)*.

H. Khayami, T. Eghlidos and M.R. Aref, "A Joint Encryption-Encoding Scheme Using QC-LDPC Codes Based on Finite Geometry," *Scientia Iranica* (2024) 31(17), pp. 1504-1516

M. Shirvanimoghaddam, **H. Khayami**, Y. Li, B. Vucetic, "Dynamic HARQ with Guaranteed Delay," *2020 IEEE Wireless Communications and Networking Conference (WCNC)*, Seoul, Korea, May 2020.

H. Khayami, M. Ghassemi, K. Ardekani, B. Maham, W. Saad, "Cognitive Radio Ad Hoc Networks for Smart Grid Communications: A Disaster Management Approach," *2013 IEEE/CIC International Conference on Communications in China (ICCC)*, pp.716-721, Aug. 2013.

H. Morsali, S. M. Shekarabi, K. Ardekani, **H. Khayami**, A. Fereidunian, M. Ghassemian, H. Lesani, "Smart Plugs for Building Energy Management Systems," *2nd Iranian Conference on Smart Grids (ICSG 2012)*, May 24-25, Tehran, Iran.

Professional Experiences

Vicinia, ***California, USA*** **May 2022 – Aug 2022**
RTLS IoT Network Engineer

- I designed and developed the hardware, firmware, and the communication protocol of a wireless IoT data gathering node for a cloud-based indoor Real-Time Locating System (RTLS). The network supported both positioning-on-device and positioning-on-server capabilities to enable campus navigation and asset tracking.
- The key impact was a 50% reduction in network coverage costs, achieved through an optimized two-layer edge architecture that lowered hardware and infrastructure requirements.

MTN Irancell, ***Tehran, Iran*** **Mar 2020 – Jul 2021**
Data Analyst, Network Performance Engineer

- I automated the generation of routine KQI/KPI reports and anomaly detection procedures, and conducted on-demand data analyses of core network quality and performance indicators using Python, SQL scripts, and Hadoop framework.
- My work saved hours of manual work that had previously been done every day.

Arshon Technology, ***Ontario, Canada (remote)*** **Dec 2020 – Jul 2021**
Senior Hardware Engineer

- Designed and developed the hardware of an industrial IoT gateway.
- Enabled customers to remotely monitor and control building equipment, improving operational efficiency and convenience.

Sarveen Technologies Inc., ***Tehran, Iran*** **Sep 2016 – Feb 2020**
Head of Embedded Systems Team

- Led the embedded team from day one and drove the development of multiple AI-enabled devices for Sarveen's comprehensive livestock health monitoring solution, including an electronic milk meter, an ultra-low-power wearable, an IoT gateway, a walk-over weigh scale, and a livestock exhale analyzer.
- Designed and implemented the hardware, communication protocols, and embedded software for an ultra-low-power wearable activity recognition system using IMU sensors for dairy cow monitoring.
- Implemented signal processing algorithms and developed firmware in C/C++ for the electronic milk meter system.
- The system has been successfully deployed in several dairy farms across Iran.

Teaching Experiences

University of Maryland *Teaching Assistant* **2021 – 2023**

- Signal and System Theory, Cryptography, Digital Circuits and Systems Laboratory, Embedded Systems

Sharif University of Technology *Teaching Assistant* **2015**

- Data Communication Networks

University of Tehran *Teaching Assistant* **2011 – 2013**

- Multimedia Communications lab, Signal and Systems, Microprocessors

Exceptional Talent High Schools *Teacher* **2008 – 2015**

- Principles of Computer Programming, Robotics and Embedded Programming, Life and Social Skills

Professional Services

Peer-Reviews

- IEEE MCSoC (Multicore and Many-core Systems-on-Chip) 2024
- IEEE Wireless Africa Conference, *The IEEE Vehicular Technology Society* 2019
- Physical Communication Journal, *Elsevier* 2019

Referee and Technical Committee

- Internet of Things Challenge, *Iranian University of Science and Technology* 2017
- Kharazmi Innovation Festival of Youths for Electronics projects 2017
- RoboCup IranOpen International Competitions in Junior Leagues 2007 – 2015

Student Volunteer

- Human-Computer Interaction Lab (HCIL) Symposium 2023 – 2024
- 20th Iranian Conference on Electrical Engineering 2012