Gudipaty Aniket | **190050041**
Computer Science & Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 9/26/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	CBSE	Atomic Energy Central School	2019	95.80%
Matriculation	CBSE	Atomic Energy Central School	2017	10

Pursuing **Honors** in **Computer Science** and **Minor** in **Physics**

Scholastic Achievements

- Awarded **Institute Academic Prize** (given to top **25** students) for exceptional academic performance *(2020)*
- Achieved **All India Rank 29** in JEE-Advanced out of over 1,73,000 candidates *(2019)*
- Secured **All India Rank 22**, with a **percentile score of 100** in JEE-Main among 1 million candidates *(2019)*
- Secured **AP** (Advance Performer) grade in CH-107 (Physical Chemistry), given to **top 2.5%** performers *(2019)*
- Recieved **Gold Medal** for qualifying **Indian National Chemistry Olympiad** along with **54** students *(2019)*
- Secured the **KVPY** fellowship, with an All India Rank of **31**, based on a written exam and interview *(2019)*
- Ranked among **National Top 1%** of performers in **NSEP**(National Standard Examination in Physics) and **NSEC**(National Standard Examination in Chemistry), conducted by IAPT *(2019)*

Research Internship

Analyzing Sample and Time Complexity of Quantum Machine Learning *May 2021 - Present*
Guide: Prof. Rahul Jain *National University of Singapore*

- Reviewed literature on the query and sample complexities of **Exact learning**, **PAC learning** and **Agnostic learning** models, and compared the complexities for classical and quantum learning algorithms
- Studied **information-theoretic** & **state identification** arguments for deriving quantum query complexities
- Analysed a **majority-vote driven** quantum PAC learning algorithm for achieving optimal sample complexity
- Formulating and working on **quantum learning of CPTP maps** and the associated learning complexites

Key Projects

Intrusion Detection System *Summer 2020*
Seasons of Code *Web and Coding Club, IIT Bombay*

- Developed a real-time **Network-based Intrusion Detection System**, to detect malicious network activity
- Applied **Chi-square test** & **Pearson Correlation** on the CICIDS2017 dataset to select best 15/81 features
- Trained ML models like **MLP**, **Random Forest** and **ExtraTrees** over more than 2 million data points
- Deployed an ExtraTrees classifier of **99.7% accuracy** with a **raw network packet sniffer** written in Python

Eye Tracking for Mouse Action Replication *Summer 2020*
Institute Technical Summer Project *Institute Technical Council, IIT Bombay*

- Developed a system to **replace mouse-based user interface** using **eye gaze** and **voluntary blinking**
- Trained a **CNN** for classifying the state of the user's eye as 'open' or 'closed', so as to detect voluntary blinking
- Utilized a trainable **polynomial regression** model along with **perspective transform** for gaze mapping
- Received a **special mention** for being among the **top 7** teams out of more than **60 participating teams**

Online Competition and Development Environment *Autumn 2020*
Guide: Prof. Amitabha Sanyal | Course Project *IIT Bombay*

- Developed an **online programming environment** with features like secure login and personal workspace
- Provided a **web-based IDE** with support for multiple languages including C++, Java and Python3, using **Angular**
- Utilized **PHP** along with **BASH** for the compilation and execution of user-submitted code on a Linux server
- Implemented an **online competition environment** with real-time grading, utilizing **MySQL** for the database

Video Denoising using Low-Rank Matrix Completion *Spring 2021*
Guide: Prof. Ajit Rajwade | Course Project *IIT Bombay*

- Applied **Ranked-order based Adaptive Median Filter** for the detection and removal of **impulse noise**
- Implemented **Three Step Search** (TSS) for organising similar patches across the spatial domain of the video
- Utilized **Fixed Point Iteration Algorithm** (FPIA) for reducing **Poisson and Gaussian noise** from the frames

