Vikram Murali Mandikal

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Education

The University of Texas at Austin — Austin, Texas
Master of Science in Computer Science — Aug 2019 - May 2021 (Expected)
Coursework: Machine Learning, Advanced Data Mining, Natural Language Processing, Topics in NLP, Statistical Machine Learning, Discourse Processing and Natural Language Generation, Linear Algebra

National Institute of Technology Karnataka (NITK), Surathkal
Bachelor of Technology in Information Technology — Surathkal, India
GPA: 9.79/10, Gold Medalist (Rank: 1/104) — Aug 2015 - May 2019

Internships

Amazon, Alexa AI — Seattle, WA
Applied Scientist Intern — May 2020 to August 2020

- Developed structured distillation techniques for cross-lingual models which obtain better cross-lingual generalization when compared to standard knowledge distillation.
- Designed Adaptive Internal Distillation (AID), a novel technique to learn the internal representations from the teacher.
- Obtained a 3× reduction in latency on Alexa Rephrase data and a 2× reduction on the open source PAWS-X data, with no drop in performance.

Microsoft Research — Bangalore, India
Research Intern | Tensorflow, Pytorch — August 2018 to December 2018
Advisors: Dr. Harsha Simhadri and Dr. Prateek Jain — and May 2019 to July 2019

- Worked on developing resource efficient machine learning algorithms which can be deployed on edge devices, specifically for keyword detection in speech and gesture recognition.
- Developed a novel meta learning algorithm which enables RNNs to make rolling predictions. This reduces the amortized computational complexity by an order of 100.
- Also contributed to the Shallow RNN project by designing shallow RNN based models for speech transcription. This is accepted at **NeurIPS 2019**.

Heidelberg Collaboratory of Image Processing, University of Heidelberg
Research Intern - DAAD WISE Fellowship | Pytorch, Python — Germany
Advisor: Prof. Fred Hamprecht — May 2018 to July 2018

- Designed a GAN framework for instance segmentation using the Mutex Watershed algorithm.
- Developed a novel smooth auxiliary loss which stabilized the GAN training and improved the performance. This work has been accepted at the **SGO&ML Workshop NeurIPS 2018**.

Video Analytics Lab, Indian Institute of Science — Bangalore, India
Research Intern | Theano, Python — May 2017 to July 2017

- Developed code for Spiking Neural Networks (SNNs) in Theano framework - this is one of the first implementation of SNN in any tensor-based framework.
- Spiking neural networks are biologically plausible neural networks which learn through Spike Time Dependent Plasticity (STDP) - an alternate to gradient descent.

Academic Projects

Multi-modal Medical Image Retrieval | *Tensorflow, Python* — Spring 2018 [Github]

- Developed a LDA based approach for visual feature extraction from medical images.
- Proposed novel early and late fusion techniques for fusing visual and textual features. Improved the state-of-the-art on ImageCLEF 2009 dataset and is published at **CoDS COMAD 2019**.

Suspicious Posture Recognition for Home Security | *Python, Java* — Spring 2018 [Github]

- Used Microsoft Kinnect to capture the skeletal features and a deployed classifier to detect suspicious postures.
- An Android app was built to notify the users when suspicious activities are detected. This work has been published at the IEEE INDICON 2018.

Traffic Sign Detection using YOLO Architecture | *Tensorflow, Python* Spring 2018 [Github]

- Fine-tuned the YOLO network to detect traffic signs in the Belgium Traffic Sign Dataset.
- Modified the loss function to deferentially penalize large and small objects; this significantly improved the performance in traffic sign detection.

Software Development Project

Fund management software for purchase department, NITK | *PHP, SQL, HTML* [Github]

- The application is designed to handle the formalities and procedures involved in managing the funds allocated for various projects.
- It is currently being used by the accountants at the purchase department of NITK.

Teaching / Research Assistant Experience

TA for Advanced Predictive Modelling - a graduate course by Prof. Joydeep Ghosh Fall 2019
RA for Prof. Joydeep Ghosh - developing techniques for ML models to train on aggregated data. Spring 2020

Publications

1. D Dennis, D Acar, **Vikram Mandikal**, V Sadasivan, V Saligrama, H Simhadri, Prateek Jain, " *Shallow RNN: Accurate Time-series Classification on Resource Constrained Devices*", Conference on Neural Information Processing Systems (NeurIPS), 2019
2. **Vikram Mandikal**, S Wolf, *"A GAN framework for Instance Segmentation using the Mutex Watershed Algorithm*", Smooth Games Optimization & Machine Learning Workshop, Neural Information Processing Systems conference (NeurIPS) 2018, Accepted for Spotlight presentation.
3. **Vikram Mandikal**, A Anantharaman, Suhas B S and S Kamath, *"An Approach for Multi-modal Medical Image Retrieval using Latent Dirichlet Allocation*", ACM India KDD CoDS-COMAD 2019 (Oral Presentation) · A short version accepted at the AI for Social Good Workshop, Neural Information Processing Systems conference (NeurIPS) 2018.
4. **Vikram Mandikal***, A Anantharaman*, Suhas B S*, Ashwin TS and RM Reddy, *"Kinect Based Suspicious Posture Recognition for Real-Time Home Security Applications*", IEEE India Council International Conference (INDICON) 2018. * equal contribution

Academic Achievements and Awards

- Awarded Huawei Scholarship for Excellence for three consecutive years (2017-2019).
- Awarded the DAAD WISE fellowship to pursue a summer research internship in Germany.
- University Gold Medalist - Information Technology, Batch of 2019.
- Awarded National Talent Search Scholarship by NCERT. A national-level scholarship program in India to identify and recognize students with high intellect and academic talent.
- Qualified Regional Mathematics Olympiad (RMO) - among the thirty students who qualified in the state (Karnataka). RMO is a proof-based mathematics exam, equivalent to the AMC12 and AIME in the US.

Programming Skills

Deep Learning Frameworks:	TensorFlow, PyTorch, Theano
Languages and Scripts:	C++, C, Python, Java, HTML, CSS, Javascript, MySQL, Bash
Tools:	Android Studio, OpenGL, Flask, Git