

Hossein Zareinejad

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Summary

BSc student in Computer Engineering with hands-on experience in NLP, LLM evaluation, and building production-ready pipelines. Proficient in developing Retrieval-Augmented Generation (RAG) systems, implementing conversational agents, and fine-tuning foundation models for domain-specific applications. Experienced in multi-domain data curation and diagnosing model behaviors like hallucinations. Highly motivated to solve engineering challenges in scaling large language models, processing high-quality datasets, and deploying intelligent systems using clean-code practices.

Education

Amirkabir University of Technology
B.Sc. in Computer Engineering
Talayedaran High School (Gifted High School)
High School Diploma

Sep 2022 – Present
Tehran, Iran
Sep 2019 – Jun 2022
Iran

Research Interests

Interests: Large Language Models (LLMs), RAG Architectures, Agentic Systems, LLM Benchmarking & Evaluation, Fine-Tuning, Autonomous Planning.

Professional & Research Experience

Undergraduate Researcher — LLM Evaluation & Benchmarking
Amirkabir University of Technology (under Dr. Momtazi)

Mar 2026 – Present
Tehran, Iran

- Curated and annotated high-quality, multi-domain benchmark datasets across diverse categories, including Medical and Religious domains, ensuring robust data preparation for model ingestion.
- Conducted comprehensive evaluations of state-of-the-art generative language models (e.g., LLaMA, Qwen, Mistral) to systematically track response accuracy and answer correctness.
- Analyzed model performance limitations and behavioral edge cases, focusing on measuring hallucination rates and evaluating domain-specific knowledge alignment.

Undergraduate Researcher — Autonomous Driving & Simulation
Amirkabir University of Technology (under Dr. Javanmardi)

May 2026 – Present
Tehran, Iran

- Tested and benchmarked diverse open-source autonomous vehicle control and end-to-end planning models within the CARLA simulation framework.
- Integrated system nodes with Autoware and ROS2 stacks to evaluate vehicle behaviors, lane-keeping, and routing under various environmental conditions.

Undergraduate Researcher — Autonomous Driving & LLM Agents
Amirkabir University of Technology (under Dr. Javanmardi)

Mar 2026 – Present
Tehran, Iran

- Developed agentic decision-making frameworks based on Generative LLMs for autonomous vehicles as an alternative to traditional rule-based behavioral planners.
- Designed integration pipelines connecting high-level LLM agent outputs with ROS2 / Autoware lower-level planning and control modules.
- Reviewed contemporary literature on foundation models for robotics to draft simulated scenarios and evaluation suites for testing planning logic.

Undergraduate Researcher — NLP & Large Language Models
Amirkabir University of Technology (under Dr. Nazerfard)

Mar 2025 – Feb 2026
Tehran, Iran

- **Conflict Prediction:** Utilized transformer-based architectures (BERT, GPT-style models) to parse and process political speeches and social-media texts for predicting underlying tension patterns.
- **Cross-platform Profile Mapping:** Implemented feature extraction and representation learning workflows to map user profiles across platforms using textual alignment.
- **Big Data Analysis:** Explored distributed processing architectures and engineered medium-scale preprocessing pipelines to handle textual data challenges.

Frontend Developer
Ariana Shabake Afaq

Jul 2025 – Oct 2025
Tehran, Iran

- Built responsive web applications using React and Next.js (SSR/SSG) with Tailwind CSS, adhering to modern ES6+ and clean code standards.
- Integrated GraphQL queries/mutations and RESTful APIs, implementing proper caching, pagination, and accessible RTL/LTR component layouts.

