

# SHARUKA THIRIMANNE

Toronto, Canada | (647) 633-2248 | [sharukat@gmail.com](mailto:sharukat@gmail.com) | <https://sharukat.github.io/> | <https://www.linkedin.com/in/sharukat>

## KEY SKILLS AND COMPETENCIES

- Experience in Python OOP (Data Structures and Algorithms), C++, Django, Django REST API Framework
- Docker, SQL, PostgreSQL, MySQL, Redis, Git (Version Control), Google Cloud Platform (GCP), AWS EC2 & S3
- PyTorch, TensorFlow, Keras, Pandas, Scikit-Learn, Hugging Face, LangChain, Cohere Vector database.
- Natural Language Processing, Machine Learning, Deep Learning, Prompt Engineering (Zero & Few-Shot Learning, CoT)
- Experience in Retrieval Augmented Generation (RAG), RAG Evaluation, Tool usage with LLMs, Fine-tune Sentence Transformers.

## PROFESSIONAL EXPERIENCES

**Teaching And Research Assistant**, York University, Toronto, Canada 09/2022 – 04/2024

- Led and mentored software engineering labs with 30+ undergraduates per class, reinforcing lecture concepts.
- Performed data wrangling, machine learning model training, optimization (hyper-parameter tuning), and testing.
- Analyzed and processed unstructured raw text data for downstream tasks by designing **data preprocessing pipelines**.
- Developed **Generative AI** application with **LangChain** leveraging **LLMs (GPT, Claude, Cohere)** to customize documentation.
- Evaluated performance of RAG application in both retrieval and generation phases leveraging RAGAS library.
- Collaborated with researchers to design experiments and implement research methodologies at EXINES lab.
- Produced peer-reviewed research documentation and presentations, effectively communicating findings to diverse audiences.

**Software Engineer**, Tryonics, Colombo, Sri Lanka 08/2021 – 08/2022

- Developed [Tryo Duplicate Document Identifier](#), achieving ~90% accuracy in identifying near-duplicate insurance claim images.
- Won merit award at the NBQSA National Awards, competing with 30+ companies & universities in Sri Lanka.
- Documented technical specifications and system architecture for the solution with attention to detail.
- Engineered large scale backend systems with **Django, Django REST, & PostgreSQL** utilizing client-server architecture experience
- Designed and implanted **10+ RESTful API endpoints** to communicate with the core module and the user management system.
- Performed **front-end** development for mobile applications using **Flutter** framework, applying **agile** development methodology.
- Conducted product demonstrations for enterprises to introduce the Tryo Duplicate Document Identifier solution.

## EDUCATION

**M.Sc. in Computer Science**, York University, Canada 09/2022 – 04/2024

- Overall GPA: 7.8/9.0 | Awarded **Merit-based scholarship** worth of \$62,500 recognizing the academic excellence.

**B.Sc. in Electronics & Telecommunications**, Sri Lanka Technological Campus (SLTC) 10/2016 – 11/2021

- GPA: 3.3/4.0 | Awarded the most prestigious **Eng. Ranjith Rubasinghe University Award for Overall Excellence**.

## PROJECTS

### Automatic TensorFlow API Documentation Customization

- Built an automated software documentation customizer using NLP to improve comprehensibility based on the users' query.
- Fine-tuned a pretrained **sentence transformers** with limited labeled data using **SetFit** method to perform **binary classification**.
- Developed **multi-class classifiers** by fine-tuned pretrained transformer models on extracted Stack Overflow data.
- Integrated LLMs (**GPT, Cohere, Claude**) into generative AI frameworks to develop applications powered by large language models.
- Established **vector databases** using **Chroma** for semantic search, leveraging **OpenAI** and **Voyage** embeddings.
- Designed and developed **Retrieval Augmented Generation** application to automatically customize software documentation.
- Integrated external tools with large language models (LLMs) through APIs for tasks like web search utilizing **agents**.
- Evaluated RAG application in terms of fairness (hallucination), relevancy, context precision, context recall using RAG-Assessment.
- Conducted empirical study on prompt engineering using Zero & Few-Shot, and Chain-of-Thought (CoT) methods.
- *Tools & Technologies:* **Python, PyTorch, Lang Chain, Hugging Face, Prompt Engineering, Chroma, RAGAS, Cohere ReRanker**

