Hossein Aghaei

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Education

Sharif University of Technology (SUT)   *2019 - Present*
- Bachelor of Science, Computer Engineering
- **GPA: 19.13/20** (Last 2 years: **19.83/20**) (Transcript)

RESEARCH INTERESTS

- Software Engineering
- Database & Information System
- Distributed System & Operating System
- Programming Language & Compilers

RESEARCH EXPERIENCES

RADIAN Lab (Dr.Bardia Safaei)   *Sep:2023 - Present*
- Initiated the department's **first** comprehensive project on **databases**, focusing on **SQL**, **NoSQL**, and **Time-Series databases** specifically for IoT applications.
- Conducted a detailed **comparison** of **SQL**, **NoSQL**, and **Time-Series databases for IoT**, presenting findings in a report and through an in-depth presentation. (Link).
- Compiled and analyzed several **Time-Series datasets**, **profiling IoTDB** performance in a **clustered** environment using the **MQTT** protocol.
- Engineered a **custom MQTT** data format, **reducing energy consumption and network overhead** for IoT devices interfacing with IoTDB.
- Authored (**as first author**) "**Integrate the IoTDB with Different Communication Protocols Suitable for IoT Devices**", a paper currently under preparation.

Cyber Physical System Lab (Dr.Mohsen Ansari)   *Feb:2024 - Present*
- Co-authored "**Thermal-Aware Fault-Tolerance in Heterogeneous Multi-Core Systems Using Adaptive Machine Learning**" (submitted to **DAC 2024**), proposing a method to **dynamically determine task replica count** and mapping in **heterogeneous** multi-core processors for **reliability**, **real-time constraints**, and **fault tolerance**.
- Developed frameworks using **LSTM** to **predict system temperature at runtime**, integrating techniques like **DVFS** and **DTM** to avoid **overheating** and **reduce power consumption**.
- Translated **MiBench** benchmark codes to **Python** and **Java**, and executed them on **gem5 x86 and ARM** simulators to gather **power usage and area metrics**, later processed using **McPAT**.
- Collaborated with **Professor Ansari** and **Dr. Safar**i on a comprehensive **survey** exploring r**esource-sharing strategies for real-time systems.**

Setaerh Group   *Jul:2021 - Sep-2021*
- Write a reliable Nugget package to run **multiple programming language scripts, such as .NET, Python, R**, and **Matlab** with extensive data in a remote **Jupyter Notebook server**.
- Prototype for several network protocol like HTTP and **WebSocket.**

PROFESSIONAL EXPERIENCES

Senior Software engineer at Digikala   *Jul:2022 - Present*
- Conduct several **advanced MySQL** courses for about **200** engineers.
- Member of the **database disaster management** team.
- **Lead** of the promotion team for **2 Black Friday** campaigns with **800k** online **users**.
- Develop features on our native framework to **decrease 21% of Redis queue sizes**.
- Develop a **micro-service** for stock management with **distributed transactions** and about **50k** requests/second.

Software engineer at Mohaymen *Feb:2021 - Nov:2021*
- Develop a fast multi-operational CSV parser in **.NET** to read a **4G file in 8 seconds**.
- Develop a **logging** system to track a request among **different services.**

SKILLS

- **Programming language**: **Java**, **.NET**, **Python**, Node.js, PHP, **C**, C++, R, Assembly, Verilog, Bash.
- **Technology**: **Git**, **Docker**, Redis, **Kafka**, Memcached, Elasticsearch, **MySQL**, PostgreSQL, MongoDB, **IPTable**.
- **Coding: SOLID**, **Test** (Unit, Integration), **Design Patterns**, **Agile** methodologies, **Clean Architecture, CI/CD**
- **OS: Linux,** MacOS, Windows

VOLUNTEER EXPERIENCES

Teaching Assistant
- Technical Presentation (7x)
- Database Design (2x, 1x as the **Head**)
- Signals And Systems (1x)
- Software Engineering (1x as the **Head**)
- Basic programming (2x)
- Linear algebra (1x)
- ADV information retrieval (1x)
- Embedded System (1x)

Teaching And Mentorship
- Organize an study group, lead 7 teachers and consultants, webinar for more than 2000 students.
- Teaching Chemistry and Math in my **ALPHA** to more than **1000 students** from 2019.
- **Edit 7 books & Author of a book** in Chemistry for the university entrance exam- Konkur.

RELATED COURSES

- Database Design (19.2) (github)
- Agile Software Development (20) (github)
- System Analysis & Design (20) (github)
- Essentials of Prompt Engineering (link)
- Compiler Design (20) (github)
- Operating System (19.5) (github)
- Computer Networks (20) (github)
- Blockchain Scalability (coursera)
- Embedded Systems (20) (github)
- Software Engineering (20)
- Artificial intelligence (20)
- Data structure & Algorithm (20)

RELATED PROJECTS

- **PintOS**: Implement OS features like **syscalls**, an **inode-based filesystem**, directories, **priority inversion**, buffer cache, and **locking** mechanisms (mutex, semaphore).
- **Kafka**: An MVP of the Kafka streaming platform for **multiple producers/subscribers** to guarantee **the exact one** recipient.
- **Torrent**: An MVP of the **Torrent protocol** for **distributed file sharing** using Python sockets.
- **DayPay**: This is my **startup MVP** in Jango about a platform to facilitate **employee advance payments**.
- **C-Minus**: A **compiler** for a **simplified C language** called c-minus.
- **Search-Engine:** A **ML-powered** search engine using techniques like **Transformer** and **fastText**.

HONOURS AND AWARDS

- **Ranked 24th,** in Iranian University Entrance Exam among 164k students.

LANGUAGES

- **Persian:** Native
- **English:** TOEFL iBT 103/120 (R: 30, L: 28, S: 22, W: 23)