Ritik Mandal   190050101

Computer Science & Engineering   **B.Tech.**

Indian Institute of Technology Bombay   **Gender: Male**

                                                    DOB: 5/22/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	CBSE	Gyan Ganga International Academy	2019	91.40%
Matriculation	CBSE	St. Mary's Convent School	2017	10

SCHOLASTIC ACHIEVEMENTS

- Among **Top 0.73 percentile** in JEE (Advanced) among 224,000 eligible candidates.   *(2019)*
- Secured **99.23 percetile** in JEE Mains out of a total of 1.2 million candidates.   *(2019)*
- Secured 2nd position in **(NIMO) National Interactive Maths Olympiad** and **(NISO) National Interactive Science Olympiad**at school level.   *(2017)*
- Awarded certificate of merit for Class 10 Boards.   *2017*
- Awarded certificate of merit in **NCEF-NFLAT** for two consecutive years.   *(2014, 2015)*

INTERNSHIP EXPERIENCE

BharatX   *Summer 2021*

- Worked with **Docker**, **Cassandra** & **Golang test files** for **testing** and **debugging** the modules.
- Implemented the **OAuth 2.0 protocol** to gain access to the **email data** using the **Google APIs**.
- **Refactored** the **Automated Messaging** module to **automate** notifications and worked with **Python Scripts** to **schedule** notifications for the users.
- Implemented the **Webooks** module and integrated the **APIs** for **bulk** & **flash** sms.
- Worked on building new **REST APIs** to support new **Android SDK** and on modules dealing with **authenticating** and blocking the phone number and storing the data of the users.

Dass Scientific Research Labs   *Winter 2020*

- Worked on **Qt Creator** Platform using **C++**, **JavaScript** and **QML** for **building** & **testing**.
- Deployed a **Replayer Module** for replaying the past tournaments using the exported **XML files**.
- Assisted to improve the **interface** of the game-website, **uploading** the results, managing the **database** of the users and simplifying the **game-play instructions**.
- Conducted tournament for **testing** the robustness of newly implemented **features** and **fixed bugs**.

PROJECTS UNDERTAKEN

Online Competing & Development Environment   *Spring 2020*
Guide: Prof. Amitabha Sanyal, Dept. of Computer Science & Engineering |Course Project   *IIT Bombay*

- Developed an **OCD-E** website which gives user the functionality to **write** and **store** code files.
- Supports **C++**, **Python** and **Java** including their commonly used **libraries** and **packages**.
- Developed the backend using **Django**, with an **API** for the frontend to communicate with the backend.
- Implemented the **Code Directory** bonus feature whereby each code file in a directory can have **imports** from multiple files and could work with **dependencies** on each other as a project.

Distributed Systems   *Summer 2020*
Institute Technical Summer Project (ITSP)   *IIT Bombay*

- Presented a model on **Hierarchical** Deep Convolutional Neural Networks using **Distributed Systems**.
- Implemented better training of **super-high-resolution** data by **spatial segmentation** of sample.
- Verified the approach by using **CINIC-10** and **Retinal OCT Datasets** on Kaggle with accuracy more than **70%**. Resulted in increasing the training speed of the model and efficient usage of memory.

Neutral Networking and Deep Learning   *Summer 2020*
Summer of Science(SoS), MNP Club   *IIT Bombay*

- Developed code for **deep neural networks** and **recurrent neural networks** models using **Python**.
- Learned about the various techniques of **Hyper-Parameter Tuning, Regularization** and **Optimization** algorithms for **improvising** training of the Neural Networks.
- Implemented **regression**, **classification**, **clustering** & **data retrieval algorithms** with neural networks on datasets involving **real estate**, **sentiment analysis**, **speech** & **animal recognition**.

Planet/Atmosphere Renderer using OpenGL
Summer of Code (SoC), WnCC

Summer 2020
IIT Bombay

- Built a real time engine capable of **rendering** Earth complete with features including **diffused lighting**, **terrain**, **atmospheric scattering**, **day and night map**, **revolution** etc.
- Implemented various mathematical models of physics laws of optics like **Blinn-Phong Shading**, **Rayleigh Scattering** and **Mie Scattering**.

SAT Solver
Guide: Prof. Ashutosh Gupta, Dept. of Computer Science & Engineering |Course Project

Spring 2021
IIT Bombay

- Designed a Mastermind Game Solver by encoding it into a **SAT** problem using the **Z3 Solver** in python.
- Implemented a solver based on **Conflict Driven Clause Learning** which is robust to an unreliable player

IITB-Proc
Guide: Prof. Virendra Singh, Department of Electrical Engineering |Course Project

Spring 2021
IIT Bombay

- Designed and simulated a 16-bit Primitive Computing System based on the IIT-B RISC Instruction Set.
- Applied behavioral VHDL principles to implement RAM, ALU, Register File, and, Test Bench units.

Permutation Class
Guide: Prof. Ajit A. Diwan, Dept. of Computer Science & Engineering |Course Project

Spring 2020
IIT Bombay

- Developed code for the class to implement an abstract data type called **permutation**.
- Implemented methods to compute **inverse**, **composition** and **exponentiation** of the permutation.
- Implemented algorithm for finding logarithm of a permutation with respect to another using the **extended euclidean algorithm**.

Image Compression
Guide: Prof. Amitabha Sanyal, Dept. of Computer Science & Engineering |Course Project

Spring 2020
IIT Bombay

- Implemented a basic method of **image reconstruction** using **statistical analysis** and **mean filtering**.
- Used the **Kmeans++ algorithm** and the python **SciPy** library to generate smaller(pixel-wise), yet descriptive images.

TECHNICAL SKILLS

Programming	C/C++, Python, Golang, Bash, Java, Make
Development	HTML5, CSS, JavaScript, PHP, Bootstrap, MYSQL, Cassandra, Django.
Softwares Tools	MATLAB, Git, Numpy, Scikit-learn, Keras, SolidWorks, TensorFlow, Pandas, PyTorch, LaTeX, Scipy, AutoCAD, Docker, Android SDK.

POSITIONS OF RESPONSIBILITY

Mentor, Summer of Science
Maths And Physics Club

[Summer 2021]
IIT Bombay

- Mentored a group of 4 students to get an in-depth understanding of **Data Structures and Algorithms**.
- Monitored their weekly progress, cleared their doubts and provided them with the **resources** as per their needs.

Organiser, Techfest
Asia's largest Science and Technology Festival

[Jan 2020]
IIT Bombay

- Planned and coordinated along with a team of 10 organisers to execute events at **Robowars** arena.
- Responsible for evaluating the performance of the students participated in the **Techfest Olympaid**.

House Captain
St. Mary's Convent School, Sagar(M.P)

[2016-2017]

- Elected as the School House-Captain in the school **Student Council** for the academic year 2016-17.
- Represented my house in various school events and organized various other sports and cultural fests.

EXTRACURRICULARS

- Completed a one-year course under **National Sports Organization** (NSO-Guitar)   *[2019-2020]*
- Participated in **Valorant Tournament** organised by **CSEA**, IIT Bombay.   *[2021]*
- Participated in **Virtual Run Competition** orgainsed by **Aavahan**, IIT Bombay.   *[2020]*
- Participated in **Crossy-GC** organised by IIT Bombay Sports.   *[2020]*
- Volunteered the **food distribution camp** for children orgainsed by **Abhyuday**, IIT Bombay.   *[2019]*
- Participated in **RC plane** making competition organised by **Aeromodelling Club**, IIT Bombay.   *[2019]*
- Won the inter-house **tableau competition** organised by the school.   *[2017]*