

# Amaya Dharmasiri

Research Assistant - Mohammad Bin Zayed University of Artificial Intelligence

✉ amaya.dharmasiri@mbzuai.ac.ae

## Education

---

### University of Moratuwa - Sri Lanka

Dec 2017 - June 2022

*B.Sc. Engineering (Electronics and Telecommunications)*

- Cumulative GPA- **4.09/4.20** (3rd highest GPA in the cohort of 100 students in Electronic and Telecommunication Engineering, Dean's list in all semesters)
- Selected Courses- Programming Fundamentals (A+), Signals and Systems (A+), Random Signals and Processes (A+), Calculus (A+), Linear Algebra (A+), Graph Theory (A+), Fundamentals of Image Processing and Machine Vision (A+), Machine Vision (A+), Neural Network and Fuzzy Logic (A+), Advances in Machine Vision (A+).

## Research experience

---

### Research Assistant – MBZUAI Abu Dhabi

July 2022–present

- **Long-Tail Visual Recognition using Large Vision-Language Models** - Currently researching on improving the fine-tuned performance of Large Pretrained Vision-Language models such as CLIP on standard Long-Tail Visual Recognition benchmarks such as Imagenet-LT, and iNaturalist.

### Undergraduate Researcher – University of Moratuwa

2019–2022

- **Multi-modal late fusion for object detections in stereo images** - Developed a geometric combination approach for object detections for stereo cameras in an autonomous driving setting to minimise the impact of truncated and occluded objects in monocular views. Evaluated the performance of the approach in Kitti and Cityscapes datasets to demonstrate improved precision and recall of vehicle and pedestrian detections.
- **3D point cloud transformation and regeneration for mixed reality** - Developed a point cloud autoencoder architecture to introduce controllable transformations to 3D objects via latent space manipulations while preserving perceptual quality of 3D objects and their intended utility in MR applications. (*Work presented in Learning to Generate 3D Objects and Scenes ECCV 2022 workshop*). Proposed a novel self-supervised contrastive learning framework for representation learning of 3D point cloud objects using cross-modal correspondance of 3D pointclouds and 2D images. The proposed method yielded state-of-the-art results in pointcloud understanding. (*Publication in CVPR 2022*)

### Visiting Student Researcher – University of Sydney

2020– 2021

- **Content-aware 360-degree video optimisation in mobile systems** - Designed a tiling scheme to encode 360-degree videos for efficient bandwidth utilisation and improved quality of experience during streaming by incorporating visual content features such as image saliency, object composition and optical flow. Conducted comprehensive analysis on 360-degree video content-viewport relationships and developed a dynamic categorisation framework for video segments based on user viewport trends. The developed categorisation is intended to support efficient caching mechanisms and resource utilisation in the video streaming process. (*Publication in NOSSDAV 2021*)
- **User-controllable 3D spatial privacy for mixed reality** - Developed a privacy-preserving encoding for 3D point cloud objects with a continuous privilege spectrum for user-controllability of object privacy in mixed-reality applications. Evaluated the performance of the encoding against simulated object reidentification attacks using state-of-the-art point cloud classifiers. (*Preprint*)

## Publications

---

### Accepted/ Published

- Mohamed Afham, Isuru Dissanayake, Dinithi Dissanayake, **Amaya Dharmasiri**, Kanchana Thilakarathna, and Ranga Rodrigo. 2022. **CrossPoint: Self-Supervised Cross-Modal Contrastive Learning for 3D Point Cloud Understanding** - *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2022*
- **Amaya Dharmasiri**, Dinithi Dissanayake, Isuru Dissanayake, Mohamed Afham, Ranga Rodrigo, and Kanchana Thilakarathna. 2022. **3DLatNav: Navigating generative latent spaces for semantic aware 3D object manipulation**. -*Presented in Learning to Generate 3D Objects and Scenes - ECCV 2022 Workshop*
- **Amaya Dharmasiri**, Chamara Kattadige, Vincent Zhang, and Kanchana Thilakarathna. 2021. **Viewport-aware dynamic 360-degree video segment categorization**. *In Proceedings of the 31st ACM Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV '21)*.

## Pre-prints

- Arpit Nama, **Amaya Dharmasiri**, Kanchana Thilakarathna, Albert Y. Zomaya, Jaybie Agullo de Guzman: **User configurable 3D object regeneration for spatial privacy**. CoRR abs/2108.08273 (2021)

## Under review

- Achintha Wijesinghe, Sahan Liyanaarachchi, **Amaya Dharmasiri** and Kanchana Thilakarathna. **MaskAE: Enhanced Auto-Encoder for Privacy-Aware Masking of 3D Point Clouds**

## Professional activities

---

### Peer reviewing

- Reviewer - Conference on Computer Vision and Pattern Recognition 2022
- Reviewer - European Conference of Computer Vision 2022
- Reviewer -International Conference on 3D vision 2022
- Reviewer -Learning with Limited and Imperfect Data @ ECCV 2022

### Talks

- 3DLatNav: Navigating generative latent spaces for semantic aware 3D object manipulation- *Phishing for knowledge group- Meta Reality Labs 2022, Learning to Generate 3D Shapes and Scenes - ECCV 2022 Workshop*
- Introduction to Deep Learning: *Introductory session at Open Course "Embedded Machine Learning for Edge Computing" offered by the Department of Electronic and Telecommunication Engineering, University of Moratuwa.*

## Industrial Experience

---

### Veracity AI, Colombo, Sri Lanka

June 2021 - March 2022

*Associate Machine Learning Engineer (Part-time)*

- Developed computer-vision solutions for automated vehicle insurance claim calculations based on vehicle damage detections. Built, trained, and validated models for Frame selection, Vehicle localization and Damage detection based on the state-of-the-art computer vision models.

