# AMIRHOSSEIN GHAFFARI

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## EDUCATION

**Doctoral Degree in Computer Science and Engineering** *2023–Present*
University of Oulu, Oulu, Finland
GPA: 4.4/5

**M.Sc. in Electrical Engineering – Digital Electronic Systems** *2017–2019*
Sharif University of Technology, Tehran, Iran
GPA: 18.20/20

**B.Sc. in Electrical Engineering** *2012–2017*
Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran
GPA: 16.24/20

**High School Diploma in Mathematics and Physics** *2008–2012*
Roshd1 Educational Complex, Tehran, Iran
GPA: 19.87/20

## RESEARCH INTERESTS

Urban Computing
Machine Learning
Graph Neural Networks
Federated Learning

## RESEARCH AND PROFESSIONAL EXPERIENCE

**Doctoral Researcher** *Spring 2023–Present*
*University of Oulu* *Oulu, Finland*

· Conducting doctoral research in urban computing, machine learning, graph neural networks, multi-source urban data, and data-driven analysis of smart city systems.

**Computer Vision and Deep Learning Researcher** *Winter 2019–Spring 2023*
*Fard Iran Co.* *Tehran, Iran*

· Designed and implemented an algorithm for an Automatic Number Plate Recognition system.

· Designed and implemented motion detection and human detection applications for surveillance systems.

· Designed and implemented an algorithm to automatically optimize camera parameters, including gain and shutter speed, ensuring the capture of high-quality car license plate images throughout the day and night.

· Designed and implemented a signal processing tool using neural networks to measure vehicle weights in a Weigh In Motion (WIM) system.

· Designed and implemented a driver assistance tool to detect abnormal driving using deep learning, GPS sensor data, and ECU information for comprehensive driving analysis.

· Contributed to the large-scale successful deployment of 70+ Weigh In Motion (WIM) sites across Iran; participated in on-site installation, system debugging, performance optimization, and technical support to ensure operational reliability.

**Deep Learning Researcher** *Spring 2020–Winter 2022*
*Institute of Water and Energy, Sharif University of Technology* *Tehran, Iran*

· Designed and implemented algorithms using deep learning and machine learning methods for an air pollution prediction system.

## THESIS PROJECTS

**M.Sc. Thesis** *2017–2019*
*360-degree Video Transmission over Network using Coded Caching*

· Supervisor: Dr. Mohammad Sharifkhani.

**B.Sc. Thesis** *2016–2017*
*Design and Fabrication of an Active Noise Cancellation System for Environmental Disturbing Sounds*

· Supervisor: Prof. Hassan Kaatuzian.

## TEACHING EXPERIENCE

**Teaching Assistant** *Spring 2026, 2025, 2024*
*Big Data Processing and Applications, M.Sc. Course* *University of Oulu*

· Faculty of Information Technology and Electrical Engineering (ITEE).

· Instructor: Dr. Ekaterina Gilman.

**Teaching Assistant** *Spring 2025*
*Network Analysis and Graph Machine Learning, M.Sc. Course* *University of Oulu*

· Faculty of Information Technology and Electrical Engineering (ITEE).

· Instructor: Prof. Joydeep Chandra.

**Teaching Assistant** *Spring 2019*
*Computer Vision, M.Sc. Course* *Sharif University of Technology*

· Electrical Engineering Department.

· Instructor: Dr. Hoda Mohammadzadeh.

**Teaching Assistant** *Fall 2018*
*Computer Architecture, B.Sc. Course* *Sharif University of Technology*

· International Campus.

· Instructor: Dr. Hamed Farbeh.

**Teaching Assistant** *Fall 2018*
*Advanced Computer Architecture, M.Sc. Course* *Sharif University of Technology*

· Electrical Engineering Department.

· Instructor: Dr. Mohammadreza Movaheddin.

**Mathematics and Physics Teacher** *2012–2015*
*Roshd1 Educational Complex* *Tehran, Iran*

· Taught mathematics and physics.

