Harshana Weligampola

Research Assistant · IDRC

University of Peradeniya, Sri Lanka.

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Interests

Computer Vision | Algorithms | Machine learning | Artificial Intelligence | Physics

Education

BSc Engineering *2015 - 2020*

University of Peradeniya *Sri Lanka*

- GPA: 3.95

G.C.E. Advanced Level *2012 - 2014*

Kingswood College *Sri Lanka*

- Z-Score: 2.714
- Country Rank: 28

Research Experience

University of Peradeniya *Kandy, Sri Lanka.*

Advisors: Prof. Janaka Ekanayake, Dr. Roshan Godaliyadda *Apr. 2021 - Present*

- Project: Artificial Intelligence framework for threat assessment and containment for COVID-19 and future epidemics.

Sri Lanka Technological Campus *Padukka, Sri Lanka*

Advisors: Prof. Vijitha Herath, Dr. Roshan Godaliyadda, Dr. Dhammika Elkaduwe *Aug. 2020 - Apr. 2021*

- Project: Computer vision for low light images.

Nokia Bell Labs *Antwerp, Belgium*

Advisor: Prof. Haris Gačanin *Feb. 2019 - Aug. 2019*

- Project: Study on Deep Learning for Latency Constraint Applications in Wireless Systems

Publications

Published

Harshana Weligampola, Gihan Jayatilaka, Suren Sritharan, Parakrama Ekanayake, Roshan Ragel, Vijitha Herath, Roshan Godaliyadda. "An optical physics inspired CNN approach for intrinsic image decomposition", Accepted for IEEE International Conference on Image Processing (IEEE ICIP), 2021 PDF

Umar Marikkar*, **Harshana Weligampola***, Rumali Perera, Jameel Hassan, Suren Sritharan, Gihan Jayatilaka, et. al. "A generalized forecasting solution to enable future insights of COVID-19 at sub-national level resolutions", Accepted for IEEE International Conference on Industrial and Information Systems (ICIIS), 2021 PDF

Suren Sritharan, **Harshana Weligampola**, Haris Gačanin. "A Study on Deep Learning for Latency Constraint Applications in Beyond 5G Wireless Systems", Accepted for IEEE Access, 2020 PDF

Harshana Weligampola, Gihan Jayatilaka, Suren Sritharan, Roshan Godaliyadda, Parakrama Ekanayake, Roshan Ragel, Vijitha Herath. "A Retinex Based GAN Pipeline to Utilize Paired and Unpaired Datasets for Enhancing Low Light Images". Accepted for Moratuwa Engineering Research Conference (MERCon), 2020 PDF

Gihan Jayatilaka*, **Harshana Weligampola***, Suren Sritharan*, Dhammika Elkaduwe, Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Nalin Harischandra. "Generalizing of Foreground Estimation Algorithms in Dynamic Background Conditions", Accepted abstract for SLTC International Research Conference, 2020

Gihan Jayatilaka*, **Harshana Weligampola***, Suren Sritharan*, Pankayaraj Pathmanathan, Roshan Ragel, Isuru Nawinne. "Non-contact Infant Sleep Apnea Detection", Accepted for IEEE International Conference on Industrial and Information Systems (ICIIS), 2019 PDF

In Review

Umar Marikkar, **Harshana Weligampola**, Rumali Perera, Roshan Godaliyadda, Vijitha Herath, Parakrama Ekanayake, Janaka Ekanayake, Anuruddhika Rathnayake, Samath Dharmaratne. "A generalized forecasting solution to enable future insights of COVID-19 at sub-national level resolutions". PLOS ONE, 2021

In Prep

Harshana Weligampola, Yasiru Ranasinghe, Roshan Godaliyadda, Vijitha Herath, Parakrama Ekanayake, Janaka Ekanayake. "Threat assessment and containment of COVID-19 and future threats using computer-based simulation". PLOS ONE Computational Biology, 2021

Awards & Honors

2020 **Prof. E.F.Bartholomeusz Endowment award**, for best mathematical thesis project of the Faculty of Engineering, University of Peradeniya
Nominated for best thesis, Escape 2020 – Thesis project symposium of the Department of Computer Engineering

2019 **2nd Country Rank and 64th World Rank**, IEEEXtreme 13.0 (out of 3000+ teams)
Winner, StatHack 2.0 – nationwide inter university statistical data analysis competition

2018 **2nd Country Rank and 79th World Rank**, IEEEXtreme 12.0 (out of 3000+ teams)
National rank 4, Sri Lanka Robotics Competition (Inter university robotics competition)
Runners up, Dialog NB-IOT Hackathon (Invitational undergrad and professional dev hackathon)
Runners up, BrainStorm: Sri Lanka's The Premier Biomedical Competition
Champions, SLIIT Codefest: Emerging Innovator nationwide open competition
Champions, IEEE Region 10 Humanitarian Technology Conference (Asia / Australia region)
Champions, ACES Coders v7.0

