Diba Rashidi

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Research Interests

Explainable AI | Trustworthy AI | Cyber-physical Systems
Applied Machine Learning | Data Mining | IoT

Education

- **University of Tehran**, Tehran, Iran Sep 2022 – Feb 2025
  M.Sc. in Information Technology (GPA: 4.0/4.0)
  Courses: Data Mining, Artificial Neural Networks, Trustworthy AI, Social Network.

- **Alzahra University**, Tehran, Iran Sep 2018 – Sep 2022
  B.Sc. in Mathematics (GPA: 3.2/4.0)
  Courses: Graph Theory, Linear Optimization, Numerical Analysis, Probability.

Publications

- **Design and implementation of an ultralow-power ECG patch and smart cloud-based platform**, (IEEE Transactions on Instrumentation and Measurement 2022)

- **Clinical IoT in Practice: A Novel Design and Implementation of a Multi-functional Digital Stethoscope for Remote Health Monitoring**, (Under Review 2024)

- **A Low-cost Epicenter Estimation Scheme for Earthquake Early Warning Systems: A Preliminary Study**, (CSICC 2025)

Research Experience

- **Advanced Robotics and Intelligent Systems Lab**, University of Tehran Sep 2022 – Feb 2025
  - *Early Earthquake Warning*
    - Bench-marked deep learning architectures (LSTM, CNN, ResNet) for denoising smartphone-acquired seismic time-series.
    - Developed a generative model that synthesizes smartphone-grade seismic signals from high-quality datasets.
    - Curated and structured a comprehensive seismic dataset collected from smartphone sensors.
    - Implemented Gaussian-based model for epicenter estimation in smartphone-based EEWS, prioritizing cost-effectiveness and real-time deployment on edge devices; results published in peer-reviewed venues.
    - Conducted a systematic evaluation of mechatronic platforms (CNC systems, robotic arms, hydraulic jacks) for physically simulating seismic activity in lab.
  - Machine Learning
    - Explored and bench-marked interpretable machine learning techniques (Grad-CAM, LIME, SHAP, NAM) to improve the reliability and trustworthiness of deep vision models.
    - Investigated model generalization under domain shift, utilizing hyper parameter optimization (normalization, augmentation, loss tuning) to improve robustness of Farsi handwriting recognition.
    - Implemented and evaluated Fast Gradient Sign Method (FGSM) for robustness evaluation of image classifiers, analyzing model responses to adversarial attacks.
    - Re-implementation of Neural Cleanse (Wang et. al.) for backdoor attack detection and trigger pattern analysis in Farsi handwriting recognition model.
  - Data Mining
    - Worked on Data Warehousing and OLAP (Online Analytical Processing) to design and implement data storage solutions and enable complex queries and data analysis for business intelligence.
    - Applied frequent pattern mining techniques to discover recurring patterns and associations in large datasets, enhancing data-driven decision-making and insights.

- **Wearable Sensors Lab**, Sharif University Oct 2020 – Sep 2022
  - Smart Health Care
    - Designed a low-power wearable Holter monitor and digital stethoscope, enabling continuous remote monitoring of ECG signals.
    - Developed a cloud-based healthcare architecture, comprising a BLE-enabled smartphone application for device connectivity, a web-based dashboard for clinicians, and backend server for real-time data collection, processing, and visualization.
    - Developed an intermittent audio signal filter for denoising and up-sampling of heart and lung audio signals, optimized for edge devices like smart stethoscope.
    - Developed an ensemble learning method based on decision tree and KNN algorithms for arrhythmia classification in ECG data.

- **Iran IoT Research Center** Feb 2020 – Sep 2020
  - IoT
    - Integrated multi-range vibration sensors into an embedded predictive maintenance device by designing interface circuits and developing custom firmware for data acquisition.
    - Developed a backend server and database architecture for reliable collection and storage of sensor hub data for industrial sites.
    - Designed and implemented a decision-level fusion algorithm that combines outputs from multiple vibration sensors based on their performance under different operational conditions, improving detection accuracy over simple averaging or pooling methods.

Teaching & Mentoring Experience

- **Introduction to Computing Systems and Programming**, University of Tehran Oct 2023 – Jun 2024
  - TA for C programming, algorithm design, image processing.
- **Data Mining**, University of Tehran Jan 2024 – Jun 2024
  - TA for data warehousing and OLAP.

Skills Summary

- **Programming:** Python, C, C++, Matlab, Java, Dart, HTML/CSS, JavaScript, SQL
- **Libraries:** Scikit, PyTorch, NumPy, Pandas, TensorFlow, Keras
- **Frameworks:** Spring, Hibernate, Flutter
- **Platforms:** Linux, Arduino, Raspberry Pi, ESP32, STM32
- **Languages:** English, Farsi (Native)

Volunteer Experience

- **Data Mining Workshop**, University of Tehran (Oct 2021): Intro to Python, pandas, numpy for data mining.
- **Resana Association**, Sharif University (Nov 2021): Talk on cloud-based IoMT platform.
- **Tehran Summer 2019**, World Cube Association (Jul 2019): Executive secretary for competition.

Licenses & Certifications

- Certified Linux Administrator (LPIC-1), Fanavaran Anisa (2021)
- IoT BootCamp 99, IoT RC (2020)
- Java EE 8 Programming, MFT (2020)
- Java SE 8 Programming, MFT (2019)

References

- Hadi Moradi, Professor at the University of Tehran; moradih@ut.ac.ir
- Mahmoud Reza Hashemi, Associate Professor at the University of Tehran; rhashemi@ut.ac.ir
- Azadeh Shakery, Assistant Professor at the University of Tehran; shakery@ut.ac.ir
- Ali Moradi, Assistant Professor at the University of Tehran; asmoradi@ut.ac.ir