Hossein Khayami

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Summary — Highly motivated PhD student at the University of Maryland specializing in Communications and Signal Processing with a focus on applying machine learning to time series and sensory data applications. Possessing 5+ years of experience in embedded systems, signal processing, and data science, including the development of wearable devices for health monitoring. Proven ability to design, implement, and optimize machine learning models and algorithms. Eager to contribute to cutting-edge machine learning solutions for next-generation mobile, IoT, and embedded platforms.

Education

University of Maryland, College Park, MD, USA **Sep 2021 – present**
PhD Student in Electrical Engineering - Communication and Signal Processing
- **GPA (up to now): 3.71/4.0**

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

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

Research Interests

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

Skills

Machine Learning TensorFlow, TFLite, PyTorch, Scikit-learn, Keras, CNNs, RNNs, LSTMs, Model Compression, Quantization, Optimization
Embedded Systems RTOS, Bare-metal firmware, IoT Devices
Data Analysis SQL, Pandas, Numpy
Programming Python, MATLAB, C/C++
Signal Processing Sensor Fusion, Real-time DSP
Hardware Circuit and PCB Design (Altium)

Research Experience

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

- My current work is focused on making wearable device activity tracking technologies more personalized, interactive, and accessible to older adults by designing and using personalized machine learning models with teachable interactions.
- Under the supervision of Dr. Hernisa Kacorri, I investigated novel activity data collection methods that combine self-reports and sensor-based monitoring to better understand the patterns of physical activity in the real world.

Publications

H. Khayami, L. Wang, Y. Kim, B. Lee, D. Conroy, A. Lazar, E. Choe and 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* (2025).

Y. Wang, **H. Khayami**, B. Lee, A. Lazar, H. Kacorri and E. Choe, "Toward Enabling Older Adults to Provide High-Quality Activity Labels: Unpacking Accuracy, Precision, and Granularity in Activity Labeling," *submitted to IMWUT* (2025).

V. Ramani, **H. Khayami**, Y. Bai, N. Garg and 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 and 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 and 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 and H. Lesani, "Smart Plugs for Building Energy Management Systems," *2nd Iranian Conference on Smart Grids (ICSG 2012)*, May 24-25, Tehran.

Professional Experiences

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

- Designed and developed hardware, firmware, and communication protocols for a wireless IoT data gathering node in a cloud-based indoor Real-Time Locating System (RTLS).
- Enabled both on-device and on-server positioning capabilities for campus navigation and asset tracking.
- *Quantifiable achievement:* Achieved a 50% reduction in network coverage costs through an optimized two-layer edge architecture that reduced the need for hardware and infrastructure.

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

- Automated the generation of routine KQI/KPI reports and anomaly detection procedures using Python and SQL scripts
- Conducted on-demand data analyses of core network quality and performance indicators.
- *Quantifiable achievement:* Saved hours of manual work daily by automating report generation.

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

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

Sarveen Technologies Inc., ***Tehran*** **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.
- *Quantifiable achievement:* Successfully deployed system in several dairy farms.

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 and Instructor* **2011 – 2013**

- Wireless 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

Selected Courses

University of Maryland

- Random Process [ECE]
- Advanced Digital Signal Processing [ECE]
- Estimation and Detection Theory [ECE]
- Information Theory [ECE]
- Statistical Pattern Recognition [ECE & CS]
- Convex Optimization [ECE]
- Advanced Numerical Optimization [CS]
- Wireless and Mobile Systems for the IoT [CS]
- Interactive Technologies in Human-Computer Interaction [CS]
- Federated Learning [ECE]

Sharif University of Technology

- Cryptography
- Advanced Cryptography
- Cryptography Math
- Coding Theory
- Random Process
- Data Networks
- Advanced Communication Systems

University of Tehran

- Signal and Systems
- Digital Signal Processing
- Microprocessors
- Communications I
- Communications II
- Antennas
- Computer Networks
- Advanced Programming
- Real-Time DSP lab
- Software-Defined Radio lab
- Linear Algebra
- Wireless Multimedia Communications
- Wireless Multimedia Communications lab

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