Sashini Liynage

Department of Computer Engineering, University of Peradeniya, Sri Lanka
+94 713585988 sashini.n.liyanage@gmail.com linkedin.com/in/sashini-liyanage
sashiniliyanage.github.io Google Scholar

RESEARCH INTERESTS

My research interests lie in **signal processing** and artificial intelligence, particularly **deep learning** and **computer vision**, with **wearables**, focusing on but not limited to **biomedical engineering** applications.

EDUCATION

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
in *Elsevier - Computers in Biology and Medicine (IF-7.0)* [Manuscript under peer review]
Praditha Alwis, Isuru Thilakasiri, Sashini Liyanage, Rahal Nanayakkara, Roshan Godaliyadda, Mervyn Ekanayake, Chathura Rathnayake, Janaka Wijayakulasooriya, Vijitha Herath
Contribution: Conceptualization, Methodology, Data curation, Formal analysis, Writing – Original Draft.

[J 3] **A Novel ECG Compression Algorithm Using Pulse-Width Modulation Integrated Quantization for Low-power Real-time Monitoring** | DOI | Presentation
in *Nature - Scientific Reports (IF-4.3)*
Isuri Devindi*, Sashini Liyanage*, Titus Jayarathna, Janaka Alawathugoda, Roshan Ragel
Contribution: [Co-First Author] Conceptualization, Methodology, Formal analysis, Software, Validation, Writing – Original Draft, Review & Editing

[J 2] **Multimodal Deep Convolutional Neural Network Pipeline for AI-Assisted Early Detection of Oral Cancer** | DOI | Poster | YouTube
in *IEEE Access (IF-3.4)*
Isuri Devindi, Dinura Dissanayake, Sashini Liyanage, Achintha Francis, Nadisha Piyarathne, Sumudu Rasnayaka, Kalani Hettiarachchi, Ruwan Jayasinghe, Roshan Ragel, Dhanushki Mapitigama, Isuru Nawinne
Contribution: Conceptualization, Data Curation, Software, Validation, Writing - Review & Editing.

[J 1] **A Comprehensive Dataset of Annotated Oral Cavity Images for Diagnosis of Oral Cancer and Oral Potentially Malignant Disorders** | DOI | Dataset | YouTube | Software
in *ScienceDirect - Oral Oncology (IF-4.0)*
Nadisha Piyarathne, Sashini Liyanage, Sumudu Rasnayaka, Kalani Hettiarachchi, Isuri Devindi, Dinura Dissanayake, Achintha Francis, Dhanushki Mapitigama, Isuru Nawinne, Roshan Ragel, Ruwan Jayasinghe
Contribution: Formal analysis, Data curation, Visualization, Software, Writing – Original Draft.

[C 4] **Real World Data-Driven Agent-Based Modeling for Health Policy Insights During Epidemics**
in *International Conference on Advancements in Computing 2024 (ICAC 2024)* [Manuscript under review]
Sashini Liyanage, Mahesha Viduranga, Mario De Silva, Roshan Godaliyadda, Mervyn Ekanayake, Vijitha Herath, Janaka Ekanayake
Contribution: Conceptualization, Methodology, Formal analysis, Software, Writing – Original Draft.

[C 3] **Self-Paced Brain-Computer Interface on Sensorimotor Rhythms for Controlling Virtual Objects** | DOI | YouTube
in *Moratuwa Engineering Research Conference (MERCon) 2024*
Avishka Athapattu, Prageeth Dassanayake, Sewwandie Nanayakkara, Sashini Liyanage, Isuri Devindi, Roshan G. Ragel, Theekshana Dissanayake, Isuru Nawinne
Contribution: Writing - Review & Editing, Visualization

[C 2] **EEG Based Brain-Computer Interface for Inner Speech Classification** | DOI
in *Moratuwa Engineering Research Conference (MERCon) 2024*
Praveen Dhananjaya, Isurika Adikari, Sumudu Lakmali , Isuri Devindi, Sashini Liyanage, Mahanama Wickramasingha, Theekshana Dissanayake, Roshan G. Ragel, Isuru Nawinne
Contribution: Writing - Review & Editing, Visualization

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

EXPERIENCE

- **Cornell, Maryland, Max Planck Research School (CMMRS)** 28 July - 04 Aug 2024
  Pre-doctoral fellow at the CMMRS Research School in Computer Science
- **Research Assistant** Apr 2024 - Present
  Multidisciplinary AI Research Center (MARC) at the University of Peradeniya.
  Involved in two projects: Agent-Based Modelling for Disease Propagation Analysis and Early Detection of Preterm Birth from Non-invasive Wearable Devices.
- **Teaching Assistant** Jan 2024 - June 2024
  Department of Computer Engineering, University of Peradeniya
  Co-supervisor, GP106 Computing, CO503 Advanced Embedded Systems, CO421 Final Year Project I
- **Software Engineer Intern** Dec 2022 - May 2023
  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

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. (Out of 415 engineering students)
- **IEEEXtreme 16.0** - 24 hours algorithmic programming competition 2022
  Team Name: IEEEMild (Team of three), Country Rank – 20, Global Rank – 388

- **Hackfest** - Inter-university hackathon 2022
  An inter-university hackathon organized by the University of Peradeniya. The "Oral Cavity Region Detection" project ranked 1st in the Healthcare category (out of the top 20 teams).
- **ACES Coders v9.0** - 12 hours algorithmic programming competition 2022
  An inter-university 12-hour coding competition organized by the University of Peradeniya. Ranked 6th out of 100+ teams.
- **Best All-Rounder of the Year 2017 at Pushpadana Girls' College, Kandy** 2017
  Received the *'Piripun Diyaniya Award'* for the Best All-Rounder of the Year 2017 at Pushpadana Girls' College, Kandy, Sri Lanka.

SELECTED PROJECTS

1. **Agent-Based Modelling for Disease Propagation Analysis** (Ongoing) Mar 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 from Non-invasive Wearable Devices** (Ongoing) Mar 2024 - Present
   Early detection of preterm and term births through the use of EHG and tocogram signals for enhanced fetal health monitoring.
   - Methods: Autoregressive model, Intrinsic mode functions (IMF), Signal power spectrum, LSTM, U-Net

3. **Low-complexity Algorithm for Arrhythmia Detection** May 2023 - Dec 2023
   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. **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: OpenCV, EasyOCR
   - Techniques: Morphological transformation, Contouring, Spatial, and Frequency domain filtering

5. **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: IoT with Raspberry Pi, ReactJS, ElectronJs, Nodejs, MongoDB, Rest API, AWS

EXTRACURRICULAR

- **Public speaker at *"Empowering Sri Lanka Through AI"* workshops** 2024
- **Member of the Association of Computer Engineering Students (ACES)** 2022 - 2023
  - Member of the problem-setting team for algorithmic questions, ACES Coders v10.0
  - Member of Design Team of ACES and Hackers' Club at the University of Peradeniya
- **Member of the Rotaract Club and Dramatic Society - 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

Prof. Roshan Godaliyadda — roshang@eng.pdn.ac.lk
Senior Professor, Department of Electrical and Electronic Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka.