

Amirsadra Abdollahi

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EDUCATION

- **McGill University** Montreal, QC, Canada
M.Sc. in Electrical and Computer Engineering *Jan. 2026 - Expected Graduation Jan. 2028*
- **Sharif University of Technology** Tehran, Iran
B.Sc. in Computer Engineering *Sep. 2019 - May. 2024*
GPA: 18.88/20 (3.91/4.00)

RESEARCH EXPERIENCE

- **Broadband Access Communications Lab** McGill University, Montreal, Canada
Research Assistant *Jan. 2026 - Ongoing*
Supervisor: Prof. Tho Le-Ngoc
 - **Using Diffusion Models on Predicting Communication Channels**
 - Benchmarked **zero-shot diffusion models** to identify optimal architectures, then developed a domain-specific pretrained model using OpenAI's improved-diffusion framework trained on a custom MATLAB-simulated wireless channel dataset.
 - Applied pretrained diffusion models as backbone networks for wireless channel prediction, enabling multi-task inference including **denoising, inpainting, and super-resolution**
- **WebAssembly Analysis and Testing Lab** University of Southern California, Los Angeles, USA
Remote Research Assistant *Sep. 2024 - Aug. 2025*
Supervisor: Prof. Weihang Wang
 - **Towards Comprehensive WebAssembly Malware Detection**
 - Conducted the most comprehensive study to date on WebAssembly malware, curating a large, diverse **dataset spanning cryptojacking, keyloggers, malicious redirects, and obfuscated JavaScript malware**
 - Designed a novel **detection framework combining static + dynamic analysis with LLMs** (Large Language Models), achieving state-of-the-art accuracy in Wasm malware classification
 - Addressed critical gaps in existing methods, which focused narrowly on cryptojacking, by targeting broad malware categories evading traditional JavaScript detectors
 - **Code Reasoning Abilities of LLMs**
 - Designed a novel **evaluation framework** to assess the code reasoning capabilities of Large Language Models (LLMs), moving beyond traditional input-output correctness metrics
 - Developed a fine-grained **execution trace annotation system** to localize and categorize LLM reasoning failures in control flow, loops, and variable state transitions
 - Engineered a **Perturbation Suite** featuring loop unrolling, operator flips, and code mutants to systematically test LLM robustness and resilience to semantics-preserving code changes
 - Conducted in-depth failure analysis by comparing LLM-generated delta-state traces against ground-truth execution data, revealing latent vulnerabilities in step-by-step reasoning
 - Investigated **self-correction protocols** to evaluate LLMs' capacity for iterative reasoning and error recovery in debugging-like scenarios
- **Intelligent Software Engineering (ISE) Lab** Sharif University of Technology, Tehran, Iran
Research Assistant *Sep. 2023 - May. 2024*
Supervisor: Prof. Abbas Heydarnoori
 - **Generating title for GitHub issues**
 - Conducted research on the **automatic generation of titles for GitHub issues** in Python using **Pytorch** and **Pandas**
 - Gathered a substantial dataset of issues sourced from highly-rated GitHub repositories to facilitate comprehensive analysis and model training
 - Executed thorough **filtering** and **preprocessing** of initial data to consider labels, templates, and patterns of issues to optimize input for model training
 - Utilized various **large language models** and **tokenizers**, performing comparative analyses to evaluate performance and effectiveness

WORK EXPERIENCE

- **DDMAL (Distributed Digital Music Archives & Libraries Lab)** Montreal, QC, Canada
May. 2026 - Aug. 2026
Software Engineer Intern (Backend Developer)
 - Provisioned and configured a lightweight **Kubernetes cluster using k3s**, establishing container orchestration infrastructure for the lab's software services
 - **Migrated legacy services to Kubernetes**, improving deployment consistency, scalability, and maintainability of the lab's production environment
- **Cafe Bazaar (Iranian Android App Store)** Tehran, Iran
Jan. 2022 - Dec. 2025
Software Engineer (Backend Developer)
 - Led end-to-end development of a high-throughput payment platform using **gRPC** and **REST APIs** in **Python**, handling thousands of daily transactions
 - Designed and maintained a user loyalty system in **Python** with points, badges, and rewards
 - Engineered a high-performance upgrade system supporting 3,000 requests per second using **Kafka** and **Redis** for real-time communication and caching in **Go**
 - Led the development and release of a beta user application from **architectural design** through **implementation**, integrating multiple **microservices** and ensuring robust inter-service communication
 - Developed scalable web applications using **Django** and **Gin** frameworks
 - Optimized application performance with **PostgreSQL** database design and management
 - Deployed applications using **Docker**, **Kubernetes**, and **CI/CD pipelines**
 - Implemented monitoring and alerting with **Prometheus**, **Grafana**, and **Alertmanager**

