

Prateek Garg

3rd year undergraduate, Electrical Engineering, IIT Bombay

EDUCATION

IIT BOMBAY

DUAL DEGREE(BTECH + MTECH) IN EE

2020-Present | Mumbai, MH

CPI: 8.37/10

Minor in Computer Science and Engineering

CONTACT DETAILS

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COURSEWORK

UNDERGRADUATE

Introduction to Machine Learning

Signal Processing

Using Python for Research

Neural Networks and Deep Learning

Improving Deep Neural Networks

Convolutional Neural Networks

Artificial Intelligence

Probability and Random Processes

Computer Programming

Logic for Computer Science

TECHNICAL SKILLS

PROGRAMMING

C & C++ • Python • Java • Assembly •
VHDL • MATLAB

FRAMEWORKS

Pytorch • Tensorflow • OpenCV

• Scikit-Learn • Numpy • SciPy • Pandas

MISCELLANEOUS

Bash • Git • \LaTeX • WSL • NgSPICE

ACHIEVEMENTS

Achieved **AIR-762** in JEE Advanced 2020

Secured **AIR-200** in KVPY 2020 SX stream

Among 802 applicants selected for Indian
National Chemistry Olympiad(INChO 2021)

HONORS

KVPY FELLOWSHIP

IISC BANGLORE

Mar '20

Awarded fellowship under *Kishore Vagyanik
Pratsahan Yojna*, SX stream.

PROJECTS

VISUAL EXPLANATIONS FOR DEEP NEURAL NETWORKS

WINTER OF DATA SCIENCE, ANALYTICS CLUB, IITB

Dec '21 - Jan '22

- Explored ways of visualising Deep Convolutional Neural Networks and reviewed literature about **Attribution Models**.
- Implemented attribution methods such as **Saliency Maps**, **Occclusion Sensitivity Maps**, **Class Activation Maps** and **Gradient based Class Activation Maps** using deep learning framework **Pytorch**.

EVALUATING ML MODELS ON PIMA INDIANS DIABETES DATA

GUIDE: PROF. ABIR DE, DEPT. OF COMPUTER SCIENCE & ENGINEERING

Apr '22 - May '22

- Analysed a dataset to the predict onset of diabetes in a team of 5 and utilised libraries such as **matplotlib**, **Pandas**, **Seaborn** for data visualization.
- Trained various ML models such as **Support Vector Classifier**, **K-Nearest Neighbour Classifier**, **Neural Network** and evaluated their performance.

RENDERA: RAY-TRACING ENGINE IN C++

SUMMER OF CODE, WEB AND CODING CLUB

May '22 - Present

- Part of maths subsystem which aims to optimise complex mathematical computations for the ray tracer exploiting data level parallelism.
- Utilised **XSIMD**, a cross-platform SIMD(**Single Instruction Multiple Data**) intrinsics wrapper library to implement a vector class

IITB-RISC:16-BIT RISC MICROPROCESSOR

GUIDE: PROF. VIRENDRA SINGH, DEPT. OF ELECTRICAL ENGINEERING

Apr '22 - May '22

- Led a team of 4 to design and implement a 16-bit, 6-Stage Pipelined RISC processor based on a custom **instruction set architecture**.
- Implemented the design in VHDL, included **branch predictor**, data and control and hazard mitigation unit to improve the performance

HYPERLOOP POD SUBSCALE PROTOTYPE DESIGN

JUNIOR ENGINEER, CONTROLS SUBSYSTEM, TEAM HYPERLOOP IITB

Oct '21 - May '22

- Responsible for development of overall **control architecture** of the prototype with the onboard communication and data logging.
- Implemented **Sensor fusion** strategies for sensor data analysis in MATLAB and studied about various control and **noise reduction algorithms**.

PUBLIC KEY CIPHERS

SELF LEARNING PROJECT IN PUBLIC KEY CRYPTOGRAPHY

May '21 - Jun '21

- Studied different public key ciphers like **RSA encryption** and **Diffie Hellman Key Exchange Protocol** and their implementation.
- Utilised **BigInteger** class in Java to implement a program which takes two prime numbers to generate a **public-private key pair** using **RSA algorithm**.

EXTRACURRICULAR ACTIVITIES

- Secured **1st position** for Hostel-5 in **Inter-Hostel Jhatka General Championship** by Electronics and Robotics Club, IIT Bombay

Mar '22

- Contributed to **Open-Source** during **Hacktoberfest**, a month long celebration of open source software organised by **Digital Ocean**

Oct '21