Prathamesh Sachin Pilkhane

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Academic Qualifications

- **Bachelor of Technology in Computer Science and Engineering, IIT Bombay** **CGPA:** 9.92/10
- **Intermediate from FIITJEE World School, Hyderabad (2020)** **Percentage:** 97.2%
- **Schooling from Pallavi Model School, Hyderabad (2018)** **Percentage:** 94.6%

Scholastic Achievements

- **Department Rank 4** in a batch of more than 160 students.
- Felicitated with the **DHRUV** award by **the Vice President of India** under Pradhan Mantri Innovative Learning Program , **PMILP**, awarded to **top 30** students in India in the field of Science. *(2019)*
- Secured **All India Rank 13** in Joint Entrance Examination Advanced amongst 150,000+ students. *(2020)*
- Secured **All India Rank 28** in Joint Entrance Examination Main amongst 1 million students. *(2020)*
- Received **Institute Academic Prize** given to **top 20** out of **1400** students, for excellent academic record. *(2020)*
- Secured **2 AP** grades (Advanced Performer) given to the **top 1%** of students pursuing the course. *(2021)*
- Received the prestigious **KVPY** scholarship with an All India Rank **109**, from the Govt. Of India. *(2019)*
- Awarded the National Talent Search Examination **NTSE** scholarship by NCERT, Govt. of India. *(2018)*
- Selected in **top 1%** of students in National Search Examination Astronomy **NSEA** and Chemistry **NSEC**. *(2019)*

Internships And Work Experience

FinSPL Language Enhancement & Interface Development

Autumn 2022

Software Internship — *FinIQ Consulting*

- Tackled the problem of compiling a non type-casted language **FinSPL** to a type casted language, **C#.**
- Enhanced a user friendly language, **FinSPL** to help users to write custom functions in a **Python** like appearance.
- Developed the parser and compiler for the above mentioned language using **Antlr** in **C#**, converting FinSPL to C#.

The Homesteading problem , Computational Geometry

Summer 2022

Guide : Dr. Aaron Becker | Research Internship — *University of Houston , Texas*

- Developed a successful and efficient strategy for **The Homesteading Problem**, and simulated the same algorithm.
- Currently working on the paper to **submit** at one of the **world-leading Robotics Conference** by the end of year

Packing Cubes, Voronoi and Art Gallery games

Summer 2022

Guide : Prof. Sandor Fekete | Research Internship — *TU Braunschweig*

- Worked on a wide variety of problems including **Voronoi games** and their variations, **Computational Geometry** problems such as packing and covering of geometrical shapes, and **the Art Gallery Problem** variants.
- Developed upon the worst case optimal packing density of cubes in sphere, using the proof for cubes in cube.

AI/ML intern at Mizuho Bank

Autumn 2021

Software Internship — *Mizuho bank, Mumbai*

- Developed a **Proof of Concept** for the task of extracting information from recorded phone calls of customers.
- Tested out various modules and libraries, used **Speech recognition** library for transcribing the phone call along with **spaCy**, an **NLP** library for extracting details from the above generated textual format of speech.
- Implemented an **Amount Checker code**, which could check the correctness of records in database corresponding to amount in words to that in figures. Developed it to be less prone to errors due to misspelt or incomplete words.

Key Projects

University Administration Interface

Summer 2023

Guide: Prof. S Sudarshan | Ongoing Course Project — *IIT Bombay*

- Developing a university-based software for maintaining students records by building a website.
- Developing the backend server with **Node JS** framework and maintaining records with databases such as **PostgreSQL**.
- Maintaing sessions for logged in users with the help of cookies. Also, developing the front-end using **ReactJS**

Faster Image Segmentation using Cuts and Flows

Summer 2022

Guide : Prof. Suyash Awate | Course Project — *IIT Bombay*

- Tested out various strategies to increase the **speed** in segmentation using cuts on flow network built on images.
- Studied upon a faster max-flow algorithm, **Boykov Kolmogorov** for faster segmentation of colored images.
- Implemented the **Fast Interactive Super Pixel Based Image Generation** research paper for segmentation.

Floating Moodle
Autumn 2021

Guide: Prof. Amitabha Sanyal | Course Project *IIT Bombay*

- Creating a **cross platform** learning environment where teachers and students can interact effectively.
- Developing the backend server with **Django** framework and maintaining records with databases such as **PostgreSQL**
- Adding support for adding various assignments , quizzes and storing grades in the database for each subject.
- Designing the frontend using **CSS** and **Bootstrap** to make the webpages more responsive and interactive.
- Providing Command Line Interface, **CLI** functionalities for increasing ease of access to the website via the terminal.

