YASITH JAYAWARDANA

Ph.D. Student

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RESEARCH INTERESTS

Streaming Analytics, Workflow Management, Deep Learning, Uncertainty Quantification, Out-of-Distribution Detection

EDUCATION

Ph.D. Computer Science *@ Old Dominion University, Norfolk, VA* — 2019 – 2023*

Streaming Analytics, Workflow Management, Uncertainty Quantification, Out-of-Distribution Detection — GPA: 4.00

- **Awards:** Dominion Graduate Scholar (2019)
- **Advisor:** Dr. Sampath Jayarathna

B.Sc. Computer Science & Engineering *@ University of Moratuwa, Moratuwa, LK* — 2015 – 2018

Machine Learning, Signal Processing, Bioinformatics, Distributed Systems, Calculus, Probability, Statistics — GPA: 3.84

- **Awards:** First Class Honors, Dean's List (Semesters 1,2,4,6,7,8)

EXPERIENCE

Postgraduate Research Fellow *@ Harvard University, Cambridge, MA* — 2022 – Now

Center for Advanced Imaging at Harvard

- **Projects:** DL-Guided Sparse Imaging, Robust Label-Free Diagnostics

Graduate Assistant *@ Old Dominion University, Norfolk, VA* — 2019 – Now

Department of Computer Science

- **Projects:** StreamingHub, MGaze, ASDetection, HACS

Graduate Research Intern *@ Los Alamos National Laboratory, Los Alamos, NM* — 2021 Summer, 2022 Summer

LANL Research Library

- **Projects:** Robust PDF Links

Developer / Team Lead *@ DesignBoo (PVT) Ltd, Colombo, LK* — 2018 – 2019

The GP Service (UK)

- **Projects:** GP Service Platform

Undergraduate Assistant *@ University of Moratuwa, Moratuwa, LK* — 2018 Jan – Jun

Department of Computer Science

- **Projects:** Teaching, Grading

Software Engineering Intern *@ WSO2 (PVT) Ltd, Colombo, LK* — 2017 Jun – Dec

WSO2 Support Team

- **Projects:** Semantic-KB

TECHNICAL SKILLS

Languages	Python, Java, C/C++, C#, Julia, PHP, HTML/JS/CSS
Frameworks (ML)	TensorFlow, TensorFlow-Probability, TF.js, PyTorch, OpenCV, Pandas, NumPy
Databases	MySQL, PostgreSQL, MongoDB, SQLite, Redis, DynamoDB
AWS	S3, RDS, EC2, Route 53, CloudWatch, ELB, EKS
Frameworks (JS)	Node.js, Angular, React, React-Native
IDEs	PyCharm, IntelliJ, Visual Studio, XCode, VSCode
Software	WEKA, NeuroPype, Node-RED, LabStreamingLayer, Orange, Pupil Capture
Devices	PupilLabs Core, Empatica E4, Emotiv Insight, CGX Quick-30
OS	Windows, Android, MacOS, Ubuntu, iOS
Version Control	Git, SVN
Creative Tools	Adobe Photoshop, Adobe Illustrator, Draw.io

PROJECTS

DL-Guided Sparse Imaging
2022 – Now

Python, PyTorch, SciPy, NumPy, Wandb

Building differentiable, budget-constrained, decision models for sparse multi-resolution imaging of whole slides. Trained perceiver-style attention models to capture multi-resolution images with few imaging steps while optimizing for a downstream classification task.

Robust Label-Free Diagnostics
2021 – Now

Python, PyTorch, GeoTorch, BoTorch, SciPy, NumPy, Wandb

Building calibrated, out-of-distribution aware models to identify bacteria species and cellular damage from Quantitative Phase Images (QPI). Trained ResNet, CapsNet, and Normalizing Flow models to predict the target class along with calibrated probability estimates, uncertainty estimates, and out-of-distribution metrics.

StreamingHub
2019 – Now

Python, LabStreamingLayer, WebSocket, Node, React, Flask, Node-RED

A framework to build real-time bio signal analysis algorithms, test them on replayed data streams, and deploy them on live data streams. It provides Python APIs to read data from datasets or live sensors alike, JSON schemas to provide replay-enabling metadata about datasets, a Web UI to annotate datasets and auto-generate metadata, and Node-RED / Apache Beam integrations for deployment.

Robust PDF Links
2021 Summer, 2022 Summer

Python, PyPDF2, PDFIUM, GROBID, PDFMiner, Flask, Linked Data, HTML/JS/CSS

A web service to generate robust links for web resources. It allows to upload PDF documents, extract URLs from PDF annotations/text, invoke the Robust Links Service on URLs to preserve their content in web archives, and thereby generate robust links. Upon generating robust links, their availability can be announced to external systems via Linked Data Notifications. It also allows to view PDF documents side-by-side with robust links.

