

# Bhanuka Mahanama

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## RESEARCH INTERESTS

Eye-Tracking, Computer Vision, Machine Learning, Data Science, Information Retrieval

## EDUCATION

**Ph.D. in Computer Science** Aug. 2019 - Present  
*Old Dominion University, Norfolk, VA* GPA: 4.0  
Advisor: Dr. Sampath Jayarathna  
Classes: Data Science & Analytics, Machine Learning, Information visualization, Data Structures & Algorithms, Computer Architecture.

**B.Sc. in Computer Science and Engineering** Jan. 2015 - Dec. 2018  
*University of Moratuwa, Sri Lanka* First Class Honours, GPA: 3.83  
Dean's List distinctions (Semesters 1, 2, 4, 6, 7, & 8)  
Classes: Machine Learning, Machine Vision, Data mining & information retrieval, Micro-controllers, Computer and Network Security.

### Advanced Diploma in Management Accounting

*Chartered Institute of Management Accountants (UK)*  
Classes: Financial Reporting Standards (IFRS, GAAP-UK), Risk and Control, Capital Investment Decisions, Project Management, Budgeting and Budgetary control.

## PROFESSIONAL EXPERIENCE

**Los Alamos National Laboratory** Los Alamos, NM  
*Research Intern* May 2021 - Aug. 2021

- Designed and developed a toolset for the Memento Protocol (IET RFC 7089) compliance testing and reporting.
- Implemented improvements to enable toolset and service accessibility to public and private web archives.

### Old Dominion University

*Graduate Teaching/ Research Assistant* Norfolk, VA  
Aug. 2019 - Present

- Research on multi-user eye-tracking, multi-sensory information retrieval for human-computer interaction, and behavioral analysis.
- Conducted teaching assistant duties for CS 361 (Data structures and algorithms), CS 381 (Discrete Structures), CS 463 (Cryptography for Computer Security), and CS 624 (Data analytics and Big data).

### University of Moratuwa

*Junior Consultant* Moratuwa, Sri Lanka  
Jan 2019 - Aug 2019

- Planned, coordinated, conducted, and evaluated Computer Network, Industrial Computer Engineering, and Software Engineering laboratory sessions.
- Evaluating and mentoring undergraduate Software Engineering and Research and Development projects.

*Visiting Instructor*

- Aug 2018 - Dec 2018
- Conducted and evaluated practical sessions for Computer Networks.

## **Gloabal Wavenet (Pvt) Ltd**

Colombo, Sri Lanka

*Associate Software Engineer*

*Jan 2018 - Aug 2018*

- Designed, developed and optimized databases for high throughput applications using MySQL cluster.
- Developed plugins and plugin support for data warehousing and data analytics for existing telecommunication products.

*Trainee Software Engineer*

*Jun 2017 - Dec 2017*

- Developed high available and throughput applications using Erlang, Mnesia and MySQL cluster for telecommunication service providers.
- Developed plugins to integrate sub-systems with the company product stack.
- Developed front-end applications using HTML, Javascript and Erlang.

## **TEACHING EXPERIENCE**

### **Old Dominion University**

Norfolk, VA

#### **CS 624 - Data Analytics and Big Data**

Teaching Assistant, Spring 2021

#### **CS 463/563 - Cryptography for Cyber-security**

Teaching Assistant, Fall 2020

#### **CS 381 - Introduction to Discrete Structures**

Teaching Assistant, Fall 2020

#### **CS 361 - Data Structures and Algorithms**

Teaching Assistant, Fall 2020

### **University of Moratuwa**

Moratuwa, Sri Lanka

#### **CS 4202 - Research and Development Project**

Project Examiner, Spring 2019

#### **CS 3332 - Industrial Instrumentation and Control**

Laboratory Instructor, Spring 2019

#### **CS 3062 - Computer Networks**

Laboratory Instructor, Spring 2019

#### **CS 3082 - Software Engineering Project**

Project Examiner/ Mentor, Spring 2019

#### **CS 3062 - Computer Networks**

Laboratory Instructor, Fall 2018

## **PUBLICATIONS Journal Publications**

**Bhanuka Mahanama**, Yasith Jayawardana, Sundararaman Rengarajan, Gavindya Jayawardana, Leanne Chukoskie, Joseph Snider, and Sampath Jayarathna. "Eye Movement and Pupil Measures: A Review", *Frontiers in Computer Science: Human-Media Interaction*, 2022

## **Peer-reviewed Conference Publications**

**Bhanuka Mahanama**, Gavindya Jayawardana, Sampath Jayarathna "Analyzing Unconstrained Reading Patterns of Digital Documents Using Eye Tracking", in *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, 2021, IEEE. [**Best Poster**]

**Bhanuka Mahanama**, Yasith Jayawardana, Sampath Jayarathna, "Gaze-Net: Appearance-Based Gaze Estimation using Capsule Networks", in *11th Augmented Human International Conference (AH)*, 2020, ACM. pp. 1-4.

