Paarth Jain
Computer Science & Engineering
Indian Institute of Technology, Bombay

190050076
B.Tech.
Gender: Male
DOB: 17-09-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	
Intermediate	CBSE	Aklank Public School	2019	92.40%
Matriculation	CBSE	Aditya Birla Public School	2017	10

Pursuing **Honors** in **Computer Science and Engineering**

Scholastic Achievements

- Achieved **All India Rank 16** in **JEE Advanced** out of **1.6 lakh** eligible candidates. *(2019)*
- Achieved **99.98** percentile in **JEE Main** out of **1.2 million** eligible candidates. *(2019)*
- Participated in the **Physics Olympiad Camp** at **HBCSE** by qualifying **INPHO** *(2019)*
- Made it to the **top 30** students in the country in **INPHO** and **INAO**. *(2019)*
- Stood amongst **National top 1%** in NSEP(Physics), NSEC(Chemistry), NSEA(Astronomy). *(2019)*
- Recieved the prestigious **KVPY fellowship** by DST, Government of India. *(2018)*

Work Experience

Software Development Intern *(May 2021 - July 2021)*
Newzera | Deep Tech Startup

- Worked on **backend feature development**, and refactoring **GraphQL API codebase** according to coding guidelines
- Used various **AWS** tools, **Redis** and **serverless-offline** while adding new backend features.
- Implemented **lambda logging** feature in various APIs, and analysed the logs on **AWS CloudWatch**.
- Created a **tutorial video** with steps to visualise the logs on a **CloudWatch** dashboard in the form of graphs.
- Wrote tests for backend, frontend and API related files using **Jest** and **Enzyme** in Javascript.

Key Projects

Compressed Sensing using Channel Code Matrices *(May 2021)*
Guide: Prof. Ajit Rajwade | Course Project: Advanced Image Processing *IIT Bombay*

- Studied the bridge between **channel coding** and **compressed sensing** problems, using **parity-check matrices** for the **Binary Symmetric Channel** as measurement matrices under **Compressed Sensing** applications.
- Implemented **CS** using **LDPC matrices** (a family of **parity-check matrices**).
- Found significantly more compression and speed using **LDPC matrices** compared to **Random Gaussian Matrices**

Slow and Secure SKE Library in C++ *(May 2021)*
Guide: Prof. Manoj Prabhakaran | Course Project: Cryptography and Network Security *IIT Bombay*

- Developed a **C++ Library** for **Shared Key Encryption** based on conjectured hardness of simple math problems.
- Ensured interface **doesnt expose** the key or the underlying **randomness** of the programmer
- Implemented primitives such as **OWF, OWP, PRF** and **PRG** in an **Object-Oriented** fashion, used **Miller-Rabin Primality Test**, for efficient key generation.

Online Competing and Development Environment *(Sept 2020)*
Guide: Prof. Amitabha Sanyal | Course Project: Software and Systems Lab *IIT Bombay*

- Developed an **Online Competing and Development Environment** with secure login.
- Utilized **PHP, MySQL, AJAX** and **Bash** for compilation and execution of user code on a Linux Server.
- Implemented **user directory separation**, support for **multiple languages**, and a personalised **file explorer**.

Sentiment Analysis Tool *(Summer 2020)*
Institute Technical Summer Project | Tinkerer's Lab *IIT Bombay*

- Developed a **Recurrent Neural Network** based on **Bidirectional LSTMs** using **Keras** trained on **multi-domain** English sentences, from the Sentiment140 database, giving **84%** validation accuracy.
- Performed **Normalisation** and **Word Embedding**, utilizing the **Snowball Stemmer** and **GloVe** in the process.
- Using **Bootstrap** and **Django** developed a web app interface to complete the tool.

