

# Yasith Jayawardana, Ph.D.

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## RESEARCH INTERESTS

Streaming Analytics, Workflow Systems, Deep Learning, Robust ML

## EDUCATION

**Ph.D. Computer Science @ Old Dominion University, Norfolk, VA** 2019 – 2024  
Streaming Analytics, Information Retrieval, Workflow Systems, Deep Learning 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, DSP, Bioinformatics, Distributed Systems, Calculus, Probability, Statistics GPA: 3.84

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

## EXPERIENCE

**Research Scientist @ Georgia Institute of Technology, Atlanta, GA** 2024 – Now

Center for AI in Science and Engineering

- **Projects:** Cybershuttle

**Graduate Assistant @ Old Dominion University, Norfolk, VA** 2019 – 2024

Department of Computer Science

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

**Postgraduate Research Fellow @ Harvard University, Cambridge, MA** 2022

Center for Advanced Imaging at Harvard

- **Projects:** DL-Guided Sparse Imaging, Hypothesis Driven OoD Detection

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

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, Course Preparation, Grading

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

WSO2 Support Team

- **Projects:** Semantic-KB

## TECHNICAL SKILLS

**Languages** Python, Go, Java, C/C++, C#, Julia, PHP, HTML/JS/CSS

**Frameworks (ML)** PyTorch, Lightning, TensorFlow, TF.js, OpenCV, Scikit-Learn, SciPy, NumPy, Pandas

**Frameworks (Web)** Node.js, Angular, React, React-Native, Flask

**Databases** MySQL, PostgreSQL, MongoDB, SQLite, Redis, DynamoDB

**Cloud** Docker, Kubernetes, S3, RDS, EC2, ELB, EKS

**Software** Pupil Capture, EEGLab, Node-RED, LabStreamingLayer, WEKA, NeuroPype, Orange

**Wearables** PupilLabs Core, Empatica E4, Emotiv Insight, CGX Quick-30

**OS** Windows, Android, MacOS, Ubuntu, iOS

**Creative Tools** Photoshop, Illustrator, Logic Pro, Draw.io

PROJECTS	
<b>StreamingHub</b> (PhD Project, Old Dominion University)	2019 – 2024
Python, LabStreamingLayer, WebSocket, Node, React, Flask, Node-RED Designed a framework for data analysts to quickly switch between data sources when developing real-time algorithms. It provides JSON schemas (DFDS) to describe datasets for low-code data streaming, a Web UI to annotate datasets with DFDS metadata, Web APIs to stream data from datasets and live sensors alike, and Python / Node-RED / Beam bindings for algorithm deployment.	
<b>Real Time Ambient / Focal Attention Estimation</b> (Old Dominion University)	2023 Fall
Eye Tracking, Python, PyTorch, NumPy Developed a real-time, EM-based estimator to track one's attention using real-time eye movement data.	
<b>MGaze</b> (Old Dominion University)	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.	
<b>HACS</b> (Old Dominion University)	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.	
<b>Hypothesis Driven OoD Detection</b> (Collaboration, Center for Advanced Imaging at Harvard)	2022 – 2024
Python, PyTorch, Lightning, Scikit-Learn, SciPy, NumPy, WandB Developed an out-of-distribution detection method based on permutation-based hypothesis testing. Given a classifier trained on data from K class labels, it detects when a new sample does not fall under any of K classes. Successfully detected OoD data for bacteria image classifiers. Got experience in obtaining calibrated probabilities, uncertainty estimates, and OoD metrics from deep networks.	
<b>DL-Guided Sparse Imaging</b> (Collaboration, Center for Advanced Imaging at Harvard)	2022 – 2023
Python, PyTorch, SciPy, NumPy, WandB Trained perceiver-style attention models for whole-slide imaging in sparse, multi-resolution format. The model captures few regions in high-resolution and others in low-resolution. The model is optimized via a classification loss on the imaged whole-slide.	
<b>ASDetection</b> (Collaboration, Indiana University Purdue University Columbus)	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.	
<b>Robust PDF Links</b> (Internship Project, Los Alamos National Laboratory)	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 users to upload PDFs, extract URLs from PDF annotations/text, preserve their content in Web archives, and display URLs of the archived content (i.e., robust links) side-by-side with the PDF. The generated URLs are then announced to external systems via Linked Data Notifications.	
<b>GP Service Platform</b> (Freelance Project, The GP Service PVT Ltd UK)	2018 – 2019
React Native, AWS, Docker, Angular, Spring, PostgreSQL, OpenID, OAuth, Bitbucket, HTML/JS/CSS Built a mobile app for making doctor consultations. Re-structured cloud infrastructure on AWS to reduce costs. Set up logging on AWS CloudWatch. Created Dockerfiles and Bitbucket CI Pipelines to build/test/deploy services onto AWS. Provided DevOps support for web apps. Added single-sign-on functionality to web apps. Upgraded web apps from Angular v2 to v4.	
<b>Semantic-KB</b> (Internship Project, WSO2 Lanka)	2017 Jun – Dec
Elasticsearch, TensorFlow, PostgreSQL, NLTK, Scrapy, Flask, Python, DialogFlow, HTML/JS/CSS 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 for automated Q&A in WSO2 Support portal.	
<b>MS-stack</b> (Capstone Project, University of Moratuwa)	2018 – 2019
Java, Netty, Kafka, Zookeeper, Curator, Git A full-stack, event-driven, microservices framework for Java, with business modeling. It streamlines microservice development by letting users define high-level business processes via markup and auto-generate boilerplate code for them. The framework internally handles the microservice lifecycle, including data partitioning and auto-scaling.	
<b>Deng-AI</b> (DrivenData 2017, 1 <sup>st</sup> Place)	2018 Jan – Jun
Python, Scikit-Learn, Pandas, WEKA Developed a ML model for Dengue spread using weather and geography features.	
<b>Raven</b> (TadHack 2017, 3 <sup>rd</sup> Place)	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.

