Yasith Jayawardana

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RESEARCH INTERESTS

Deep Learning, Computational Science, HCI, Research Software

EDUCATION

Ph.D. in Computer Science, Old Dominion University, Norfolk VA (4.00 GPA)
(2019 – 2024)

- Dissertation - "StreamingHub, A Realtime Biosignal Processing Framework for Lab Scale Experimentation" (Advised by – Dr. Sampath Jayarathna)
- Awards – Dominion Graduate Scholar (2019)

B.Sc. in Computer Science Engineering, University of Moratuwa, Sri Lanka (3.84 GPA)
(2015 – 2018)

- Capstone - "MSStack, A Full Stack Microservice Framework with Business Modeling"
- Awards – First Class Honors, Dean's List (6 of 8 Semesters)

PROFESSIONAL EXPERIENCE

Researcher (Contractor), Center for AI in Science and Engineering, Georgia Tech, Atlanta GA
(2024 – Present)

- Built a system to easily switch between local and HPC runtimes within JupyterLab.

Co-Founder, Marketrix Inc, San Francisco, CA
(2024 – Present)

- Designed an in-app simulator to autonomously uncover the action space of applications.
- Designed a spatial RAG model for in-app Q&A, enabling AI-driven co-browsing support.
- Coordinated cross-functional teams across product development and UX design.

Postgraduate Research Fellow, Center for Advanced Imaging at Harvard, Cambridge MA
(2022)

- Explored methods to interpret the outcome of single-cell bacteria image classifiers.
- Trained Neural ODEs to approximate the dynamics of multimode fibers.

Summer Research Intern, Los Alamos National Laboratory, Los Alamos NM
(2021, 2022)

- Built a platform to extract URLs from scholarly PDFs, create robust links by archiving their content, and replace the original URLs with these robust links.

Graduate Assistant, Computer Science, Old Dominion University, Norfolk VA
(2019 – 2024)

- Trained ML methods to diagnose ASD from discrete wavelet coefficients of EEG / IRT data.
- Built a probabilistic estimator to forecast updates to webpages using archived and timestamped content, improving crawl scheduling efficiency.
- Teaching / Grading – Data Structures and Algorithms, Principles of Programming Languages, Computers in Society, Programming with C++, Data Science and Analytics

Developer / Team Lead, DesignBoo (PVT) Ltd, Sri Lanka
(2018, 2019)

- Developed a React Native app for doctor consultations for The GP Service (UK) Ltd.
- Integrated single sign-on (SSO) and migrated web apps from Angular V2 to V4.
- Set up CI/CD from Bitbucket to AWS and CloudWatch logging, managed DevOps.

Undergraduate Assistant, Computer Science Engineering, University of Moratuwa, Sri Lanka
(2018)

- Teaching / Grading – CS2963 Presentation Skills

Software Engineering Intern, WSO2 (PVT) Ltd, Sri Lanka
(2017)

- Indexed support docs in Elasticsearch and trained TensorFlow models for query lookup
- Developed an API to answer support questions and integrated it with DialogFlow

Co-Founder, Onion Inc, Sri Lanka
(2016 – 2019)

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

TECHNICAL EXPERTISE

- **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
- **Biosensor Software -** Pupil Capture, EEGLab, Node-RED, LabStreamingLayer, WEKA, NeuroPype, Orange
- **Biosensor Hardware -** PupilLabs Core, Empatica E4, Emotiv Insight, CGX Quick-30

PROJECTS

Real Time Attention (2023)

- Optimization algorithm to estimate one's attention level from gaze data in real time.

OoD Hypothesis Tests (2022 – 2024)

- Two-sample hypothesis testing approach leveraging sample homogeneity to enhance out-of-distribution detection for trained models.

Sparse Imager (2022)

- Perceiver-style attention model for whole-slide imaging in a sparse multi-resolution format, capturing key regions in high resolution.

MGaze (2020 – 2021)

- Web-based platform for multi-user eye tracking via a single webcam.

Containerized Deployment of Apache OODT (2019)

- Created Dockerfiles for core components of OODT. Added a Maven Archetype to generate docker/compose files for new OODT projects.

StreamingHub (2019 – 2024)

- Biosignal processing framework for assembling computational elements into real-time workflows and processing live and recorded biosignal data streams.

