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 – Jul 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.
- Trained 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% through hyperparameter optimization.

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 µVision, 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 - Jul 2017**

- Joined the High Performance Computing Facility at IIT Gandhinagar under Dr. Ravi Hegde, in the capacity of a research intern, 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).

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