Nithish Divakar

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Current position

Associate Research Scientist, Rakuten India, Bangalore

Areas of specialisation

Deep Learning algorithms for Computer Vision

Education

2016-2017 PhD Candidate in Dept. of Computational and Data Sciences, IISc Bangalore
2013-2015 Mtech in Computational Science From IISc Bangalore
2009-2013 Btech in Computer Science from Govt. Engineering College Idukki

Work Experience

2018 to date Associate Research Scientist, Rakuten India, Bangalore
2017 - 2018 Research Engineer, Cogknit Semantics, Bangalore
2015-2016 Research Assistant, VAL Lab, IISc Bangalore

Projects

Aesthetic Image Ranking for CTR

2020 Developed vision models which can accurately rank images based on their Click Through Rate. Helps in selecting the best display image among alternatives for a product.

vChallenger

2019 This project involved developing an authentication service using crowdsourcing solution using e-commerce catalog images. The solution also doubles up as a crowdsourced data labelling tool. Was primary Researcher in this project.

Image Super Resolution

2019 Developed a model which can super resolve images. Main focus was on aesthetic enhancement rather than plain reconstruction. Used in enhancing logos and product images.

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 an 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].

Skills Repertoire

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]

Image Super Resolution

- Have developed Super resolution model which focus on aesthetic enhancement

Image Ranking

- Developed image ranking models which can rank images based on Aesthetic features as well Click Through rate viability.

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].

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 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.

Software and frameworks

■ python ■ pytorch ▩ tensorflow ▩ numpy ▧ keras ▦ opencv
▦ pandas ▤ Flask ▤ jupyter ▤ C
☐ javascript ☐ d3js ☐ reactjs

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

August 2019 *Basics of Computer Vision* at Rakuten India, Internal Workshop
July 2018 *Make your own DL framework* at anthill workshop.
url: `https://anthillinside.in/2018-july-dl-framework`
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