https://hashara.github.io/
LinkedIn
Google Scholar

# HASHARA KUMARASINGHE

+ 61 452452053
hashara0923@gmail.com
u7826985@anu.edu.au
https://github.com/Hashara

## EDUCATION

**Australian National University**          Acton ACT 2601, Australia          **Jan 2024 - present**
- **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**
- **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**
- **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** |
|---|---|---|

- Managed infrastructure provisioning, Terraform codebases, and AWS configurations for 100+ production sites across multiple regions, ensuring zero downtime.
- Automated key generation and secret management using AWS KMS, Secrets Manager, and SSM Parameter Store.
- Led cloud migration initiatives, completing over 100 successful AIX-to-AWS migrations with minimal disruption.
- Developed and enhanced Jenkins pipelines for production deployments, server type changes, password rotation, and Chef converges.
- Integrated SonarQube for CI/CD quality checks and automated Git tagging, improving code quality and compliance.
- Acted as Scrum Master, leading Agile ceremonies, mentoring team members, and collaborating across offshore and onshore teams.
- Delivered critical production support, incident management, and infrastructure automation to maintain high system reliability.

| **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

- **IEEEXtreme**
  A 24 hours programming competition organized by IEEE.
  > Global: 274 - IEEEXtreme 14.0 - 2020
  > Global: 464 - IEEEXtreme 13.0 - 2019
  > Global: 495 - IEEEXtreme 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** | **February 2025** |
| NVIDIA \| View here | |
| **Getting Started with Accelerated Computing in CUDA C/C++** | **February 2025** |
| NVIDIA \| View here | |
| **Introduction to Concurrent Programming with GPUs** | **January 2025** |
| Coursera \| View here | |
| **Microsoft Certified: Azure Fundamentals** | **May 2021** |
| Microsoft \| View here | |
| **Neural Networks and Deep Learning** | **April 2021** |
| Coursera \| View here | |
| **AWS Fundamentals: Going Cloud-Native** | **May 2021** |
| Coursera \| View here | |
| **Developing Applications with Google Cloud Platform Specialization** | **July 2020** |
| Coursera \| View here | |

## 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.