

Gihan Jayatilaka

Computer Science PhD student at the University of Maryland, USA
Seeking research/development internships for 2024 summer

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Google Scholar Github

INTERESTS

Computer vision Machine Learning Deep Learning Algorithms

EDUCATION

- **University of Maryland** College Park, MD, USA
PhD in Computer Science [Courses] Aug 2021 - May 2026
- **University of Peradeniya** Peradeniya, Sri Lanka
BSc in Computer Engineering (First Class Honors) [Courses, Thesis] 2015 - 2020

EXPERIENCE

- **Futurewei Technologies** Santa Clara, CA, USA
Research intern (Camera and Vision team) Summer 2022
 - Applicability of Vision Transformers for implicit ground-truth tasks
- **University of Peradeniya** Peradeniya, Sri Lanka
Research Assistant Aug 2020 - Jul 2021
 - Computer vision for COVID-19 mitigation
 - Low light image enhancement and Intrinsic Image Decomposition
- **University of Peradeniya** Peradeniya, Sri Lanka
Undergraduate Thesis Student May 2020 - Jul 2020
 - Retinex decomposition of low light images and GAN based enhancement
- **Living Analytics Research Center, Singapore Management University** Singapore
Research Intern Feb 2019 - Jul 2019
 - Computer vision based screen to camera communication

ONGOING PROJECTS

- **Deep clustering for unbalanced image datasets**
Developing techniques to use deep learning techniques to cluster long-tailed datasets. We achieve the objective by utilizing the recent advances in Self Supervised Learning and relaxing the inherent assumptions about dataset balance in SOTA deep clustering techniques.
- **Pitfalls of Caption Expansion using Vision Language Models (VLMs)**
Automated captioning (and caption expansion) has been used in recent literature as a synthetic ground truth for training VLMs. In this project, we evaluated such pipelines and discovered a spectrum of issues that are detectable by off-the-shelf computer vision tools including hallucinations and attribute mismatch.
- **Generating supervision signals from non-annotated data for object localization in unconstrained environments**
The objective of this work is to come up with an object localization pipeline that is not limited by the availability of annotated training data for classes. We achieve this by computing pseudo ground truth for object locations from SSL features.
- [Mentoring] **Improving 3D Semantic Occupancy Prediction Using Temporal Information**
We improve upon the Tri-perspective-view encoding of 3D scenes (for self-driving-related 3D mapping tasks) by a novel transformer architecture to promote temporal information passing through the network.

Most of my earlier projects have an accompanying publication in the next section.

- [P 10] **S2TPVFormer: Spatio-Temporal Tri-Perspective View for temporally coherent 3D Semantic Occupancy Prediction**
Sathira Silva, Savindu Wannigama, [Gihan Jayatilaka](#) , Roshan Ragel
In *arXiv preprint arXiv:2401.1378*
[PDF](#) , [DOI](#)
- [J 9] **Holistic Interpretation of Public Scenes Using Computer Vision and Temporal Graphs to Identify Social Distancing Violation**
[Gihan Jayatilaka](#) , Jameel Hassan, Suren Sritharan, Janith Bandara Senanayaka, Harshana Weligampola, Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Janaka Ekanayake, and Samath Dharmaratne
In *MDPI Applied Sciences*
[DOI](#) , [PDF](#) , [HTML](#) , [Presentation](#) , [Project Page](#)
- [C 8] **An optical physics inspired CNN approach for intrinsic image decomposition**
Harshana Weligampola, [Gihan Jayatilaka](#) , Suren Sritharan, Parakrama Ekanayake, Roshan Ragel, Vijitha Herath, Roshan Godaliyadda
In *2021 IEEE International Conference on Image Processing (ICIP). IEEE.*
[PDF](#) , [PDF \(Paywalled\)](#) , [DOI](#) , [Poster \(PDF\)](#) , [Poster \(JPG\)](#) , [Presentation\(PDF\)](#) , [Presentation\(Youtube\)](#)
- [C 7] **DeepLight: Robust & Unobtrusive Real-time Screen-Camera Communication for Real-World Displays**
Vu Tran, [Gihan Jayatilaka](#) , Ashwin Ashok, Archan Misra,
In *2021 20th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). IEEE. Best paper artifact award*
[PDF](#) , [PDF \(paywalled\)](#) , [Code](#) , [DOI](#) , [Presentation \(PDF\)](#) , [Presentation \(Youtube\)](#)
- [C 6] **Hands Off: A Handshake Interaction Detection and Localization Model for COVID-19 Threat Control**
Jameel Hassan, Suren Sritharan, [Gihan Jayatilaka](#) , Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Janaka Ekanayake
In *2021 IEEE International Conference on Industrial and Information Systems (ICIIS)*
[PDF](#) , [PDF\(Paywalled\)](#) , [DOI](#) , [Presentation\(PDF\)](#) , [Presentation\(Youtube\)](#) , [Code](#)
- [C 5] **Generalizing of Foreground Estimation Algorithms in Dynamic Background Conditions (Abstract)**
[Gihan Jayatilaka*](#) , Harshana Weligampola*, Suren Sritharan*, Dhammika Elkaduwe, Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Nalin Harischandra
In *SLTC International Research Conference 2020*
[PDF](#) , [Presentation\(PDF\)](#)
- [C 4] **Non-contact Infant Sleep Apnea Detection**
[Gihan Jayatilaka*](#) , Harshana Weligampola*, Suren Sritharan*, Pankayaraj Pathmanathan, Roshan Ragel, Isuru Nawinne
In *2019 IEEE International Conference on Industrial and Information Systems (ICIIS)*
[PDF](#) , [PDF\(Paywalled\)](#) , [DOI](#)
- [C 3] **A Retinex based GAN Pipeline to Utilize Paired and Unpaired Datasets for Enhancing Low Light Images**
Harshana Weligampola, [Gihan Jayatilaka](#) , Suren Sritharan, Roshan Goldaliyadda, Parakrama Ekanayeka, Roshan Ragel, Vijitha Herath
In *MERCON 2020*
[PDF](#) , [PDF\(paywalled\)](#) , [Presentation\(PDF\)](#) , [Presentation\(Youtube\)](#) , [DOI](#)
- [J 2] **GPU accelerated adaptive banded event alignment for rapid comparative nanopore signal analysis**
Hasindu Gamaarachchi, Chun Wai Lam, [Gihan Jayatilaka](#) , Hiruna Samarakoon, Jared T. Simpson, Martin A. Smith, Sri Parameswaran
In *BMC Bioinformatics 21, 343 (2020)*
[PDF](#) , [HTML](#) [DOI](#)

