

# Siddhant Garg

FINAL YEAR UNDERGRADUATE · IIT KANPUR

D-112/Hall-9, IIT Kanpur, Uttar Pradesh, 208016

☎ (+91) 9711905582 | ✉ siddhant@iitk.ac.in | 📷 gargsid | 🌐 siddhantgarg

## Education

B.S. Maths and Statistics	IIT Kanpur	2015-Present	<b>9.3/10.0</b>
Grade-XII, CBSE	S.R.D.A.V, Delhi	2015	<b>96%</b>
Grade-X, CBSE	S.R.D.A.V, Delhi	2013	<b>10.0/10.0</b>

## Scholastic Achievements

2015	<b>All India Rank 1121</b> , JEE Advanced among 1,50,000 candidates	India
2015	<b>All India Rank, 1327</b> , JEE Mains (B.Tech) among 1.2 million students.	India
2015	<b>All India Rank 340</b> , JEE Mains (B.Arch)	India
2015	<b>KVPY Scholarship Awardee</b> , Government of India and IISc Bangalore.	India

## Work Experience

### Software Engineering Intern, Samsung R&D

Bangalore, India

CHAR-LSTM LANGUAGE MODEL

May. 2018 - July. 2018

- Proposed and implemented a model to reduce the number of mistakes while typing on an android keyboard.
- Implemented a character level **language model** to improve the **Touch Area Correction Module** of the Samsung Keyboard.
- Used **feedforward neural network** to learn the character embeddings.
- The embeddings encoded the contextual and spatial information of the characters on the keyboard
- Those embeddings were then used as input for the **Char-LSTM model** architecture with two 2 hidden layers.
- Achieved **99.2% accuracy** on the final model.
- Got a **Pre-Placement Offer** by the company to work with them as full-time employee after graduation.

## Academic Projects

### LASSO and Elastic Net for Feature Selection | Undergraduate Project

Report

PROF. DEBASIS KUNDU, DEPT. OF MATHS AND STATISTICS

Aug. 2018 - Nov. 2018

- Studied **Least Absolute Shrinkage and Selection operator** and **Elastic Net** and their use in Feature Selection.
- Studied **Geometric Skew-Normal Distribution** and the **EM Algorithm** for estimating the MLEs of the parameters.
- Performed simultaneous **parameter estimation** and **variable selection** using **flexible**, zero mean GSN distribution.
- The proposed model was run and tested on three different datasets and the analysis and comparison of the results with the existing baseline models showed similar and sometimes better results for different datasets.
- Studied the **Active Set Method** and **Interior Point Method** for solving the constrained optimization problem.
- Studied the other techniques like **Subset Selection**, **AIC**, **BIC** and also **Gibbs Sampling** and **EM-Algorithm** with **Laplace Priors** used for feature selection in high-dimensional data.

### Hotel Recommendation System, Information Retrieval

Report

PROF. ARNAB BHATTACHARYA, DEPT. OF CSE

Jan. 2018 - May. 2018

- Project was based on text mining problem aimed at analyzing opinions from the text data at the level of topical aspects.
- Processed the hotel reviews with their overall rating and generated the scores of 5 pre-defined aspects related to the hotel.
- Proposed a **scoring system** to rank the hotels, relevant to the user, based on their **free-text query**.
- Used **Bootstrap Algorithm** and **Sentiment Analysis** to segment and generate the scores of the latent aspects of the hotel.
- A generative model called **Latent Rating Regression Model**, was also used to generate the latent scores of each aspect and the respective emphasis that the user assigned to those aspects in their review.
- Introduced a modification in LRR model to incorporate the sentiments of the users while generating latent the aspect ratings and their respective weights, used for the generation of the overall rating of the hotel.

