

Shaibal Muhtadee

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EDUCATION

University of Toronto

Bachelor of Applied Science in Computer Engineering (Co-op)

Toronto, ON

Sept 2020 – Apr 2025

EXPERIENCE

Robotics Software Engineering Intern

Zebra Technologies

May 2023 - Sept 2024

Toronto, ON

- Designed and deployed **authentication** and **authorization** servers, securing access for **200+** autonomous robots
- Engineered secure **API** endpoints in **TypeScript**, enabling management of sensitive data like API keys and **JWTs**
- Architected an **ABAC system** with a TOML config **parser**, enabling dynamic policy updates for multiple teams
- Crafted a modular UI with **React**, **Flutter**, and **Cloudflare Pages**, for managing secrets and robot configurations
- Developed a **comprehensive test suite** in Rust, eliminating **99%** of system bugs and ensuring a reliable API
- Developed an internal **CLI** tool for connecting secrets from platforms like **GitHub**, **GCP**, and **AWS**
- Automated **CI/CD** pipelines and containerized microservices using **Docker**, deployed in **Kubernetes**
- Created a **test runner** to audit API security, ensuring compliance with **Minimum Security Requirements**
- Assisted in creating a secure **object store** for efficient **file management** of data uploads and downloads
- Implemented **Model Predictive Control** for a SpeedyBee **drone** with **iNAV**, enabling semi-autonomous flight

PROJECTS

GanttWise | Python, React, Node.js, MongoDB

- Built dynamic web app using **React** and **TypeScript** to automate task planning with Deep Reinforcement Learning
- Used **Python scripts** to preprocess datasets and **debug learning agents**, optimizing scheduling under constraints
- Integrated a full-stack pipeline with **Node.js** backend and **MongoDB**, enabling real-time project updates

Searchington | Python, Bottle, Redis, AWS

- Built a web **search engine** with a crawler that recursively visits URLs, extracts HTML, creates word lists, and stores data in **SQLite**, using an inverted index and various metrics to deliver relevant search results
- Hosted on **AWS** and implemented **caching** with **Redis** to optimize query performance, improving response times by over **70%**

Computer Graphics Library | C, C++, Visual Studio

- Developed a comprehensive graphics library implementing core concepts, algorithms, and techniques in computer graphics, including **ray casting**, **ray tracing**, and **shader pipelines**
- Optimized **rendering** performance through **bounding volume hierarchy**, enabling real-time simulation of animations and complex 3D scenes

ChromaMap | C++, OpenStreetMap API, GTK Library, Git

- Created a **Geographic Information System** mapping software using **C++** and the OpenStreetMap **API**
- Implemented **Dijkstra algorithm** and **A* pathfinding heuristics** to solve the travelling salesman problem
- Improved browse and load times by over **300%** by developing a **Level of Detail** tiling scheme for the map
- Optimized application speed by **multi-threading** and code visualization, **stack trace** and **flame graphs**

PROGRAMMING SKILLS

Languages: TypeScript, JavaScript, Python, C/C++, Rust, Dart, SQL, HTML/CSS, Bash, ARMv7 Assembly

Frameworks: React, Node.js, Cloudflare Pages, Flutter, Django, Flask

Developer Tools: Git, Linux, Docker, Kubernetes, VS Code, Visual Studio, Google Cloud Platform, AWS

Libraries: NumPy, TensorFlow, Redis, Scikit-learn, Matplotlib, GTK