- [J 1] **Adaptive hierarchical clustering for hyperspectral image classification: Umbrella Clustering**
 S.S.P. Vithana, E.M.M.B. Ekanayake, E.M.H.E.B. Ekanayake, A.R.M.A.N. Rathnayake, G.C. Jayatilaka , H.M.V.R. Herath, G.M.R.I. Godaliyadda and M.P.B. Ekanayake
 In *J. Spectral Imaging 8, a11 (2019)*
[PDF](#) , [HTML](#) , [DOI](#)

HONORS AND AWARDS

	[A] Algorithms	[C] Competitive Programming	[E] Examinations	[D] Development
2022	[A]	ACM/IEEE International Conference on Information Processing in Sensor Networks. <u>IPSN 2021 Best artifact award.</u>		
2021	[]	University of Maryland, College Park : <u>Dean's Fellowship</u>		
2020	[A]	Prof. E.F.Bartholomeusz Endowment award for <u>best mathematical thesis</u> project of the Faculty of Engineering, University of Peradeniya (413 students).		
2020	[A]	Escape 2020 – Thesis project symposium of the Department of Computer Engineering (60 students), University of Peradeniya. <u>Nominated for best thesis</u>		
2019	[E]	Huawei Seeds for the Future: Selected to <u>top 10</u> CS/IT undergraduates of the country in terms of academic merit to participate in the program.		
2019	[A]	StatHack 2.0 – nationwide inter university statistical data analysis competition (90 teams) organized by Dept. of Statistics, University of Colombo. <u>Winners</u>		
2019	[C]	IEEEExtreme 12.0: (World wide algorithmic programming competition : 4300 teams) National Runners up , World Rank 67		
2019	[A]	Dialog Axiata Datathon - data science hackathon in SL on smart city planing (for students and data science professionals). Best data engineer award		
2019	[C]	ACES Coders v7.0 (National level inter university algorithmic programming competition: 120 competing teams) <u>Champions</u>		
2019	[C]	Google Code Jam Qualification round : Perfect score, Best performance in SL, World Rank 298 (24000 participants)		
2018	[C]	IEEEExtreme 12.0: (World wide algorithmic programming competition : 4000 teams) <u>National Runners up , World Rank 79</u>		
2018	[A]	IEEE Region 10 Humanitarian Technology Conference (Asia / Australia region) Humanitarian Technology Products Competition for grad/undergrad students. <u>Champions</u> . Project: Infant sleep apnea detection system		
2018	[A]	SLIIT Codefest: Emerging Innovator nationwide open competition: <u>Champions - Gold award</u> . Project: Infant sleep apnea detection system		
2018	[A]	BrainStorm: The Premier Biomedical Competition in Sri Lanka. <u>Runners up and Silver medal</u> . Project: Infant sleep apnea detection system		
2018	[A]	Dialog NB-IOT Hackathon (Invitational undergrad and professional dev hackathon) Project: Infant sleep apnea detection system: <u>Runners up</u>		
2018	[A]	United Nations' Social Innovation Challenge: Shortlisted for national innovation camp and to the per-incubation program (<u>Top 14 out of 700+ teams</u>)		
2018	[R]	Sri Lanka Robotics Competition (Inter-university robotics competition) Project Galvans : <u>National rank 4</u>		
2017	[C]	IEEEExtreme 11.0: <u>National Champions, World Rank 124</u>		
2017	[A]	ACES Hackathon 2017: (Intra university hackathon) Project: Expert miner: <u>Software section winners, Best idea of the competition</u>		
2016	[A]	IEEEExtreme 10.0: <u>National Champions, World Rank 62</u>		
2016	[A]	ACES Coders v6.0 <u>Champions</u>		
2016	[D]	ACES Hackathon 2016: Project Motify: <u>Software section winners, Most popular idea of the competition</u>		
2016	[E]	HDTs Scholarship award in recognition of 2014 GCE AL performances		
2015	[E]	Mahapola merit scholarship for performance in GCE AL examination		
2015	[E]	Member of the SL national team for Asian and International Physics Olympiads		
2015	[E]	Sri Lanka Mathematics Olympiad: National rank 25, High distinction		
2014	[E]	GCE AL (Advanced Level) examination. Mathematics A, Physics A, Chemistry A. z score 2.55 , National rank 86 (30,000+ students).		
2014	[E]	Sri Lanka Physics Olympiad: National rank 8, Silver Medal		
2014	[E]	Sri Lanka Mathematics Olympiad: High distinction		
2013	[E]	Star Quest - Astronomical quiz competition: National rank 4.		
2013	[E]	National Chemistry Quiz (iChem, SL): National rank 2, High distinction		
2013	[E]	Sri Lanka Mathematics Olympiad: National rank 35, High distinction.		

