

RAMITH HETTIARACHCHI

+1 (857) ●●● - ●●●●● • [✉ im@ramith.fyi](mailto:im@ramith.fyi) • [🏠 website](#) • [🐙 github](#)

SUMMARY

I am passionate towards using machine learning for scientific advancements (especially towards healthcare) while making sure these models are robust, interpretable and equitable.

Research Interests : [Trustworthy ML](#) [Uncertainty Quantification](#) [ML for Science](#) [Self-Supervised Learning](#)

EDUCATION

University of Moratuwa

B.Sc. Eng(Hons.) Electronic & Telecommunication Engineering

Moratuwa, Sri Lanka

Oct 2017 - June 2022

- Dean's List: Semesters 1,2,3,4,6,7,8

CGPA : 3.96/4.2 (First Class)

Thesis Title: "A Novel Hardware Accelerated Imaging Cytometry Modality Using Diffractive Deep Neural Networks (D2NNs)"

RESEARCH EXPERIENCE

JULY 2022 - Present

Post Baccalaureate Fellow, Division of Science, Harvard University

With the guidance of Dr. Sergey Ovchinnikov, I am developing a differentiable approach to multiple sequence alignment to improve downstream protein structure prediction tasks. Also, I am developing quantization-aware training methods and robust optical neural networks under the guidance of Dr. Dushan Wadduwage.

OCT 2020 - MAR 2021

Research Intern at CSIRO Data61, Australia

The project involved real-time machine vision with a focus on 3D reconstruction from Intel Realsense D435 camera and performing dynamic obstacle avoidance.

PUBLICATIONS

- [1] **R. Hettiarachchi**, U. Haputhanthri, K. Herath, H. Kariyawasam, S. Munasinghe, K. Wickramasinghe, D. Samarasinghe, A. C. De Silva and C. U. S. Edussooriya, "A Novel Transfer Learning Based Approach for Screening Pre-existing Heart Diseases using Synchronized ECG Signals and Heart Sounds," *IEEE International Symposium on Circuits and Systems (ISCAS)*, 2021, pp. 1-5, doi: [10.1109/ISCAS51556.2021.9401093](https://doi.org/10.1109/ISCAS51556.2021.9401093).
↔ [Transfer-learning](#) [ECG ↔ PCG](#) [CNN](#)
- [2] S. Rajapakshe, **R. Hettiarachchi**, "Design and Development of a Research Oriented Low Cost Robotics Platform with a Novel Dynamic Global Path Planning Approach," *2022 8th International Conference on Control, Automation and Robotics (ICCAR)*, 2022, pp. 71-76, doi:[10.1109/ICCAR55106.2022.9782663](https://doi.org/10.1109/ICCAR55106.2022.9782663). ↔ [Path-planning](#) [Visualization](#) [C++](#)
- [3] H. Arguello, J. Bacca, H. Kariyawasam, E. Vargas, M. Marquez, **R. Hettiarachchi**, H. Garcia, K. Herath, U. Haputhanthri, B. S. Ahluwalia, P. So, D. N. Wadduwage, C. U. S. Edussooriya, "Deep Optical Coding Design in Computational Imaging". To appear in *IEEE Signal Processing Magazine Special Issue on Physics-Driven Machine Learning for Computational Imaging, Jan 2023*. [[link](#)] ↔ [Tutorial Paper](#)

INVITED TALKS

- [1] "Towards Realizable Optical Meta-surfaces through Physics-informed Quantization Aware Training", Northeast Symposium on Biomedical Optics - Nov, 2022 - MIT, Lansdowne St. [[link](#)]
- [2] "Towards Realizable D2NN Designs Through Quantization Aware Training", Nano-SymBioSys workshop at UiT, The Arctic University of Norway - Sep, 2022 - Tromsø, Norway. [[link](#)]
- [3] "A Workshop on Healthcare Research: From Sketchbook to Real-world Implementation During a Global Pandemic.", IEEE EMBS International Student Conference. - Feb, 2021 - (Virtual) [[Link](#)].

