KAELAN **MOFFETT**

kaelan.xyz | github.com/oasixer | 647-997-6783 | ksmoffet@uwaterloo.ca | linkedin

Skills

Languages

Proficient Python, Rust, C++, TypeScript, Javascript, Lua, Bash ***Familiar*** C, Golang, Kotlin, Java, x86

Technologies

Linux, GraphQL, Docker, Redis, TCP/IP, Nginx, OpenCV, Kubernetes, Protobuf

Work Experience

Software Engineer Intern | **NVIDIA** | Remote *May-Aug 2022*

- Reduced latency for core **C++** and **Python** nodes in OmniGraph (scalable procedural graph engine) using memoization to cache repeated vector inputs, improving rendering performance.
- Identified memory leaks coming from hash grids in JIT-compiled **CUDA C++** kernels using **Heaptrack** and **GDB**.
- Overhauled versioning and installation system for OmniGraph extensions to cache dependencies, reduce conflicts, and allow multi-instancing on developer machines.

Backend Engineer Intern | **Trexo Robotics** | Toronto *Sep-Dec 2021*

- Responsible for creating a **Kotlin** server on **AWS** to manage live data for 200 exoskeleton robots.
- Leveraged **Merkle Tree** data structure to bidirectionally sync onboard and cloud DBs, allowing seamless access for customers with spotty internet.
- Eliminated expensive manual testing by designing integration testing framework in **Bash** that emulates a remote server to verify behavior of the onboard server across a suite of use-cases.
- Improved security, performance and maintainability by porting legacy **ExpressJS** login server to **Spring**/**Kotlin**

Backend/Infrastructure Engineer Intern | **Pronti Inc.** | Waterloo *Jan-Apr 2021*

- Created **Flask** server for registration/logins using SMS 2FA, **JWT**, and **GraphQL** to reduce API boilerplate.
- Reduced runtime of recommender algorithm by 75% by batching SQL queries, and caching results in **Redis**.
- Moved server container from **GCP** to **Kubernetes** to scale with an influx of users, and implemented waitlist/referral system to manage growth rate.

Backend Developer Intern | **Backr Inc.** | Toronto *Jun-Sep 2020*

- Ported high-volume ingestion microservice to **Go**, resulting in 4x speedup over OG **Python** implementation.
- Reduced **AWS** costs by refactoring monolithic ML pipeline into microservices to enable granular scaling.
- Redesigned main DB schema to speed up CRUD with indexing and relationships, migrated **3M** rows using **Python** script, and used **GraphQL** to simplify the associated API endpoints.

Fullstack Developer Intern | **CIBC** | Toronto *Sep-Dec 2019*

- Created full-stack webapp for managers to create and retrieve fraud reports, built in **Flask**, **SvelteJS**, PostgreSQL.
- Streamlined ticket inflow process for fraud reports by creating a **classifier** using spaCy, NLTK in **Python**.

Computer Vision Software Intern | **North Inc. (Acquired by Google)** | Waterloo *Jan-Apr 2019*

- Created optical raytracing engine using **OpenCV** matrices in **C++** and optimized for specialized ASIC.
- Worked with scientists to create a material property calculator with n-dimensional interpolation in **C++**.
- Automated high-powered laser test jig by developing a **Python** app and **Arduino** firmware with alerts and logging.

Final Year Design Project | Distributed Underwater Positioning System *Sep 2022 - Apr 2023*

- Created positioning system for underwater robots using acoustic nodes in a graph, outperforming commercial solutions in tolerance to reflections and obstructions, achieving 85 meter range with 98% accuracy.
- Awarded **Best Overall Project** out of 52 teams presenting at 2023 U of Waterloo Mechatronics Eng. symposium.
- Responsible for **Rust** Server to send and receive high bandwidth data from each Node and deliver UI webapp.
- Architected Node firmware (**C++**, targeting ARM M7), real-time positioning, networking, and autocalibration.
- Optimized realtime freq. analysis, via **sliding window** implementation of **Fast Fourier Transform**.
- Designed positioning strategy in which each node listens and replies to acoustic pings underwater, the distances are calculated using Time of Flight, then absolute positions of each node are resolved using multilateration.

Education

University of Waterloo | **Mechatronics Engineering BASc** | **Software Option** *Sep 2018 - Apr 2023*

Coursework ▶ Programming for Performance, Search Engines, Adaptive Algos, Datastructures and Algos, Microprocessors