Pulkit Adil | **200070062**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 24/5/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Bhagat Public Sr Sec School, Ladura, Kota, Rajasthan	2020	91.00%
Matriculation	CBSE	Krishna Public School, Dunda, Raipur, Chhattisgarh	2018	95.40%

Pursuing a **Minor** in **Computer Science and Engineering** from the Department of CSE, IIT Bombay

Scholastic Achievements

Key Projects

Estimation of sample covariance matrix from compressive measurements *(Spring 2022)*
Course Project | CS754: Advanced Image Processing | Prof. Ajit Rajwade

- Implemented an **unbiased estimator** to extract the covariance matrix from compressive measurements obtained by a general class of random projection matrices consisting of i.i.d. zero-mean entries using MATLAB
- Used the unbiased estimator to estimate the covariance matrix for **MNIST**, **Gen4** and **Traffic data** sets and compared the computation time and the results obtained with those achieved using a biased estimator
- Reconstructed the base image using **Principal Component** technique, specifically, by using the first eigen vector

IITB-RISC Microprocessor Design *(Spring 2022)*
Course Project | EE309: Microprocessors | Prof. Virendra Singh

- Designed flowcharts and datapaths for **multicycle** and **pipelined** implementations of an 8-register, 16-bit RISC microprocessor with the given Instruction Set Architecture comprising of 17 instructions
- Implemented the microprocessor using **VHDL**, and simulated it using ModelSim Altera in Quartus
- Employed **data forwarding** and **stalling** for obtaining a CPI of 1 in the pipelined implementation in Quartus

Convolutional Neural Networks and Their Applications *(Spring 2021)*
Seasons of Code, 2021 | WnCC, IIT Bombay

- Implemented the **ResNet50** architecture along with **transfer learning** from the **ImageNet project** using Tensorflow and used it for classifying movie posters based on their genres
- Achieved an accuracy of **18%** for correctly predicting all genres and **80%** for a single genre

Algorithmic Trading Strategies *(Summer 2022)*
Summer of Science, 2022 | Maths and Physics Club, IIT Bombay *Ongoing*

- Learned about various **trading strategies** like market-making, hedging, mean reversion and momentum based strategies involving moving averages and Relative Strength Index (RSI), arbitrage strategies and pairs trading
- Backtested strategies involving simple moving average crossover and RSI using **Backtesting** library in python

Stock Price Prediction using LSTM *(Summer 2022)*
Self Project

- Implemented a multi-layered **LSTM** model in python to predict closing prices of a stock using past 20 days data
- Trained and tested the model using APPLE stocks data from past 5 years and obtained a **MAPE** value of 0.016

Option Pricing Models and Their Accuracy *(Spring 2022)*
FinSearch | Finance Club, IIT Bombay

- Investigating options markets and **pricing models** along with their fundamental mathematical underlyings
- Analyzing option pricing based on the **Black-Scholes Model** and **Monte Carlo Simulations** respectively

Other projects

Spanning Tree Protocol *(Autumn 2021)*

Course Project | CS224: Computer Networks | Prof. Varsha Apte

- Implemented the **Spanning Tree Protocol** in C++ to build a loop-free network of bridges and LANs
- Displayed the **configuration messages** sent and received by the bridges throughout the protocol

Mastermind Game Solver *(December 2021)*

Self Project

- Encoded the six colors, four holes, 2 players mastermind game into a **Boolean Satisfiability** (SAT) problem
- Created a python program to solve the SAT problem using **Z3 Theorem Prover** from **z3py** library

Temperature Monitor *(Autumn 2022)*

Course Project | EE337: Microprocessors Laboratory | Prof. Saravanan Vijayakumaran

- Created a program in assembly language to monitor room temperature using **8051** micro-controller
- Interfaced LM35 **temperature sensor** with the PT-51 board using MCP3008 **ADC** and **SPI**

The Lasso Game *(Spring 2021)*

Course Project | CS101: Computer Programming and Utilization | Prof. Bhaskaran Raman

- Enhanced a basic **GUI** based coin catching game written in C++ by adding timing modes and saving leaderborad
- Adopted an **object oriented** approach, using classes to represent projectile bodies, the lasso and the moving coins with recurring function calls to model continuous step motion for parabolic projectiles

Digital Design using VHDL *(Autumn 2021)*

Course Project | EE214: Digital Design Laboratory | Prof. Maryam Shojaei Baghini

- Designed a VHDL program which calculates the optimal number of currency notes of denominations 100, 50 and 1 respectively that sum up to the amount entered (upto 255), using 8-bit dividers
- Tested the functionality by running the program on Krypton MAX V CPLD board

Positions Of Responsibility

Teaching Assistant | *Linear Algebra and Calculus-II* *(Spring 2022)*

- Academically mentored a batch of 45 students in introductory courses on Linear Algebra and Calculus
- Conducted weekly problem solving sessions and ensured clarification of any conceptual doubts

Technical Skills

Languages	C++, Python, VHDL, Embedded C, MATLAB, LaTeX
Data Science	NumPy, Pandas, Tensorflow, ScikitLearn, Keras
Softwares	Git, Quartus, Ngspice, Keil, Wireshark

Key Courses Undertaken

Electrical Engineering	Signal Processing, Probability and Random Processes, Communication Systems*, Digital Systems, Analog Circuits, Control Systems, Power Engineering, Microprocessors, Electronic Devices and Circuits, Electromagnetic Waves*
Computer Science	Data Structures and Algorithms, Design and Analysis of Algorithms*, Advanced Image Processing, Data Structures and Algorithms, Computer Networks, Computer Programming and Utilization
Mathematics	Linear Algebra, Calculus, Complex Analysis, Differential Equations
Other Courses	Economics, Electromagnetism, Quantum Physics and its Applications

**To be completed by Nov-22*

Extracurricular Activities & Other Interests

- Completed 1 year of training under **National Cadet Corps** (NCC), IIT Bombay *(2020-21)*
- Participated in **Capture The Flag** (CTF) competition conducted by CSec Club, IIT Bombay *(2021)*
- Received a Special Mention in the prelims of Mimamsa Science Quiz, conducted by IISER Pune *(2021)*
- Secured **National Rank 73** in National Financial Literacy Assessment Test conducted by National Centre for Financial Education, RBI and Securities and Exchange Board of India *(2015)*