## Bayesian Modelling of GSN | Undergraduate Project

PROF. DEBASIS KUNDU, DEPT. OF MATHS AND STATISTICS

Report

Jan. 2018 - May. 2018

- Studied properties of **Geometric Skew-Normal Distribution** like infinite stability, geometric stability, and induced levy process.
- Applied **Metropolis Hastings Algorithm** for computing the **Bayes Estimates** of the unknown parameters under squared error loss by assuming independent priors on them and simulating from the designed **proposal distribution**.
- Studied **Hierarchical Bayes** and **Emperical Bayes** model, **Monte-Carlo Importance Sampling** and other **MCMC** sampling methods like **Gibbs Sampling**.

## Question Answering, Natural Language Processing

PROF. HARISH KARNICK, DEPT. OF CSE

Report

Jan. 2018 - May. 2018

- Studied **Match-LSTMs**, **Attention Mechanism**, **Bi-LSTMs**, **FastQA**, **R-Net** architectures for the Question-Answering task.
- Analyzed the different field lengths and question types in **SQuAD** dataset for **design** and **hyperparameter decision**.
- Implemented Match-LSTM with **Answer Pointer Layer** which are based on **Pointer Networks**.
- Setup separate answer-pointer layers for each of the question types, inducing different attention mechanisms for each of them. Weighted loss function was introduced. These resulted in better model EM-scores, convergence and accuracy than baselines.
- Also implemented **Scaled Dot Product Attention** and **Multi-Head Dot Product Attention** mechanism for the task.

## Other Projects

### Few-Shot Multi-Label Classification | Machine Learning

PROF. PIYUSH RAI, DEPT. OF CSE

Report

Fall. 2018

- Used the first order approach for Multi-Label Classification task with **Prototypical Newtorks** for low density label sets.

### Generation of Gamma Random Variables | Statistical Simulation

PROF. DEBASIS KUNDU, DEPT. OF MATHS AND STATISTICS

Report

Jan. 2018 - May. 2018

- Generated gamma random variables using different algorithms and compared their rejection ratio and generation time.
- Algorithms included **Ratio of Uniform**, **Acceptance-Rejection**, **Metropolis Hastings** and algorithms from [this paper](#).

### Gaussian Mixture Model | Data Analysis

PROF. DEBASIS KUNDU, DEPT. OF MATHS AND STATISTICS

Report

Jan. 2018 - May. 2018

- Modeled Swiss-Bank Dataset using **GMM** and predict whether the currency is original or fake.

### Sentiment Analysis | Association of Computing Activities

GOVIND GOPAKUMAR, DEPT. OF CSE | ACA INSTRUCTOR

IIT Kanpur, India

Summer. 2016

- Studied and compared ML algorithms like **SVM**, **Random Forests**, **Naive Bayes** for the task of Sentiment Analysis.

## Relevant Course Work

Probability & Statistics (A\*)  
Time Series\*  
Stochastic Processes

Machine Learning\*  
Theory of Computation\*  
Information Retrieval

Natural Language Processing  
Data Structure & Algorithms  
Statistical Simulation & Data Analysis

\*: Ongoing    A\*: For exceptional performance

## Technical Skills

Programming Languages  
Software and Utilities  
Operating Systems

C/C++ | Python  
Vim |  $\text{\LaTeX}$  | MS Excel | Terrier  
Windows | Ubuntu

## Positions of Responsibility

### Academic Mentor, Computer Programming

COUNSELLING SERVICE

IIT Kanpur, India

July. 2016-May. 2017

- Conducted remedial classes for the 1<sup>st</sup> year students facing difficulty in the topic.
- Also provided mentoring on 1-to-1 basis to some students facing difficulties in the topic.
- Developed practice problems and wrote solutions of the quizzes, mid-semester and end-semester examinations as a reference guide for the students.

## Extracurricular Activities

- Awarded the Best Manufacturing award for fabricating F3P planes, Aeromodelling Club, IITK.
- Secured 1<sup>st</sup> position in Fresher's Inferno (Sports Fest), IITK.