ACADEMIC PROJECTS

- **Agile Software Development** [source-code](#) Fall 2023
 - Designed and developed a scalable **support platform** allowing businesses to register, onboard, and utilize ticketing services.
 - Implemented the **Agile methodology (Scrum)** within a collaborative team environment, enabling effective project management and coordination.
 - Built a scalable backend service using Django, leveraging its ORM for secure and efficient database interactions. Designed PostgreSQL schemas to ensure high-performance data storage and retrieval.
 - Established a robust CI/CD pipeline using Docker for containerization, enabling seamless deployment to remote servers.
- **Object-Oriented System Design** [source-code](#) Spring 2023
 - Developed a comprehensive **social media platform**, enabling users to create accounts, establish channels, publish diverse multimedia content, join channels, appoint administrators, and implement a payment system for accessing premium content.
 - Applied a thorough object-oriented design approach, integrating the **UML modeling language** to ensure robust software architecture.
 - Implemented the **Unified Process (UP) methodology** within a collaborative team environment, fostering effective project management and coordination.
 - Used the **Django framework** for the backend service, utilizing **PostgreSQL** for efficient database management, implementing essential features and functionalities, and established a **CI/CD pipeline** to streamline the deployment process onto a remote server.
- **Data and Network Security** [source-code](#) Spring 2023
 - Designed and implemented a **secure messenger application** in Python, focusing on robust data and network security measures.
 - Established secure connections between clients and servers utilizing **socket programming**, ensuring encrypted and reliable communication channels.
 - Implemented **encryption** techniques using private and public keys to safeguard the confidentiality and privacy of client messages.
- **Computer Simulation** [source-code](#) Spring 2023
 - Developed a Python program to simulate a **dynamic queue-based system**, offering valuable insights into system performance and efficiency.
 - Considered a diverse range of parameters, including load balancing algorithms, the number of queues, and probability distributions for both incoming customers and the amount of time required for servers to complete tasks.

- **Operating Systems** [source-code](#) Fall 2022
 - Worked on enhancing an existing project, extending the **ECS150 file system** in C.
 - Improved the performance by integrating a **cache block** into the read and write processes.
 - Addressed issues related to file deletion and editing, enhancing the file system's reliability and functionality.
- **Systems Analysis and Design** [source-code](#) Fall 2022
 - Designed and developed a **simplified version of Google Drive**, offering account management, multimedia upload and download capabilities, and content sharing among users.
 - Utilized the Django framework to build a robust backend service, enhancing the application's functionality and security.
 - Employed **Docker** for containerization, ensuring seamless deployment and scalability of the application.
- **Advanced Programming** [source-code](#) Spring 2020
 - Created a feature-rich **e-commerce platform**, enabling store creation, product selling, buying from other sellers, and user-to-user communication.
 - Utilized the **MVC architecture** with the **Java programming language**, ensuring a structured and maintainable codebase.

TEACHING ASSISTANT EXPERIENCE

- **Programming Languages**, Prof. Izadi *Fall 2023*
- **Software Engineering**, Prof. Rivadeh *Fall 2023*
- **Systems Analysis and Design**, Prof. Aghamohammadi *Fall 2023*
- **Machine Learning**, Prof. Sharifi-Zarchi *Fall 2022*
- **Artificial Intelligence**, Prof. Rohban *Fall 2022, Spring 2022*
- **Probability and Statistics**, Prof. Najafi *Spring 2021*
- **Advanced Programming**, Prof. Fazli *Fall 2020*

TECHNICAL PROFICIENCIES

- **Programming Languages:** Python, Go
- **Frameworks & Tools:** Django, Gin, gRPC, REST APIs, Kafka, Redis, PostgreSQL, Git
- **Cloud & DevOps:** Docker, Kubernetes, CI/CD Pipelines, Prometheus, Grafana, Alertmanager

TEST SCORES

TOEFL: 106 (Reading: 28, Listening: 30, Speaking: 21, Writing: 27)

HONORS AND AWARDS

- **Ranked 121st in the Nation-Wide University Entrance Examination**
B.Sc. in Mathematics and Physics, among over 164,000 participants, 2019, Iran