Areeb Asgar | **210100022**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 07/12/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	CBSE	Sunbeam English School, Bhagwanpur, Varanasi	2021	98.40%
Matriculation	CBSE	Sunbeam English School, Bhagwanpur, Varanasi	2019	96.60%

Pursuing a **Minor Degree** in the department of **Computer Science and Engineering** at IIT Bombay

SCHOLASTIC ACHIEVEMENTS

- Secured **98.5** percentile in JEE Mains among more than **0.93 million** candidates across all over India ['21]
- Ranked among top **2.7** percentile in JEE Advanced from over **0.14 million** students across all over India ['21]
- Awarded a perfect **AA grade** for excellence in course CS 745 - **Principles of Data and System Security** ['23]

PROFESSIONAL EXPERIENCE

Application Development Intern [May '23 – July '23]

Upayaahealth Pvt. Ltd.

Providing healthcare screening and triaging services to the rural population of India with little access to healthcare

- Employing **Flutter and Django** to create a **healthcare triaging app** to collect health data of the rural population
- Providing **early stage screening** to guide them for further diagnosis and perform extensive **analyses on the data**
- Incorporated **multi-language support** to cater to the diverse population of India, beginning with **3 languages**
- **Encrypting sensitive user** data prior to storage in order to adhere to the **HIPAA guidelines** for healthcare data
- Integrating **third party APIs** for AI triaging tool to **generate screening report** for the users, sent to them via SMS

KEY PROJECTS

SeDriCa [Feb '22 – Present]

Unmesh Mashruwala Innovation Cell (UMIC), IIT Bombay

Working in a team of 30+ students to develop India's First Level 5 Self Driving Car, customised for the Indian roads

- Exploring fast and robust solutions to the **Simultaneous Localisation and Mapping Problem** using **LiDAR** sensors
- Employing state of the art algorithms like **ORB-SLAM** and **LOAM** to localise the vehicle and map its environment
- Configured **Extended Kalman Filter** Package to fuse **GPS, IMU** data to derive state vector for real time position
- Reviewing literature related to SLAM to formulate our own solution to the problem for a **dynamic environment**
- Implemented a highly performant algorithm to **segment ground** from point cloud through **iterative plane fitting**
- Segmented **44.43%** and **166.81%** more points than the popular algorithms **RANSAC and MLESAC respectively**
- Curating a swift and accurate variant of **Iterative Closest Point** algorithm to generate real time location estimate

Buffer Overflow in Heap | Principles of Data and System Security [Apr '23 – May '23]

Course Project | Guide: Prof. Virendra Singh

- Researched the vulnerabilities that can arise as consequence of **Buffer Overflow in Heap** segment of a process
- Exploited overflow due to unchecked input to a block in heap to expose potential for **malicious code execution**
- Implemented **C++** code for **vtable hijacking** of an object inside heap, ultimately **diverting program control flow**
- Devised code for **corrupting metadata** of an allocated block, which in consequence **returns an arbitrary pointer**

(De)Noise | Seasons of Code [May '22 – July '22]

Web and Coding Club (WnCC), IIT Bombay

- Built a model to **filter out background noises** from an audio clip to generate the unblemished voice of a person
- Implemented **Speech Enhancement GAN paper** and incorporated **28 speakers** and **40** different **noise conditions**
- Utilised **ResNet** architecture with fully convolutional layers in the **Generative Adversarial Network** (GAN) model
- Achieved Mean Absolute Error of **0.00606** after extensively training the **SEGAN** model for speech enhancement

Techpoints Portal [Oct '22 – Nov '22]

Institute Technical Council (ITC), IIT Bombay

- Developed a portal to **introduce techpoints,** a revolutionary system for prize distribution at all institute events
- Constructed **APIs utilising Django** to store, process and display details of students' points and available prizes, purchase prizes, display details of transactions (earning and redeeming points), status of orders, delivery dates
- Created **admin pages** to upload points for multiple users by the means of a CSV file, and change status of orders
- Enabled IITB **SSO login** to authenticate users and authorise the portal to only registered students of IIT Bombay

