Sashini Liynage

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sashiniliyanage.github.io Google Scholar

INTERESTS

Machine Learning Deep Learning Signal Processing Biomedical AI

EDUCATION

Cornell, Maryland, Max Planck Research School (CMMRS) 28 July - 04 Aug 2024
Selected to the CMMRS Pre-doctoral Research School in Computer Science

BSc. (Hons.) in Computer Engineering (First Class Honours) Nov 2018 - Dec 2023
University of Peradeniya, Sri Lanka **GPA: 3.95/4.00**

G.C.E Advanced Level Examination 2017
Physics(A), Chemistry(A), Combine Mathematics(A) National Rank - **80/32000+**

PUBLICATIONS

[J 4] **Application of an LSTM-Based Channel Attention and Classification Mechanism in Fetal Movement Monitoring** | Pre-print | Poster
Praditha Alwis, Isuru Thilakasiri, Sashini Liyanage, Rahal Nanayakkara, Roshan Godaliyadda, Mervyn Ekanayake, Chathura Rathnayake, Janaka Wijayakulasooriya, Vijitha Herath
in *Elsevier - Computers in Biology and Medicine (IF-7.0)* [Manuscript under peer review]

[J 3] **AI-Assisted Early Diagnosis of Oral Cancer using Multimodal Deep Convolutional Neural Networks** | DOI | Poster | YouTube
Isuri Devindi, Dinura Dissanayake, Sashini Liyanage, Achintha Harshamal, Nadisha Piyarathne, Sumudu Rasnayaka, Kalani Hettiarachchi, Ruwan Jayasinghe, Roshan Ragel, Dhanushki Mapitigama, Isuru Nawinne
in *IEEE Access (IF-3.4)*

[J 2] **A Novel ECG Compression Algorithm Using PWM-Integrated Quantization for Low-Power Real-Time Monitoring** | DOI | Presentation
Isuri Devindi*, Sashini Liyanage*, Titus Jayarathna, Janaka Alawathugoda, Roshan Ragel
in *Nature - Scientific Reports (IF-4.3)*

[J 1] **A Comprehensive Dataset of Annotated Oral Cavity Images for Diagnosis of Oral Cancer and Oral Potentially Malignant Disorders** | DOI | Dataset | YouTube | Software
Nadisha Piyarathne, Sashini Liyanage, Sumudu Rasnayaka, Kalani Hettiarachchi, Isuri Devindi, Dinura Dissanayake, Achintha Harshamal, Dhanushki Mapitigama, Isuru Nawinne, Roshan Ragel, Ruwan Jayasinghe
in *ScienceDirect - Oral Oncology (IF-3.4)*

[C 4] **Real World Data-Driven Agent-Based Modeling for Health Policy Insights During Epidemics**
Sashini Liyanage, Mahesha Viduranga, Mario De Silva, Roshan Godaliyadda, Mervyn Ekanayake, Vijitha Herath, Janaka Ekanayake
in *International Conference on Advancements in Computing 2024 (ICAC 2024)* [Manuscript under review]

[C 3] **EEG Based Brain-Computer Interface for Inner Speech Classification**
Praveen Dhananjaya, Isurika Adikari, Sumudu Lakmali , Isuri Devindi, Sashini Liyanage, Mahanama Wickramasingha, Theekshana Dissanayake, Roshan G. Ragel, Isuru Nawinne
in *Moratuwa Engineering Research Conference (MERCon) 2024* [Camera-ready paper is submitted]

[C 2] **Self-Paced Brain-Computer Interface on Sensorimotor Rhythms for Controlling Virtual Objects**
Avishka Athapattu, Prageeth Bandara Dassanayake, Sewwandie Nanayakkara, Sashini Liyanage, Isuri Devindi, Roshan G. Ragel, Theekshana Dissanayake, Isuru Nawinne
in *Moratuwa Engineering Research Conference (MERCon) 2024* [Camera-ready paper is submitted]

[C 1] **Decoding Non-Motor Imagery Tasks with Non-Invasive EEG Based Brain-Computer Interface: A Review**
Sumudu Lakmali, Praveen Dhananjaya, Isurika Adikari, Isuri Devindi, Sashini Liyanage, Mahanama Wickramasingha, Theekshana Dissanayake, Roshan G. Ragel, Isuru Nawinne
in *Moratuwa Engineering Research Conference (MERCon) 2024* [Camera-ready paper is submitted]

ACHIEVEMENTS

Best Paper Award in Biomedical Engineering Track at MERCon 2024 2024
Best Paper Award for the paper "EEG-Based Brain-Computer Interface for Inner Speech Classification" in the Biomedical Engineering track at the Moratuwa Engineering Research Conference (MERCon) 2024.

