AmirSalar Safaei Ghaderi

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Education

Sharif University of Technology **Tehran, Iran**

Bachelors of science in Computer science, 18.45/20 GPA - 19.16/20 GPA (final 3 years) *Oct 2020 - Current*

Research Interests

- Software Engineering
- Oprating Systems
- Network and Application Security
- Databases
- Systems
- Distributed Systems

Experience

Divar (Iran's largest tech platform) **Iran**

Mid-to-Senior Software Engineer *April 2023 - Current*

- As the **system owner**, contributed to the development and maintenance of Open-Platform (Kenar Github Docs), Divar's solution for open APIs.
- Improved the latency and security of our API gateway by using the Open Policy Agent (OPA), reducing latency from 200ms to under 5ms at the 99.9% quantile.
  - Applied policy code generation within OPA to enhance performance.
  - **Contributed** to the OPA Envoy plugin project and collaborating with maintainers to resolve critical issues on OPA project. LINK
  - Conducted comprehensive research on a critical performance bug in the OPA compiler. Identified significant design flaws in the optimizer, particularly in its inlining mechanism, which caused erroneous multiple invocations of inlined functions, leading to performance degradation. Issue LINK
- Designed and implemented a rate-limiting system using advanced protobuf annotations.
- Designed, implemented and maintained APIs with upport for multiple data centers and handling high traffic efficiently
- Designed and implemented custom OAuth server aligned with the RFC.
- Developed a synchronizer to sync business logic across multiple datacenters.
- Mitigated security vulnerabilities, including addressing SSRF and Open-Redirect.

CafeBazaar **Iran**

Software Engineer *July 2022 – April 2023*

- Researched and engineered a cost-effective e-commerce platfrom using Django-Tenants
- Integrated Auto-TLS certificates using caddy
- Optimized Django-Tenants schema creation using Postgresql copy features.

Awards

National University Entrance Exam ranked 466 among 155k **2020**

Iran National Olympiad in Informatics Silver medalist – Young Scholars Club **2019**

- INOI subjects include combinatorics, graph theory, automata theory and algorithms in form of competitive programming.

Volunteering

Teaching Assitant **Fall 2021 - Current**

- **Basic Programming**: I was responsible for tutoring a class every week and creating assignments. Fall 2021
- **Principal of Computer Systems**: I was responsible for creating MIPS assignments and grading them afterward. Fall 2022
- **Advanced Programming**: I was responsible for solving extra problems for students to better understand the course. Winter 2023
- **Probability Theory**: I was responsible for authoring homework and solving side problems for students to better understand the course. Winter 2023
- **Operating Systems**: I was responsible for preparing the Blitz emulator for the course, authoring and marking assignments. Fall 2024 LINK

Grading participant exam solutions of Iran National Olympiad in Informatics **2021**

- One of the required exams before proceeding to IOI.

IOI Tutoring **August 2020 – July 2022**

- Taught algorithms and graph theory concepts aligned with IOI (International Olympiad in Informatics) to exceptional talents from around the Country.
- Subjects included: graph shortest paths, SCC, DSU, MST, LCA, 2-SAT, SQRT decomposition, sorting, ...

Personal Projects

SQLC PGX Monitoring - LINK

- I felt the void in my workplace toolchain when I was trying to debug database queries and their timings.
- Engineered a solution using *Sqlc*'s approach toward naming generated functions which is commenting the name above the sql query.
- Developed a wrapper using **pgx** (Golang's Postgresql driver).

Rasspberry AI assistant

- Hailo AI Module & TAPPAS Pipelines: Implemented voice activity detection (Silero VAD) and facial recognition using the Raspberry camera module and TAPPAS pipelines.
- Knowledge Graph Integration: Connected the AI to a Neo4j database with a dynamic schema defined in the system prompt. Enabled the assistant to add nodes, form connections, retrieve data, and store facial information via GStreamer.
- Transcription & Speech: Leveraged Gemini for transcription and Whisper for text-to-speech, providing full conversational capabilities.

3d laptop with terminal - LINK

- Developed a website using three.js library showcasing the exact model of my personal laptop in 3d and featuring a simple terminal emulator that can emulate a simple file system and "*cd*","*mkdir*","*ls*" commands.

Competitions

LLM Hackathon 2024 (First Place) February 2024

- Model Quantization: Adapted a Falcon model for low-end environments by implementing quantization techniques. Achieved a lightweight model capable of running without a GPU, utilizing only 7 GB of memory while preserving most of its accuracy.
- Model Fine-Tuning: Collaborated on fine-tuning a model using a specific text corpus. Employed advanced search techniques and prompt engineering methods to enhance model performance effectively.

AI Cup 2023 (Second Place) 2023

- A competition around a multi-agent game like RISK. Our team achieved second place using **graph and heuristic algorithms**. Our work: LINK

Torob Data Challenge 2023: Learning to Rank (First Place) March 2023 - April 2023

- Collaborated with a three-person team to sort a list of products for given a query based on relevancy, on real search data of Torob, and came in first place, having a NDCG score of 0.83.
- Our work included: XGBoost, BM25, text normalization and tokenization, algorithmic spell checking and correction, complex feature extraction

Optimizer2022: Multi-Manifold Clustering (First Place) March 2022 - Sep 2022

- Our report is available at this LINK.
- Our work was a mix of Dimensionality reduction techniques (Mostly LLE and PCA), k-estimation, clustering methods like DBSCAN (with a custom extension based on the local dimensionality of points which we proposed)

Skills

- **Programming Languages**: Golang, Python, C++, Java, Javascript, Rust
- **Framework and Tools**: GRPC, Protobuf, Kubernetes, AWS S3, Django, Redis, RabbitMQ, Spark, ONNX, Tensorflow, Pytorch

Hobbies

One of my passions is tinkering with **Linux**, especially its cutting-edge aspects. My work laptop is an M2 MacBook, so I used Asahi to install NixOS on it. There were a lot of limitations that I had to deal with, but I learned a great deal about Apple's implementation of macOS along the way. I also enjoy creating my own desktop environment. While I was using X.Org, I relied on bspwm, sxhkd, eww, and numerous bash scripts to create a personalized desktop setup. Now that I'm on Wayland, I'm using Hyprland and Waybar. The other thing that I'm passionate about is **Neovim**, I love its ability to be configured up from the basic text editor to the full fledged IDE. Also here are my dotfiles: LINK