PCOS Tracker App | Guide : Prof. Azizuddin Khan [Mar '23 – Present]

iSURP, EnPoWER, IIT Bombay

- Developing a **Kotlin app** to track the psychological and physical state of women suffering from PCOS disorder
- **Tracking physical parameters** like sleep, step, mood and period cramps daily and storing in **Firebase Backend**
- Providing features like **journaling** and **global chat** between all the users to help users express themselves better
- Curating various **cognitive games** to test user's cognitive abilities and make inferences from the collective data
- Deploying a **customisable guiding character** to guide the user throughout the app and make it more interactive
- Creating **data visualisation pages** for each monitored parameter to allow user to understand about their state

Counsellor Portal [July '22 – Sep '22]

Institute Technical Council (ITC), IIT Bombay

- Developed a **Counselling Portal** under **Student Wellness Centre** to ease the counselling procedure for students
- Facilitated management of students' **psychometric evaluations** and **automate the scheduling** of appointments
- Integrated **Google Calendar API** to permit the counsellors to schedule new and show upcoming appointments
- Utilised **Token Authentication** as an additional check to ensure security of the data of the counselling sessions

Data Analysis of IPL | Winter in Data Science [Dec '21 – Jan '22]

Analytics Club, IIT Bombay

- Performed **Exploratory Data Analysis** on IPL Dataset to obtain performance status of teams, players and more
- Implemented **Linear**, **RF**, **SVM**, **Neural Network** regressors and predicted scores with a minimum **5.948** RMSE
- Curated **Logit**, **SVM**, **Decision Tree** classifiers for predicting match winner, achieving maximum **87.73%** accuracy

Greeting Chatbot | Self Project [July '22]

- Employed **TensorFlow** and **GloVe embeddings** to create a chatbot, to give auto generated replies to greetings
- Built a model with **2 LSTM** layers, capable of classifying input to **9 classes**, achieving training accuracy of **91.49%**

POSITIONS OF RESPONSIBILITY

Subsystem Lead, Localization [Apr '23 – Present]

Unmesh Mashruwala Innovation Cell (UMIC), IIT Bombay

- Managing one of the five subsystems of the team, tasked with providing real time location estimate of the car
- Responsible for preparing timeline for efficient operation of subsystem, allocating tasks and bringing new ideas
- Leading a team of 7 members in the **Flipkart Grid 5.0** Robotics Challenge, designing an autonomous robotic arm
- Foremost support on Budgeting Proposals, Recruitments, Trainings and Sponsorship for proper team execution

Web Convener [May '22 – Mar '23]

Institute Technical Council (ITC), IIT Bombay

- Part of **6-membered** team responsible for creating and maintaining websites of the **Institute Technical Council**
- **Developed 3 portals** from the ground up, to completion and further **initiated 2 portals** over the span of an year
- Constructed backend of **Inter-IIT Portal** under ITC to facilitate students to easily register for the competitions

TECHNICAL SKILLS

- **Programming** C++ | Python | SQL | Linux | HTML | CSS | JavaScript | Git | GitHub
- **Web Development** Django | MySQL | Bootstrap | Angular | NodeJs | ExpressJs | MongoDB
- **App Development** Kotlin | Java | Flutter | Dart | Google Firebase | Android Studio
- **Machine Learning** Numpy | Pandas | Matplotlib | Seaborn | Scikit-Learn | TensorFlow
- **Robotics** Robot Operating System (ROS) | Gazebo | Rviz | URDF

EXTRACURRICULAR ACTIVITIES

- Constructed a **wifi controlled bot** from scratch using **ESP-32** and **L293D** as a part of the XLR8 competition by ERC
- Completed an year-long military training program for freshmen under National Cadet Corps (**NCC**), IIT Bombay