Vibhav Aggarwal
Computer Science & Engineering
Indian Institute of Technology, Bombay

190050128
B.Tech.
Gender: Male
DOB: 20-06-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	CBSE	Lord Buddha Public School, Kota	2019	95.00%
Matriculation	CBSE	Modern Public School, Bhiwadi	2017	10

Pursuing Honors in **Computer Science and Engineering** and Minor in **Applied Statistics**

Scholastic Achievements

- Ranked **7** in the department of computer science in a batch of **140+** students *(2021)*
- Awarded **2 AP grades** (Advanced Performer) for outstanding academic performance in *Calculus* and *Quantum Physics and Application* courses given to top **1%** students in the batch *(2019)*
- Secured **All India Rank 19** in Joint Entrance Examination - Advanced out of 2,45,000 candidates *(2019)*
- Secured **All India Rank 214** in Joint Entrance Examination - Mains out of 1.2 million candidates *(2019)*
- Received the prestigious **KVPY** fellowship from **IISc** with an **All India Rank 18** in SX Stream *(2019)*

Competitions & Olympiads

- Secured **Global Rank 516** in **Codejam Round 3** organised as part of Google Coding Competitions *(2021)*
- Secured **Global Rank 48** in **Q# Quantum Programming Contest** conducted by Microsoft *(2020)*
- Actively engaged in **competitive programming** on various online programming sites including **Codeforces** : Max. Rating **2158 (master)** and **Codechef** : Max. Rating **2090 (5 star)** *(2021)*
- Awarded **certificate of Merit** in **INMO** (Indian National Mathematical Olympiad) conducted by **HBCSE** given to only **44** students across the country for excellent performance *(2018)*

Work Experience

Data Flow Control in OCP Cluster Logging Pipeline *Summer 2021*
Summer Internship *IBM Research Lab Bangalore*

- Scrutinized the implementation details and analysed the **multi-threaded** architecture of **Fluentd** - a popular open-source log collector used by the community and various companies
- Implemented various metrics to inspect the rate of data flow in Fluentd pipeline at various plugin levels and exported them to **Prometheus** server for visualization on **OpenShift Container Platform** dashboard
- Experimented with Fluentd on different workload profiles and closely examined the effects on log-loss metrics to pinpoint the bottlenecks in the pipeline causing data loss
- Designed and implemented a **flow control policy** to throttle data flow at the input level so as to minimize log loss

Key Projects

Reinforcement Learning based Stock Trader *Summer 2020*
Institute Technical Summer Project *Institute Technical Council, IIT Bombay*

- Created an **OpenAI Gym** environment to simulate the stock market by using authentic stock data
- Implemented two Deep Reinforcement Learning algorithms namely **Deep Double Q Network (DDQN)** and **Deep Deterministic Policy Gradient (DDPG)** to create two intelligent trading agents
- Proposed the usage of a **parallel double decision architecture** to reduce action bias in the agents
- Developed a **web interface** using **Django**, **jQuery**, and **CanvasJS** to graphically analyse and compare the profit gained by the two agents on stock data provided by the user

Resume Verification Portal *Summer 2020*
Developers' Community Project *DevCom, IIT Bombay*

- Developed a **web portal** for greatly simplifying the process of resume verification by multiple bodies in the institute
- Designed the frontend in **Angular**, coupled it with a **Node.js API**, and integrated it with a **MySQL** database
- Incorporated **Single Sign-On** (SSO) login system using **JWT authentication tokens** to enhance security
- Currently being used by **2000+** students to get their resumes verified by different institute and external bodies

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

- Developed a **cloud based IDE** and a programming contest platform using **Django REST APIs** and **Angular**
- Implemented a **custom tree-like data structure** on the server for **CRUD** operations on files and directories
- Implemented **sandbox isolation** on the server to enhance the security and robustness of the system

Copy-move Forgery Detection in Images *Spring 2021*
Guide: Prof. Ajit Rajwade | Course Project *IIT Bombay*