2017 **1st Country Rank and 116th World Rank**, IEEEXtreme 11.0 (out of 3000+ teams)
Best Idea, ACES Hackathon

2016 **1st Country Rank and 62nd World Rank**, IEEEXtreme 10.0 (out of 3000+ teams)
Champions, ACES Coders v6.0

2015 **Bronze Medal**, International Physics Olympiad, Mumbai, India.
Member National Team, Asian Physics Olympiad, Hangzhou, China.
Mahapola merit scholarship, for performance in GCE Advanced Level examination

2014 **National rank 28**, GCE Advanced level examination (out of 60,000+)
National rank 1, Gold Medal, Sri Lanka Physics Olympiad (out of 500+)

2011 **9A for 9 subjects**, GCE Ordinary level examination

Projects

2021 **Human behaviour simulation and analysis**. Developed a tool to simulate the realistic movement of a large population and impose dynamics of disease spreading to identify vulnerable population and critical areas that spreads diseases.
Technologies: python, react-js
Techniques: Hierarchical modelling of environment.
Contribution: Design, implementation, testing.

2019-2021 **Low light image processing algorithm development**. Characterizing the properties of low light images. Enhance images obtained in low light environments. Decomposing image into intrinsic constitutes using single image.

Technologies: Python, Tensorflow, OpenCV
Techniques: CNNs, GANs, one class classifiers, signal processing
Contribution: Proposing, algorithm development, implementation, testing, paper writing

2018 **Infant Sleep Apnea detection**. A portable video processing device that can detect sleep apnea condition in infants.
Technologies: Python, numpy, scipy, OpenCV, Raspberry Pi, tensorflow
Techniques: Deep neural networks, Edge detection, subspace filtering, sensor fusion.
Contribution: algorithm development, report writing, paper writing

2017 **Foreground estimation in dynamic background conditions**. Video processing research project to identify foreground objects in a video recorded stationary.
Technologies: MATLAB, python, numpy
Techniques: Gaussian mixture models, adaptive filtering, unsupervised learning, hierarchical algorithms for use-cases.
Contribution: Proposing, algorithm implementation, development, reporting.

Mini-Projects

2020 **Image segmentation**, using Random Markov Fields.
2018 **BCI**, Mapping the EEG signals from Visual Cortex to what a person is seeing.
2018 **Autonomous maze solving robot**, Implemented the algorithm for solving a maze using Arduino
2017 **CPU**, Implementation of the ALU, registers, cache and RAM using the behavioural model of verilog HDL
2017 **ALU**, An implementation of the complete ALU and registers using the gate model of verilog HDL
2017 **Assembly Image Processing**, Basic image manipulation software in ARM assembly
2017 **Fractals**, Multi threaded application for fractal visualization in JAVA
2016 **Speaker identification software**, using basic signal processing techniques

Teaching Experience

Spring 2021	**CCS201: Communication Protocols**, Teaching Assistant	*SLTC*
Fall 2020	**CCS112: Internet technologies**, Teaching Assistant	*SLTC*
Fall 2020	**ECS100: Programming Fundamentals**, Teaching Assistant	*SLTC*
Spring 2020	**CO543: Image processing**, Casual Instructor	*University of Peradeniya*
Spring 2020	**CO224: Computer architecture**, Casual Instructor	*University of Peradeniya*

Outreach & Professional Development

Service and Outreach

2021 **IEEE Access**, Reviewer
2019 **Aces Coders**, Problem Setter

Workshops / Training programs attended

2018	**Hackadev National Social Innovation camp**, United Nations Development Project and Malaysian Global Innovation and Creativity Center	*Colombo*
2017	**Joint Indo-Sri Lanka workshop on big data analytics**, IEEE International Conference on Information Systems	*University of Peradeniya*
2014-2015	**Sri Lanka National Physics Olympiad Team training**, Department of Physics	*University of Colombo*

Skills Summary

Computer skills

Programming Languages, Python, C, Java, C++, MATLAB
Deep Learning Frameworks, Tensorflow, Keras, PyTorch
Web, Javascript, React-js, HTML, CSS, PHP
Mobile Programming, Android, React-native
Graphics / Video, Adobe Photoshop, Adobe Illustrator, Adobe After Effects
Hardware-oriented Programming, Arduino, Verilog HDL, Assembly

Language skills

English, Professional fluency
Sinhalese, Mother tongue

References

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Dr. Roshan Godaliyadda
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