MGaze
2020 – 2021

MediaPipe, TF.js, Node, Parcel, HTML/JS/CSS

Collaborative project for webcam-based, multi-user eye tracking on the browser. It eliminates the need for additional eye-tracking equipment by performing facial detection, facial landmarks detection, iris detection, and gaze estimation through webcam feeds.

ASDetection
2019 – 2020

TensorFlow, Python, NumPy, Pandas, PyWavelets

Using EEG and Thermography data to predict a diagnosis of ASD. First, features were extracted from pre-processed EEG and thermography data. Here, spatiotemporal features were extracted from EEG data using wavelet transformation. Next, machine learning models were trained on features to predict a diagnosis of ASD.

HACS
2019 – 2020

Python, Internet Archive, SciPy, NumPy, Pandas

Estimating the rate of change of the academic web using archived copies of web pages. Here, archived copies are first obtained from the Internet Archive through its CDX Server API. Next, for each web page, archived copies are analyzed to detect when changes have occurred. These changes are then modeled as a Poisson process and used to predict when a page is likely to change in the future.

Containerized Deployment of Apache OODT
2019 Summer

Java, Maven, Docker, Docker-Compose, Avro, Solr, SLF4J, JIRA, Confluence

Created Dockerfiles for each core component in Apache OODT. Added a Maven Archetype to auto-generate Dockerfiles and a Docker-Compose file when creating a new Apache OODT project. Issue tracking was handled using JIRA, and documentation was written using Confluence.

GP Service Platform
2018 – 2019

React Native, AWS, Docker, Angular, Spring, PostgreSQL, OpenID, OAuth, Bitbucket, HTML/JS/CSS

Built a mobile application for making doctor consultations. Re-structured cloud infrastructure on AWS to reduce costs. Set up unified logging using AWS CloudWatch. Created Dockerfiles and Bitbucket Pipelines to build, test, and push build artifacts into AWS. Provided development and production support for the web apps of The GP Service (UK) Ltd. Added single-sign-on capability to web portal. Upgraded web portal from Angular v2 to v4.

MS-stack
2018 – 2019

Java, Netty, Kafka, Zookeeper, Curator, Git

A full-stack, event-driven, microservices framework for Java, with business modeling. It abstracts away the complexities of microservices architecture by providing interfaces to write business logic. The framework internally handles microservice lifecycle, data partitioning, and auto-scaling. It also facilitates generating boilerplate code from Business Process Models.

Deng-AI	2018 Jan – Jun

Python, Scikit-Learn, Pandas, WEKA

A competition hosted by DrivenData, to model the spread of Dengue using weather and geographical information. Built a machine learning model that ranked #1 in 2017.

Semantic-KB	2017 Jun – Dec

Elasticsearch, TensorFlow, PostgreSQL, NLTK, Scrapy, Flask, Python, DialogFlow, HTML/JS/CSS

Internship project at WSO2 Lanka (PVT) Ltd to automate question answering in WSO2 Support portal. Created a document index using Elasticsearch, a reinforcement learning model using TensorFlow to predict document-query relevance, and a search interface using HTML/JS/CSS.

Tourmate	2017 Jan – Jun

Express.JS, Node, MongoDB, React, Git, HTML/JS/CSS

A web platform aimed at tourists and tour providers. Tourists can discover tour services and make reservations, while tour providers can post and advertise their services.

Raven	2016 – 2017

Microsoft Emotion API, C#

A real-time customer satisfaction monitoring framework for the hospitality industry. It uses camera feeds to detect customer faces, analyze emotions, provide satisfaction ratings, and alert dissatisfactions in real-time.

Onion	2016 – 2017

C#, WPF, MySQL, Dapper ORM, VSTS

A Point-of-Sales, Inventory, Reporting, Loan, & Payroll System for Dambulla Economic Centre, Sri Lanka

Music School	2016 Jan – Jun

PHP, Laravel, jQuery, MySQL, HTML/JS/CSS

A web platform to manage information of a medium sized music school. It supports classroom management, progress tracking, attendance, and payroll.

PUBLICATIONS

JOURNALS

B. Mahanama, **Y. Jayawardana**, S. Rengarajan, G. Jayawardena, L. Chukoskie, J. Snider, S. Jayarathna, "Eye Movement and Pupil Measures: A Review", In *Frontiers in Computer Science*, 2022, Frontiers Media. [Featured]

BOOK CHAPTERS

S. Jayarathna, **Y. Jayawardana**, M. Jaime, S. Thapaliya, "Electroencephalogram (EEG) for Delineating Objective Measure of Autism Spectrum Disorder", in *Computational Models for Biomedical Reasoning and Problem Solving,* 2019, IGI Global.

CONFERENCE PROCEEDINGS

Y. Jayawardana, V.G. Ashok, S. Jayarathna, "StreamingHub: Interactive Stream Analysis Workflows", in *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, 2022, ACM.

