Kanchana Nisal Ranasinghe

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Education

University of Moratuwa, Sri Lanka **CGPA: 3.95** (First Class Honours) Dec 2015 - Jan 2020
B.Sc. Engineering - *Awarded Most Outstanding Graduand of the Year* Dean's List: Semester 1,2,3,4,6,7,8

Royal College, Colombo, Sri Lanka Grad: Dec 2014
GCE Advanced Level (Mathematics, Physics, Chemistry, General English) 4As / 13th in country / z-score of 2.83
(country-wide university entrance examination taken by over 100,000 students annually)

Other Courses
Deep Learning: 5-course specialization (on Coursera) (Certificate earned - Apr 2018)
Intermediate C++ (on EdX) (Certificate earned - Oct 2017)
Machine Learning (on Coursera) (Certificate earned - Aug 2016)

Experience

MBZUAI, Abu Dhabi, UAE
Research Assistant (Nov 2020 - Present)

- Working as a research assistant for the computer vision department in the university research division.
- Research on Few Shot Learning with focus on leveraging self-supervised methods to improve few-shot object detection.

VeracityAI, Colombo, Sri Lanka
Machine Learning Engineer (Feb 2020 - Oct 2020)

- Leading a team of 3 associate data scientists for research and development of vehicle damage detection system
- Adopting algorithms similar to Mask R-CNN, SSD and EfficientDet with use-case specific data augmentation methods, hyper-parameter tuning, and real world testing based dataset expansion
- Building active learning pipeline analysing model confidence extraction methods for optimal annotation of data

Associate Data Scientist (Jan 2019 - Jan 2020)

- Developing computer vision component of vehicle damage estimation system for insurance purposes: product was developed beyond MVP stage with real-world testing
- Research on LIDAR based examining of buildings and structures for maintenance and insurance purposes
- Research on state-of-the-art deep learning based instance and semantic segmentation algorithms, implementation and fine-tuning of selected methods using case-specific datasets, and analysis on most suitable approaches
- Implementation of quantized neural network architectures efficient for real-time inference on edge devices

FiveAI, Cambridge, UK
Research Intern (June 2018 - Dec 2018)

- Research on 3D orientation estimation of objects in 2D image feeds and development of a novel algorithm with superior performance deployed to autonomous vehicle software stack
- Exploring and integrating synthetic data to training datasets and verifying improvements for a range of computer vision tasks with augmented datasets
- Research on neural network verification and exploration through methods like GradCam, Saliency Maps, and TCAV.

Cerebrium, Moratuwa, Sri Lanka - *Researcher* (Jan 2017 - June 2018)

- Developing of plant-leaf based disease detection system from multi-spectral image feeds (NIR/RGB spectra) and implementing transfer learning based training of CNNs on small datasets of domain-specific images
- Project deployed using mobile app with edge inference and recognized as a Top Initiative at National Tech Awards

Publications

S. Ramasinghe, **K Ranasinghe**, Salman Khan, Nick Barnes, and Stephen Gould, **Conditional Generative Modeling in Continuous Multimodal Spaces** (submitted for ICLR 2021)

S. Jayasumana, **K. Ranasinghe**, M. Jayawardhana, S. Liyanaarachchi and H. Ranasinghe, **Bipartite Conditional Random Fields for Panoptic Segmentation**, Proceedings of the British Machine Vision Conference, 2020.

S. Ramasinghe, J. Rajasegaran, V. Jayasundara, **K. Ranasinghe**, R. Rodrigo and A. A. Pasqual, **Combined Static and Motion Features for Deep-Networks Based Activity Recognition in Videos,** in IEEE Transactions on Circuits and Systems for Video Technology, vol. 29, no. 9, pp. 2693-2707, Sept. 2019.

S. Ramasinghe, J. Rajasegaran, V. Jayasundara, **K. Ranasinghe**, R. Rodrigo and A. Pasqual, **Micro Actions and Deep Static Features for Activity Recognition**, 2017 International Conference on Digital Image Computing: Techniques and Applications (DICTA), Sydney, Australia, 2017, pp. 1-8.

K. Ranasinghe, M. Jayawardhana, S. Liyanaarachchi and H. Ranasinghe, **Extending Multi-Object Tracking systems to better exploit appearance and 3D information**, 2019 arxiv preprint.

Research Projects

Few Shot Detection (June 2020 - Present)

- Research and experimentation with state-of-the-art methods for few shot learning in the domain of object detection
- Analysis on transfer learning strengths of various feature extraction architectures.

