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

GitHub prateekgargx
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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 Protsahan 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 litrature about **Attribution Models**.
- Implemented attribution methods such as **Saliency Maps**,**Occulusion Senstivity 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 diabtetes in a team of 5 and and utilised libraries such as **matplotlib, Pandas, Seaborn** for data visualization.
- Trained various ML models such as **Support Vector Classifer**, **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*