Eeshaan

Electrical Engineering

Indian Institute of Technology Bombay

19D070022

Dual Degree (B.Tech. + M.Tech.)

Gender: Male

DOB: 17-09-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	HSC	Aditya English Medium School	2019	93.20%
Matriculation	ICSE	Wisdom World School	2017	98.20%

Pursuing minor in **Artificial Intelligence and Data Science** from C-MInDS IIT Bombay

SCHOLASTIC ACHIEVEMENTS

- Ranked **2nd** among **79** students enrolled in the Dual Degree Programme of the EE Department *(2021)*
- Awarded **AP Grade** for **outstanding performance** in Differential Equations-II and Physical Chemistry *(2020)*
- Bagged **1st** prize in prelims and **2nd** in the final round of **Chemenigma** at **IISC Bangalore** *(2020)*
- Achieved **All India Rank 120** in **JEE Main 2019** out of around **1.2 million** candidates *(2019)*
- Achieved **All India Rank 355** in **JEE Advanced 2019** out around **245,000** qualified candidates *(2019)*
- Selected among **300** students nationally for Indian National **Chemistry** and **Astronomy** Olympiads *(2019)*
- Received **Kishore Vaigyanik Protsahan Yojana Fellowship** and secured **All India Rank 100** *(2018)*
- Placed among the **National Top 1%** in **NSEP**, **NSEC** and **Maharashtra(State) Top 1 %** in **NSEA** *(2018)*

KEY PROJECTS

NEURAL MACHINE TRANSLITERATION
Course Project | Guide: Prof. Biplab Banerjee

(Mar 2021 - May 2021)
DS 303: Introduction to Machine Learning

- Implemented **sequence to sequence neural machine transliteration** to convert a given Hindi text to English
- Added **Optical Character Recognition** using **EasyOCR** to facilitate **extraction** of Hindi text from images
- Surveyed literature on **DeepTrans**, an attention-based transliteration model implemented in **TensorFlow**

SELF-DRIVEN PROJECTS
Hobby Projects based on Machine Learning

(Dec 2020 - Apr 2021)

- Implemented a **conditional-GAN** to return colored images from sketches without knowing the ground truth
- Made a **text generator** mimicking **Shakespearean text** using **NLP** and hosted the project on **Heroku**
- Learnt about the **Faster-RCNN** model and performed real-time **weed detection** among crops using PyTorch
- Worked upon **classification** and **mutation prediction** from **non-small cell lung cancer** histopathology

STOCK MARKET ANALYSIS AND PRICE PREDICTION
Course Project | Guide : Prof. Amit Sethi

(Nov 2020 - Dec 2020)
DS 203: Programming for Data Science

- Studied performance of various sectors of the **Indian stock market** during the initial **COVID-19** period
- Performed **data analysis** on **NIFTY sectoral indices** and compared them using various technical indicators
- Compared performance of neural network architectures such as **CNN** and **GRU** to predict stock market prices

NATURAL LANGUAGE PROCESSING
Coursera

(May 2020 - Jun 2020)
Partner University: HSE Russia

- Performed **named-entity recognition** on Twitter using the **Bag of Words** approach and **multi-label** classifiers
- Studied **vector space model of semantics** and used them to **find duplicate questions** on StackOverflow
- Used **sequence to sequence** modeling to build a calculator for **evaluating arithmetic expressions**

AUTONOMOUS GARBAGE COLLECTING BOT
Institute Technical Summer Project

(Apr 2020 - Aug 2020)
Institute Technical Council, IIT Bombay

- Designed an **autonomous garbage collecting bot** which can **classify, detect** and **collect** three types of garbage
- Made a full-scale model prototype on **Blender** and a circuit on **Fritzing** using **Raspberry Pi 4** and **Arduino**
- Used **YOLO v2** for object detection, **ROS** for simulation and designed a custom gripper to pick the garbage
- Declared as one of the **top 3** projects out of all the projects made by **60+ teams** in **ITSP 2020**

HYPERLOOP POD SUBSCALE PROTOTYPE DESIGN
Junior Controls Subsystem Engineer

(Jan 2020 - Dec 2020)
Team Hyperloop IITB

- Applied knowledge acquired on **I2C** and **CAN** communication protocol to Hyperloop communication systems
- Studying about various **control and communication systems** and various **error detection** algorithms
- Qualified in the **top 5** college teams internationally for the finals of the **European Hyperloop Week**