P2P Network designing
Summer 2022

Guide: Prof. Kameshwari Chebrolu | Course Project *IIT Bombay*

- Implementing a **network** of clients which are interconnected with each other by a specified topology.
- Designing and implementing a **protocol for file search and download** for a client using TCP connections.
- Used the **Select system** calls for parallel transfer of files to achieve maximum throughput without buffer overflow

RISC 16 Bit Processor in VHDL
Summer 2022

Guide: Prof. Virendra Singh | Course Project *IIT Bombay*

- Devised an efficient 22 state FSM for an 8 register, 16-bit **multicycle processor** having 4MB of RAM
- Synthesized and assembled **FSM controller**, **Datapath**, and **Memory Unit** in Quartus Prime using VHDL.

Speech Emotion Recognition WebApp
Summer 2021

Institute Technical Summer Project *Institute Technical Council, IIT Bombay*

- Designed a User friendly **speech emotion recognition** web-app, **Dezipher**, which helps users in the task of identifying emotion from voice samples in the absence or minimalilty of visual facial expressions.
- Utilized **Librosa** library to extract sound features such as frequency and amplitude, and **GloVe Word Embeddings**, with **speech recognition** library to work with the words spoken in the input voice sample.
- Designed the backend of web-app using **Flask** and displayed the emotion as predicted by the model on user interface, and the frontend with the help of **CSS**, **Javascript** and **Bootstrap** making the web-app highly responsive.

Other Projects

Analysis of Anchor Free vs Anchor based Object Detection
Autumn 2021

Guide: Prof. Biplab Banerjee | Course Project *IIT Bombay*

- Studied different object detection models amongst **anchor based** and **anchor free** and compared their accuracies.
- Compiled the results and differences observed in outputs of **YOLOv3** and **FCOS** when used as object detectectors.

(Un)Clear, Image Super Resolution Project
Summer 2021

Seasons of Code *Web and Coding Club , IIT Bombay*

- Developed a **Deep Learning** solution to the problem of **Single image Super Resolution**, a fundamental low level vision problem , which aims to reconstruct a high resolution image from a low resolved observation.
- Utilized **OpenCV** library on image data-set, **DIV2K** for augmentation and preprocessing to increase data-set size

Technical Skills

Programming Languages	C/C++, Python, C# ,Java, Bash, Prolog, MATLAB, AWK, FLTK, LaTeX, Assembly
Development	HTML, CSS, ReactJS , NodeJS ,Bootstrap, PostgreSQL, SQL , Django, Flask, Git, Antlr
Data Science	Tensorflow, Keras, OpenCV, Matplotlib, Numpy, SciPy, Pandas, SciKit,

Positions of Responsibility

Department Aacademic Mentor |*Computer Science Department* *Autumn 2021- Summer 2022*

- Among the **30** candidates selected after extensive peer reviews and interviews out of **60**+ applications
- Appointed as the mentor and contact point of **6** sophomore students to resolve their academic queries

Sports Secretary | *Computer Science Department* *Autumn 2021- Summer 2022*

- Responsible for organizing various events throughout the year for **1000**+ students in the Computer Science department.
- Promoting and improving interaction amongst students from various batches as a part of the **CSEA** council.

Teaching Assistant | *Dept. of Mathematics* *Autumn 2021*

- Appointed as a Teaching assistant for **Calculus, MA109** and **Algebra, MA106** courses to clear doubts of students.
- Conducting weekly interactive problem-solving sessions for the students to practice tutorial questions and clear doubts.

Relevant Courses

Computer Science: Operating Systems, Implementation of Programming Languages, Software and Systems Lab, Computer Networks, Digital Logic Design and Computer Architecture, Logic for CS, Discrete Structures, Design and Analysis of Algorithms, Machine Learning for Remote Sensing , Medical Image Computing, Automatic Speech Recognition, Artificial Intelligence and Machine Learning,

Mathematics: Calculus , Differential Equations, Linear Algebra, Data Analysis and Interpretation

Extracurricular

- Actively participating in Competetive Programming on various platforms, with an **expert** title on Codeforces.
- Won Chess tournament conducted by CSEA, and stood $\mathbf{4}^{th}$ in tournament conducted by **Dark Knight Chess Club.**
- Selected among the **top 50** teams in **Mimamsa** Science Competetion conducted by **IISER, Pune**.
- Stood in the $\mathbf{1}^{st}$ place in the Riddle Night conducted by IIT Bombay **Sports Club**, as a part of Freshie la Vista.