### Expertise Impact on Stack Overflow (SO) Questions

- Built a model to assess user expertise in machine learning and software engineering using **clustering techniques** (unsupervised).
- Conducted statistical analysis using methodologies including the Mann-Whitney test, Cohen's d effect size, and correlation tests.
- *Tools & Technologies:* **Pandas, Scikit-Learn, K-Means, Seaborn, Matplotlib, Statistical Analysis**

### Near Duplicate Image Identifier

- Engineered core module and backend to identify duplicate medical claim images, employing descriptor brute force matching.
- Designed and developed **SQL** relational database system and **NoSQL** in-memory data management system.
- Implemented real-time image preprocessing pipeline for rescaling, Gaussian filtering, erosion, and dilation operations.
- Developed the backend for a comprehensive user management system, implementing 5+ **RESTful API** endpoints.
- *Tools & Technologies:* **Django, Django REST Framework, PostgreSQL, Redis, NumPy, OpenCV, Token Authentication**

### Yard Management System

- Full Stack Yard Management System for managing inbound and outbound containers, including invoice generation.
- Integrated frontend and backend using 10+ RESTful APIs for communication with customers, containers, and reservation systems.
- Developed and deployed several SQL databases to efficiently manage data pertaining to containers, vessels, and user profiles.
- *Tools & Technologies:* **React.js, Django, Django REST Framework, Relational Database (Postgres), Postman**

### Machine Learning (ML) based Real-Time Intrusion Detection System (IDS)

- Comparatively analyzed 6 ML algorithms for intrusion detection (DNN, SVM, K-NN, One-Class SVM, K-Means, and EM)
- Developed a real-time IDS by training a Deep Neural Network (DNN) and using packet sniffing technique.
- Won **Best Research** University Award and **Gold Medal** for Best Contribution for Research & Innovation.
- *Tools & Technologies:* **Keras, TensorFlow, Pickle, Deep Neural Networks, Support Vector Machine, KNN, Anomaly Detection**

### Automated Car Parking System

- Car park management system to visualize vacant spaces, reserve, receipt generation, and notify users.
- *Tools & Technologies:* **Java, MySQL, NetBeans**

## **PUBLICATIONS**

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### **One Documentation Does Not Fit All**

- ACM Transaction on Software Engineering and Methodology (TOSEM), 2024 – To be submitted.

### **Deep Neural Network based Real-time Intrusion Detection System**

- Springer Nature SN Computer Science Journal, 2022 | DOI: [10.1007/s42979-022-01031-1](https://doi.org/10.1007/s42979-022-01031-1)
- International Conference on Cyber Security and Privacy in Communication Networks (ICCS), 2021

### **Comparative Algorithm Analysis for ML Based Intrusion Detection System**

- International Conference on Information & Automation for Sustainability | DOI: [10.1109/ICIAfS52090.2021.9605814](https://doi.org/10.1109/ICIAfS52090.2021.9605814)

## **CERTIFICATES**

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- Google Cloud Platforms (GCP) Fundamentals – Core Infrastructure
- Machine Learning
- Neural Networks and Deep Learning
- Introduction to Data Science in Python
- Machine Learning with TensorFlow on GCP Specialization
- Amazon Web Services (AWS) Cloud Practitioner Essentials
- Convolutional Neural Networks
- Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

## **LEADERSHIP EXPERIENCE**

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| • Vice President – IEEE Student Branch of SLTC | 03/2018 – 03/2019 |
| • President – College ISAAC of SLTC            | 02/2018 – 02/2019 |

## **SOFT SKILLS**

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- Consistently highly-motivated to meet deadlines and achieve milestones.
- Well-organized and a strong ability to adapt to new challenges in various work environments.
- Fast learner with the ability to work independently and enthusiastically in a variety of projects.
- Strong ability to work under pressure and handle changing priorities effectively.
- Team-oriented with the ability to work collaboratively in diverse fast paced environments.
- Demonstrates strong critical thinking skills for effective problem-solving.