Hanan Basheer | **20B030018**
Aerospace Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 12/13/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Delhi Public School, Navi Mumbai	2020	94.60%
Matriculation	CBSE	Delhi Public School, Navi Mumbai	2018	97.20%

Pursuing a **Dual Minor** in **Computer Science and Engineering** and **Machine Intelligence & Data Science**

Scholastic Achievements

- Acquired a **Department Rank 8** in **B.Tech Aerospace** amongst 90+ students *(2021)*
- Awarded Branch Change to **Aerospace Engineering** (Top **9%**) based on exceptional academic performance *(2021)*
- Achieved the National Top 1 percentile in JEE Mains 2020 among 1.2 million+ candidates *(2020)*
- Qualified for **B.Tech Computer Science** in BITS Pilani Campus, Rajasthan based on BITSAT 2020 *(2020)*

Key Projects

SeDriCa | *Unmesh Mashruwala Innovation Cell, IIT Bombay* *(Sep '21 - Present)*

A team developing India's first self-driving car and participating in Intelligent Ground Vehicle Competition 2023

- **Subsystem Lead of Controls** - Leading a group consisting of 4 members for developing the controls
- Developing India's first **level 5 autonomous car** by modifying a Mahindra e_20 Plus electric car
- Designed and tested a **Non-Linear Model Predictive Control** for stabilized motion planning of the ego-vehicle
- Boosted the performance of controller by fine-tuning hyperparameters, decreasing the response time by **4 times**
- Increasing model complexity and designing an **Adaptive linear MPC controller** for better performance
- Implementing **Reinforcement learning** in controls framework for reducing time complexity for different scenarios

Hand of God | *Institute Technical Summer Project, IIT Bombay* *(Mar '21 - Aug '21)*

*Awarded the **first position** in ITSP'21 amongst **80**+ participating teams consisting of freshmen and sophomores*

- **Co-founder** of a startup **mechatronic glove** to control various gadgets satisfying interface requirements
- Developed an all-new **String Sensor** technology based on string length to generate finger-wise voltage values
- Implemented **k-nearest neighbour** algorithm to learn hand gestures and worked on Python-Arduino integration
- Presented the glove in final rounds by controlling an **Air Mouse** pointer on screen and accessing various applications

Hacktoberfest | *Github & DigitalOcean* *(Oct '21 - Nov '21)*

Hacktoberfest is a yearly event to encourage people to contribute to open source in October with participation of 1.5 lakh

- Completed Hacktoberfest'21 with **4 successful PRs** merged by **Hello Foss ML Repository** of WnCC, IIT Bombay
- Formulated algorithms for **gradient descent**, **linear regression** and **k-nearest neighbour classifier** from scratch
- Implemented various ML classification techniques on **Iris dataset** like **Logistic Regression**, **SVM** & **Decision Tree**

Hybrid ANN-Statistical Model | *Summer of Code, IIT Bombay* *(Mar '21 - Aug '21)*

- Developed models to predict stock market prices using **SARIMA**, **Basic GARCH** and **Hybrid Garch-LSTM**
- Implemented the **Seasonal regressive model**, based on partial autocorrelation plots, with integrated moving average
- Developed a Multi-Layer Perceptron Network & a Time-Dependent Neural Network and tested out prediction accuracies
- Optimized model using loss functions LSE L2-Norm & Logistic for Regression & Classification models respectively
- Fine-tuned new seasonal hyperparameters for **Seasonal AR**, **Seasonal MA** and **Seasonal Differencing**

Year of Security | *Cybersecurity Club, IIT Bombay* *(Jan '22 - Present)*

An year-long course on basic & advanced implementation of CyberSecurity and Hacking methods used in modern times

- Implemented a Bash code for recursively unzipping **embedded .zip/7-zip** files to retrieve a flag
- An ASCII text file contained the password within every zip encoded in either of **base32**, **base64**, **hex** or no encoding
- Modelled a Python-based **tic-tac-toe AI bot** with a win rate of 100% by using the **minmax decision algorithm**

(De)Noise | *Summer of Code, IIT Bombay* *(Mar '22 - Aug '22)*

- Designed a model to filter out background noises from an audio clip to generate the unblemished voice of a person
- Operated at the waveform level, extensively trained the model end-to-end for speech enhancement
- Implemented **Generative Adversarial Networks** and incorporated 28 speakers and 40 different noise conditions
- Utilized the **Resnet** architecture & **Self-Attention GAN** on the trained model to provide improved accuracy of 91%

