

# Siddhartha Saxena

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## EDUCATION

**IIT KANPUR, INDIA** | B.TECH IN COMPUTER SCIENCE | EXPECTED APRIL 2019  
**VIJAYVERGHIYA BAL VIDYALAYA, KOTA** | 12TH STANDARD | YEAR 2015  
**DELHI PUBLIC SCHOOL REWARI** | 10TH STANDARD | YEAR 2013

CPI: 9.23/10  
PERCENTAGE : 93.8%  
CGPA: 10/10

## RESEARCH INTERESTS

I am broadly interested in the field of machine learning, especially Deep Learning, Bayesian Machine Learning and their applications in Computer Vision and Natural Language Processing

## AWARDS AND FELLOWSHIPS

- Received **Academic Excellence Award**, IIT Kanpur for the year 2015-16 among 100 students in the department.
- First runner-up** in National Autonomous Underwater Vehicle Competition, SAVE-NIOT 2016 in debut attempt.
- Secured Rank **74** in Goldman Sachs Quantify (2016, with real-world Machine Learning problems).
- Secured rank of **190** in JEE Advanced 2015 out of **150k** students who qualified through JEE Mains.
- Scored 305/360 (**99.99 percentile**) rank of 777 in JEE Mains 2015 out of 1.5 million students.
- Received the prestigious KVPY fellowship 2015 given to **only 400** students in science stream from all over India.
- Received Merit Certificate in Mathematics for being in top **.1%** students in class XII examinations.
- Received Merit Certificate in Class X CBSE Board for being in top **.1%** students all over the country.

## RESEARCH EXPERIENCE

### ENVESTNET YODLEE | INTERN | INSTANCE SELECTION IN BIG DATA

Mentored by Dr Om Deshmukh, Director, Data Science | Report\*

May 2017 - July 2017

- Developed an Instance Selection method using word2vec embeddings from scratch that will significantly enhance the generalizability of all Data Science models implemented by the company, that will go into production.
- Tackled the high complexity problem via a novel on-line clustering model in spark on Amazon Web Services, with growing number of clusters undercutting the problem of Big Data and creates a proper representation of it.

### GENERATING MULTIPLE PLAUSIBLE DEPTH MAPS VIA A SEQUENTIAL ADVERSARIAL NETWORK | B.TECH PROJECT MENTORED BY PROF. VINAY NAMBOODIRI

December 2016 - Present

- Developed a novel technique to produce multiple depth maps of a scene from training on just a couple of images.
- Created an artificial dataset from scratch on Unreal Engine 4 and extracted Depth Maps, comprising 4 scenes.
- Produced good qualitative results on the KITTI dataset, showing the technique's ability to work on real datasets.
- This work is presently under evaluation, we are especially working on its quantitative results.

## PROJECTS

### IMPROVING VARIATIONAL INFERENCE MODELS VIA NORMALIZING FLOWS

MENTORED BY PROF. PIYUSH RAI CODE\* | ARXIV\*

January 2016 - April 2017

- Produced richer latent representations in Variational Auto-encoders suited to data from different classes.
- Implemented Variational Auto-encoders with Normalizing Flows for generating MNIST handwritten digits.
- Surveyed Various other Techniques for Variational Inference, overcoming the mean field assumption.

### INTERACTIVE BAYESIAN DOCUMENT CLUSTERING

MENTORED BY PROF. PIYUSH RAI | CODE\* | REPORT\*

August 2016 - November 2016

- Built a clustering model from scratch invoking user feedback via a cycle of rejection, acceptance or ignore.
- Implemented a prior over gaussian likelihood, down-weighting rejected clusters and vice-versa for accepted ones.
- Implemented it to cluster documents according to the topics contained in them, extracted through LDA.

## AUV-IITK (AUTONOMOUS UNDERWATER VEHICLE) | SOFTWARE SUBSYSTEMS | MENTORED BY PROF. K.S VENKATESH AND PROF SACHIN Y SHINDE | CODE\* | REPORT\* December 2015 - December 2016

- The aim of the project is to build **Institute's first** AUV. The vehicle is capable of following distinctly-colored lines, shoot torpedoes and drop markers autonomously using sensor data and computer vision, which has been integrated using Robot Operating System (**ROS**), used for the first time by a team in IIT Kanpur.
- Applied Pose Detection via SIFT and SURF Descriptors for an L-shaped gate, identifying the angle made by it.
- Applied Convolutional Neural Networks for pattern detection via Deep Learning implemented upon Tensorflow.
- Used OpenCV library along with ROS framework to implement various object detection algorithms

## SENTIMENTAL ANALYSIS AND HANDWRITING RECOGNITION | ASSOCIATION OF COMPUTING ACTIVITIES | CODE\* | PRESENTATION\* February 2016 - April 2016

- Classified movie reviews dataset part of NLTK corpus using Naive Bayes Algorithm with 79% Accuracy .
- Implemented face recog. using Eigen Faces on 'Labeled faces in the wild' with PCA dimensionality reduction.
- Performed Handwriting Recognition on MNIST dataset via feed-forward neural net, achieving **96%** accuracy.
- Experimented with quadratic, cross entropy and softmax loss functions to improve classification accuracy.

## SEMINARS AND TALKS

### HIDDEN MARKOV MODELS FOR SPEECH RECOGNITION | PRESENTATION\* October 2016

- Familiarized the audience with Hidden Markov Models and illustrated it's application on Speech Recognition

### COMPUTER VISION IN ROBOTICS | GOOGLE DEV GROUP IITK | PRESENTATION\* March 2016 |

- Demonstrated the use of C.V. in robotics via ongoing projects using object detection and image matching.

\* mark indicates hyperlink

## RELEVANT COURSES

Bayesian Machine Learning  
Introduction To Computing  
Probability and Statistics

Machine Learning Techniques  
Differential Equations  
Computer Organization

Data Structures and Algorithm  
Logic in Computer Science

## PROGRAMMING SKILLS

Torch • Tensorflow • Spark • Amazon Web Services • Unreal Engine • ROS • CUDA • Shell Scripting • MATLAB • Solidworks OpenCV • Github • Arduino IDE •  $\LaTeX$  • HTML/CSS • C++ • Python

## POSITION OF RESPONSIBILITY

### EDITOR, VOX POPULI | JOURNALISM BODY OF IIT KANPUR MARCH 2017 - PRESENT

- Moved Vox closer to people with articles voicing the opinions of the campus community and surveys.
- Lead articles on pressing issues like problems of PhD students, effect of coaching on IIT undergrads, statistical analysis of World University Rankings.
- Brought Vox to a larger scale by authoring an article that got published on **Business Insider** and **Times of India** .

### PRESIDENT'S NOMINEE MINIMUM WAGE MONITORING COMMITTEE FEBRUARY 2016 - MARCH 2017

- Took actions to reduce the **child labor** going on within the canteens inside different halls.

### SECRETARY , ROBOTICS CLUB FEBRUARY 2016 - NOVEMBER 2016

- An active member of the club with numerous contributions towards the day to day functioning of the club.
- Prepared a voice recognition Bot for SnT day 2016 as well as presented it at the event.
- Presented AUV-IITK in an exhibition in Techkriti 2015, the annual Technical fest of IIT Kanpur.
- Took part in various robotics events like IRGT in Techkriti 2015, Robotricks in Takneek 2015.