Self Supervised Learning (Mar 2019 - June 2020)

- Research on state-of-the-art conditional generative modeling approaches, their performance in multi-modal spaces, and leveraging generative models for self-supervised learning
- Experimentation with a range of state-of-the-art generative adversarial networks (GANs) on standard image datasets and evaluating performance in terms of accuracy, speed, and computational overhead

Undergraduate Research Project (Jan 2019 - Jan 2020)

- Research on combining Siamese Trackers and recurrent neural networks (LSTM) to simultaneously exploit appearance and spatial information for multi-object tracking, developing unique approach for occlusion aware object tracking, and analyzing effectiveness of BEV space projections for spatial tracking
- Research on panoptic segmentation using conditional random fields, development of novel information fusion layer achieving state-of-the-art performance

Action Recognition in Videos (July 2016 - Jan 2017)

- Research on optimal methods of static and motion feature fusion for deep learning based action recognition in videos
- Literary review on state-of-the-art methods, research on various feature fusion techniques and analysing mathematical validity in fusing feature vectors, and implementing recurrent neural networks (LSTM) for capturing temporal variation of fused features

Selected Awards

Most Outstanding Graduand of the Year - University of Moratuwa, Sri Lanka 2020

Mahapola Merit Award - Ranked 13th in Sri Lanka at GCE Advanced Level 2014

Participation/ Ranked 296th in world - International Mathematical Olympiad (IMO), Columbia 2013

Bronze Medalist - International Mathematics Competition, South Korea 2010

International Representation / National Champion - IGNOU UNESCO Science Olympiad, India 2011

Professional Activities

British Machine Vision Conference - Peer Reviewer 2020

IEEE Transactions on Circuits and Systems for Video Technology - Peer Reviewer 2017, 2018

Skills

Languages: Python (proficient), MATLAB, C++, Lua (novice) **Tools**: Tensorflow, PyTorch

Experience & Interests: Computer Vision, Machine Learning, Algorithms

Hackathon Experience

Finalists - Presidential Hackathon organized by the Government of Taiwan Taiwan, 2019

Asia-Pacific Runners-Up - Innovate FPGA organized by Intel and Terasic International, 2018

Champions & Best Data Scientist - Datathon organized by Axiata Colombo, 2019

Champions - CodeSprint 3.0 organized by IdeaMart & IIT Colombo, 2018

Runners-Up - 4iR Hackathon organized by SLASSCOM Colombo, 2018

Runners-Up - LetMeHack organized by Sabaragamu University Belihuloya, 2018

Runners-Up - Techno Hackathon organized by IESL Colombo, 2017

Runners-Up - SLTA Hackathon organized by SLTA Colombo, 2017

Volunteer Experience / Leadership

Captain - University of Moratuwa Debating Team 2016/2017
Reviving and establishing a debating society and team at the university. Training of university debating teams comprising of around 20 debaters. Team emerged 1^{st} runners-up at national level inter-university tournament.

President - OREPA Student Chapter 2019
Leading the Student Chapter of a volunteer past-pupils association group comprising of engineers. Coordinating over 10 annual projects under 5 different avenues by leading a executive committee of 12 and a club membership exceeding 200.

Secretary - Mathematics Society - University of Moratuwa 2017/2018
Leading the university mathematics society comprising of over 50 members in organising weekly forums, intra-campus competitions, and activities for freshers. Initiated a program to hold monthly talks by notable researchers in fields closely linked to mathematics and engineering.

Executive Committee - Sri Lanka Model United Nations 2015
President of a sub-committee. Responsible for organising multiple awareness sessions around the country, coordinating with partners like UNPD and UNFPA, and organising an international conference (Asia's largest student led conference) with over 1000 participants.

President - Gavel Club of Royal College (affiliated to Toastmasters International) 2012/2013
Responsible for leading executive committee of 7 members, and club of 60 members. Led the organising of a regional competition with over 800 high school participants. Organised multiple workshops for student skills development.

Community Service Director - Interact Club of Royal College 2013/2014
Giving leadership to a club of over 200 high school students. Organising of a wide range of community service projects targeting school students, rural regions, and selected poor families. Also led three teams that were organising large scale fund raisers: a talent show, a theatre production and a rugby tournament.

Player - Football Team of Royal College 2010/2011/2012
Represented the high-school football team at multiple regional and national level tournaments. Member of the champion team at the annual Royal Thomian Football encounter in 2011.

Scouting - Royal College 2009/2010/2011/2012
Patrol Leader, Troop Leader, and Instructor (for one troop comprising of 3 patrols with 6-7 students in each patrol) for scouting at high school. Guiding and monitoring continuous development and weekly activities for all all students of the troop. Also involved in organising multiple outstation year-end camps and various scouting events at school.

Cast Member - Theatre Circle of Royal College 2012/2013
Acting in multiple theatrical performances and public productions at high school. Emerging champions at multiple inter-school theatre contests.