## PUBLICATIONS

- **A. Ghaffari**, A. Goodarzi, H. Nguyen, S. Hosio, L. Lovén, and E. Gilman, "Redditpersona: A modular framework for community-conditioned llm adaptation from reddit," 2026. arXiv: `2606.06027 [cs.AI]`.
- **A. Ghaffari**, H. Nguyen, L. Lovén, and E. Gilman, "Stram: Spatio-temporal road-aware mapping for graph neural network prediction," *Neurocomputing*, vol. 696, p. 134 161, 2026.
- **A. Ghaffari**, S. Sheikhi, and E. Gilman, "Graph-conditioned mixture of graph neural network experts for traffic forecasting," in *27th IEEE International Conference on Mobile Data Management (MDM)*, Accepted, to appear, 2026.
- D. Goncharenko, **A. Ghaffari**, and E. Gilman, "Open-data traffic noise prediction across cities and traffic stations," in *2026 IEEE 42nd International Conference on Data Engineering Workshops (ICDEW)*, IEEE, 2026, pp. 231–239.
- H. Nguyen, M. Bettinelli, **A. Ghaffari**, A. Benoit, H.-T. Nguyen, S. Pirttikangas, and L. Lovén, "From data heterogeneity to convergence: A data-centric review of federated learning," *arXiv preprint arXiv:2606.10595*, 2026, Under review.
- H. Nguyen, **A. Ghaffari**, J. Chandra, E. Gilman, and L. Lovén, "Centrality matters: Lightweight graph-centric aggregation for moderately heterogeneous federated learning," *IEEE Transactions on Artificial Intelligence (TAI)*, 2026, Under review.
- H. Nguyen, **A. Ghaffari**, and L. Lovén, "When we talk morse: Lightweight parameter encoding for secure federated learning," in *Proceedings of the 21st International Conference on Availability, Reliability and Security (ARES) Workshops*, ser. Lecture Notes in Computer Science (LNCS), Accepted, to appear, Springer, 2026.

- H. Ahmed, H. Nguyen, **A. Ghaffari**, E. Gilman, and L. Lovén, "Past to plan: Llm-powered personalized travel via mobility patterns," in *13th IEEE International Conference on Big Data (BigData)*, IEEE, 2025, pp. 7652–7661.
- **A. Ghaffari**, H. Nguyen, L. Lovén, and E. Gilman, "Stm-graph: A python framework for spatio-temporal mapping and graph neural network predictions," in *Proceedings of the 34th ACM International Conference on Information and Knowledge Management(CIKM)*, 2025, pp. 6377–6381.
- **A. Ghaffari**, S. Pirttikangas, and E. Gilman, "Understanding Well-Being in Urban Context: A Survey," *IEEE Access*, 2025.
- H. Nguyen, M. Bettinelli, **A. Ghaffari**, A. Benoit, T. H. Nguyen, S. Pirttikangas, and L. Lovén, "From heterogeneous data to secure convergence: A data-centric review of federated learning," *Available at SSRN 5856890*, 2025, Under review in Neurocomputing journal.
- S. Sheikhi, **A. Ghaffari**, A. Amiri, and L. Lovén, "Federated variational autoencoders for unsupervised anomaly detection in distributed 5g networks," in *33rd International Conference on Software, Telecommunications and Computer Networks (SoftCOM)*, IEEE, 2025, pp. 1–6.
- S. Sheikhi [*], A. Amiri [*], and **A. Ghaffari** [*], "Balancing Latency and Energy: A Hybrid Geometric Method for Leader Drone Positioning in IoT-Enabled Smart Cities," in *22nd International Conference on Networking, Sensing and Control (ICNSC)*, [*]Equal contribution, IEEE, 2025, pp. 364–369.
- **A. Ghaffari**, "Urban well-being: Leveraging multi source data for informed decision-making," in *22nd IEEE International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops)*, IEEE, 2024, pp. 358–359.
- **A. Ghaffari**, H. Nguyen, A. Saleh, L. Lovén, and E. Gilman, "Traffic accident prediction and warning system: Integration use case," in *Fourth Workshop on Knowledge-infused Learning (KIL), in conjunction with the 30th ACM conference for Knowledge Distillation and Data Mining (KDD)*, 2024.