Other Projects

Vehicle Overtake Assist System *(May 2020 - July 2020)*
Institute Technical Summer Project | Tinkerer's Lab *IIT Bombay*

- **Awarded Special Mention** for developing a real time algorithm to deem overtakes on 2-lane roads safe or unsafe.
- Developed a **3D Simulation** using **ThreeJS** that modelled the overtakes of multiple cars, based on our algorithm.
- Utilised ingenious techniques based on **length-width ratios**, and **vehicle specifications**, to make the algorithm work with minimal pre-requisite , and more real-time data, thus improving the accuracy in various scenarios.

Virtual Keyboard *(Summer 2020)*
Summer of Code | Web and Coding Club *IIT Bombay*

- Developed a **Virtual Keyboard** system that detects, multiple key presses in **real-time**.
- Used various techniques like **Geometric Image Transformations**, **Contour Detection**, **Adaptive thresholding** and **Sobel Derivatives** using **OpenCV** in **Python3**.

Image Compression using Quad Trees *September 2020*
Guide: Prof. Ajit Diwan | Course Project: Data Structures and Algorithms *IIT Bombay*

- Created a **Quad Tree** class in C++ to store black and white images with highly optimised memory utilisation.
- Implemented **time** and **memory** efficient methods like **Resize**, **Extract** etc. for image processing applications.

Tomographic Reconstruction of Brain Magnetic Resonance Image *Autumn 2020*
Guide: Prof. Ajit Rajwade | Course Project: Advanced Image Processing *IIT Bombay*

- Used simulated measurements of brain MR volume slices at 18 random angles and reconstructed complete slices.
- Performed **inverse radon transform** using the **Ram-Lak filter** and used CS-based reconstruction for MRI slices.

Mastermind Player *Feb 2021*
Prof. Ashutosh Gupta | Course Project *IIT Bombay*

- **Encoded** moves of the mastermind game into a **SAT** problem and solved using **conflict driven clause learning**
- Implemented a solver in **z3py library** which was robust to the other player lying upto **40%** of the time

Positions Of Responsibility

Convener *(May 2020 - May 2021)*
Institute Technical Council | Electronics and Robotics Club *IIT Bombay*

- Part of a **15 member team** formed based on SoP, interview & peer reviews.
- **Key speaker** for various tech talks and events like **Arduino Bootcamp** and **Linux for Robotics**
- Contributed an article, **Introduction to Fuzzy Logic** for the **ERC-Wikipedia page**

Organiser, Climbathon *(2020)*
Bouldering Competition | Adventure Club *IIT Bombay*

- Conducted the **first ever bouldering competition** at IIT Bombay, with **60+** participants
- Introduced climbing as a sport to the participants, along with the necessary safety protocols.

Technical Skills

Programming Languages	C++, Python, Javascript, Java, VHDL, MATLAB, Bash, Sed, Awk
Data Science	Numpy, Tensorflow, Keras, Matplotlib, Pandas, OpenCV
Development	AWS, Serverless, React, Angular, GraphQL, Jest, Django, PHP, SQL, Redis

Key Courses Undertaken

- **Computer Science:** Data Structures and Algorithms, Design and Analysis of Algorithms, Data Analysis and Interpretation, Software and Systems Lab, Computer Networks, Advanced Image Processing, Cryptography and Network Security, Operating Systems*, Artificial Intelligence*, Blockchains and Cryptocurrency*, Automata Theory**, Databases and Information Systems**
- **Misc:** Calculus, Linear Algebra, Quantum Physics, Biology, Introduction to Electronic Circuits, Marketing Management, Economics, Sociology*

* : *To be completed by December 2021* ** : *To be completed by April 2022*

Extra Curriculars

- Successfully completed a one year **badminton** course under the National Sports Organisation(**NSO**) *(2019-20)*
- Secured **1st** rank as a team in **PlutoX Hackathon** conducted by Aeromodelling Club IIT Bombay. *(2020)*
- Secured **6th position/160** teams in RC bot making competition conducted by ERC IIT Bombay. *(2019)*
- Participated in the **StreetPlay GC** with a team of 15 members to address critical social evils. *(2020)*