Y. Jayawardana, G. Jayawardena, A.T. Duchowski, S. Jayarathna, "Metadata-Driven Eye Tracking for Real-Time Applications", in *ACM Symposium on Document Engineering (DocEng)*, 2021, ACM.

Y. Jayawardana, A.C. Nwala, G. Jayawardena, J. Wu, S. Jayarathna, M.L. Nelson, C.L. Giles, "Modeling Updates of Scholarly Webpages Using Archived Data", in *IEEE International Conference on Big Data (Big Data), 2020*, IEEE.

B. Mahanama, **Y. Jayawardana**, S. Jayarathna, "Gaze-Net: Appearance-Based Gaze Estimation using Capsule Networks", in *Augmented Human International Conference (AH)*, 2020, ACM.

Y. Jayawardana, S. Jayarathna, "Streaming Analytics and Workflow Automation for DFS", in *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, 2020, ACM. [Best Poster Nominated]

D. Haputhanthri, G. Brihadiswaran, S. Gunathilaka, D. Meedeniya, **Y. Jayawardana**, S. Jayarathna, M. Jaime**,** "An EEG based Channel Optimized Classification Approach for Autism Spectrum Disorder", in *International Multidisciplinary Engineering Research Conference (MERCon),* 2019, IEEE.

Y. Jayawardana, M. Jaime, S. Jayarathna, "Analysis of Temporal Relationships between ASD and Brain Activity through EEG and Machine Learning", in *International Conference on Information Reuse and Integration (IRI)*, 2019, IEEE. [Best Student Paper]

Y. Jayawardana, S. Jayarathna, "DFS: A Dataset File System for Data Discovering Users", in *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, 2019, ACM.

Y. Jayawardana, R. Fernando, G. Jayawardena, D. Weerasooriya, I. Perera, "A Full Stack Microservices Framework with Business Modelling", in *International Conference on Advances in ICT for Emerging Regions (ICTer),* 2018, IEEE.

DOCTORAL CONSORTIUMS (Not in Proceedings)

Y. Jayawardana, S. Jayarathna, "Towards a Consistent Metadata Format for Data Analysis", in *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, 2020, ACM.

GRANTS

$500 – Grants in Aid of Research (GIAR), Sigma Xi	2020

Can we stream Data Analytics alongside Sensory Data and Metadata?
Article: https://www.odu.edu/sci/news/2020/7/yasith_jayawardana_r

AWARDS, HONORS, & SCHOLARSHIPS

Dominion Graduate Scholar, Old Dominion University	2019
First Class Honors, University of Moratuwa	2018
Dean's List, University of Moratuwa	Semesters 1,2,4,6,7,8

TEACHING EXPERIENCE

CS250 Problem Solving & Programming II, Dr. Ayman El Mesalami, ODU	2021 Spring
CS620 Introduction to Data Science & Analytics, Dr. Sampath Jayarathna, ODU	2021 Spring
CS300T Computers in Society, Rekha Gupta, ODU	2020 Fall
CS361 Data Structures & Algorithms, Dr. Steven Zeil, ODU	2020 Summer
CS355 Principles of Programming Languages, Dr. Jay Morris, ODU	2020 Summer
CS361 Data Structures & Algorithms, Dr. Zac Howland, ODU	2020 Spring
CS2963 Presentation Skills, Dr. Rapti de Silva, UOM	2018 Spring

SERVICES

INVITED TALKS

Re-Streaming and Synthesis for Real-Time Analysis	2021
Web Science & Digital Libraries (WSDL) Research Group Expo, ODU	
Machine Learning on Data	2020
Student ThinSat Research Summer Camp (STRS), ODU	
Diagnosing ASD from Brain Activity	2020
CS395: Research Methods in Data and Web Science, ODU	
Data Science with EEG	2019
CS Summer Research Workshop, ODU	

PEER REVIEWS

ACM/IEEE Joint Conference on Digital Libraries **(JCDL)**	2020, 2021, 2022, 2023
ACM SIGIR Conference on Human Information Interaction and Retrieval **(CHIIR)**	2020, 2021
ACM Conference on Intelligent User Interfaces **(IUI)**	2020, 2021
Augmented Human International Conference **(AH)**	2020, 2021

VOLUNTEERING

34th Great Computer Challenge @ ODU	2019
Trick or Research @ ODU	2019, 2020, 2021
Science Connection Day @ ODU	2019
STEAM on Spectrum @ Virginia Modeling, Analysis, & Simulation Center	2019

MEMBERSHIPS

Graduate Student Member @ Honor Society of Phi Kappa Phi (**PKP**)
Student Member @ Association for Computing Machinery (**ACM**)
Student Member @ Institute for Electrical and Electronics Engineers (**IEEE**)
Student Member @ Institution of Engineers, Sri Lanka (**IESL**)