OTHER PROJECTS

DIGITAL CIRCUIT DESIGN IN QUARTUS
Course Project | Guide : Prof. Maryam Shojaei Baghini
(Jan 2021 - Apr 2021)
EE 214: Digital Circuits Lab
- Implemented a 4 bit **ripple carry** adder/subtractor, **arithmetic right shift** and **clock divider** on Krypton board
- Designed a **tone synthesizer** circuit to **automate** the sequence of 8 musical notes using a **Finite State Machine**
- Programmed a 4 bit **divider** and **multiplier** using **behaviorial** and **structural** modeling style in VHDL

16 BIT ARITHMETIC LOGIC UNIT
Course Project | Guide : Prof. Virendra Singh
(Oct 2020 - Nov 2020)
EE 224: Digital Systems
- Designed a **2x1 multiplexer** using **structural description** and a 4 input XOR gate using the 2x1 multiplexers
- Implemented 16 bit **Kogge Stone** adder and subtractor, along with bitwise operations structurally in **VHDL**
- Integrated all components into an **ALU** with input as 2's complement form and used a **MUX** for controlling operations

VIRTUAL REALITY GAME DEVELOPMENT
Tinkerer's Lab
(Mar 2020 - Jul 2020)
IIT Bombay
- **Headed the animation team** and developed a first person virtual reality game in **Unity** Game Engine and **Blender**
- Applied knowledge acquired in the field of **3D animation and modelling** to create assets and rigged characters

OBSTACLE MANEUVERING BOT
Electronics and Robotics Club
(Aug 2019)
IIT Bombay
- **Designed** and **built** Bluetooth controlled **(HC-05)** robotic car with **differential mechanism** for turning
- Used **IC7805** as a voltage regulator, **L293D** as the motor driver and **Li-Polymer** battery for power supply

TECHNICAL SKILLS

Programming	Python, C++, Julia, LaTeX, JavaScript, HTML, CSS
Softwares	MATLAB, Quartus, Keil, Blender, Git, AutoCAD, SolidWorks, GNU Radio
Machine Learning	PyTorch, TensorFlow, Keras, NLTK, Scikit-Learn, OpenCV, Flux.jl
Python Libraries	NumPy, Pandas, Matplotlib, Seaborn, SciPy, Qiskit, SymPy, PyQt5

POSITIONS OF RESPONSIBILITY

UNDERGRADUATE TEACHING ASSISTANT
MA 108 - Ordinary Differential Equations & CH 107 - Physical Chemistry
(Jan 2021 - July 2021)
IIT Bombay
- Conducted weekly **tutorial** sessions for a batch of 50 freshmen and helped them through **personal interaction**
- Provided assistance to the instructor in **course logistics** by proctoring exams and evaluating answer scripts

CHEMISTRY CLUB CONVENER
Chemistry Club
(May 2020 - Jun 2021)
Institute Technical Council, IIT Bombay
- Contributed to the **ideation** for setting up the **foundations** of the club and further for the future events
- Organized and conducted **Rascionix**, a chemistry competition with **200+ participants** from all around India

CLASS REPRESENTATIVE
Dual Degree Batch
(Sep 2019 - Present)
Electrical Engineering Department
- Addressed the issues of **160+** fellow **first and second year** students, catering to their academic needs
- Responsible for **establishing communication** between professors, functionaries, other academic staff, and the class
- **Facilitated discussion** among students of the class to understand general consensus on various academic issues

KEY COURSES UNDERTAKEN

Machine Learning	Programming for Data Science, Introduction to Machine Learning, Foundation of Intelligent Learning Agents*, Learning with Graphs*
Electrical Engineering	Microprocessors, Digital Systems, Signal Processing, Introduction to Number Theory and Cryptography*, Image Processing*
Online Courses	Deep Learning, Natural Language Processing, SIMULINK Onramp, Algorithmic Toolbox, Managing Company of the Future, Quantum Computing

*to be completed by Nov 2021

EXTRACURRICULAR ACTIVITIES

- Introduced **Python** to 1000+ students in the course **PyCK** hosted under **WnCC, IIT Bombay** *(2021)*
- Mentored students during their **Institute Technical Summer Project** relating to **Machine Learning** *(2021)*
- Guided first-year students during their **Summer of Science** on the topic **Deep Learning** *(2021)*
- Completed a year-long professional course in **Chess** under National Sports Organization (**NSO**) *(2019 - 20)*
- Completed the **Quantum Computing** workshop held by **MnP Club, IIT Bombay** using **Qiskit** *(2020)*
- **Represented** the school in various inter-school debates and won the **best speaker** award for Hindi debate *(2016)*
- Qualified **LIMIT** examination held by **ISI Banglore** and attended their camp on abstract mathematics *(2019)*
- Won the award of the fastest cuber in **Cubing Fever 2k16**, a district-level speedcubing competition *(2016)*
- Completed all 6 levels of **Speed Arithmetic** under IPA and stood 2nd in the state-level competition *(2015)*