#### Containerized Deployment of Apache OODT (Open-Source Contribution) 2019 Summer

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

Created Dockerfiles for core components of OODT. Added a Maven Archetype to generate Dockerfiles + Docker-Compose file when creating a new OODT project.

#### Onion (Co-Founded Startup) 2016 – 2018

C#, WPF, MySQL, Dapper ORM, VSTS

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

#### Tourmate (Class Project, University of Moratuwa) 2017 Jan – Jun

ExpressJS, Node, MongoDB, React, Git, HTML/JS/CSS

A web platform where tour providers can advertise their services, and tourists can reserve the advertised services.

#### Music School (Class Project, University of Moratuwa) 2016 Jan – Jun

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

A web platform to manage a medium sized music school with class management, progress tracking, attendance, and payroll features.

## PUBLICATIONS

### JOURNAL ARTICLES

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. [\[Featured Article\]](#)

### 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 PAPERS

**Y. Jayawardana**, A. Ahmad, B.S. Ahluwalia, R. Ahmad, S. Jayarathna, D.N. Wadduwage, "Hypothesis-Driven Deep Learning for Out of Distribution Detection". [\[Preprint, In Review\]](#)

G. Jayawardena, **Y. Jayawardana**, S. Jayarathna, "A Real-Time Approach to Capture Ambient / Focal Attention in Visual Search". [\[WIP\]](#)

**Y. Jayawardana**, V.G. Ashok, S. Jayarathna, "DataMux: Replaying Bio-Signal Datasets in Pseudo Real-Time". [\[WIP\]](#)

**Y. Jayawardana**, V.G. Ashok, S. Jayarathna, "Curator: Generating Bio-Signal Datasets for Low-Code Streaming Analytics". [\[WIP\]](#)

H. Kariyawasam, S. Jayasinghe, **Y. Jayawardana**, D.N. Wadduwage, "Differentiable Modeling of Nonlinear Dynamics in Multimode Fibers", in 2023 IEEE Photonics Conference (IPC), 2023, IEEE.

**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

<b>\$500 – Grants in Aid of Research (GIAR), Sigma Xi</b>	2020
Can we stream Data Analytics alongside Sensory Data and Metadata?	
<b>Article:</b> <a href="https://www.odu.edu/sci/news/2020/7/yasith_jayawardana_r">https://www.odu.edu/sci/news/2020/7/yasith_jayawardana_r</a>	

<b>AWARDS, HONORS, &amp; SCHOLARSHIPS</b>	
<b>Dominion Graduate Scholar</b> , Old Dominion University	2019
<b>First Class Honors</b> , University of Moratuwa	2018
<b>Dean's List</b> , University of Moratuwa	Semesters 1,2,4,6,7,8

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

<b>SERVICES</b>	
<b>INVITED TALKS</b>	
<b>Re-Streaming and Synthesis for Real-Time Analysis</b>	2021
Web Science & Digital Libraries (WSDL) Research Group Expo, ODU	
<b>Machine Learning on Data</b>	2020
Student ThinSat Research Summer Camp (STRS), ODU	
<b>Diagnosing ASD from Brain Activity</b>	2020
CS395: Research Methods in Data and Web Science, ODU	
<b>Data Science with EEG</b>	2019
CS Summer Research Workshop, ODU	
<b>PEER REVIEW</b>	
ACM/IEEE Joint Conference on Digital Libraries ( <b>JCDL</b> )	2020, 2021, 2022, 2023
IEEE International Conference on Big Data ( <b>BigData</b> )	2023
ACM SIGIR Conference on Human Information Interaction and Retrieval ( <b>CHIIR</b> )	2020, 2021
ACM Conference on Intelligent User Interfaces ( <b>IUI</b> )	2020, 2021
Augmented Human International Conference ( <b>AH</b> )	2020, 2021
<b>VOLUNTEERING</b>	
<b>34th Great Computer Challenge @ ODU</b>	2019
<b>Trick or Research @ ODU</b>	2019, 2020, 2021
<b>Science Connection Day @ ODU</b>	2019
<b>STEAM on Spectrum @ Virginia Modeling, Analysis, &amp; Simulation Center</b>	2019

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