

Adib Rezaei Shahmirzadi

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Education

College of Electrical and Computer Engineering, University of Tehran

Undergraduate student of B.Sc. in Software Engineering

• **GPA of Last Year: 18.53 (Cum. GPA: 17.98/20)**

Tehran, Iran

Sep. 2019 - Present

Shahid Beheshti High School

Affiliated with the National Organization for the Development of Exceptional Talents (NODET)

Qaemshahr, Iran

Sep. 2013 - Jun. 2019

Research Interests

- Cloud & Edge Computing
- High-Performance Computing
- Distributed Systems
- Computer Networks

Publications

[1] F. Niknia, P. Wang, Z. Wang, A. Agarwal, and **A. Rezaei Shahmirzadi**. "Edge Caching Based on Deep Reinforcement Learning and Transfer Learning" *IEEE Transactions on Network Science and Engineering* [To be submitted in Jan. 2024].

Research Experience

Internship at York University

Under Supervision of Prof. P. Wang

Remote/York University, Canada

May. 2023 - Nov. 2023

- Engaged in advancing deep reinforcement learning-based caching strategies tailored for IoT networks that handle transient data at the edge nodes to perform better in resource-intensive environments and took advantage of transfer learning to transfer the reusable trained policy in different environments.
- My contributions to the project involved assessing reinforcement learning algorithms on the problem, such as DDQL and A2C, and enhancing the performance of the caching approach, with a focus on enhancing cache hit rate and freshness across diverse scenarios such as different request rates or lifetimes.

Undergraduate Research Assistant at High-Performance Network Laboratory

Under Supervision of Prof. A. Khonsari

University of Tehran

Jul. 2023 - Present

- Our current focus revolves around a challenging problem—providing services to a maximal number of users while ensuring the delivery of fresh data. The complexity is heightened by the inclusion of a delay factor in caching actions, presenting a challenge for the RL agent to cache requested files seamlessly.
- In my role, I examined various RL algorithms to pinpoint the most suitable ones for our specific problem. This involved a comprehensive evaluation of algorithms such as Proximal Policy Optimization (PPO) and deep deterministic policy gradient (DDPG), culminating in the creation of a benchmark for comparison tailored to our unique problem domain.

Professional Experience

Software Engineer at Yektanet

Yektanet is Iran's leading online ad network, reaching 25 million users monthly with 5 billion impressions

Tehran, Iran

Oct. 2021 - Mar. 2023

- System owner overseeing critical services, accountable for code reviews and ensuring system availability, scalability, and maintainability.
- Responsible for interviewing new software engineer candidates and improvement of the technical interview process.
- Running technical knowledge-sharing conferences among domain members.

Co-Founder at Gymtime

Gymtime is a startup tech company associated providing online reservation service to athletes

Sharif University of Technology

Jan. 2022 - Jan. 2023

- Co-founder and team coordinator of 7 people in this group.
- As a software engineer, responsible for developing features, improving services, and addressing technical challenges.
- As a site reliability engineer, responsible for automated operations like continuous deployment, building high available, fault-tolerant, scalable services capable of efficiently handling hundreds of requests per second.

Awards and Honors

2019 **Ranked 216 (Top 0.2%)** in Konkur (Iranian University Entrance Exam) out of 164,000 participants.

2013 **Awarded** as an exceptional talent student in elementary school

Iran

Iran

Technical Skills

Computer Networking	WireShark, GNS3, TCL, PuTTY, Telnet, SSH
Technologies	Docker, Kubernetes, Apache Kafka, Redis Cluster, PostgreSQL, MongoDB, Prometheus, Grafana
Programming	Go, Python, Matlab, C/C++, OpenMP, Java, TypeScript, Verilog HDL, C#, Shell Script
Web Development	Django, React, Vue, Spring, JUnit

Teaching Experience

University of Tehran

Tehran, Iran

- **Teaching Assistant** Engineering Probability and Statistics, M. Tavassolipour Fall 2023
- **Teaching Assistant** Artificial Intelligence, H. Fadaei Spring 2023
- **Teaching Assistant** Algorithm Design, MJ. Dousti Spring 2022, Fall 2022
- **Teaching Assistant** Data Structure, H. Faili Spring 2021, Fall 2021, Spring 2023
- **Teaching Assistant** Discrete Mathematics, S. Mohammadi Spring 2023, Fall 2023
- **Teaching Assistant** Advanced Programming, R.Khosravi Fall 2021, Spring 2022, Fall 2022

Academic Projects

Computer Networking: Developed an FTP server, utilizing low-level socket programming techniques. Additionally, conducted NS2 simulations and analyzed various parameters within a wireless network, including Throughput, Packet Transfer Ratio, and Average End-to-End Delay. Furthermore, I implemented TCP congestion control mechanisms using UDP network sockets. Lastly, designed both distance vector and link-state algorithms to determine the most efficient routing paths between routers in a specified network topology.

Operating System: Enhanced a cloned MIT xv6 kernel by introducing additional functionalities in the areas of CPU scheduling, memory management, and CPU synchronization. This customized kernel has undergone rigorous testing and can run in the Qemu simulator. Additionally, I developed a word counter using MapReduce to gain insights into process management and intercommunication techniques. Moreover, a multi-threaded image filtering system has been implemented, utilizing both multi-threading and serial programming approaches.

Parallel Programming: Utilized SIMD, OpenMP, and POSIX in C programs for parallel image opacity computation, overlay on another image, and parallel sorting of arrays, demonstrating enhanced performance through benchmarking.

Simple Loop Compiler: Implemented a compiler for a new object-oriented programming language, called *Simple Loop* in 4 phases. These phases include lexer and parser analyzer, symbol table and AST tree, type checking, and code generation. This is done by compiling *Simple Loop* code to Java bytecode and then running the bytecode instructions.

ARM Implementation on FPGA: Designed and Implemented ARM CPU with four-stage pipeline and 13 instructions. Written in synthesizable Verilog HDL code and tested in an FPGA with Quartus II simulator.

Hardware implementation of a Multi-Layer Perceptron Neural Network: Implemented Multi-Layer Perceptron model with Verilog HDL. To test the design, we used TensorFlow to generate neural network parameters from existing training data.

Neural Network and Deep Learning: Implemented various model designs from multiple research papers, including Adaline, Madaline, Linear Regression, CNN, Faster-RCNN, Transfer Learning, LSTM, and GAN as part of my NNDL course projects.

Artificial Intelligence: Implemented seven projects of different artificial intelligence topics such as Search Algorithms, Genetic Algorithms, Classification, Multi-layer Neural Networks, and Regression as part of my AI course projects.

Workshops

Introduction to ML Workshop

ACM, University of Tehran

Directed by the Association for Computing Machinery (ACM) Student Chapter, University of Tehran

July, 2021

Teaching Assistance Training

University of Tehran

A three-hour workshop held by the School of ECE, University of Tehran

Jan. 2021

Languages

English Professional proficiency. **TOEFL: 106/120** (R29, L28, S23, W26)

Persian Native