DengAI (2017)

- Machine learning model to predict dengue spread using weather and geography features. Awarded 1st Place in DrivenData 2017.

Raven (2016 – 2017)

- Platform for Real-time customer satisfaction monitoring for the hospitality industry. Uses CCTV feeds for face tracking, emotion analysis, satisfaction monitoring, and real-time alerts. Awarded 3rd Place in TadHack 2017.

PUBLICATIONS

Dissertation

- **Y Jayawardana** "StreamingHub: A Realtime Biosignal Processing Framework for Lab Scale Experimentation", Doctor of Philosophy (PhD), Computer Science, Old Dominion University, 2024.

Journal Articles

- Y Abeysinghe, B Mahanama, G Jayawardena, **Y Jayawardana**, M Sunkara, AT Duchowski, VG Ashok, and S Jayarathna, "A-DisETrac Advanced Analytic Dashboard for Distributed Eye Tracking," In International Journal of Multimedia Data Engineering and Management (IJMDEM), 2024, IGI Global.
- 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]
- 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,** D Wannipurage, E Abeysinghe, and S Marru, "Enhancing Research Productivity: Seamless Integration of Personal Devices and HPC Resources with the Cybershuttle Notebook Gateway," In Practice and Experience in Advanced Research Computing 2024: Human Powered Computing (PEARC '24). ACM, 2024.
- H Kariyawasam, S Jayasinghe, **Y Jayawardana**, DN Wadduwage, "Differentiable Modeling of Nonlinear Dynamics in Multimode Fibers", in 2023 IEEE Photonics Conference (IPC), 2023, IEEE.
- **Y Jayawardana,** VG Ashok, S Jayarathna, "StreamingHub: Interactive Stream Analysis Workflows", in ACM/IEEE Joint Conference on Digital Libraries (JCDL), 2022, ACM.
- G Jayawardena, **Y Jayawardana**, S Jayarathna, J Högström, T Papa, D Akkil, AT Duchowski, V Peysakhovich, I Krejtz, N Gehrer, K Krejtz. Toward a real-time index of pupillary activity as an indicator of cognitive load. Procedia Computer Science. 2022.
- **Y Jayawardana,** G Jayawardena, AT Duchowski, S Jayarathna, "Metadata-Driven Eye Tracking for Real-Time Applications", in ACM Symposium on Document Engineering (DocEng), 2021, ACM
- **Y Jayawardana,** AC Nwala, G Jayawardena, J Wu, S Jayarathna, ML Nelson, CL Giles, "Modeling Updates of Scholarly Webpages Using Archived Data", in IEEE International Conference on Big Data (Big Data), 2020, IEEE.

- **Y Jayawardana,** S Jayarathna, “Streaming Analytics and Workflow Automation for DFS”, in ACM/IEEE Joint Conference on Digital Libraries (JCDL), 2020, ACM
- B Mahanama, **Y Jayawardana**, S Jayarathna, “Gaze-Net: Appearance-Based Gaze Estimation using Capsule Networks”, in Augmented Human International Conference (AH), 2020, ACM.
- 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,** S Jayarathna, “DFS: A Dataset File System for Data Discovering Users”, in ACM/IEEE Joint Conference on Digital Libraries (JCDL), 2019, ACM [Best Poster Nominated]
- **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,** 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

Preprints / In Review / Symposiums

- G Jayawardena, **Y Jayawardana**, S Jayarathna, “A Real-Time Approach to Capture Ambient and Focal Attention in Visual Search”, 2024. [In Review]
- **Y Jayawardana,** A Ahmad, BS Ahluwalia, R Ahmad, S Jayarathna, DN Wadduwage**,** “Hypothesis-Driven Deep Learning for Out of Distribution Detection”, 2024. [Preprint]
- **Y Jayawardana,** BJ Cain, M Klein, SM Jones, “PDF Server: Robustifying URL References in PDF Documents,” Los Alamos National Laboratory (LANL), 2022. [Symposium]
- **Y. Jayawardana,** S. Jayarathna, “Towards a Consistent Metadata Format for Biosignal Data Analysis”, in ACM/IEEE Joint Conference on Digital Libraries (JCDL), 2020. [Symposium]