

EDUCATION

Australian National University	Acton ACT 2601, Australia	Jan 2024 - present
<ul style="list-style-type: none">• Doctor of Philosophy Engineering and Computer Science Majoring in: Computer Science Conduct research on integrating machine learning and high-performance computing to improve phylogenetic inference performance for large-scale genomic and public health applications.		
University of Moratuwa	Moratuwa, Sri Lanka	Aug 2017 - June 2022
<ul style="list-style-type: none">• BSc. Engineering (Honors) Department of Computer Science and Engineering, University of Moratuwa, Sri Lanka GPA: 3.70/4.20 First Class honors, included in Dean's List for 1, 6, 7, 8 semesters Achieved the highest grade (A+) for the final year research project		
Devi Balika Vidyalaya	Colombo 08, Sri Lanka	Aug 2016
<ul style="list-style-type: none">• G.C.E. Advanced Level in Physical Science Stream Combined Maths: A Physics: A Chemistry: A Island rank: 158 District rank: 52		

RESEARCH EXPERIENCES

Exploring machine learning and high-performance computing technologies to enhance phylogenetic inference performance - Ongoing

Australian National University

This project explores methods to optimize phylogenetic inference workflows by integrating machine learning techniques with high-performance computing (HPC) strategies, thereby supporting large-scale genomic data.

- Designing a hybrid phylogenetic evolutionary model selection framework integrating traditional statistical and supervised learning approaches to improve speed and accuracy.
- Implementing and evaluating distributed parallelism using MPI in ModelFinder (IQ-TREE) for efficient model selection across partitioned and nonpartitioned datasets.
- Developing GPU-accelerated phylogenetics likelihood computation modules using CUDA/OpenACC for IQ-TREE to address computation bottlenecks.
- Benchmarking performance improvements on real and simulated datasets with multinode and hybrid CPU-GPU environments.

Technologies - MPI | OpenMP | CUDA | OpenACC | Parallel Systems | C++ | Distributing Computing | GPU programming | Machine Learning | Python | Convolutional Neural Network

Automated Radiography Analysis Framework Using Deep Learning for Pneumonia and Covid-19 Identification Final Year Research Project

University of Moratuwa, Sri Lanka

[View project](#)

An automated radiography analysis framework for the identification of pneumonia and COVID-19 can be used to provide better performance in chest radiography analysis to detect lung infection conditions.

- A systematic review presenting deep learning-based pneumonia and coronavirus detection solutions, trends, datasets, guidance for a deep learning process, challenges, and future research directions.
- Chest x-ray classification with MobileNetV2, InceptionV3, Xception, ResNet50 models with added top layers
- Develop an ensemble using the earlier trained MobileNetV2, InceptionV3, Xception, and ResNet50 models
- experiment chest x-ray classification with segmentation using U-net architecture
- Develop a web application for the developed framework, consisting of segmentation and classification as a proof of concept.

Technologies - Python | Tensorflow | Machine Learning | Computer Vision | Convolutional Neural Network

RESEARCH PUBLICATIONS

Journals

- D. Meedeniya, **H. Kumarasinghe**, S. Kolonne, C. Fernando, I. Díez and G. Marques, "Chest X-ray analysis empowered with deep learning: A systematic review", Applied Soft Computing, p. 109319, 2022.
DOI: <https://doi.org/10.1016/j.asoc.2022.109319>
- **K. A. S. H. Kumarasinghe**, S. L. Kolonne, K. C. M. Fernando, D. Meedeniya, "U-Net Based Chest X-ray Segmentation with Ensemble Classification for Covid-19 and Pneumonia", International Journal of Online and Biomedical Engineering (iJOE), Vol. 18, No. 7, pp. 161-174, 2022. DOI: <https://doi.org/10.3991/ijoe.v18i07.30807>

Conferences

- C. Fernando, S. Kolonne, **H. Kumarasinghe** and D. Meedeniya, "Chest Radiographs Classification Using Multi-model Deep Learning: A Comparative Study," 2022 2nd International Conference on Advanced Research in Computing (ICARC), 2022, pp. 165-170, DOI: <https://doi.org/10.1109/ICARC54489.2022.9753811>
- S. Kolonne, C. Fernando, **H. Kumarasinghe** and D. Meedeniya, "MobileNetV2 Based Chest X-Ray Classification," 2021 International Conference on Decision Aid Sciences and Application (DASA), 2021, pp. 57-61, DOI: <https://doi.org/10.1109/DASA53625.2021.9682248>

PEER REVIEWS

Pre-publication review

Journal of Computational Biology - [View](#)

EMPLOYMENT

Software Engineer **Sysco LABS Technologies (Pvt) LTD, LK** **May 2022 – January 2024**

- Learn new technologies on the job: Jenkins | Chef | AWS | Shell | Terraform
- Add new functionalities and modifications to the existing Jenkins pipelines
- Modified the existing chef cookbook to support active-active high-availability architecture
- Implemented Lambda function to schedule start and stop AWS instance
- Modified existing Terraform code to provision new resources in AWS
- Design failover process for active-active high available architecture
- Implemented new Jenkins pipelines for support functionalities in an active-active high-availability architecture

Software Engineering Intern **CodeGen International(Pvt) LTD., LK** **October 2020- March 2021**

Database Data Security Project

- implemented LDAP authentication for an in-house built database security project that detects sensitive data using Spring Security features.
- Learnt the existing code and extended the system capabilities both at the Angular frontend and REST-API-based backend levels
- Implemented features to support multiple databases: MYSQL, Oracle.

Oracle APEX BI Dashboard Project

- Learned on the job and successfully set up the Oracle Database and Oracle APEX environments and implemented an interactive BI dashboard for booking-related data analysis.

