Mohamed Afham

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"A self-motivated individual equipped with strong fundamental knowledge and passionate in solving real-world problems with open source cutting edge research contributions in Computer Vision and Machine Learning."

Research Interests

- Computer Vision
- Machine Learning
- 3D Vision
- Self-Supervised Learning

Education

Technical University of Darmstadt, Germany — Oct 2023 - Present
M.Sc + Ph.D. in Computer Science
ELIZA Graduate Fellowship
Advisor: Stefan Roth

University of Moratuwa, Sri Lanka — Aug 2017 - Jul 2022
CGPA: 3.84 (First Class Honours)
B.Sc (Hons) - Electronics and Telecommunication Engineering — Dean's List: Semester 1,2,4,6,7,8

St. Joseph's College, Trincomalee, Sri Lanka — Grad: Aug 2016
GCE Advanced Level — Z - Score: 2.78
High Distinctions for Combined Mathematics, Chemistry, Physics and General English
District Rank : 2, National Rank : 11 (out of $\sim$ 35, 000 candidates)

Experience

Meta AI, New York, USA — Jul 2022 - July 2023
AI Resident
Advisors: Pengchuan Zhang, Sernam Lim

- Long-form video understanding. *(ICCVW '23)*
- Video-language foundation modeling

Machine Vision Research Group, University of Moratuwa, Sri Lanka — Apr 2021 - Jun 2022
Undergraduate Thesis Research Student
Advisor: Ranga Rodrigo

- Self-supervised representation learning for 3D point cloud understanding. *(CVPR '22)*

VeracityAI, Colombo, Sri Lanka — Jun 2021 - Feb 2022
Associate Machine Learning Engineer - Part time

- Vehicle damage detection system: fast and accurate objection, instance segmentation

MBZUAI, Abu Dhabi, UAE — Oct 2020 - Apr 2021
Research Assistant - Internship
Advisor: Salman Khan

- Multimodal few-shot image classifcation: vision-language models *(BMVC '21, ECCVW '22)*

Publications / Preprints

Mohamed Afham, Satya Narayan Shukla, Omid Poursaeed, Pengchuan Zhang, Ashish Shah and Sernam Lim, **Revisiting Kernel Temporal Segmentation as an Adaptive Tokenizer for Long-form Video Understanding** *(ICCV 2023, Workshop on Resource Efficient Deep Learning for Computer Vision*

Mohamed Afham, Isuru Dissanayake, Dinithi Dissanayake, Amaya Dharmasiri, Kanchana Thilakarathna and Ranga Rodrigo, **CrossPoint: Self-Supervised Cross-Modal Contrastive Learning for 3D Point Cloud Understanding** *(CVPR 2022)*

Mohamed Afham and Ranga Rodrigo, **Visual-Semantic Contrastive Alignment for Few-Shot Image Classification** *(ECCV 2022, Workshop on Computer Vision in the Wild)*

Amaya Dharmasiri, Dinithi Dissanayake, **Mohamed Afham**, Isuru Dissanayake, Ranga Rodrigo and Kanchana Thilakarathna, **3DLatNav: Navigating generative latent spaces for semantic aware 3D object manipulation** *(ECCV 2022, Workshop on Learning to Generate 3D Shapes and Scenes)*

Mohamed Afham, Udith Haputhanthri, Jathurshan Pradeepkumar, Mithunjha Anandakumar, Ashwin De Silva and Chamira Edussooriya, **Towards Accurate Cross-Domain In-Bed Human Pose Estimation** *(ICASSP 2022)*

Mohamed Afham, Salman Khan, Muhammad Haris Khan, Muzammal Naseer and Fahad Shahbaz Khan, **Rich Semantics Improve Few-Shot Learning** *(BMVC 2021)*

Invited Talks

IEEE Student Branch, SLIIT - **Computer Vision Foundation Models** Jul, 2023
Meta Reality Labs Research - **Multimodal 3D Point Cloud Understanding** Apr, 2022
BYJU's Research, UK - **Multimodal Few-Shot Image Classification** May, 2022

Research Projects

Video Modeling Jul 2022 - Jul 2023
AI Residency at Meta AI

- Implementing an adaptive frame/ clip sampling mechanism for long-form video understanding
- Developing a novel video-language foundational architecture.
- Outcome: `https://arxiv.org/abs/2309.11569`

3D Point Cloud Understanding Apr 2021 - Jun 2022
Undergraduate Thesis Project

- Developing a novel self-supervised architecture for 3D point cloud understanding, which achieves SOTA performance across variety of tasks.
- Outcome: `https://arxiv.org/abs/2203.00680`
- Github: `https://github.com/MohamedAfham/CrossPoint` [200+ ★]

In bed Human Pose Estimation June 2021 - Oct 2021

- Implementing a novel learning mechanism for in-bed human pose estimation leveraging image-to-image translation and knowledge distillation.
- Outcome: `https://arxiv.org/abs/2110.03578`
- Github: `https://github.com/MohamedAfham/CD_HPE`

Few-Shot Learning Oct 2020 - June 2021

- Developing novel vision-language architectures to impose class-level semantic information for few-shot image classification.
- Outcomes: `https://arxiv.org/abs/2104.12709`, `https://arxiv.org/abs/2210.11000`

Selected Undergraduate Projects

Few-Shot Image Classification using Memory Augmented Neural Networks 2020
Github Link, *Blog Article*

COVID-19 patients detection in crowd using cough samples 2020
Github Link

Twitter Sentiment Analysis 2019
Github Link, *Blog Article*

American Sign Language Gestures Classification 2019
Github Link

Selected Awards / Hackathons

ELIZA Graduate Scholarship - German Academic Exchange Service (DAAD) 2023
SPS Travel Grant - IEEE Signal Processing Society 2022
2nd Runner Up - Video and Image Processing Cup, IEEE ICIP, Alaska, USA (Virtual) 2021
IEEE SMC Winners - BR41N.io hackathon, IEEE SMC Conference, Toronto 2020
Ranked 191st in the world - IEEExtreme 13.0 2019
Bronze Medalist - International Mathematics Competition for University Students, Blagoevgrad, Bulgaria 2018
Participant - Asian Physics Olympiad, Yakutsk, Russia 2017
Honorable Mention - International Mathematics Olympiad (IMO), Chiang Mai, Thailand 2015
Merit Award - International Mathematics Competition, Daejeon, Korea 2014
Gold Medalist - Sri Lanka Physics Olympiad 2016

Skills

Languages: Python, MATLAB
Cloud Computing: AWS (EC2, S3), Microsoft Azure (VM), Slurm
Frameworks: PyTorch, Tensorflow, Keras
Utilities: PyCharm, VSCode, Git

Professional Services

Peer Reviewer - CVPR, ECCV, IROS, IEEE TPAMI, IET Computer Vision 2021 - 2023
Undergraduate Thesis Co-Advisor - Dept of Electronic and Telecom Eng, University of Moratuwa 2022 - 2023