Nithish Divakar

Computer Vision Research Engineer
Phone: (+91) 80757-44-933

email: nithish.divakar@gmail.com
URL: everythingproject.in

Current position

Research Engineer, Cogknit Semantics, Bangalore

Areas of specialization

Deep Learning algorithms for Computer Vision

Education

2013-2015	Mtech in Computational Science From Indian Institute of Science, Bangalore
2009-2013	Btech in Computer Science from Govt. Engineering College Idukki

Work Experience

2017 to date	Research Engineer, Cogknit Semantics, Bangalore
2016-2017	PhD Candidate, VAL Lab, IISc Bangalore
2015-2016	Research Assistant, VAL Lab, IISc Bangalore

Skills Repertoire

Object Detection

- Trained an object detection model from scratch for *MiDAS* project. The model can detect 2000+ distinct object categories and the entire pipeline has been written in `tensorflow`.
- The inference pipeline of the same model was optimised to remove redundant operations and take in image as batches. This inference pipeline was then developed as a RESTful micro service using *Flask* and deployed in cloud service.

Image Captioning

- Optimised inference pipeline to do batched inference of a custom trained image captioning model for *access.ai* project.
- The original implementation was an ensemble of base models which made batch inference challenging to implement.
- Developed the pipeline as a RESTful service which can be readily deployed.

- The model was used as part of larger system which generated video descriptions. the body of work for this module is published as [1].

Image Classifiers

- Have trained numerous image classifiers for different use cases. Have used techniques ranging from fine-tuning existing model to building new model from scratch.
- Developed a bootstrapping technique to get a classifier model and labeled training data when no labeled data is available.
- Can write the entire pipeline in `tensorflow` or `keras` .
- Developed entire DNN classifier in pure `numpy` including training code.

GANs

- Have successfully developed an image reconstruction model using adversarial training. The work got published as [3]
- Was successful in using the same technique for speech denoising/reconstruction which also resulted in a published work [2]

Tensorflow

- Have developed numerous training and inference pipelines for variety of problems
- Have developed optimised input pipelines for small and large datasets.
- Have written image classifiers, captioning models, GANs and object detectors in `tensorflow` .

OpenCV, Keras and others

- Extensive experience in using opencv for image processing tasks especially for the augmentation work for deep learning.
- Also used opencv for standalone projects related to optical character recognition (OCR) and text spotting.
- Have used `keras` framework for prototyping ideas to building full sized models. Have some minor contribution to the official library.
- Have basic knowledge in other frameworks like Flask and redis which helps in developing deep learning models as a RESTful service.

Projects

MiDAS

2018

This project provides video *Meta Data as Service*. The meta data involves features of a scene like location, objects present, people present(including identification), what is spoken, different sounds that can be heard etc.

Access.ai

2017   *access.ai* converts a video to context. The team of 10 built a system which extracted vision and speech information from a video to generate a two stream descriptions. A rich Speech description involving what was spoken and other other sounds. The video description part contains an semantic description of what transcribed in the video in a given duration. The worked on video description part has been published as [1].

Image Denoising using Generative Adversarial Networks

2017   This project involved solving the image reconstruction problem using adversarial networks. A novel architecture was developed and trained from scratch using GAN technique to solve this problem. The work is published as [3]

Accelerating Image Denoising using GPUs

2016   Developed a approximation scheme which lead to 100x increase in speed up for *Non-local means image denoising* algorithm. The developed algorithm was targeted to have many patterns which make is very apt for a GPU like architecture. The work has been published as [4].

Publications

2018   **[1]**   Abhay Kumar, **Nithish Divakar** and Anuroop Iyengar. "Domain Adaption of image Captioning Model for Video Descriptions" In *NVIDIA GPU Technology Conference* GTC 2018.

2018   **[2]**   Laxmi Pandey, **Nithish Divakar**, Krishna D.N and Anuroop Iyengar. "Deep Clean: GPU powered Speech Denoising using Adversarial Learning" In *NVIDIA GPU Technology Conference* GTC 2018.

2017   **[3]**   **Nithish Divakar** and R Venkatesh Babu. "Image Denoising: and Adversarial approach". In *CVPR workshop on NTIRE.* 2017.

2016   **[4]**   **Nithish Divakar** and R Venkatesh Babu. "Denoising in a Jiffy: A fast and GPU friendly algorithm for image denoising". In *International Conferences on Signal Processing and Communications* (SPCOM). IEEE. 2016.

2015   **[5]**   **Nithish Divakar**. "Primal Dual Affine Scaling on GPUs". In arXiv preprint arXiv:1502.03543

Talks and Tutorials

June 2017   *from tensorflow import learn* at tensorflow workshop, IISc Bangalore organised by IEEE chapter

July 2016   *Learning with Neural Networks* at R V College of Engineering