NLP related project

- Annotated texts and updated gazetteer files, and trained the NLP engine, which was built for company usage, to identify amenities from the texts.

PROJECTS

Research Buddy: A android app

January 2022 - April 2022

[View Project](#)

"Research Buddy" is a mobile application-based solution for efficiently collecting research data. The application offers data collection methods, including questionnaires, interviews, and observations. Questionnaires are used to collect text data, while audio recordings are collected through interviews, and images, videos, and audio are collected through observations.

The collected data is stored in the local device and a cloud database.

Personal contribution - Developed user authentication, questionnaire forms creation, Audio recording, image capturing and video capturing functionalities

Technologies - Java | Firebase | Google Cloud Storage

Distributed Chat System

Septemeber 2021 - October 2021

[View Project](#)

A distributed chat application where clients can connect to the servers, join or create chat rooms, and chat with other clients using a command-line interface. Delete chat room, leave the chat room, view other participants, and view the list of chat rooms are the additional features. This project included the implementation of the bully algorithm for leader selection and the heartbeat mechanism for failure detection.

Personal Contribution - Developed client requests for deleting a chat room, chat room list, leaving and joining a chat room, and a part of the bully algorithm.

Technologies - Java | Maven

NCMS: A fullstack web application

June 2021 - July 2021

[Frontend](#) | [Backend](#)

A full-stack web application with functionalities like patients with COVID symptoms reserving beds from the nearest hospital, hospitals keeping patient records, and public viewing COVID-19 statics, bed statistics at multiple levels (Hospital/District/Country) or based on time. JSON Web Token(JWT) was used for the authentication of the application. Gson, Jcrypt, and log4j are some libraries that were used to implement the backend. Formik, React-ChartJs-2, React-Redux, and Immer are some libraries that were used to implement the frontend.

Technologies - Java | Java Servlet | React | React-redux | PostgreSQL

TECHNICAL SKILLS

- **Technical Fields** – Machine Learning, Computer Vision, Web Development, Mobile Development, Distributed Systems, Object-Oriented Programming, Parallel Programming
- **Programming Languages** – Java, Python, JavaScript, C++, PL/SQL
- **Web Development** – Node.js, Spring Boot, React.js, AngularJS
- **Databases** – MySQL, PostgreSQL, Oracle, Firebase, MongoDB
- **Mobile Development** – Flutter, Java (Android)
- **DevOps & Cloud** – Google Cloud Platform, AWS, Jenkins, Chef, Terraform
- **Parallel & Distributed Computing** – OpenMP, MPI, OpenACC
- **Tools & Utilities** – Bash, Git

HONORS AND AWARDS

- **Australian Government Research Training Program International Fee-Offset Scholarship**
ANU College of Systems & Society, School of Computing, The Australian National University
- **Australian Government Research Training Program International Scholarship**
ANU College of Systems & Society, School of Computing, The Australian National University (A\$ 38,154 per annum)
- **Academic Excellence Award**
Department of Computer Science and Engineering, University of Moratuwa, Sri Lanka
Included in Dean's List for semesters 1, 6, 7, 8 for obtaining GPA 3.80 or above each semester
- **Mahapola Stipend Award**
University of Moratuwa/University Grant Commission, Sri Lanka
Received stipend for the duration of the honors degree based on academic merits.
- **Code with WIE**
A hackathon organized by the IEEE WIE Sri Lanka Section.
Best Team Process
- **Hackdown2020**
A coding competition organized by the IEEE WIE Student Affinity Branch of the University of Moratuwa.
Winners

- **IEEEExtreme**
A 24 hours programming competition organized by IEEE.
Global: 274 - IEEEExtreme 14.0 - 2020
Global: 464 - IEEEExtreme 13.0 - 2019
Global: 495 - IEEEExtreme 12.0 - 2018
- **MoraXtreme**
A 12-hours programming competition organized by the University of Moratuwa
Rank: 14 - MoraXtreme 5.0 - 2020
Rank: 14 - MoraXtreme 4.0 - 2019
Rank: 63 - MoraXtreme 3.0 - 2018
- **Google Hash Code 2020**
Global team programming competition organized by Google
Rank: 21 in Sri Lanka

PROFESSIONAL CERTIFICATES

Fundamentals of Accelerated Computing with OpenACC NVIDIA View here	February 2025
Getting Started with Accelerated Computing in CUDA C/C++ NVIDIA View here	February 2025
Introduction to Concurrent Programming with GPUs Coursera View here	January 2025
Microsoft Certified: Azure Fundamentals Microsoft View here	May 2021
Neural Networks and Deep Learning Coursera View here	April 2021
AWS Fundamentals: Going Cloud-Native Coursera View here	May 2021
Developing Applications with Google Cloud Platform Specialization Coursera View here	July 2020

EXTRA-CURRICULAR

- **Webmaster** - International Women in Engineering Symposium 2020 and 2021
The International Women in Engineering Symposium is organized and hosted virtually by the IEEE Women in Engineering (WIE) Sri Lanka Section. For this event developed a website using WordPress and maintained it.
- **Webmaster** - IEEE Student Branch University of Moratuwa 20/21
For the term 20/21 of the IEEE Student Branch, the University of Moratuwa volunteered as the webmaster.
- **Creative Content Team Member** - IEEE SL SYW CONGRESS 2020
The IEEE Sri Lanka Section Student/Young Professionals/Women in Engineering Congress, which is the flagship event of the IEEE Sri Lanka Section, promotes fostering technological innovation for the benefit of mankind. This event also aims at strengthening the collaboration and cooperation among IEEE members across the country, providing the opportunity to network and brainstorm. Volunteered as a creative content team member for this event.

REFERENCES

Assoc.Prof. Minh Bui
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