

HIRSHAN RAJENDRAN

Lecturer, Faculty of Engineering, South Eastern University of Sri Lanka

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PROFILE

- Motivated individual with 7+ years of experience in the field of Telecommunications Engineering.
- Passionate about applying mathematical concepts in Telecommunications Engineering for technological advancement.
- Hardworking and achievement-oriented person both individually and as part of a research team.
- Sound knowledge of MATLAB and Programming languages (Java, C, Python).

EDUCATION

B. Sc. Eng. with a **First Class Honours** (Overall GPA: **3.75/4.00**) in the Department of Electrical and Electronic Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka

AWARDS

- Professor. E.F. Bartholomeusz award for Engineering Mathematics, Faculty of Engineering, University of Peradeniya, Nov. 2013 (This award was given for the best performance in Engineering Mathematics).

WORK EXPERIENCE

Feb. 2017 – Present: Lecturer, Department of Electrical and Telecommunication Engineering, Faculty of Engineering of South Eastern University of Sri Lanka (SEUSL).

- Prepare and deliver lectures, and design and conduct laboratory classes for course modules: Introduction to Telecommunications (EN 33002), Communication Theory (EN 53001), Communication Systems I (EN 63001), Signals and Systems (EN 43002), and Control Systems (EN 63002)
- Supervise undergraduate students' research projects.

Dec. 2016 – Feb. 2017: Assistant Lecturer, Department of Interdisciplinary Studies, Faculty of Engineering, South Eastern University of Sri Lanka.

- Prepared and delivered lectures for Mathematical Modelling (ID 73002) course module.

Oct. 2015 – Oct. 2016: Teaching Assistant, Department of Electrical and Electronics Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka.

- Conducted laboratory sessions for Control systems and Communication systems courses.
- Delivered lectures for course modules: Automatic Control (EE352) and Applied Electromagnetics (EE355).

RESEARCH EXPERIENCE

Feb. 2017 – Present: Researcher, Department of Electrical and Telecommunication Engineering, Faculty of Engineering of South Eastern University of Sri Lanka (SEUSL).

- Facial Emotion Recognition System to investigate Micro-Expressions
The main objective of this research is to recognize and classify micro-expressions, and from that information, identify the emotional state of a person. This micro-emotion recognition system is based mainly on machine learning and image processing tools.
- Development of an Image Processing-based Driver Assistance System
The proposed system is an integrated device that could be fitted into an automobile that enables safety functions of traffic-sign detection and recognition and lane-alignment pre-warning. An external node was designed for over-speed detection and messaging. This computer vision-based system provides real-time safety precautions, and the external node provides reliable and efficient data on over speeding.
- Design of hybrid energy harvesting device for charging mobile phones
This research seeks to employ a radio frequency energy harvester and a solar energy harvester to charge mobile phones. This study determined the suitable frequency for power transmission and a microstrip patch antenna was designed. A suitable solar panel was selected to harvest solar energy with considering the efficiency of the panel.

- Investigating the effect of Network Coding on video transmission (*cont...*)

The sliding-window mechanism and network coding technique were combined to create an efficient network, where the simulation results showed a reduction in packet loss and transmission delay.

Oct. 2015 – Oct. 2016: Research Assistant, Department of Electrical and Electronics Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka.

- Investigating the effect of Network Coding on video transmission

Developed an algorithm using Network Coding technology to analyze the effect of it on video transmission networks. The impact on bandwidth usage and packet loss was mainly considered.