- Applied image processing techniques to identify and demarcate matching patches in artificially forged images containing translated, rotated and scaled versions of the original image patches copied to other regions
- Extracted prominent keypoints and their feature vectors using the **Scale Invariant Feature Extraction** method
- Produced a **linear transformation** that maps a majority of the keypoints to their corresponding points and eliminates the outlier keypoints using the **Random Sample Consensus (RANSAC)** method
- Devised a technique that uses **best fit lines** to find the degree of rotation between the image patches

Other Projects

Visual Sudoku Solver | *Self Project* *Spring 2020*

- Built a self contained application capable of solving the Sudoku puzzle from images
- Used contour detection algorithm in OpenCV to identify the main puzzle board, passed each cell through a multilayer feed-forward neural network and fed the obtained numbers to a custom Sudoku solver implemented in C++

Face Recognition using Statistics | *Seasons of Code* | *Web and Coding Club* *Summer 2020*

- Developed a Face Recognition System using Principal Component Analysis and extended this with a neural network which gave an accuracy of **96%** on test set derived from the extended Yale Face Database B

Multiparty Homomorphic Encryption from RLWE | *Course Project* | *Prof. Manoj P.* *Spring 2021*

- Studied the Brakerski-Fan-Vercauteren cryptosystem for homomorphic encryption based on RLWE (Ring Learning With Errors) hardness assumption and its extension to the multiparty computation setting

16 Bit RISC Based Processor | *Course Project* | *Prof. Virendra Singh* *Spring 2021*

- Devised an efficient **finite-state automaton** for a processor with reduced instruction set and implemented it in VHDL, capable of performing basic arithmetic and memory read/write operations

Quantum Computation | *Summer of Science* | *Maths and Physics Club* *Summer 2020*

- Built a strong foundation of Quantum Information Theory and studied different quantum algorithms including Quantum Fourier Transform, Quantum search, and Deutch-Josza Algorithm

Technical Skills

Programming and Tools	C, C++, Python, Bash, NS3, Git, Docker
Development	jQuery, Angular, Node.js, Django, Flask, SQL
Data Science	NumPy, OpenCV, SciPy, MATLAB, Matplotlib, Pandas

Positions of Responsibility

Project Lead *May 2021 - Present*
Developers' Community, IIT Bombay

- Project leader at **IIT Bombay's largest Developers' Community**, DevCom, responsible for ideating, developing and deploying countless out of the box applications for the institute
- Currently mentoring 5 students for developing a cross-platform **remote cursor app** using **Electron** and **Flutter**

Teaching Assistant

- Data Structures and Algorithms Minor (CS 213M) — Prof. Sharat Chandran *Spring 2021*
- Calculus (MA 109) — Prof. Ravi Raghunathan, Prof. Manoj Kesari *Autumn 2020*

Seasons of Code *Summer 2021*
Web and Coding Club, IIT Bombay

- Co-mentored 5 students for developing a Python based source code **plagiarism detector** for **C++** code files

Relevant Courses

- **Mathematics:** Calculus, Linear Algebra, Introduction to Probability Theory
- **Computer Science:** Data Structures and Algorithms, Computer Networks, Cryptography and Network Security, Software Systems Lab, Advanced Image Processing, AI and Machine Learning*, Foundation of Intelligent Agents*, Web Mining and Information Retrieval*, Operating Systems*, Database and Information Systems**

** To be completed by November 2021* *** To be completed by April 2022*

Extracurricular

- Ranked among the **top three** teams all over India in **Mimamsa** organized by **IISER Pune** *(2020)*
- Ranked among the **top five** finalists in **Ubisoft Game Jam** held at Ubisoft Studios, Mumbai *(2019)*
- Placed **2nd** in **Bazinga** (maths contest) organized by Maths and Physics Club, IIT Bombay *(2019)*
- Volunteered for the **CovEd** initiative and **mentored** school students during the COVID-19 pandemic to help them cope up with their studies and implemented a **bipartite matching algorithm** to automatically assign appropriate mentors to the students *(2020)*
- Successfully completed one year of **athletics training** under **NSO, IIT Bombay** *(2019-20)*

Scholastic achievements and extracurricular activities are not verified by the Placement Cell