NILAKSHAN KUNANANTHASEELAN

https://nilakshankunananthaseelan.github.io/

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Monash University, Wellington Rd, Clayton VIC 3800, Australia

PROFILE SUMMARY

As a dedicated doctoral candidate in Computer Vision, I am interested in multimodal models that push the boundaries of AI reasoning capabilities. My expertise spans deep learning, specializing in complex vision tasks and proficient in programming languages like Python, MATLAB, and R, as well as frameworks like PyTorch and TensorFlow. I have a strong foundation in Natural Language Processing (NLP), with significant experience using tools such as HuggingFace, LLamaIndex, and LangChain. I also have hands-on experience in developing applications using Large Language Models and Retrieval-Augmented Generation (RAG). Driven by a passion for innovation, I am committed to solving practical AI challenges by seamlessly integrating theoretical knowledge with real-world applications.

EDUCATION

Monash University, Australia   Jan 2023 - Present

Ph.D. in Computer Vision, focusing on customizing foundational models through multimodal representations.

Advisors: A/Prof Mehrtash Harandi, Dr Trung Le

University of Moratuwa, Sri Lanka   Nov 2014 - Dec 2018

Honours B.Sc. in Electronic and Telecommunication Engineering.

Relevant Courses: Signals and Systems, Differential Equations, Calculus, Fundamentals of Image Processing and Machine Vision, Digital Signal Processing, Linear Algebra, Applied Statistics, Neural Networks and Fuzzy Logic, Pattern Recognition and Machine Intelligence.

CGPA: 3.98/4.20

PUBLICATIONS

LaViP: Language Grounded Visual Prompting

Nilakshan Kunananthaseelan, Jing Zhang, and Mehrtash Harandi. Lavip: Language-grounded visual prompting. Proceedings of the AAAI Conference on Artificial Intelligence, 38(3):2840– 2848, Mar. 2024.
https://doi.org/10.1609/aaai.v38i3.28064

Machine-Based Detection and Classification for Bone Marrow Aspirate Differential Counts: Initial Development Focusing on Nonneoplastic Cells

Chandradevan, R., Aljudi, A. A., Drumheller, B. R., **Kunananthaseelan, N.**, Amgad, M., Gutman, D. A., Cooper, L., & Jaye, D. L. (2020). Laboratory investigation, 100(1), 98–109.
https://www.nature.com/articles/s41374-019-0325-7

TEACHING EXPERIENCE

Monash University, Clayton   Feb 2023 - Present
Teaching Assistant

· ECE 4076/ECE 5176: Computer vision - Semester 1, 2023 & 2024
· ECE 4179/ECE 5179/ECE 6179: Neural networks and deep learning - Semester 2, 2023

WORK EXPERIENCE

Computational and Integrative Pathology Group, Northwestern University Feb 2021 - June 2023
Research Intern

- Prepared and processed breast cancer datasets for survival analysis.
- Created models for multi-task learning and domain-adversarial training in survival analysis.
- Developed a tailored hyperparameter tuning package for survival data analysis, enhancing model accuracy and reliability.
  website: https://www.pathdata.io/

Analog Inference, USA Mar 2019 - Nov 2022
Senior ML Research Engineer

- Developed customized deep learning models for diverse vision tasks, enhancing the accuracy and robustness of the systems under different analog hardware constraints.
- Devised tailored algorithms for model optimization in Computer Vision, focusing on quantization, compression, pruning, and noise compensation.

Omdena AI community Jan 2021 - Nov 2022
Volunteer Lead ML Engineer

- Employed named entity recognition models, such as BERT, DistilBERT, and BiLSTM variants, to accurately identify key phrases in abstracts from a dataset comprising over 7000 medical articles.
- Designed and developed a specialized model for sentiment analysis of finance-related tweets to identify and classify instances of financial crimes.

CooperLab, Emory University Feb 2018 - Oct 2019
Undergraduate Research Intern

- Created and deployed a region-based object detector and classifier specifically designed for counting white blood cells in non-neoplastic samples. Integrated and deployed the developed model seamlessly with **HistomicsTK**.

PROJECTS

Digitization of Tamil documents and literature Oct 2023 - Present
Noolaham Project, Sri Lanka

- Developed an OCR pipeline to extract content from scanned documents.
- Focusing on customization of LLMs to establish a reliable and efficient QA pipeline.
- Developed RAG-based LLM API for an interactive chatbot with custom documents.

Deep Learning Accelerator Mar 2019 - Nov 2022
Analog Inference, USA

- Implemented integer-only models, including ResNet, FCN, SSD, YOLOv5, KeyPoint Extraction, and Person ReID, to overcome inherent constraints and enable their execution on an Analog hardware accelerator.
- Developed advanced algorithms for precise quantization of weights and activations, achieving accuracy levels close to floating-point representation.
- Created a specialized pre-processor tool to analyze and comprehend model behaviour in varying hardware environments, enabling refined optimization.

Developing Text Analytic API (Jan 2021 - Nov 2022)
ExentAI, UK

- Developed language processing models proficient in executing diverse text analytics tasks.
- Deployed machine learning models as API-based services.

Early Prediction of Network Anomalies (Apr 2019 - Oct 2019)

Paraqum Technologies, Sri Lanka

- Developed analytical models utilizing Cluster Analysis, Decision Trees, and RNNs for analysing network traffic data.
- Implemented predictive models to detect bandwidth congestion, anomalies, and potential bottleneck scenarios, enhancing the performance of network monitoring systems.

SKILLS/ INTERESTS

Research	Learning through multimodality, Few-shot and Zero-shot learning
	Adapting foundational models,
	Reasoning and Interpretable AI
Programming Languages	Python, MATLAB, R
ML Tools	PyTorch, TensorFlow, Keras, OpenCV, Scikit-learn, HuggingFace, spaCy
LLM Tools	LangChain, LLamaIndex
MLOps	MLflow, DAGsHub (Basic Level)
Cloud	AWS, GCP (Basic Level)
Web	Streamlit, Flask, Bootstrap, HTML (Basic Level)
Softwares	InkSpace, LaTeX
Tools	Git, Docker, DVC, Kubernetes (Basic Level)

AWARDS & ACADEMIC ACTIVITIES

Recipient Dec 2023 - Aug 2024

Monash univeristy

- Received a DUG grant of $25k for cloud GPU usage to conduct research focused on customizing foundational models.

Reviewer 2024

ECCV,WACV

Workshop Organizer Dec 2023

Monash univeristy

- I contributed to the hybrid workshop titled "AI for Everyone" which was conducted by the Faculty of Engineering across several Monash campuses.

Recipient Dec 2020

Udacity

- One of the top 300 candidates for the AWS Machine Learning course.

Dean's List, Faculty of Engineering 2015 - 2018

University of Moratuwa, Sri Lanka

- Given to those who maintain a semester GPA of 3.7/4.2 or above in each semester.

Certificate of Appreciation 2016

University of Moratuwa, Sri Lanka

- Awarded for being an active volunteer for the annual exhibition.

EXTRACURRICULAR ACTIVITIES

E-Club University of Moratuwa

Member

· Member of Organizing Committee, Expose exhibition

Sri Lanka Robotics Competition workshop   University of Moratuwa
Voluntary Teaching

· Participated in teaching sessions conducted for school students.