## CONFERENCES, WORKSHOPS, AND SUMMER SCHOOLS

- **ACM CIKM 2025**, Seoul, South Korea. Participated as a student volunteer and first-author presenter of a paper. *Fall 2025*
- **IEEE ICNSC 2025**, Oulu, Finland. Participated as an author of a paper. *Fall 2025*
- **NVIDIA Workshop**, University of Oulu, Finland. Participated in the NVIDIA workshop on Fundamentals of Accelerated Computing with CUDA Python. *Fall 2024*
- **ACM IoT 2024**, Oulu, Finland. Participated as a student volunteer helping the organizing committee. *Fall 2024*
- **ACM KDD 2024**, Barcelona, Spain. Full participation with a poster presentation. *Fall 2024*
- **12$^{th}$ UBISS Summer School** , University of Oulu, Finland. Full participation and worked as a liaison student helping organizers in the "Care-full! More-than-human Urban Futures" workshop. *Summer 2024*
- **6G Symposium**, Levi, Finland. Full participation. *Spring 2024*
- **IEEE PerCom 2024**, Biarritz, France. Full participation with a poster presentation. *Spring 2024*
- **11$^{th}$ UBISS Summer School**, University of Oulu, Finland. Full participation in the "Smart Internet of Things (IoT) Wireless Connectivity in 5G and Beyond" workshop. *Summer 2023*
- **IEC2-2019 Sharif**, Sharif University of Technology, Tehran, Iran. Attended KNIME, Tableau, and Pandas workshops. *Summer 2019*
- **Deep Learning Summer School**, University of Tehran, Tehran, Iran. *Summer 2018*
- **TensorFlow Workshop**, Sharif University of Technology, Tehran, Iran. *Summer 2018*

## AWARDS AND HONORS

- Received an ACM CIKM Student Travel Grant to participate in the 34th ACM International Conference on Information and Knowledge Management (CIKM), Seoul, Republic of Korea, 2025.
- Received Tauno Tönning Foundation personal research grant, 2024.
- Received an IEEE Student Travel Grant to participate in the IEEE International Conference on Pervasive Computing and Communications (PerCom), Biarritz, France, 2024.
- 4-year fully funded doctoral researcher position through competitive selection at the University of Oulu.

- Iran's National Elites Foundation Award in 2019.
- Received national graduate and undergraduate full scholarships.
- Ranked within the top 0.5% among more than 31,000 participants in the Iranian Electrical Engineering Graduate University entrance exam.
- Ranked within the top 0.5% among more than 220,000 participants in the Iranian Mathematics and Physics University entrance exam.

## SELECTED SKILLS

- **Deep Learning & Graph Neural Networks:** PyTorch, PyTorch Geometric, Hugging Face.
- **Agentic AI & Large Language Models:** LangGraph, LangChain, Google ADK, OpenAI / LLM provider APIs, RAG and GraphRAG pipelines.
- **Big Data & Distributed Systems:** Apache Spark, PySpark.
- **Databases & Knowledge Graphs:** PostgreSQL, Neo4j, Cypher, SPARQL, RDF.
- **MLOps & Cloud Native:** Docker, Kubernetes, Prometheus, Grafana, Weights & Biases, Git.
- **Programming Languages:** Python, C / C++, MATLAB.

## LANGUAGES

- **Persian:** Native
- **English:** Full professional proficiency
- **Finnish:** Beginner
- **Swedish:** Beginner

## REFERENCES

- **Adj. Prof. Ekaterina Gilman**
  Adjunct Professor, Faculty of Information Technology and Electrical Engineering (ITEE), University of Oulu, Oulu, Finland
  Email: ekaterina.gilman@oulu.fi
  Web Page: https://www.oulu.fi/en/researchers/ekaterina-gilman
- **Adj. Prof. Susanna Pirttikangas**
  Adjunct Professor, Faculty of Information Technology and Electrical Engineering (ITEE), University of Oulu, Oulu, Finland
  Email: susanna.pirttikangas@oulu.fi
  Web Page: https://www.oulu.fi/en/researchers/susanna-pirttikangas
- **Asst. Prof. Lauri Lovén**
  Assistant Professor, Tenure Track; Head of Future Computing Group, University of Oulu, Oulu, Finland
  Email: lauri.loven@oulu.fi
  Web Page: https://www.oulu.fi/en/researchers/lauri-loven