## Selected Undergraduate Projects

---

### Optimizing Re-configurable Intelligent Surfaces for OFDM systems

April 2021

- Developed an approach to improving channel estimation and Rate maximization algorithms for an OFDM system as a part of Signal Processing Cup 2021 by IEEE Signal Processing Society and ICASSP 2021.

### Vision based person tracking Automated stage spotlight

2020

- Designed and developed a stationary spotlight that can rotate in two axes to track a performer on stage. An IR camera sends the position of a tag which emits IR light worn by the performer to the computer in real time.

### Multi-core Processor for Matrix Multiplication

2021

- Developed a 16-bit multi-core processor (ISA, timing schedules, state machine, micro sequences etc.) for matrix multiplication for variable input sizes. Developed using Quartus using Verilog.

### Micromouse robot

Aug 2019

- Designed and built a micromouse robot with Time of Flight laser sensors which can solve and travel in the optimum path on a 16\*16 maze (as per international micromouse competition rules). Control based on **STM32** programmed with **c++** with a modified version of flood-fill algorithm.

## Achievements

---

### *Olympiads*

#### Bronze medal - International Physics Olympiad

June 2017 Yogyakarta- Indonesia

- International high school physics competition with the participation of 80+ countries around the world.

#### National Champion - Asian Physics Olympiad

April 2017 Yakutsk- Russia

- International high school physics competition with the participation of 19 Asian countries.

#### National Champion - International Science Olympiad

Oct 2008- Indonesia

- International Science and Maths competition for junior school students among over 50 countries.

### *Academics*

#### Dean's List Certificate - all 8 semesters

2017- 2022

- The highest grade that an undergraduate can obtain for the excellence in academic studies in a semester.

#### All Island best performance - G.C.E. Advanced Level

Aug 2016

- University entrance examination taken by 270,000 students annually. Passed with 3 'A' passes and a Z-score of 2.98, ranking first in the country for physical sciences subjects.

## Competitions

### Winner - Arimac Futurecast open Ideathon

Feb 2021

- Open tech-ideathon organized by Arimac Sri Lanka. Proposed solution- Augmented reality based Mall Navigation system using 3D pointcloud based localization and mapping.

### Runner up - InnoChamps ideathon by Synopsis India

Dec 2020

- Ideathon to develop innovative technological solutions to detect, prevent, and fight the coronavirus pandemic. Proposed solution- Machine learning based fake news detection application to battle the infordemic of COVID-19.

### Regional Finalists (APJ) - Innovate FPGA by Intel and Terasic

Aug 2019

- International FPGA based design competition organized by Intel and Terasic.

### First Runner Up- Unilever Business Challenge

2018

- Business case study competition organized by Unilever Sri Lanka as a part of Unilever global business challenge.

### 9th in Sri Lanka- IEEEextreme 13

2018

- The world's largest 24 hour algorithmic coding challenge organized by IEEE for university students. Placed 191 in the world out of 4000+ teams.

## Other

### Baden Powell Award - World Organization of Scout Movement

Feb 2019

- The highest and the most prestigious award that can be won by a scout in their scouting life. Awarded for Rover Scouts around the world for exceptional performance and community service.

### 1st Runner Up and Best Impromptu Speaker- Speech Olympiad XII

2018

- Intra-university public speaking competition organized by the Gavel Club of University of Moratuwa.

### Most Outstanding student - Maliyadeva Girls' College (High School)

2016

- Awarded to the student of the graduating class with most impressive performance academic and extra-curricular performance.

## Leadership/ Volunteering/ Extracurriculars

---

### Chairperson- IEEE Professional Communication Student Branch Chapter

2021 – 2022

- Initiated Sri Lanka's first-ever student branch chapter affiliated to the IEEE Professional Communication Society. Gave leadership to an executive committee of 15, organizing activities to improve the skills of technical and academic communication of undergraduates.

### Assistant Program Manager- Sustainable Education Foundation

Oct 2020 – Aug 2021

- A voluntary organization operating to uplift the education of Sri Lanka. Contributed to delivering a premium mentoring program connecting over 70 overseas scholars and experts with 250+ Sri Lankan undergraduates.

### President- Gavel Club of University of Moratuwa

Jan 2020 – Feb 2021

- Affiliated to Toastmasters International. Provided leadership to an executive committee of 14 and a member base of 200. Organized public speaking coaching and competitions, and educational meetings.

### Chairperson- Ethugalpura Pioneers Girls Rover Crew

Sept 2017 – Sept 2019

- A community-based crew of 90 registered Rover Scouts under the Sri Lanka Scouts Association. Won awards for the best-performing Girls Rover Crew of Sri Lanka for the years 2017 and 2018.

## References

---

- Dr. Ranga Rodrigo** - Head of Department, Senior Lecturer, Department of Electronic and Telecommunication Engineering, University of Moratuwa  
Email- ranga@uom.lk
- Dr. Kanchana Thilakarathna** - Lecturer - School of Computer Science, University of Sydney  
Email- kanchana.thilakarathna@sydney.edu.au
- Dr. Sadeep Jayasumana** - Senior Research Scientist, Google Research  
Email- sadeep@google.com