

# JONTI TALUKDAR

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## EDUCATION

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### Institute of Technology, Nirma University

2014 - 2018

*Bachelor of Technology (Electronics and Communication Engineering), 7<sup>th</sup> Semester*

GPA: **8.69** (Top 5 of the Batch)

### R.N. Podar School, Santa-Cruz West, Mumbai

2010 - 2014

*CBSE, Class XII, (Physics, Chemistry, Mathematics and Biology)*

Percentage: **95.2%** (Top 1% of Class)

*CBSE, Class X, (Science, Mathematics and English)*

GPA: **10**

## RESEARCH PROJECTS

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### Transfer Learning for Object Detection using Deep CNNs

May 2017 – Aug 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 using Nvidia GPUs like Titan X and GTX 1070.
- Developed artificially rendered synthetic datasets using Blender, achieving high photorealism for transfer learning.
- Trained state of the art deep convolutional neural networks 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, SAC 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.
- Performed speckle filtering methods on images extracted using C2 features like entropy, anisotropy, scattering.

### Smart Spectrum Sensing for Cognitive Radio

Nov 2016 – Feb 2017

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

- Developed an 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.

### Real-time Human Action Recognition System

Nov 2015 - Dec 2016

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

- Developed a novel approach for recognizing human actions using good features and iterative optical flow algorithm.
- Used the resilient backpropagation algorithm for training the feedforward neural network by utilizing OpenCV and Python based machine learning libraries including 'sklearn', 'skimage', etc.
- Implemented and tested the system on embedded Linux platforms including Odroid XU4, Raspberry Pi 3.

### Sensor Management System using IoT

Mar 2016 - Apr 2016

*Mini Project, Nirma University, Guide: Dr. Sachin Gajjar*

- Projected data from light, temperature and motion sensors to 'ThingSpeak' cloud API using the ESP8266 module.
- Used the ESP8266 as a web server, controlling its GPIOs through the internet by another device connected to the same network.

### Design and Simulation of Autonomous Indoor Navigating UAV

Dec 2015 - May 2016

*Nirma University UAV Team, Faculty Advisor: Dr. Dilip Kothari*

- Proposed an autonomous UAV system which performs simultaneous localization and mapping (SLAM).

- Simulations of the model and SLAM algorithm performed in 'gazebo' and ROS Indigo.
- Proof of concept implemented and successfully tested using a terrestrial ground robot with on board 360° RPLidar.

## TECHNICAL SKILLS

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

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

**Operating Systems:** Windows, Linux, Embedded Linux.

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

**Software:** Xilinx ISE, Keil µVision, Altera Quartus II, Eagle, GNU Radio, Blender, Atmel Studio.

**MOOCs:** Introduction to IOT with Embedded Systems, Exploratory Data Analysis with R, CS231n Convolutional Neural Networks for Visual Recognition.

## EXPERIENCE

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### Research Intern, HPC Lab, IIT Gandhinagar

May 2017 - July 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

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### 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

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- P. Rajpura, A. Aggarwal, M. Goyal, S. Gupta, **J. Talukdar**, R. Hegde, H. Bojinov, 'Transfer Learning by Finetuning Pretrained CNNs Entirely with Synthetic Images', 6<sup>th</sup> 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', 6<sup>th</sup> 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', 2<sup>nd</sup> 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', 2<sup>nd</sup> Int. Conf. on Soft Computing (IcSoftComp), Dec. 2017 (accepted).