



Ojas Gramopadhye
Computer Science & Engineering
Indian Institute of Technology, Bombay

190050075
B.Tech.
Gender: Male
DOB: 17-06-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	null
Intermediate	CBSE	The New Green Field Public Academy	2019	92.00%
Matriculation	CBSE	The Emerald Heights International School	2017	10

SCHOLASTIC ACHIEVEMENTS

- Secured **99.84** percentile in **JEE Mains** out of over **1.1 million** candidates (2019)
- Achieved **98.3** percentile in **JEE-Advanced** out of more than **0.2 million** candidates (2019)
- Scored **410** out of **450** marks in **BITSAT** examination conducted by *BITS, Pilani* (2019)
- Qualified to the *Regional Mathematics Olympiad (RMO)* conducted by the **(HBCSE)** (2018)

INTERNSHIP AND KEY PROJECTS

Locust Occurrence Modelling and Prediction

Summer 2021

Data Science Associate

Dtime

- Worked on an **end-to-end** machine learning project to model and forecast **locust outbreaks** in East-African region.
- Implemented machine learning algorithms to **extract and engineer new features** and capture the **spatial and temporal** characteristics of the problem, and tackle the heavily skewed nature of the problem, (*as high as 1:5k*).
- Implemented **Bi-directional ConvLSTM** based **U-Net** model for pixel level classification on **67k grid-IDs** of 10 km^2 each, projected over **spatial images** corresponding to **450+ timestamps**, with respective segmentation masks.
- Used a combination of algorithms like **SMOTEENN** and **SMOTETomek**, with **Balanced Ensemble Classifiers** to reduce the effect of class asymmetry and predict a locust occurrence, **minimizing false negatives** successfully.

Spoof-Resistant Face Recognition

Summer 2020

Institute Technical Summer Project

WnCC, IIT Bombay

- Developed a system to differentiate between live and digitally created faces from input image and identify them.
- Implemented **OpenCV's Caffe** based Single Shot Detector (SSD) framework, to get the region of interest.
- Built an **artificial neural network** incorporating several **convolutional** layers in combination with others and trained it on a **self-made** live and fake images dataset, for **liveness detection feature**.
- Extracted **128-D facial encoding vectors** from **dlib's 5-point facial landmark model** to train a support vector machine and work with the liveness detection model for **facial recognition capability**.

Lossless High-Entropy Compression Algorithm

Summer 2020

Seasons of Code

WnCC, IIT Bombay

- Achieved the task to convert numeric sequences of a fixed length to compressed versions minimizing the complexity of their **fourier-transform**, achieving **high entropy data compression**.
- Implemented a system of **seq2seq recurrent neural network** using *Long Short Term Memory (LSTM)* units in combination with other layers to output compressed form and make transmission and storage more viable.
- Generated a mapping using the compressed version to **recreate original signal** for simpler signals accurately.

Red Plag : Plagiarism Checker

Autumn 2020

Prof. Amitabha Sanyal — (Course project)

IIT Bombay

- Developed a **plagiarism checker** to measure pairwise similarity between a collection of text files.
- Adopted an algorithm that involved using **separate tokenizers** for languages **C++, Java, Python** followed by **winnowing of vectors** from **hashed k-grams** to compute similarity percentage.
- Created a web **front-end** using **Angular** framework to visualize results in a graphical manner, and **Django** based web-framework for the **backend** server to maintain the database, and to link and store query results.
- Added **authentication** using *JSON web-tokens (JWT)*, to restrict access to authorised individuals only.
- Added functionality for use with given boilerplate code, while comparing multiple files, for accuracy.

Comparison of TCP variants

Spring 2021

Prof. Vinay Ribeiro — (Course Project)

IIT Bombay

- Simulated a client and server network using **Socket in C**, to transfer files using different variants of **TCP**.
- Recorded network traffic using **Wireshark** and analysed **window scaling graphs** for **TCP Cubic** and **Reno**.

Quantum Information and Computing

Summer of Science

Summer 2020

MnP Club, IIT Bombay

- Completed a reading project on mathematical aspects of **Quantum Information and Computing**.
- Studied differences in computational methods in classical and quantum computers.
- Learned about some basic **quantum algorithms** and the computational ease offered by them over classical counterparts for some tasks known to be computationally complex for classical computers.