Spanning Tree Protocol | *CS 224: Computer Networks* *(Sep '21 - Oct '21)*

Guide: Prof. Varsha Apte | Department of Computer Science, IIT Bombay

- Programmed an **object-oriented C++ simulation** of bridges and LANs to establish a Network Spanning Tree
- Taking in a specific topology, the code will establish the status of its ports as a designated, root or a null port optimally

Positions Of Responsibility

Team Manager | *UMIC, IIT Bombay* *(May '22 - Present)*

Innovation Cell aims to facilitate technical start-ups and foster an atmosphere of innovation and entrepreneurship

- Managing a **team of 40**, responsible for developing the **website**, **design** and the increasing **social media** outreach
- Coordinated the recruitment drive through interviews and assignments for **100+ freshmen** applicants
- Establishing a **UMIC alumni network** by tracing past members and organizing interactive sessions
- Mentor in a competition hosted by **The Innovation Story** in collaboration with **Amazon Future Engineer**

Department Academic Mentor | *Department of Aerospace Engineering, IIT Bombay* *(May '22 - Present)*

- Part of a **20-member** team of mentors selected based on **interviews** & **peer-reviews**, mentoring 12 sophomores
- Helping mentees, strike a balance between **academics** & **extracurriculars**, and manage time efficiently

Managerial Board Member | *IKIGAI* *(May '22 - Present)*

IKIGAI (The Art of Living) is a student community that aims to impact individuals' lives and serve society

- IKIGAI aims towards the social virtue and morale-building of individuals, utilizing the boundless potential of the youth
- Recognized by **United Nations**, **UNESCO**, United People Global, IN4OBE, International Association of Engineers
- Leading the Backend team of 11 members to develop the website for IKIGAI, using **HTML**, **CSS** and **Javascript**

Mood Indigo eSports Co-ordinator | *51st Edition* | *Mood Indigo, IIT Bombay* *(May '21 - Jan '22)*

Asia's Largest College Cultural Festival | *Viewership: 100k+* | *Events: 100+* | *1,50,000+ footfall*

- Conceptualization and execution of **innovative ambience** across the Mood Indigo platform
- Involved in organizing Mood Indigo in offline mode after the pandemic
- Part of organizing committee for first-ever **Valorant eSports tournament** of IIT Bombay

Extracurricular Activites

- Developed a **Personal Website** using Github Pages with links to various projects completed with my information
- Lead parent Hostel 3 to finish **3rd** among all hostels, in **Jhatka GC** organized by Electronics & Robotics club
- Certified as **Contributer** for Python version control repository **CPython** on **Github** to open pull requests
- Developed a paper on **Discrete form of Calculus** in an attempt to solve **Riemann zeta function Millenium problem** and was later discovered as a field of complex maths known as finite differences by **Mike Giles, Professor of Scientific Computing and Head of Department of Mathematical Institute University of Oxford**
- Designed a working **Virtual Machine** on **Azure** and **Amazon Web Services** to generate .ovpn files for VPN
- Qualified for **Inter-IIT Chess** camp under **IM Sharad Tilak**, official chess coach of IIT Bombay contingent
- Assisted team **France** to finish **2nd** in Revive Sports League, football tournament since lockdown organized by Aavhan
- Participated in **Rubik's Cube Open** & mentored 10+ students on solving a 3x3 Rubik's Cube conducted by **Aavhan**
- Completed the **Analytics Workshop** as a part of **Alumination 2020** conducted by **SARC, IIT Bombay**
- Pursued **French** language for **7 years** from 6th to 12th standard in Delhi Public School with intermediate proficiency

Key Courses Undertaken

Machine Learning & Computer Science	Computer Programming and Utilization, Networks, Data Structures and Algorithms, Reinforcement Learning*, Engineering Statistics*
Aerospace Core	Data Analysis & Interpretation, Thermodynamics & Propulsions, Fluid Mechanics, Spaceflight Mechanics, Structural Mechanics, Solid Mechanics
Miscellaneous	Calculus, Linear Algebra, Differential Equations, Quantum Physics & Application, Basics of Electricity & Magnetism, Introduction to Electrical & Electronic Circuits, Biology, Introduction to Numerical Analysis

** To be completed by Dec 2022*

Technical Skills

Programming Languages	C++, Python, HTML, Dart, LaTeX, Git, MATLAB, Bash
OS, Softwares & APIs	Ansys, Arduino IDE, VS Code, Github, Jupyter, Gazebo, ROS, Linux, Ubuntu, Flutter
Deep Learning & Frameworks	Tensorflow, Generative Adversarial Networks, Convolutional Neural Network, Sequence Models, Recurrent Neural Network, Natural Language Processing