WORKSHOPS/TRAINING ATTENDED

- 2019 [Huawei seeds for the future 2019](#) two week study in China about telecommunication, 5G, cloud etc:
- 2018 Hackadev National Social Innovation camp organized by United Nations Development Project and Malaysian Global Innovation & Creativity Center.
- 2017 Joint Indo-Sri Lanka workshop on big data analytics at 2017 IEEE International Conference on Information Systems.
- 2014-15 Sri Lanka National Physics Olympiad Team training at University of Colombo, Department of Physics.

TEACHING

- 2021-24 Graduate TA for [CMSC 351 Algorithms](#) (2021 Fa, 2022 Sp, 2022 Fa, 2024 Sp).
- 2023 Fa Graduate TA for CMSC 420 Advanced Data Structures.
- 2023 Sp Graduate TA for [CMSC 430 Design and Implementation of Programming Languages](#) .
- 2022 Volunteer problem setter for Algorithm Implementation Tutorials for CO322 (E18) course.
- 2021 Volunteer organizer of [Neural Networks Reading Group](#) for CO542 (E15) course.
- 2020 Casual instructor (TA) for Computer Architecture and Digital Logic courses of the Faculty of Engineering, University of Peradeniya.
- 2018-19 Volunteer instructor (TA) for [GP106 Computing](#) (E16, E17)

SERVICES

- 2019-23 Scientific Committee, [National Informatics Olympiad](#) , Sri Lanka.
- 2021-22 Student reviewer, CS MS/PhD admissions, University of Maryland 2022 Fall and 2023 Fall.
- 2022 Invited speaker, “ [What is data science?](#) ” (in Sinhala) for high school students.
- 2021 Invited speaker at “ [Introduction to competitive algorithmic programming](#) ” @ IEEE Student Branch of University of Vocational Technology, Sri Lanka.
- 2020 Web chair, [Wearsys 2020](#): 6th ACM Workshop on wearable systems and applications.
- 2018 Instructor at “computational thinking” session series for algorithmic programming competition enthusiasts of University of Peradeniya.
- 2018 “Gold chasers” Sri Lanka iPhO (International physics olympiad) team support program, Rotract club, University of Moratuwa.
- 2017 Speaker at “ [Intro to competitive programming](#) ” webinar for IEEE Student branch University of Wollongong.
- 2017 Instructor at Weekly “Interactive coding sessions” for freshman class of University of Peradeniya.

SKILLS

Languages	Java, Python, C, MATLAB, Bash scripting
Tools (ML)	Pytorch, Tensorflow, Keras, Sci-kit learn
Tools (other)	Latex, git

REFERENCES

- PhD (Department of Computer Science, University of Maryland)
 - Prof. [Abhinav Shrivastava](#) .
- Pre-doctoral
 - Prof. [Roshan Godaliyadda](#) , Department of Electrical and Electronic Engineering, University of Peradeniya.
 - Prof. [Archan Misra](#) , Vice Provost of Research and Professor of Computer Science, Singapore Management University.

OTHER

- I can work fulltime during 2024 Summer from 27th May 2024 to 23rd August 2024 on CPT.
- Dates are flexible if I am being considered for a 2024 Fall internship.