Teaching Assistantship

Amirkabir University of Technology

- **Industrial Internship:** Teaching Assistant under Dr. AmirHossein Roshanzamir (Spring 2026).
- **Software Engineering II:** Member of the course project/design team; contributed to project specification under Dr. Faezeh Gohari (Fall 2025, Spring 2026).
- **Software Testing:** Exercise/assignment designer; prepared test-case and coverage tasks under Dr. Faezeh Gohari (Fall 2025, Spring 2026).
- **Advanced Programming:** Exercise designer for coding assignments and debugging tasks under Dr. Masoumeh Taromirad (Fall 2025, Spring 2026).
- **Entrepreneurship:** Guided student teams on MVP design and project documentation under Dr. Morteza Zakeri (Fall 2025).
- **Software Engineering I:** Assisted in Scrum practices and project reviews under Dr. Alirezaei (Spring 2025).
- **Logic Circuits:** Grader for assignments under Dr. Mehdi Sedighi and Dr. Morteza Saheb Zamani (Fall 2024).

Academic Projects

VectorID (Identity Resolution Engine) | *Python, Qdrant, FastAPI, React*

- Developed an Entity Resolution platform to identify duplicate/noisy user profiles across large datasets.
- Integrated Multilingual Sentence Transformers for semantic search and multi-vector embeddings in Qdrant.
- Designed a scoring system using Jaro-Winkler, Levenshtein, and Cosine Similarity for matching in $O(\log N)$.

GraphNLP (Advanced Text Summarizer & Entity Graph) | *Python, FastAPI, SpaCy, Hugging Face*

- Built a high-performance NLP pipeline for abstractive (BART) and extractive summarization of news articles.
- Implemented Named Entity Recognition (NER) and syntactic relationship mapping.
- Developed an interactive, physics-simulated graph visualization using Vis.js to explore entity connections.

FleetSim MAPF (Multi-Agent Path Finding) | *Python, Pygame*

- Developed a high-performance simulator for optimal multi-agent pathfinding using Conflict-Based Search (CBS).
- Implemented a 3D Space-Time A* low-level planner supporting dynamic real-time obstacle re-planning.
- Integrated standard Moving AI Benchmarks and visualized paths with sub-pixel linear interpolation (LERP).

CryptoArbitrageMonitor | *Python, FastAPI, Prometheus, Grafana, Docker*

- Built a service to fetch real-time crypto prices across exchanges and detect arbitrage opportunities.
- Integrated Prometheus and Grafana to monitor HTTP latency, success rates, and live price feeds.
- Implemented an alerting system via Telegram Bot API to notify users of profitable price differences.

MelodyChat (Sickimfy) | *Kotlin, Jetpack Compose, Ktor, WebSockets, Room*

- Developed a full-stack Android music app featuring streaming, offline downloads, and real-time chat.
- Built the UI using Jetpack Compose (MVVM) and integrated AndroidX Media3 for background playback.
- Engineered a Ktor backend with WebSocket chat hubs, JWT authentication, and Room local persistence.

RealTime Chat | *Node.js, Express, React, Socket.IO, PostgreSQL*

- Built a self-hosted real-time chat application with live search, chat requests, and read receipts.
- Developed the backend using Node.js and Socket.IO for real-time events with a PostgreSQL database.
- Containerized the full stack using Docker Compose and an Nginx reverse proxy for the React frontend.

Technical Skills

Core Programming: Python (Clean Code practices), Java, C, C#, JavaScript (ES6+), SQL, Linux CLI, Git.

AI & LLM Ecosystem: PyTorch, Transformers, Hugging Face, LangChain, LlamaIndex, Vector Databases, RAG Pipelines.

Models & Text Processing: LLaMA, Qwen, Mistral, BERT, Text Preprocessing, LLM Evaluation & Benchmarking.

Tools & Frameworks: Django, REST APIs, GraphQL, React.js, Next.js, PostgreSQL, Docker, ROS2, CARLA Simulator.

Training Courses

- **Machine Learning & Deep Learning:** Supervised Machine Learning (Coursera/Andrew Ng), Advanced Learning Algorithms (Coursera/Andrew Ng), Machine Learning (Sharif University of Technology / Ali Sharifi-Zarchi).
- **Web Development:** Task-Oriented Front-end Development Bootcamp (Coursera).

Languages

Persian: Native

English: Full Professional Proficiency