Guttu Sai Abhishek | **180050036**
Computer Science & Engineering | **B.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
DOB: 16-06-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2022	9.52
Intermediate	TSBIE	Sri Chaitanya Narayana Junior College	2018	98.70%
Matriculation	BSEAP	Sri Chaitanya High School	2016	9.8

Pursuing Minor in **Applied Statistics and Informatics**

SCHOLASTIC ACHIEVEMENTS, OLYMPIADS & SCHOLARSHIPS

- **2018** (AIR: All India Rank)
  - JEE Advanced: **AIR 31** | JEE Main paper 1: **AIR 60**, paper 2: **AIR 70** | EAMCET - TS: **Rank 10**, AP: **Rank 12**
  - Bagged **Gold medal** for being in **top 39** students in **INPhO**, Indian National Physics Olympiad
  - Secured a position among **top 40** students in **INAO**(Astronomy) & **top 49** students in **INChO**(Chemistry)
  - Selected for **3 Orientation-cum-Selection Camps**(OCSC) for IAO, IPhO, IChO
- **2017**
  - Cleared **NSEA, NSEP, NSEC, all three** in **National Top 1%**
  - After clearing **NSEA** in *2016*, secured a position among **top 30** in **INAO** and participated in **OCSC** for **IAO**
  - Recipient of prestigious **Kishore Vaigyanik Protsahan Yojana** fellowship by the Government of India

RESEARCH PROJECTS

- **Optimising Hyperparameter Tuning** — *ML* *BTP | Guide: Prof. Ganesh Ramakrishnan | July '21-Ongoing*
  - IBM AutoAI facilitates an automatic assembly of the best AI pipelines for a given task and dataset
  - One of the key components in AutoAI is hyperparameter tuning which currently uses Hyperband and HyperOpt
  - **Objective:** Speed up the hyperparameter tuning using SOTA training approaches like GradMatch and others
- **Semi-Supervised Data Programming** — *ML* *R & D Project | Guide: Prof. Ganesh Ramakrishnan | Spring '21*
  - One of the core contributors to **SPEAR**, an open source library for un/semi-supervised **data programming**
  - SPEAR can be used to **label** a large set of **Unlabeled data** using some(/none) labeled data and **Labeling Functions**
  - Implemented **CAGE**, **Joint Learning** modules to aggregate labels given by (continuous) **Labeling Functions**
  - Implemented functions for **Subset Selection** of labeled set such that it's features complement labeling functions
  - A **Paper** is to be submitted at Journal of Machine Learning Research (JMLR) 2021, preprint available on arXiv

INTERNSHIPS

- **Handling Transaction Recovery Errors** *Oracle Corporation | Summer '21*
  - Made **Transaction recovery resilient to errors** in Oracle RDBMS so as to provide high availability of databases
  - **Tested** the code and showed that in spite of **errors** during transaction recovery, **database is up and running**
- **Efficient Merging of Matrices** *Indiana University, USA | Guide: Prof. Ariful Azad | Summer '20*
  - Implemented functions(in C++) for **Parallel** merging matrices in **Compressed Sparse Column**(CSC) format
  - Various approaches use data structures like **heaps**, **dense vector**, **hash table** and a **radix sorting** algorithm
  - Observed a **better execution time** than Matlab, with most of the functions, when **tested** and **compared** the results by **generating random CSC matrices** for orders such as 50 matrices of shape $10^4 \times 10^4$ each
- **Predicting Power Consumption** — *ML* *Climate Connect Technologies | Winter '19*
  - Worked on **Feature Engineering**, **Model Selection** to predict the power consumption of a city
  - Presented in a knowledge session about **Artificial Neural Networks** to my fellow colleagues there

COURSE PROJECTS

- **CNN in python** — *ML* *AI and ML | Autumn '20*
  - Implemented **various layers** used in **CNN** architectures and the feed-forward & back-propagation algorithms
  - Used those layers to train the models to classify images from the **MNIST** and **CIFAR-10** datasets
- **Decision Trees in Racket** — *ML* *Programming Paradigms | Spring '19*
  - Built a **Decision tree** using **Iterative Dichomotiser 3** algorithm for splitting nodes to maximise information gain
  - Used decision trees to **predict** the **toxicity** in mushroom dataset and **survival** of passengers in titanic dataset

