Kanchana Nisal Ranasinghe

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Experience

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

- Developing and validating novel generative modelling methodology for multi-modal output spaces
- Experimentation on self-distillation, domain generalization, and adverserial robustness of vision transformers
- Constructing novel loss functions on embedding spaces for generalizable representation learning

VeracityAI, Colombo, Sri Lanka

Machine Learning Engineer (Feb 2020 - Oct 2020)

- Leading a team of three associate data scientists for research and development of vehicle damage detection system
- Research on unsupervised clustering and distance metric computation for learning vehicle damage distributions
- Building active learning pipeline analysing model confidence extraction methods for optimal annotation of data
- Anomaly detection and attribute identification from spectral data samples for automating tea quality assurance

Associate Data Scientist (Jan 2019 - Jan 2020)

- Developing image segmentation based computer vision component of vehicle damage estimation system for insurance purposes: product was developed beyond MVP stage with successful real-world testing
- LIDAR pointcloud analysis based examining of buildings for maintenance and insurance purposes

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

- Research on 3D orientation estimation in autonomous vehicle video feeds leading to improvements handling occluded and truncated objects that was deployed to the vehicle software stack
- Establishing value of synthetic data for boosting real-world performance in tasks like orientation estimation
- Research on neural network verification and exploration through methods like GradCam, Saliency Maps, and TCAV

University of Moratuwa, Sri Lanka - *Undergraduate Researcher* (July 2016 - Aug 2017)

- Research on optimal methods of static and motion feature fusion for deep learning based action recognition in videos
- Analysis of various feature fusion techniques, exploring mathematical validity of selected approaches, and implementing a recurrent neural network (LSTM) for capturing temporal variation of fused features

Publications

S. Ramasinghe, **K Ranasinghe**, Salman Khan, Nick Barnes, and Stephen Gould, **Conditional Generative Modeling via Learning the Latent Space** (accepted 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.

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)

Research Projects

Self Supervised Learning (Mar 2020 - Oct 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

Plant Disease Detection (June 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

Selected Awards

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

Mahapola Merit Scholarship - Ranked 13th in Sri Lanka at GCE Advanced Level Examination 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++ (novice) **Frameworks**: Tensorflow, PyTorch
Experience & Interests: Computer Vision, Machine Learning, Deep Learning

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

Volunteer Experience / Leadership

Captain - University of Moratuwa Debating Team 2016/2017

President - OREPA Student Chapter 2019

Secretary - Mathematics Society - University of Moratuwa 2017/2018

Executive Committee - Sri Lanka Model United Nations 2015

President - Gavel Club of Royal College (affiliated to Toastmasters International) 2012/2013

Community Service Director - Interact Club of Royal College 2013/2014

Player - Football Team of Royal College 2010/2011/2012

Scouting - Royal College 2009/2010/2011/2012

Cast Member - Theatre Circle of Royal College 2012/2013