Rusiru Thushara

Mohamed bin Zayed University of Artificial Intelligence,
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GitHub & Google Scholar

Education

Mohamed bin Zayed University of Artificial Intelligence, UAE *Aug. 2023 - Present*
M.Sc. in Computer Vision **CGPA: 3.90/4.00**

University of Peradeniya, Sri Lanka *Nov. 2017 - Feb. 2023*
B.Sc. Engineering(Hons.) Computer Engineering **CGPA: 3.85/4.00**

Experience

Mohamed bin Zayed University of Artificial Intelligence, UAE *June, 2024 - Aug, 2024*
Research Intern Advisor: Prof. Ivan Laptev
Focused on 3D reconstruction of outdoor and indoor environments using Unitree Go2 robot.

Wadduwage Lab, Harvard University, USA *Jan, 2022 - July 2022*
Remote Research Fellow Advisor: Dr. Dushan N. Wadduwage
Developed deep learning applications for DNA damage repair assays, detecting γ-H2AX foci in cellular nuclei images and quantifying homologous recombination events in rare fluorescent mutant cells within RaDR mouse tissue.

BioMedInfo Lab, University of North Florida, USA *Jan, 2022 - July 2022*
External Research Intern | Part time Advisor: Prof. Indika Kahanda
Focused on deep learning based algorithms for Automated Protein Function Prediction on Human Phenotype Ontology.

Publications (View at rusiru.us)

1. **Web2Code: A Large-scale Webpage-to-Code Dataset and Evaluation Framework for Multimodal LLMs**
Sukmin Yun*, Haokun Lin*, **Rusiru Thushara***, Mohammad Qazim Bhat*, Yongxin Wang*, Zutao Jiang, Mingkai Deng, Jinhong Wang, Tianhua Tao, Junbo Li, Haonan Li, Preslav Nakov, Timothy Baldwin, Zhengzhong Liu, Eric P. Xing, Xiaodan Liang, Zhiqiang Shen.
*Accepted in **NeurIPS 2024**.*
2. **PG-Video-LLaVA: Pixel Grounding Large Video-Language Models**
Shehan Munasinghe*, **Rusiru Thushara***, Muhammad Maaz, Hanoona Rasheed, Salman Khan, Mubarak Shah, Fahad S. Khan
Arxiv, 2023.
3. **Quantification of Cells in Native Tissues with Object Detection and Weak Supervision**
R. Thushara, J. Pradeepkumar, J. Corrigan, B. P. Engelward, D. N. Wadduwage.
*Abstract accepted for **oral presentation at the Optica Imaging Congress, 2023**.*
4. **Real-Time Multiple Dyadic Interaction Detection in Surveillance Videos in the Wild**
I. M. Insaf, A. A. P. Perera, **R. Thushara**, G. M. R. I. Godaliyadda, M. P. B. Ekanayake, H. M. V. R. Herath, J. B. Ekanayake.
*Accepted at International Conference on Industrial and Information Systems, **ICIIS 2023**.*

Research Projects

1. **Sparse View 3D Gaussian Splatting with Video Diffusion** (ongoing)
Advisors: Prof. Ivan Laptev, Dr. Jiawang Bian
   - Optimizing 3D Gaussian Splatting (3DGS) using a video diffusion prior to enhance view consistency and spatial coherence in multi-perspective view synthesis.
2. **Laika Explorer: Vision Language Navigation with Unitree Go2** *Presented at **IROS 2024***
Advisors: Prof. Ivan Laptev, Prof. Hao Li
   - Developed a VR and iOS voice-controlled system for the Unitree Go2 EDU robot dog, enabling autonomous navigation, object interaction, and complex task execution in unstructured, real-world environments, incorporating open-vocabulary detection and visual question answering.
   - Achieved immersive, real-time monitoring by live-streaming a 360-degree view from the robot onto a 270-degree MetaWall display, enhancing situational awareness in dynamic outdoor settings.

3. **Collision-Free Obstacle Robots for Swarm Robots Platform**
   Advisors: Isuru Navinna, Prof. Roshan Ragel
   - Developed an obstacle bot system for swarm robots at the University of Peradeniya, using overhead cameras for accurate localization and dynamic positioning.
   - Applied Particle Repulsion Theory to model obstacle bots as charged particles, enabling collision-free movement in specified paths.
4. **Open World Object Detection and Discovery**
   Advisors: Prof. Roshan Ragel, Prof. Salman Khan
   - Investigated self-supervised, contrastive learning approaches for open-world object detection with unknown object clustering.
   - Utilized Vision Transformers for object detection with incremental learning.
5. **Protein Function Prediction with Human Phenotype Ontology**
   Advisors: Prof. Indika Kahanda
   - Explored deep learning methods to categorize human abnormal phenotypes and their semantic relationships.
   - Applied Graph Transformer Networks (GTNs) for predicting HPO annotations of human proteins.
6. **Prediction of Depths, Normals, and Surface Curvature from RGB Images using CNNs**
   Advisors: Dr. Upul Jayasinghe, Eng. Sampath Deegalla
   - Applied deep neural networks to estimate depth maps, surface normals, and surface curvature from RGB images.

Awards and Honors

- **1st Place of Code Squad 3.0 (of 150+ teams)** *Nov. 2022*
  6-hour competitive programming competition for university undergraduates in Sri Lanka.
- **2nd Runner-up of MoraXtreme 7.0 (of 180+ teams)** *Oct. 2022*
  12-hour competitive programming competition for university undergraduates in Sri Lanka.
- **1st Runner-up of MoraXtreme 6.0 (of 180+ teams)** *Oct. 2021*
  12-hour competitive programming competition for university undergraduates in Sri Lanka.
- **1st Runner-up of Douthan 1.0 (of 80+ teams)** *Feb. 2021*
  12-hour competitive programming competition for university undergraduates in Sri Lanka.
- **1st Country Rank in Hack the Interview IV and VI (Asia Pacific)** *2020*
  Placed 1st country rank, and 88/4353, 195/2530 respectively in Asia Pacific region.
- **2nd Runner-up of HackDown 2020 (of 200+ teams)** *Apr. 2020*
  Competitive programming competition.
- **2nd Runner-up of hackStat 2.0 (of 90+ teams)** *Oct. 2019*
  Competition in data analysis and prediction on an insurance dataset.
- **2nd Runner-up of UoJCoders v1.0 (of 100+ teams)** *March 2019*
  Competitive programming competition for university undergraduates in Sri Lanka.
- **Gold Medal in Sri Lankan Physics Olympiad | National Rank - 2nd** *2016*
  An annual competition held among high school students to select delegations for the APhO and IPhO.

Teaching Experience and Relevant Coursework

Instructor and Teaching Assistant, University of Peradeniya *2020 - 2023*
Taught undergraduate courses in Machine Learning and Data Mining, Data Structures and Algorithms, Advanced Computer Communication Networks, Operating Systems, Network and Web Application Design, and Embedded Systems

Selected Coursework: Visual Object Recognition and Detection, Deep Learning, Mathematical Foundations of AI, Advanced 3D Computer Vision, Vision and Language, Probabilistic and Statistical Inference, Continuous Optimization, Discrete Mathematics

MOOCs: Deep Learning Specialization, AI for Medicine, Data Structures and Algorithms Specialization (Coursera, 2020)