

# KANCHANA NISAL RANASINGHE

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## EXPERIENCE

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### VeracityAI, Colombo, Sri Lanka

*Machine Learning Engineer*

(Jan 2020 - Present)

- 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

*Associate Data Scientist*

(Jan 2019 - Jan 2020)

- Research on LIDAR based examining of buildings and structures for maintenance and insurance purposes
- Developing computer vision component of vehicle damage estimation system for insurance purposes: product was developed beyond MVP stage with real-world testing
- 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.

### Cerebrum AI Solutions, 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

## RESEARCH PROJECTS

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### 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

(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

## PUBLICATIONS

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S. Ramasinghe, **K. Ranasinghe**, et al., **Conditional Generative Modeling in Continuous Multimodal Spaces** (submitted for NIPS 2020)

S. Jayasumana, **K. Ranasinghe**, M. Jayawardhana, S. Liyanaarachchi and H. Ranasinghe, **Bipartite Conditional Random Fields for Panoptic Segmentation**, 2019 arxiv preprint (submitted for BMVC 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.

## EDUCATION

<b>University of Moratuwa, Sri Lanka</b>	<b>Cumulative GPA: 3.95</b>	<b>Dec 2015 - Jan 2020</b>
B.Sc. Engineering (Electronics and Telecommunications)		Dean's List: Semester 1,2,3,4,6,7,8
Linear Algebra (A)	Signals and Systems (A+)	Random Signals and Processes (A+)
Data Structures and Algorithms (A)	Differential Equations (A+)	Graph Theory (A+)
Fundamentals of Image Processing (A+)	Applied Statistics (A+)	Machine Vision (A+)
<b>Royal College, Colombo, Sri Lanka</b>		<b>Grad: Dec 2014</b>
GCE Advanced Level (Mathematics, Physics, Chemistry)		3As / 13th in country / z-score of 2.83
(country-wide university entrance examination taken by 270,000 students annually)		
<b>Other Courses</b>		
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)

## AWARDS

<b>Mahapola Merit Award</b> - Ranked 13th in Sri Lanka at GCE Advanced Level	2014
<b>Participation/ Ranked 296<sup>th</sup> in world</b> - International Mathematical Olympiad (IMO), Columbia	2013
<b>Bronze Medalist</b> - International Mathematics Competition, South Korea	2010
<b>Participation/National Champion</b> - IGNOU UNESCO Science Olympiad, India	2011

## SKILLS

<b>Languages:</b> Python (proficient), MATLAB, C++, Lua (novice)	<b>Tools:</b> Tensorflow, PyTorch
<b>Experience &amp; Interests:</b> Computer Vision, Machine Learning, Algorithms	

## HACKATHON EXPERIENCE

<b>Finalists</b> - Presidential Hackathon organized by the Government of Taiwan	Taiwan, 2019
<b>Asia-Pacific Runners-Up</b> - Innovate FPGA organized by Intel and Terasic	International, 2018
<b>Champions &amp; Best Data Scientist</b> - Datathon organized by Axiata	Colombo, 2019
<b>Champions</b> - CodeSprint 3.0 organized by IdeaMart & IIT	Colombo, 2018
<b>Runners-Up</b> - 4iR Hackathon organized by SLASSCOM	Colombo, 2018
<b>Runners-Up</b> - LetMeHack organized by Sabaragamu University	Belihuloya, 2018
<b>Runners-Up</b> - Techno Hackathon organized by IESL	Colombo, 2017
<b>Runners-Up</b> - SLTA Hackathon organized by SLTA	Colombo, 2017

## VOLUNTEER EXPERIENCE / LEADERSHIP

<b>Captain - University of Moratuwa Debating Team</b>	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 <sup>st</sup> runners-up at national level inter-university tournament.	
<b>President - OREPA Student Chapter</b>	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.	
<b>Secretary - Mathematics Society - University of Moratuwa</b>	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.

**Director - Interact Club of Royal College**

2012/2013/2014

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 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.