

JONTI TALUKDAR

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EDUCATION

Institute of Technology, Nirma University

2014 -2018

Bachelor of Technology (*Electronics and Communication Engineering*), 7th Semester

GPA: 8.69 (Top 5 of the Batch)

RESEARCH PROJECTS

Transfer Learning for Object Detection using Deep CNNs

Apr 2017 – Sep 2017

Research Intern, High Performance Computing Lab, IIT Gandhinagar, Guide: Dr. Ravi Hegde

- Trained Deep Convolutional Neural Networks on synthetic images for the task of object detection.
- Developed strategies for artificially rendering synthetic datasets using 3D object models from ShapeNet, achieving high photorealism for transfer learning.
- Used different data augmentation techniques for improving robustness and quality of synthetic datasets.
- Performed Hyperparameter Optimization of state of the art deep CNN architectures like faster RCNN, SSD, R-FCN, GoogLeNet, DetectNet, etc. using Caffe and TensorFlow frameworks and increased overall mAP by more than 35%.

Road Network Extraction for Remote Sensing Applications

Jan 2017 – May 2017

Under external funding through ISRO-RESPOND Project, Space Application Center- ISRO, Guide: Dr. Tanish Zaveri

- Worked on implementing a two-step algorithm for extracting linear features from Synthetic Aperture Radar (SAR) images for Ahmedabad city.
- Preprocessed dual-pol SAR data and extracted C2 features using PolSAR Pro.
- Deployed a variety of filtering methods to remove speckle noise on images extracted.
- Analyzed the result of several decomposition methods to evaluate parameters like entropy, anisotropy, lambda etc.

Real-time Human Action Recognition System

Apr 2016 - Feb 2017

Funded R&D Project, IdeaLab Technology Incubator, Nirma University, Guide: Dr. Tanish Zaveri

- Developed a novel approach for recognizing human actions like ‘clapping’, ‘boxing’, ‘running’, etc. using good features and the iterative optical flow algorithm.
- Training and testing was done on the KTH action recognition dataset.
- The algorithm used the resilient backpropagation algorithm for training the feedforward neural network, utilizing OpenCV and Python based machine learning libraries including ‘sklearn’, ‘skimage’, etc.
- Implemented and tested entire recognition pipeline in real time on embedded Linux platforms including Odroid XU4, Raspberry Pi 3.

Design of High Speed Radix-4 SRT Divider

Apr 2017 - Jul 2017

In Collaboration with RISE (Reconfig. and Intelligent Systems Engg.) Lab, IIT Madras, Guide: Dr. Sachin Gajjar

- Designed and developed Fuzzy logic based SRT Radix 4 division algorithm in IBM Bluespec (System Verilog).
- Improved earlier SRT Radix 4 method through parallelization and use of Fuzzy logic for quotient and remainder selection.
- Implemented the algorithm on reconfigurable devices like the Xilinx Virtex UltraScale FPGA.

Smart Spectrum Sensing for Cognitive Radio

Nov 2016 – Feb 2017

Minor Research Project, Nirma University, Guide: Prof. Khyati Vachhani

- Developed a Signal to Noise Ratio (SNR) based adaptive threshold algorithm for energy detection and spectrum sensing in GNU Radio.
- Used it to monitor primary user activity in radio environment using USRP B200 and reallocated bandwidth to secondary users, enhancing channel utilization.

TECHNICAL SKILLS

Programming Languages: Python, C, C++, Embedded C, Verilog HDL, MATLAB.

Operating Systems: Windows, Linux, Embedded Linux.

Tools and Frameworks: OpenCV, BVLC Caffe, TensorFlow, Nvidia DIGITS, RISC-V GNU toolchain.

Software: Blender, Xilinx ISE, Keil μ Vision, Eagle, GNU Radio, Atmel Studio.

Embedded Platforms: Arduino, Raspberry Pi 3, Odroid XU4, XBee, USRP B200.

EXPERIENCE

Research Intern, HPC Lab, IIT Gandhinagar

Apr 2017 - Sep 2017

- Joined the High Performance Computing Facility at IIT Gandhinagar under Dr. Ravi Hegde, as part of the highly competitive Summer Research Internship Programme 2017, working on Deep Learning solutions for Computer Vision problems.
- Gained hands on experience working with state of the art deep learning architectures like SSD, Faster-RCNN etc. (through Caffe & TensorFlow implementations) for training on GPUs like the Nvidia TitanX and Nvidia GTX 1070.

Internship Program, Jet Airways

May 2015 - Jun 2015

- Joined the Jet Airways Engineering and Maintenance Facility at their hangar at Mumbai airport as part of the Engineering and Management Internship program.
- Worked at the Maintenance & Control Center (MCC) which manages global operations, engineering and maintenance of the entire fleet as well as provides technical assistance to ground & air crew.

EXTRA CURRICULARS

Center Head, Fellowship Program, Make a Difference

Apr 2015 - May 2016

- Joined the Ahmedabad city Core Team as part of fellowship program under Make a Difference.
- Played an active role in the Leadership X Design (**LxD**) **Programme**, increasing student attendance, pass ratio and reducing child stress in shelter homes.
- Worked 20 plus hours every week to ensure effective implementation and quality of all projects, Ed Support, Discover and Propel, within the city.

Ed Support Volunteer, Make a Difference

Aug 2014 - Apr 2015

- Took up ownership to teach Science and Math to secondary school students at a shelter home in Gandhinagar.
- Provided after-school support through teaching assistance and mentorship of the kids at the shelter.

PUBLICATIONS

- P. Rajpura, A. Aggarwal, M. Goyal, S. Gupta, **J. Talukdar**, R. Hegde, H. Bojinov, 'Transfer Learning by Finetuning Pretrained CNNs Entirely with Synthetic Images', 6th *National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG)*, Dec. 2017 (accepted)
- **J. Talukdar**, B. Mehta, 'Human Action Recognition using Good Features and Multilayer Perceptron Network', 6th *IEEE International Conference on Communication and Signal Processing (ICCSP)*, April. 2017. (presented) (**arxiv-preprint**, arxiv:1708.06794)
- **J. Talukdar**, B. Mehta, K. Aggrawal, M. Kamani, 'Implementation of SNR estimation based Energy Detection on USRP and GNU Radio for Cognitive Radio Networks', 2nd *IEEE Intl. Conf. on Wireless Communication, Signal Processing and Networking (WiSPNET)*, Mar. 2017. (presented) (**arxiv-preprint**, arxiv:1708.06802)
- B. Mehta, **J. Talukdar**, S. Gajjar, 'High Speed SRT Divider for Intelligent Embedded System', 2nd *Int. Conf. on Soft Computing (IcSoftComp)*, Dec. 2017 (accepted).