Ali Mahdavifar

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Education

- **Norwegian University of Science and Technology** — Gjøvik, Norway
  Master's in Computational Color and Spectral Imaging (Discontinued) — 2024
  Awarded the Erasmus Mundus Joint Master Degree Scholarship by European Union
- **Sharif University of Technology** — Tehran, Iran
  Bachelor's in Computer Engineering; Cumulative GPA: 19.01/20 — 2019 - 2024
  Thesis topic: "Computational Complexity of Fine-Tuning Thresholds in Neural Networks"
- **Shahid Beheshti High School of Kashan** — Kashan, Iran
  Diploma in Mathematics & Physics; Cumulative GPA: 19.81/20 — 2016 - 2019
  Under the supervision of National Organization for Development of Exceptional Talents

Experience

- **Ayandenegar Animation Studio** — Kashan, Iran
  Summer Intern — 2023
  - In this project, I was responsible for developing a dedicated internal messenger for the company to increase the efficiency of communications between employees and artists. Besides, I got involved in several challenges for improving and automating the stages of rendering and editing for the upcoming animated movie.
- **Max Planck Institute for Informatics** — Saarbrücken, Germany
  Summer Intern — 2022
  - Worked in the Department of Algorithms & Complexity under the supervision of Prof. A. Karrenbauer, I continued a project on the complexity of fine-tuning bias terms in specific neural networks. This summer we succeeded in improving the chain of reductions from a geometric setup to the fine-tuning problem, eventually achieving proof of NP-completeness of the problem.

Honors and Awards

- Awarded the **Erasmus Mundus Joint Master Degree Scholarship** by the European Union for the Master's program in Computational Color and Spectral Imaging at NTNU, Norway. Attended for four months before withdrawing due to personal circumstances. (2024)
- Awarded **Bronze Medal** in INOI (**Iran National Olympiad in Informatics)** (2018).
  INOI is the national round of IOI (International Olympiad in Informatics) in Iran.
- **Ranked** 36^{th} in **nationwide universities entrance exam** for B.Sc. programs in *Mathematics & Physics* branch, among more than 164,000 participants. (2019)
- **Ranked** 124^{th} in **nationwide universities entrance exam** for B.Sc. programs in *foreign languages (English)* branch, among more than 165,000 participants. (2019)
- Acknowledged as the **youngest [honorary] member of the academic community of University of Kashan**, actively participating in basic courses of the faculty of mathematics at the age of 12. (2014) [link to the university bulletin]

Skills Summary

- **Languages**: C/C++ (fluent), Python (fluent), Java (familiar), JavaScript (familiar), Verilog (familiar).
- **Frameworks/APIs**: PyQt, SQLAlchemy, WebXR, Three.js, OpenGL (beginner).
- **Database**: SQL databases, specially MySQL and PostgreSQL.

Teaching Assistant

- **Discrete Mathematics** — Instructor: Prof. H. Zarrabi-Zadeh
  Responsible for designing some assignments and conducting TA classes and marking tests. — Spring 2021 & 2022 & 2023
- **Data Structures and Algorithms** — Instructor: Prof. Masoud Seddighin
  Responsible for designing assignments for some sessions as well as the final test. — Fall 2021
- **Design of Algorithms** — Instructor: Prof. H. Zarrabi-Zadeh
  Responsible for designing the assignment and TA class on NP-completeness. — Fall 2022 & 2023

Some Programming Projects

- **Occlusion Handling for AR Experience**: In this project, we aimed to scale and combine AI-generated depth maps using matching keypoints and hence handled the occlusion problem in the WebXR platform. (2023) [link to Github]
- **Secure Messaging Application**: We designed and implemented a secure local messaging application in which the used protocol was immune to many of the attacks and vulnerabilities we learned in the Data & Network Security course. (2023) [link to Github]
- **Simple Ray Tracer**: Following Peter Shirley's "Ray Tracing in One Weekend" book, I implemented my first simple ray tracer. In this project I learned about basics of ray tracing and antialiasing, implementation of reflections for several materials, depth of field, etc. (2022) [link to Github]
- **C-minus Compiler**: In this project, we implemented a simple compiler for a simplified version of the C language, called C-minus. I learned to work with DFAs, the LL parsing method, and code-generation techniques. (2022) [link to Github]
- **ChessFX**: Based on MVC architecture, I implemented a graphical chess game using JavaFX. (2020) [link to Github]

References

- **Prof. Hamid Zarrabi-Zadeh**
  Assistant Professor
  Sharif University of Technology
  Azadi Avenue, 14588-89694 Tehran, Iran
  Email: zarrabi@sharif.edu
  Relationship: Lecturer of three of my courses
- **Prof. Andreas Karrenbauer**
  Senior Researcher
  Max Planck Institut for Informatics
  Saarland Informatics Campus, 66123 Saarbrücken, Germany
  Email: andreas.karrenbauer@mpi-inf.mpg.de
  Relationship: Supervisor of my summer internship