PUBLICATIONS

1. W.K.D.S.A. Hirushan, S.A.I. Shamilka, **R. Hirshan**, and M.A.L.A. Haleem, "Mesh Network Based Mobile Communication," in IEEE International Conference on Advanced Networks and Telecommunications Systems (IEEE ANTS), Dec. 2022
2. C.S. Dissanayake, P.S. Keerthirathna, M.A. Haleem, W.G.C.W. Kumara, and **R. Hirshan**, "Design and Prototyping of High Gain Horn Antennas for Imaging Radar," in 2022 International Conference on Radar, Antenna, Microwave, Electronics, and Telecommunications (ICRAMET), Dec. 2022, pp. 200–205.
3. I.P.A. Kalindu, G.K.C.R. Kodikara, **R. Hirshan**, and W.G.C.W. Kumara, "BRAINWAVE: EEG Based Brain and Voice Controlled Hybrid Smart Multi-Plug," in 2022 6th SLAAI International Conference on Artificial Intelligence (SLAAI-ICAI), Dec. 2022, pp. 1–6.
4. J.A.L.P. Jayakodi, G.G.S.D. Jayamali, **R. Hirshan**, M.N.M. Aashiq, and W.G.C.W. Kumara, "Creating a Sri Lankan Micro-Emotion Dataset for a Robust Micro-Expression Recognition System," in 2022 International Research Conference on Smart Computing and Systems Engineering (SCSE), Sep. 2022, vol. 5, pp. 102–107.
5. L.A.Y.D. Kumara, I.K.B. Yehani, K.M.I. Nishantha, M.N.M. Aashiq, **R. Hirshan**, and W.G.C.W. Kumara, "Density-Based Real-Time Traffic Controlling System Using Image Processing," in 2nd International Conference on Science and Technology (ICST2022), Aug. 2022.
6. M.C.T. Kumara, P.S.C. Pushpakumari, H.P.S.J. Udhyani, M.N.M. Aashiq, **R. Hirshan**, W.G.C.W. Kumara, and T.K. Shih, "Image Enhancement Based CNN Approach to Covid-19 Diagnosis Using Chest X-ray Images," in 4th IEEE Eurasia Conference on Biomedical Engineering, Healthcare and Sustainability 2022 (ECBIOS 2022), May 2022.
7. I.F.J. Jahani, K.F. Joofa, I.S.F. Zeena, **R. Hirshan**, and W.G.C.W. Kumara, "Design of an Inset Feed Rectangular Microstrip Patch Antenna," in IEEE Asia-Pacific Conference on Applied Electromagnetics, Dec. 2021.
8. S.A.D.L.V. Senarathna, S.P.Y.A.A. Piyumal, **R. Hirshan**, and W.G.C.W. Kumara, "Lung Cancer Detection and Prediction of Cancer Stages Using Image Processing," in Proc. of IEEE 2021 Malaysian International Biomedical Engineering Conf. (MIBEC), Nov. 2021.
9. A.G.H.U. Dewmini, **R. Hirshan**, and W.G.C.W. Kumara, "A Study of Facial Emotion Recognition Techniques to Examine Micro-Expressions," Sri Lankan Journal of Technology (SLJoT), vol. 02, Special, pp.01-10, Sep. 2021.
10. A.M.N.C. Attanayake, W.G.R.U. Hansamali, **R. Hirshan**, M.A.L.A. Haleem, and M.N.A. Hinas, "Amigo (A Social Robot): Development of a robot hearing system," in Proc. of IET Sri Lanka Network 28th Annual Technical Conf., Aug. 2021.
11. F.L.P.M. Jayawardena, H.P.W. Anupama, M.W.L.D. Lakmal, **R. Hirshan**, and W.G.C.W. Kumara, "Development of An Image Processing Based Driver Assistance System," in Proc. of 10th International Conf. on Information and Automation for Sustainability (ICIAfS), Aug. 2021, pp. 357–362.
12. W.N.S.S. Rajakaruna, C. Vidushraj, N.M. Madanayake, **R. Hirshan**, and S.H.K.K. Gunawickrama, "IoT Based Drip Irrigation Method for Tea Plantation," in Proc. of 114th Annual Sessions of The Institution of Engineers, Sri Lanka (IESL), Aug. 2021.
13. E.A.T.M. Edirisinghe, M.M. Sajith, **R. Hirshan**, W.G.C.W. Kumara, and Y. Kishanthan, "Development of a solar powered fixed wireless network extender", Sri Lankan Journal of Technology (SLJoT), vol. 02, no. 1, pp.16-23, May 2021.
14. L.N. Mohamed, R.M.S. Rasanjalee, P. Rumesrajasegar, **R. Hirshan**, and W.G.C.W. Kumara, "Effects of Different Network Coding Techniques in Wireless Video Transmission," in Proc. of the National Engineering Research Symp., Dec. 2020.
15. H. M. R. M. Herath, K. H. S. Tharindu, K. D. M. Fernando, P. M. K. Alahakonn, and **R. Hirshan**, "Intelligent changeover solution for a domestic hybrid power system," in Proc. of 2020 International Research Conf. on Smart Computing and Systems Engineering (SCSE), Sep. 2020, pp. 210–215.

EXTRA CURRICULAR ACTIVITIES

- Presently working as a Track Coordinator and a co-editor at the 11th International Symposium of South Eastern University of Sri Lanka (SEUSL), 2023.
- Presently working as a member of the Faculty Curriculum Development Committee, Faculty of Engineering of SEUSL.
- Worked as the Department coordinator for the Internal Quality Assurance Cell, Faculty of Engineering, SEUSL.
- Acted as a Students Counsellor to the Faculty of Engineering, SEUSL.
- Acted as the President of the Electrical and Electronic Engineering Society, Faculty of Engineering, SEUSL.
- Contributed as a Track Coordinator and a co-editor at the 8th International Symposium of SEUSL, 2018.