Advanced Data structures

Prof. Ajit A. Diwan — (Course Project)

Autumn 2020

IIT Bombay

- **Quadtree**: Implemented Quadtree Data Structure for efficient **Image Compression**, with operations to **set** or **get** individual pixels, **extract** a portion, **overlap** or **intersect** two images, or **resize the image**.
- **Permutation**: Implemented Permutation data-type with functionalities like inverse, composition, square-root, exponentiation, and logarithm using **Extended Chinese Remainder Theorem** in linear time complexity.
- **Morphism**: Implemented Morphism as a function, and developed algorithms, to compute properties like function calls, size of string, and determination of substrings and subsequences for them.

IITB Proc: Multi-Cycle Processor

Prof. Virendra Singh — (Course Project)

Spring 2021

IIT Bombay

- Designed a **16-bit** computer system with 8 general purpose registers, capable of executing multiple instructions.
- Implemented an ALU, to carry out Addition and Subtraction operations using 16 bit **Kogge Stone Adder**.
- The architecture also allows instruction executions like **Jump**, **BEQ**, and **multiple Load** and **Store**.

K-Means Clustering

Prof. Amitabha Sanyal — (Course Project)

Autumn 2020

IIT Bombay

- Implemented **KMeans++** Algorithm using **Scipy** Python library to perform **colour quantization** on an image to reduce its colour palette to a fixed number k and reconstruct image in the new space.

POSITIONS OF RESPONSIBILITY

Department Academic Mentorship Program (DAMP) Mentor

Department of CSE, IIT Bombay

Since May 2021

- Appointed to be the **Department Academic Mentor**, one of **26 candidates** selected after extensive peer reviews and interviews out of **76 applications**, and currently guiding **8 sophomore students**.

Institute Technical Summer Project (ITSP) Mentor

- Guided a team of 5 members for a machine learning project combining a facial and a speech recognition system.

Summer 2021

TECHNICAL SKILLS

Programming:	C++, C, Python, Java, Matlab, VHDL, HTML, CSS, SQLite, Bash, Socket, z3
Development:	Android Studio, Angular, Django, Git, L ^A T _E X, Arduino, CSS, JavaScript
Data Science & ML:	Pandas, Matplotlib, Sklearn, Imblearn, Pytorch, Tensorflow, Keras, Numpy, OpenCV
Software Tools:	Git, Jupyter, Quartus, Wireshark, AutoCAD, SolidWorks

COURSES UNDERTAKEN

Computer Science : Discrete Structures, Data Structures and Algorithms (+Lab), Data Analysis and Interpretation, Software Systems Lab, Abstractions and Paradigms for Programming (+Lab), Digital Logic and Design (+Lab), Design and Analysis of Algorithms, Logic for Computer science, Computer Networks (+Lab), Computer Architecture (+Lab)*, Database and Information Systems (+Lab)*, Operating Systems (+Lab)*, Automata Theory[†], Implementation of Programming Languages (+Lab)[†], Artificial Intelligence (+Lab)[†]

Miscellaneous : Introduction to Electrical and Electronics Circuits, Linear Algebra, Calculus, Basics of Electricity & Magnetism, Quantum Physics, Engineering Graphics & Drawing, Physical Chemistry

*To be completed by Autumn 2021

[†]To be completed by Spring 2022

EXTRACURRICULAR

- Attended **InterIIT Camp** for **Aquatics** and currently a member of **Aquatics Team IITB**
- Competed in **All India IPSC Swimming Championship** (U-19) and won **2nd prize** in an event. (2016)
- Took part in **62nd National School Swimming Championship** (U-19) organised by **SGFI**. (2016)
- Competed in **CBSE West Zone Swimming Championship** (U-16), held in Ajmer. (2015)
- Competed in **62nd State School Swimming Championship** held in Mandsaur, M.P. (2016)
- Competed in **M.P. State Triathlon** organised under **M.P. Triathlon Association**. (2015)
- Helped organize various Lectures at **Techfest**, Asia's largest science and technology festival. (2019-2020)
- Designed **XLR8 remote-controlled bot**, to run across an obstacle course, and finished **2nd**. (2019-2020)