- **Reinforcement Learning** — *ML* *Foundations of Intelligent and Learning agents* | *Autumn '20*
  - Implemented sampling algorithms for **multi armed bandits** such as ϵ-greedy, UCB, KL-UCB, Thompson
  - Implemented **windy gird world** as an **episodic MDP**, to find **optimal path** between two cells (separate assignment)
- **Texture Synthesis** — *Image Processing* *Medical Image Computing* | *Spring '20*
  - **Developed Textures** from an **initial random seed** selected from **sample image**, can also be used for **Hole Filling**
  - An empty pixel is filled with the one **uniformly sampled** from those with most **similar set of neighbourhood**
- **Edge Detection** — *Image Processing* *Programming Paradigms* | *Spring '19*
  - Detected the edges of a given image using **Canny Edge Detection** algorithm, **implemented in Racket**
  - Used **non-maximum supression**, **double threshold**, **hysteresis** techniques on gradient values to find edges
- **Compiler for C-like Language** *Implementation of Programming Languages* | *Spring '21*
  - Developed a **Compiler** for a **subset of C** till RTL code generation supporting scope levels & control sequences
  - Used `Lex` for scanning **Tokens** and `Yacc` for **Parsing** and then constructed AST to finally generate TAC, RTL codes
- **Cracking Ciphers** — *Cryptography* *Programming Paradigms* | *Spring '19*
  - **Decrypted** messages which are encrypted using **mono-alphabetic substitution** characterised by a keyword
  - ETAI, bigrams, trigrams are used for frequency findings. **Dictionary closure** is then employed to find the keyword
- **Task Manager** — *App Dev (Android)* *Software Systems Lab* | *Autumn '19*
  - Developed an app to store **editable tasks** & **subtasks**, with **calendar**, that **distinguishes single & double click**
  - Implemented a **Day filter** which displays the tasks and subtasks for a date which can be selected by the user
- **Restaurant Manager** — *Web Dev (Node js)* *Database & Information Systems* | *Spring '21*
  - Developed a **Web app** to manage a restaurant with **multiple roles**: customer, manager, cashier, head-waiter
  - Customer can **book a table**, **place order** from **cart** and **rate** past orders. Head-waiter manages table requests
  - Manager can edit menu/ingredients, view **statistics** and will be **notified** if an ingredient falls below threshold
- **Customisable Forms** — *Web Dev (Django)* *Software Systems Lab* | *Autumn '19*
  - Developed a **Web based forms** system to conduct surveys and download the responses in **CSV** format
  - The features include **User-authentication, Modular design, Form Validation, Conditional Questions**
  - Forms can be **shared** using **form-code** or **link**. Data can be visualized in **pie-charts/bar graphs/line graphs**

KEY COURSES TAKEN

AI & ML	AI and ML, Foundations of Intelligent and Learning Agents, Web Search and Mining*
Computer Science	DSA, Computer Networks, OS, Database & Information Systems, Computer Architecture, Medical Image Computing, Implementation of Programming Languages, Discrete Structures, Logic for CS, Automata Theory, Introduction to Blockchains, Cryptocurrencies and Smart Contracts*
Maths	Introduction to Probability Theory, Statistical Inference, Differential Equations, Linear Algebra, Calculus, Numerical Analysis

**to be completed by December 2021*

TECHNICAL SKILLS

- **Programming & Scripting Languages**: C++, C, Python, JavaScript, Racket, Bash, MATLAB
- **Web Development**: HTML, CSS, Node js, Django
- **Tools & Libraries**: NumPy, Git, MIPS, LaTeX, SQLite, PostgreSQL, Z3Py, SolidWorks, AutoCAD, Android Studio

POSITIONS OF RESPONSIBILITY

- **Department Alumni Secretary** | CSE Department & SARC *April '19 - June '20*
  - Organised **two Core Talks** benefiting **200+** final year students by contacting alumni in core industry (CSE)
  - Collected **40+ winter projects** by contacting alumni of IITB as a part of **Industrial Learning Program** (ILP)
  - Assisted in **conducting mock interviews, group discussions** by gathering **60+** alumni during **Alumination**

EXTRACURRICULARS

- Dedicated **80 hours** of community service as a volunteer of **NSS**, IIT Bombay *2018-19*
- Stood in **2nd position**(out of 150) in **Crime Scene Investigation** organised by Biotech club, IIT Bombay *Autumn '18*
- Grabbed a **Special Mention** in **XLR8** competition organised by ERC, IIT Bombay *Autumn '18*
- Attended the **Vijyoshi Camp**, in IISc Bangalore to explore leading research in Science and Mathematics *2017*