## Pre-prints

**Bhanuka Mahanama**, Yasith Jayawardana, Sampath Jayarathna, "Gaze-Net: Appearance-Based Gaze Estimation using Capsule Networks", in arXiv:2004.07777 [cs.CV], 2020. (Extended Preprint)

## Blog Posts

Summer Internship at LANL - Memento Validator, WS-DL Research Group Blog  
<https://ws-dl.blogspot.com/2021/10/2021-10-14-summer-internship-at-lanl.html>

Machine Learning on Browser with TensorFlow, WS-DL Research Group Blog  
<https://ws-dl.blogspot.com/2020/12/2020-12-21-machine-learning-on-browser.html>

Student ThinSat Research Summer Camp for Hampton Roads High School Students, WS-DL Research Group Blog  
<https://ws-dl.blogspot.com/2020/09/2020-xx-xx-student-thinsat-research.html>

Augmented Human Online Trip Report (2020), WS-DL Research Group Blog  
<https://ws-dl.blogspot.com/2020/06/2020-06-05-augmented-human-online-trip.html>

## PROJECTS

### MGaze

Commodity hardware based multi-user eye-tracking project with the aim of eliminating requirement of speciality hardware for everyday eye-tracking. Project include the end-to-end development including, facial and iris detection, and gaze estimation.  
<https://mgaze.nirds.cs.odu.edu/>

### Memento Validator

Designed and developed a new toolset for testing the Memento standard (IET RFC 7089) compliance of resources capable of testing through multiple interfaces.  
<https://github.com/lanl/memento-validator>  
<http://labs.mementoweb.org/validator/>

### Link Parse

Implemented a library for Memento link header parsing combining popular algorithms.  
<https://github.com/lanl/link-parse>

### Data-Driven Education

Researched and developed applications to provide insights to enhance the learning and teaching experience of the stakeholders in the Sri Lankan education sector through the use of data mining and machine learning techniques.  
<https://mahanama94.github.io/projects/data-driven-education>

### MySQL Monitor

Designed and developed a tool for monitoring MySQL (NDB Cluster) for issues, errors and overloading and notifying users through subscribed services such as Simple Network Management Protocol (SNMP).  
<https://mahanama94.github.io/projects/mysqlmon>

### WytBoard

Developed an online collaboration application for brainstorming with automated entity linking and web based suggestions based on discussion.  
[mahanama94.github.io/projects/wytboard](https://mahanama94.github.io/projects/wytboard)

### Cordova/ Ionic Voice Plugin

Created a Cordova Android plugin for voice commands and interactions through the

Google Voice assist API.  
<https://github.com/mahanama94/cordova-voice-assist-plugin>

## SERVICES

### Reviewing

ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR), 2021 - 2022  
ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL), 2020 - 2022  
ACM Conference on Intelligent User Interfaces (IUI), 2021-2022  
Augmented Human International Conference Series (AH), 2020

### Volunteering

Trick Or Research, Old Dominion University, 2019 - 2021  
Science Connection Day, Old Dominion University, 2019  
STEAM on Spectrum, VMASC, Old Dominion University, 2019  
Moratuwa Engineering Research Conference (MerCon), University of Moratuwa, 2019  
Institute of Engineers, Sri Lanka (IESL) Techno, Colombo, 2017

## AWARDS

### Academic

Dean's List Distinctions (Semesters 1, 2, 4, 6, 7, & 8), University of Moratuwa.  
First Class Honors (2018), University of Moratuwa

### Non-Academic

Guru Edutainment Project of the Year (2016)  
Runner-Up CodeSprint (2016)  
Runner-Up Yaal Geek Challenge (2016)

## SKILLS

**Programming Languages:** Python, Java, Erlang, JavaScript, TypeScript, C++, PHP, Verilog  
**Databases:** MySQL, MongoDB, Redshift, SQLite, Redis, Derby, Neo4J  
**Machine Learning/ Vision:** TensorFlow, TensorFlow.js, Keras, OpenCV, NumPy, Pandas  
**Web/ Mobile:** Angular, Ionic, Flutter, Laravel, Spring  
**Development Platforms:** Arduino, RaspberryPi, BananaPro  
**Sensory Devices:** PupilLabs, GazePoint, Tobii, Intel-RealSense

## PROFESSIONAL AFFILIATIONS

Student Member, Association for Computing Machinery (ACM)  
Student Member, Institute of Electrical and Electronic Engineers (IEEE)  
Student Member, Institute of Engineers, Sri Lanka (IESL)  
Student Member, Chartered Institute of Management Accountants (CIMA), United Kingdom