

MANDIKAL MURALI VIKRAM

15it217.vikram@nitk.edu.in · +91 8762023969 · Github://vikram-mm · LinkedIn://vikram-mm

EDUCATION

National Institute of Technology Karnataka, Surathkal

Bachelor of Technology in Information Technology

GPA: 9.75/10, Department Rank: 1/104

Granted Huawei Scholarship for highest GPA

Surathkal, India
Aug 2015 - May 2019

Senior Secondary School

Class 12, CBSE AISSCE Secured 96.2 percentage and 99.45 percentile

Bangalore, India
March 2015

Secondary School

Class 10, CBSE AISSE Scored a perfect 10/10 CGPA

Bangalore, India
March 2013

PUBLICATIONS

Mandikal Vikram, Steffen Wolf, "A GAN framework for Instance Segmentation using the Mutex Watershed Algorithm", SGO&ML NIPS Workshop 2018

Mandikal Vikram, Aditya Anantharaman, Suhas B S and Sowmya Kamath, "An Approach for Multi-modal Medical Image Retrieval using Latent Dirichlet Allocation", CoDS-COMAD 2019 (Core B conference) , Accepted for Oral Presentation

RESEARCH EXPERIENCE

Microsoft Research

Research Intern, Intelligent Devices Expedition group

Advisors : Dr. Harsha Simhadri and Dr. Prateek Jain

Bangalore, India
August 2018 to Present

- Working on developing resource efficient machine learning algorithms which can be deployed on edge devices.
- Developed a novel meta learning algorithm which enables RNNs to make rolling predictions.
- This reduces the amortized computational complexity by a factor of 100 and improves the performance when compared to an RNN trained with a regular training routine.

Heidelberg Collaboratory of Image Processing, University of Heidelberg

Summer Research Intern, Funded by DAAD WISE Fellowship

Advisor : Prof. Fred Hamprecht

Heidelberg, Germany
May 2018 to July 2018

- Designed a GAN framework for instance segmentation using the Mutex Watershed algorithm.
- Highlights include adding a novel smooth auxiliary loss to stabilize the GAN training and improving the segmentation performance.
- Further improved the segmentation by training the generator on unlabelled natural images using a discriminator.
- This work has been accepted at the SGO&ML NIPS Workshop 2018.

Video Analytics Lab, Indian Institute of Science

Summer Research Intern

Bangalore, India
May 2017 to July 2017

- Developed code for Spiking Neural Networks in Theano framework - this is the first time an SNN is implemented in any tensor-based framework.
- Spiking neural networks are biologically plausible CNNs which learn through a temporally dependent learning method known as Spike Time Dependent Plasticity (STDP) - an alternate to gradient descent.
- The highlight of this work includes robustness towards adversarial images. [\[Github\]](#)

Indian Institute of Technology, Gandhinagar

Summer Research Intern

Advisor : Dr. Shanmuganthan Raman

Gandhinagar, India
May 2016 to July 2016

- Worked on optimizing the implementation of some of the state-of-the-art techniques such as Binary k-means algorithm and WTA-Hashing.
- Developed an algorithm for unsupervised multiple object detection and classification - by pruning edge boxes using Binary k-means clustering.

SELECTED PROJECTS

Traffic Sign Detection using YOLO Architecture *Tensorflow, Python*

[\[Github\]](#)

- Fine-tuned the YOLO network to localize and classify traffic signs using the Belgium Traffic Sign Dataset.
- Modified the loss function to differentially penalize large and small objects, thus exploiting the fact that traffic signs are generally smaller objects.

Multi-modal Medical Image Retrieval *Tensorflow, Python*

[\[Github\]](#)

- Proposed a LDA based approach for visual feature extraction in medical images.
- Explored novel early and late fusion approaches to combine visual and textual modalities.
- The proposed late fusion approach beat the state-of-the-art on the ImageCLEF 2009 dataset.
- This work has been accepted for publication and oral presentation at the CoDS COMAD 2019.

Parallel k-means Clustering *OpenMP, MPI, CUDA, C++*

[\[Github\]](#)

- Used k-means clustering for Image Colour Quantization and Image Compression.
- k-means clustering implemented in parallel on 3 platforms - OpenMP, CUDA and MPI with performance comparison.
- Obtained a speed of order 10^3 in CUDA due to data parallelism and a compression factor of 2.2.

Android Malware Detection *Tensorflow, Python*

[\[Github\]](#)

- Classification of android apps done based on pseudo-dynamic analysis of system API Call sequences.
- Developed a Deep Autoencoder model for feature compression along with CNN and RNN based models.

Fund management software for purchase department, NITK *PHP, SQL, HTML*

[\[Github\]](#)

- Designed and developed a web application for the accountants at purchase department, NITK.
- The application is designed to handle the complex formalities and procedures involved while managing the funds allocated for various projects.
- It is currently in production and I am providing support and maintaining it.

OTHER PROJECTS

- Ensemble gender classifier using face images - motivation was the minimization of the memory and computational cost of deep CNNs.
- Android malware classification using deep learning.
- Database manager for Purchase Department, NITK.
- Developed a course management portal using flask as a part of software engineering course.
- Implemented Go-Back-N ARQ using raw sockets.

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

ACADEMIC ACHIEVEMENTS

- Awarded the DAAD WISE fellowship.
- Awarded NTSE (National Talent Search Exam) by NCERT.
- Qualified Regional Mathematics Olympiad (RMO) - one of the thirty students in the state (Karnataka) to do so and was also invited for a week-long camp at the Indian Statistical Institute. This is one of the most challenging math contest in the country. RMO is a proof-based mathematics exam, equivalent to the AMC12 and AIME in the US.