Hossein Khayami

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About Me — PhD student at the University of Maryland, my current research focuses on applying AI/ML to accessibility and assistive technology. Specifically, I work in Human Activity Recognition (HAR) using sensor data to monitor the daily activities of older adults, aiming to enhance their well-being and independence, with the recent work submitted to IMWUT. I bring a strong foundation in signal processing and hands-on experience in developing wearable devices for health monitoring. I am dedicated to improving accessibility and quality of life through innovative technology.

Education

University of Maryland, College Park, MD, USA **Sep 2021 – Present**
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 Interest

- AI for Accessibility and Assistive Technologies
- Signal Processing and Machine Learning
- Embedded Systems: IoT and Health Monitoring devices
- Distributed Computing: Federated Learning

Submitted Manuscript

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).

Publications

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.

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 BLE and WiFi

Research Experience

Intelligent Assistive Machines (IAM) Lab, University of Maryland, *College Park, MD, USA* **Jun 2023 – present**
Research Assistant
- I leverage expertise in machine learning, signal processing, data analysis, and wearable devices to develop human-centered AI solutions focused on accessibility for older adult populations.
- Under the supervision of Dr. Hernisa Kacorri, my current work centers on making activity tracking technologies more personalized and accessible for older adults. I investigate novel data collection methods combining self-reports and sensor-based monitoring to better understand real-world physical activity patterns. This research has been submitted to IMWUT.

Professional Experiences

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

- As a summer intern, I designed and developed a wireless IoT network 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

- Performed data analyses on core network quality and performance indicators. I automated the generation of some routine KQI/KPI reports and anomaly detection procedures, which 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 at Arshon Technology.

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. The system has been successfully deployed in several dairy farms across Iran.
- 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.
- Directed the hardware design and firmware development of other products in the solution, including the IoT gateway, walk-over weigh scale, and livestock exhale analyzer.

Teaching Experiences

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

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

Sharif University of Technology *Teacher Assistant* **2015**

- Data Communication Networks

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

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