

Alireza Fadaei

Research in AI, Software Engineering & Cybersecurity

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RESEARCH PROFILE

Software engineer and researcher working at the intersection of artificial intelligence, software engineering and cybersecurity. My peer-reviewed research investigates federated intrusion detection in resource-constrained dew/IIoT environments. I combine experimental machine learning with hands-on experience designing security platforms, distributed software and scientific data systems.

RESEARCH INTERESTS

- **AI for Software Engineering** — AI-assisted development, agentic workflows, software testing, quality and maintainable AI-enabled systems.
- **AI for Cybersecurity** — intrusion/anomaly detection, ML-based security analysis and robust evaluation of detection systems.
- **Federated & Distributed AI** — privacy-aware learning, dependable distributed intelligence and security at the edge/dew/IIoT layer.

EDUCATION

M.Sc. Software Engineering and Information Systems 2026–Present

University of Oulu | Oulu, Finland | In progress

Academic focus: cybersecurity, software engineering, artificial intelligence and data-driven software systems.

M.Sc. Software Engineering 2022–2025

Azad University, Najafabad Branch | Iran

Thesis: An Optimized Federated Deep Learning Approach for Intrusion Detection in Dew Computing Environments.
Supervisor: Dr. Behrang Barekatain.

B.Sc. Computer Engineering 2017–2022

University of Isfahan | Iran

Thesis: Design and Implementation of an ADS-B-Based Aircraft Observation System. Supervisor: Dr. Ali Bohlooli.

PEER-REVIEWED PUBLICATION

Fadaei, A., & Barekatain, B. (2026). A novel intrusion detection system for dew computing environments based on an enhanced federated deep learning model. *The Journal of Supercomputing*, 82, Article 172.

DOI [10.1007/s11227-026-08314-x](https://doi.org/10.1007/s11227-026-08314-x)

- **Contribution:** Proposed a lightweight 1D-CNN and server-coordinated federated learning architecture operating at the dew layer, with local client training and aggregation rather than centralising raw data.
- **Evaluation:** Used Edge-IIoTset and mutual-information feature selection; reported 15-class accuracy of 97.01% (centralized) and 96.67% (federated).

FEDERATED & CENTRALIZED ML RESEARCH CODE

Federated Intrusion Detection | M.Sc. Thesis & Research Code 2023–2025

Developed the research approach reported in the peer-reviewed publication above, including Flower-based training and IID/non-IID client-data evaluations.

Code github.com/Aliz-f/edge-web-attack-detection-federated

Centralized Intrusion Detection | Comparative Baselines

Compared 1D-CNN and LightGBM on Edge-IIoTset across binary, 6-class and 15-class classification, including accuracy/F1 and inference-time evaluation.

Code github.com/Aliz-f/edge-web-attack-detection-centralized

ADDITIONAL RESEARCH PROJECTS & SYSTEMS

TV Advertisement Scheduling Optimization | Research Collaboration 2024
Contributed to a master's thesis research project at Sharif University of Technology, Tehran, developing synthetic scheduling datasets, a Python MILP model (CPLEX/DOcplex) and NSGA-II, genetic algorithm, simulated annealing and tabu search implementations.

Research code [Data generator](#) | [MILP / CPLEX](#) | [Metaheuristics](#)

ADS-B Aircraft Observation Station | B.Sc. Thesis 2022
Built a system to receive, process and visualise real-time aircraft ADS-B transmissions.

BrassicaLNC | Scientific Research Database 2021–2022
As a full-stack research software developer, built React search and exploration interfaces, Django REST APIs and data models for 1,852 curated lncRNAs from 2,361 RNA-Seq libraries; supported deployment and server operations.
Live platform brassica.arfadaei.ir

SELECTED ACADEMIC DISTINCTIONS

- **Top student** — M.Sc. Software Engineering, Azad University, Najafabad Branch (2025).
- **Best B.Sc. Thesis Award** — University of Isfahan (2022).

TEACHING & MENTORING

- **Programming Instructor | Iran TVTO (2024–2026)** — Practical programming and software development through guided projects.
- **Backend Instructor | Dana Cup (2024–2025)** — Led development workshops; project referee in 2025.
- **Python Workshop Instructor | Isfahan University of Technology (2021)** — Introductory applied Python for non-CS students.
- **Teaching Assistant | University of Isfahan (2020–2021)** — Compiler Design, Fundamentals of Programming and Computer Workshop.

PROFESSIONAL ENGINEERING EXPERIENCE

Full-Stack Software Engineer | Aminyx (Remote) 2026
Built React/FastAPI features and agentic AI sourcing/trust workflows for a B2B trade platform; developed a Dockerised data-enrichment pipeline.

Related code github.com/Aliz-f/company-domain-contact-enrichment

Full-Stack Software Developer / Technical Team Lead | Fardaad (ISTT) 2022–2024
Co-designed a hierarchical security-update platform linking signed repositories, organizational servers and Java endpoint agents; worked on Python services, vulnerability-to-patch matching, user interfaces, integration testing and GitLab CI/CD.

Backend Developer & Systems Administrator | MetaMenu 2021–2022
Developed backend features and supported cloud deployment for restaurant management with AR menus, orders, delivery and accounting.

Backend Developer | Piranest Team 2021–2022
Implemented marketplace APIs and tour-reservation workflows connecting travellers with local guides.

Python Web Developer | Fapsco Project 2020
Developed and maintained Flask applications for customer-facing and internal business workflows.

RESEARCH METHODS & TECHNICAL COMPETENCIES

ML experimentation: 1D-CNNs, feature selection, IID/non-IID splits, F1, confusion matrices and inference time.
Optimisation: MILP/CPLEX and metaheuristic search.

Research tools: Python, TensorFlow, Flower, LightGBM, scikit-learn, NumPy, Git and Docker.

Software engineering: Java, React, FastAPI, Django REST, SQL, Linux, integration testing, GitLab CI/CD and GitHub Actions.

LANGUAGES

English: IELTS Academic 7.5 (R 8.5, L 7.5, W 7.0, S 6.5) | Finnish: Beginner