Application of Convolutional Neural Networks *Summer 2021*
Seasons of Code *Web and Coding Club, IIT Bombay*
- Led a team of **12 developers** in implementing some practical applications of Convolutional Neural Networks
- Built a CNN model to predict diagnosis with **Covid-19/Pneumonia** from lung X-rays with **> 95% accuracy**
- Implemented a CNN model to **up-sample low-resolution images**, outperforming bicubic interpolation
- Experimented with **ResNet**-based CNN models to **predict genres of movies** using the images of their posters

Other Projects

Robust 'Mastermind' Player *Spring 2021*
Guide: Prof. Ashutosh Gupta | Course Project *IIT Bombay*
- Encoded the moves of a player for the Mastermind game into a **Maximum-Satisfiability problem**
- Implemented a solver using the **z3py** library which was robust to the opponent lying for upto **20%** of the time

Brain MRI Reconstruction *Spring 2021*
Guide : Prof. Ajit Rajwade | Course Project *IIT Bombay*
- Simulated tomographic measurements of brain MR volume from different random angles and reconstructed the volume
- Performed **inverse radon transform** using Ram-Lak filter and **coupled-Compressed Sensing** based reconstruction

Comparing TCP Variants *Spring 2021*
Guide: Prof. Vinay Ribeiro | Course Project *IIT Bombay*
- Implemented **socket programming** to simulate file transfer with different TCP variants and network conditions
- Performed experiments and recorded network traffic using **Wireshark** to analyse **window scaling graphs** to verify a faster **congestion window increase** in **TCP Cubic** than in **TCP Reno** during congestion avoidance phases

RISC 16-Bit Processor using VHDL *Spring 2021*
Guide: Prof. Virendra Singh | Course Project *IIT Bombay*
- Designed an efficient **Finite State Machine** for a rich instruction-set based on **8 registers** and **4GB of RAM**
- Synthesised and assembled the processor components in **INTEL Quartus Prime** using **VHDL**

Permutation Abstract Datatype Implementation *Autumn 2020*
Guide: Prof. Ajit Diwan | Course Project *IIT Bombay*
- Implemented a C++ class for creation and **time-efficient** creation and manipulation of permutation objects
- Utilized concepts from **Group Theory** and **Number Theory** for time time-efficiency of implementations

General Topology *Summer 2020*
Summer of Science *Maths and Physics Club, IIT Bombay*
- Learnt the concepts of Topological spaces and their applications in other areas of theoretical mathematics
- Studied fundamental concepts like **basis, continuous functions, connectedness and compactness**

Technical Skills

Programming	C++, Python, Java, Bash, AWK, Sed, MATLAB, GNU Octave, VHDL
Web Development	HTML, CSS, JavaScript, PHP, AngularJS
Software	Git, LaTeX, Android Studio, AutoCAD, SOLIDWORKS, Intel Quartus Prime
Data Science	Tensorflow, Keras, OpenCV, NumPy, Pandas, Sklearn, Scipy

Positions of Responsibility

Department Academic Mentor *May 2021 - Ongoing*
- Mentoring a group of **8 sophomore students** in making academic decisions and navigating the curriculum
- Among the **26 candidates** selected through extensive peer reviews and interviews out of **74 applicants**

Teaching Assistant - CH 107 *Autumn 2020*
Guide: Prof. Arindam Choudhury *IIT Bombay*
- Helped and guided a group of **35 students** in assimilating the course contents and logistics

Interests

- Software Development, Machine Learning, Image Processing, Computer Networks, Quantum Computing
- Football, Cricket, Sitcoms, Movies, Current Affairs

Extracurriculars

- Participated in a **Quantum Computing Workshop** conducted by Maths and Physics Club of IIT Bombay *(2020)*
- Constructed a **remote controlled plane** in a competition organised by the Aeromodelling Club *(2019)*
- Successfully completed a course in **Tabla** under the **National Sports Organization** *(2019-2020)*
- Stood **1st** in physics and chemistry among **top 60 students from 29 schools** in Junior Science Olympiad and Junior Mathematics Olympiad orientation programme organised by AEES along with HBCSE *(2016)*