Bronze Award at the National ICT Awards 2023
"Oral Cavity Image Annotation and Cancer Prediction from White Light Images" group project won the Bronze award in the Student Category at the National ICT Awards.

Professor E. F. Bartholomeusz Prize for Second Year Engineering Mathematics 2022
Best student in all engineering specialties who achieves the highest average marks in the engineering mathematics modules offered throughout the year.

ACES Coders v9.0 2022
An inter-university 12-hour coding competition organized by the University of Peradeniya. Rank – 06 (Out of top 120 teams)

Hackfest 2022
An inter-university hackathon organized by the University of Peradeniya. Rank - 1 (Healthcare category) (Out of top 20 teams)

WORK AND TEACHING EXPERIENCE

Research Assistant April 2024 - present
Research assistant at Multidisciplinary AI Research Center at the University of Peradeniya, Sri Lanka.

Co-supervisor Jan 2024 - present
Co-supervising undergraduate project: Automated Medical Image Annotation for Dataset Building

Teaching Assistant Jan 2024 - April 2024
Instructor at the Department of Computer Engineering, University of Peradeniya

Software Engineer Intern Dec 2022 - May 2023
Former software engineer intern at WSO2 software company

Casual Instructor - Department of Computer Engineering, University of Peradeniya 2021 - 2023
CO224 Computer Architecture, CO321 Embedded Systems, CO325 Computer & Network Security

PROJECTS

1. **Agent-Based Modelling for Social Dynamics and Impact Assessment** March 2024 - Present
   Modelling human behaviour by utilizing GPS data along with mathematical models and advanced machine learning algorithms within Agent-based Models (ABMs)
   - Methods: DBSCAN clustering, spectral clustering, data structure and algorithms, mathematical models
2. **Early Detection of Preterm Birth Through Advanced Signal Analysis and AI** March 2024 - Present
   Early detection of preterm and term births through the use of EHG and tocogram signals for enhanced fetal health monitoring.

- Methods: Signal processing, LSTM, CNN, U-Net

3. **Low-complexity Algorithm for Arrhythmia Detection** — May 2023 - Present
   A pre-packaged software solution containing a set of low-complexity algorithms for QRS-peak detection and ECG signal compression addressing the null-power consumption environments, along with a Spiking Neural Network implementation to classify ECG beats based on arrhythmia conditions.
   - Methods: Signal filtering, Leaky-boundary based QRS-peak detection, Spiking Neural Networks

4. **Oral Cancer Prediction System from White Light Images** — Apr 2023 - Present
   A web-based tool to reduce the delay in diagnosing high-risk oral cancer patients by incorporating an automated oral cancer prediction model trained on a white light image database derived from the Sri Lankan population.
   - Technologies: DenseNet and an XGBoost classifier, React.js, Express.js, flask framework
   - Contribution: Development of a web-based annotation tool and Development of the ensemble machine learning model to predict oral cancer using multiple data sources such as images and risk factors.

5. **Reconstructing highly degraded license plates** Feb 2022 - Apr 2022
   A procedure to extract a number plate from an image and reduce several noises due to low resolution, high or low lighting, and motion blur to reconstruct highly degraded images of license plates.
   - Technologies: Python, OpenCV, EasyOCR
   - Techniques: Morphological transformation, Contouring, Spatial, and Frequency domain filtering

6. **Remote Proctoring Device** Jul 2021 - Nov 2022
   A single device that integrates the hardware and software components needed to conduct an examination in online mode with no technical interruption.
   - Technologies: ReactJS, ElectronJs, Nodejs, MongoDB, Rest API, AWS
   - Contribution: Desktop app development, Hardware design

7. **8-bit single cycle processor** Jan 2022 - Mar 2022
   Implement a simple 8-bit single-cycle processor, which includes a CPU with a data memory unit and data cache.
   - Technologies: Verilog-HDL

EXTRACURRICULAR

Member of Design Team of ACES and Hackers' Club of University of Peradeniya 2022
Member of the Rotaract club of University of Peradeniya 2019 - 2023
Member of the Dramatic Society of the University of Peradeniya 2019 - 2023

REFERENCES

Prof. Roshan G. Ragel — roshanr@eng.pdn.ac.lk
Head of Computer Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka

Dr. Isuru Nawinne — isurunawinne@eng.pdn.ac.lk
Senior Lecturer, Department of Computer Engineering, Faculty of Engineering,University of Peradeniya, Sri Lanka.