

Harshana Weligampola

RESEARCH ASSISTANT · I2LAB

Purdue University, USA.

✉ wweligam@purdue.edu | [📷 harshana95](https://www.instagram.com/harshana95)

Interests

Computational Imaging | Optics | Machine learning | Artificial Intelligence | Physics

Education

PhD, Electrical and Computer Engineering

2022 - now

PURDUE UNIVERSITY

USA

- GPA: 3.94

BSc, Computer 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

Skills Summary

COMPUTER SKILLS

Programming Languages, Python, C, Java, C++, MATLAB

Simulation, Zemax OpticStudio

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, Native

Research Experience

Purdue University

West Lafayette, USA.

ADVISORS: PROF. STANLEY CHAN, PROF. QI GUO

Aug. 2022 - Present

- Project: MetaZoom; Compact high-zoom metasurface system.

University of Peradeniya

Kandy, Sri Lanka.

ADVISORS: PROF. JANAKA EKANAYAKE, DR. ROSHAN GODALIYADDA

Apr. 2021 - July, 2022

- 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.

Undergraduate research student

ADVISORS: DR. ROSHAN GODALIYADDA, PROF. VIJITHA HERATH, PROF. ROSHAN RAGEL

- Project: Intrinsic feature decomposition of images and low light image enhancement.

Kandy, Sri Lanka

Sep. 2019 - July. 2020

Nokia Bell Labs

ADVISOR: PROF. HARIS GAČANIN

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

Antwerp, Belgium

Feb. 2019 - Aug. 2019

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](#)

Awards & Honors

2022 **Ross Fellowship**, Purdue University

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**, IEEEExtreme 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**, IEEEExtreme 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**, IEEEExtreme 11.0 (out of 3000+ teams)

Best Idea, ACES Hackathon

2016 **1st Country Rank and 62nd World Rank**, IEEEExtreme 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

- 2023 **MetaZoom**. Analyze the output of an optical system designed with a metasurface on refractive optics to achieve high zoom on miniature devices. Create a post-processing pipeline to mitigate the aberrations.
Technologies: Ansys Zemax OpticStudio, python
Techniques: Zernike phase, CNNs, Ray-Tracing.
- 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.
- 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 constituents using single image.
Technologies: Python, Tensorflow, OpenCV
Techniques: CNNs, GANs, one class classifiers, signal processing
- 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.
- 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.

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

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|-------------|--|--------------------------|
| 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

- 2022 **Elsevier Digital Signal Processing**, Reviewer
- 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*

References ---

Available upon request