

Anas Alhadi

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EDUCATION

Dalhousie University

Bachelor's in Computer Science - First Class Honours - GPA: 4.1/4.3

Jan. 2021 – May. 2025

Halifax, NS

EXPERIENCE

Dalhousie University - Research Assistant

Halifax, NS

Succinct Data Structures - KeBaB ([Paper](#), [Code](#))

Sep. 2024 – May. 2025

- Developed the main program logic of an improved string matching algorithm (KeBaB) for finding maximum exact matches between a patient's DNA sequence and a large DNA dataset. The algorithm combines multiple data processing techniques such as hashing sections of the string and the use of probabilistic datastructures to skip over sections that are guaranteed to not match, thus saving CPU cycles. These optimizations resulted in a minimum of 50% speed up compared to the current industry standard.
- Built an internal testing and profiling suite using python scripts in conjunction with CPU profiling tools to analyse both correctness and performance costs of all changes performed by the development team. The suite performs unit testing of specific functions against hand verified results, as well as large scale integration tests against the output of industry level algorithms. Thus allowing researchers to focus more on improving performance while providing immediate feedback on the effect of their changes.
- Assisted teammates in the debugging process by hosting pair programming sessions involving step by step verification of the program state often at the bit level. A process that resulted in the uncovering of extremely rare bugs, thus significantly improving the robustness and correctness of our algorithm.

IoT Network Compression - Dynamic Rule Updating ([Paper](#), [Code](#))

Apr. 2024 – May. 2025

- Designed a novel rule updating algorithm that integrates CPU scheduling techniques into the SCHC compression protocol as a way to manage compression rules, thus allowing the protocol to adapt to changing network environments, improving both compression ratios with packets seeing a size decrease by up to 20% as well as making SCHC viable for use in mobile IoT networks.
- Delivered dynamic rule updating support to esp32 devices by integrating the algorithm into existing implementations of SCHC in the RIOTOS network stack.
- Built and configured an emulation environment in a linux virtual machine which was used to stress test the algorithm under various network conditions in a controlled and reproducible manner.

Dalhousie University - Teaching Assistant

Halifax, NS

- Designed and deployed CI/CD pipelines on GitLab via YAML scripts which are used to automate the grading of lab submissions while also providing helpful error messages to aid in debugging.
- Automated the grade retrieval and assignment process by using Bash scripts in conjunction with the GitLab API to fetch student grades from the CI/CD pipeline, which are then passed to my custom python script that processes the raw data into a the CSV format expected by the university portal.

PROJECTS

Cloud Lyrics Translation | *NodeJS, AWS*

Jan. 2024 - Mar. 2024

- Designed and launched a SaaS webservice that provided realtime lyric translation to songs currently played on a client's Spotify account, displaying the translated lyrics on a webpage.
- Integrated the use of AWS serverless Lambda to query AWS Translate providing universal translation, with background caching of frequently accessed lyrics in S3 buckets, significantly reducing cost from repeated translations.

TECHNICAL SKILLS

Languages: C/C++, Rust, Java, Python3, SQL, JavaScript, LaTeX, HTML

Developer Tools: Git, Docker, WireShark, Makefile, AWS, GDB

Frameworks: Flask, Nodejs, HTMX, Tailwind

AWARDS

Sexton Scholar: Awarded each semester to students with a 3.85 or higher GPA, achieved in 10 semesters.

Oman MoHE Scholarship: 4 years of paid university tuition, awarded to the top performing highschool students.