PATENT APPLICATIONS

- [1] K. Herath* , U. Haputhanthri*, **R. Hettiarachchi***, H. Kariyawasam*, A. Ahmad, B. S. Ahluwalia, C. U. S. Edussooriya and D. Wadduwage, "Provisional Application - Harvard Ref. No. HU 8932 - F&L Ref. 098930-0366 "Differentiable Microscopy Designs an All-Optical Quantitative Phase Microscope".

PREPRINTS

- [1] A. Ahmad, **R. Hettiarachchi***, A. Khezri*, B. S. Ahluwalia, D.N. Wadduwage, R. Ahmad, “Highly sensitive quantitative phase microscopy and deep learning complement whole genome sequencing for rapid detection of infection and antimicrobial resistance.” [in Review, *Nature Communications Biology*.]
- [2] K. Herath, U. Haputhanthri*, **R. Hettiarachchi***, H. Kariyawasam*, R. N. Ahmad, A. Ahmad, B. S. Ahluwalia, C. U. S. Edussooriya and D. Wadduwage, “Differentiable Microscopy Designs an All Optical Quantitative Phase Microscope”. [In Review] * equal contribution
- [3] U. Haputhanthri, K. Herath, **R. Hettiarachchi**, H. Kariyawasam, A. Ahmad, B. S. Ahluwalia, C. U. S. Edussooriya and D. Wadduwage, “From Hours to Seconds: Towards 100x Faster Quantitative Phase Imaging via Differentiable Microscopy”. [Preprint]

OTHER RESEARCH PROJECTS

Configuring an Intelligent Reflecting (IRS) Surface for Wireless Communications

FEB - JUNE, 2021

Supervisor : Dr. Prathapasinge Dharmawansa, University of Moratuwa.

- ▶ Developed an alternative optimization procedure based on a genetic algorithm and the adaptive moment estimation optimizer to find optimized IRS configurations in a 2^{4096} search space. It provided the best data rate and computational cost trade-off, and was the winning solution of the IEEE Signal Processing Cup 2021.

Python Genetic algorithm based optimization Mathematical Modeling

Realtime Sign Language Translation to Speech

JUL - NOV, 2019

Self supervised project.

- ▶ Developed a solution capable of mapping the EMG signals obtained by an arm to sign language gestures using an ML model. For high-performance inference, the DE-10 Nano field-programmable gate array is used. Project won the Iron Award at the APAC Finals of innovate FPGA, a global FPGA design contest organized by Intel.

C++ SciPy Electromyography (EMG)

HONORS, AWARDS, AND COMPETITIONS

Scholar - 2022 Princeton Pathways to Graduate School program	2022
Winner - IEEE Signal Processing Cup, ICASSP - <i>Team T³</i>	2021
1st Runner Up - IEEE CASS COVID-19 Special Student Design Competition	2020
2nd Runner Up - IEEE IAS CMD Humanitarian Contest	2020
1st in Sri Lanka, 48th in the World - IEEE Xtreme 13.0 Competitive Programming - <i>Team Siraa</i> [link]	2019
APAC - Iron Award - InnovateFPGA - Global FPGA Design Contest	2019
Sri Lankan Team Reserve - International Olympiad in Informatics (IOI)	2015
Bronze Medal - ‘Young Computer Scientist’ (YCS) Competition	2012,2013
Bronze Medal - ‘Junior Inventor of the Year’ (JIY) Competition	2010

VOLUNTEER / LEADERSHIP

L2ID @ ECCV 2022	Reviewer	2022
NEURIPS CONFERENCE	Student Volunteer	2021
IEEE SIGNAL PROCESSING SOCIETY, UoM.	Vice-Chairman, Chairman	2020 - 2022
ROTARACT CLUB OF UNIV. OF MORATUWA	Volunteer, Senior Director - IT	2019 - 2021
SUSTAINABLE EDUCATION FOUNDATION	Assistant Program Manager - ScholarX	2020 - 2021
SOCRATIC.ORG	Helping students with Chemistry & Math	2014 - 2016

PROGRAMMING PROFICIENCY

LANGUAGES:	C/C++, Python, Scilab, MATLAB, Mathematica.
VISUALIZATION/TECHNICAL:	Javascript, Processing, Git, \LaTeX .
LIBRARIES:	OpenCV, PyTorch, Tensorflow, JAX.

References available upon request.

December, 2022