



**GAURANG DEV**  
**Computer Science & Engineering**  
**Indian Institute of Technology, Bombay**

**19D070024**  
**B.Tech.**  
**Gender: Male**  
**DOB: 30-10-2001**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	null
Intermediate	CBSE	Disha Delphi Public School	2019	95.60%
Matriculation	CBSE	Shiv Jyoti Sr Secondary School	2017	10

Pursuing Honors, and Minor in **Artificial Intelligence and Data Science**

## SCHOLASTIC ACHIEVEMENTS

- Received **Institute Academic Prize** (top **20** students) for exceptional academic performance (2020)
- Awarded **3 AP** (Advance Performer) given to top **10** out of **1200** enrolled students for outstanding academic performance in Calculus, Physical Chemistry and Biology (2019-20)
- Secured **All India Rank 51** in JEE Mains out of 1.4 million candidates appeared in it (2019)
- Achieved **99.8 percentile** in JEE-Advanced out of 2,50,000 candidates appeared in it (2019)
- Received **certificate of merit** (given to **top 0.1%** of successful candidates) from the Hon'ble **HRD Minister** of India for exceptional performance in Mathematics in **AISSCE** (2019)

## OLYMPIADS AND SCHOLARSHIPS

- Represented Team **INDIA** and secured **GOLD MEDAL** in 13<sup>th</sup> International Junior Science Olympiad **IJSO** held at Bali, Indonesia organised by HBCSE-TIFR (Govt. of India) (2016)
- Selected for the prestigious **KVPY (AIR 16)** fellowship by MHRD, Govt. of India. (2017-18)
- Awarded with the prestigious **NTSE** scholarship by MHRD, Govt. of India (2017)
- Evaluated as **National Top 1%** in **NSEP** and **NSEC** organised by HBCSE-TIFR. (2017,2018)
- Recipient of **Award of Excellence** for scoring full marks in Australian National Chemistry Quiz (**ANCQ**) conducted by the Royal Australian Chemical Institute (RACI) (2017)

## INTERNSHIP

### Coverage of growing 2D region by discs & Freeze Tag

Summer 2021

Guide: Prof Sandor Fekete — Research Internship (Algorithms)

TU Braunschweig, Germany

- Worked on making a Python **simulator** for the case of clearing expanding rectangles using unit squares
- Investigated and surveyed literature on the **classical** Freeze Tag Problem and some of its modifications

## KEY PROJECTS

### Skellam Edge Detection And Background Subtraction

Spring-2020

Guide: Prof Ajit Rajwade — Course Project

IIT Bombay

- Improved the existing Gaussian noise modelling algorithm by leveraging **skellam** Distribution for intensity differences and thereby getting **poisson** distribution for noise as a more appropriate model.
- Comparison with **SOTA** algos like Canny Edge Detection showed better results in **60%** of the images
- Implemented a novel approach for generation of random noisy images and videos for testing the output

### Code Debugger — Team CHASS

Autumn-2020

Guide: Prof Amitabha Sanyal — Course Project

IIT Bombay

- Developed a **Python** based **Command-line debugging** tool for language **Bash**
- Implemented functionalities like printing out the variables on **user's choice**, inserting **breakpoints** in loops, conditional statements, function calls, sed command, debugging piped commands

### Robust Video Denoising using low rank matrix

Spring-2020

Guide: Ajit Rajwade — Course Project

IIT Bombay

- Implemented an algorithm using MATLAB to denoise videos with multiple sources of noise using low rank matrix recovery methods, with no assumptions on their original distributions
- Employed a 3-step hierarchical search algorithm to find a set of patches similar to a reference patch
- Achieved a **PSNR** of **24.87** when the image contained mixture of noises with 30% impulse noise, gaussian noise with  $\sigma = 20$ , and shot noise with  $\kappa = 5$  which is comparable to the existing algorithms

## Mastermind Solver

Guide: Ashutosh Gupta — Course Project

Spring-2020

IIT Bombay

- Created a mastermind Game solver using Python SAT solver that is tolerant to unreliable player 1
- Encoded the constraints into CNF to guess the correct sequence of color balls in minimum attempts

## OTHER PROJECTS

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### Autonomous Garbage Collecting Bot

Summer 2020

Institute Technical Summer Project — Swacch Instizens — Team Leader

IIT Bombay

- Selected amongst **Top-3** projects out of **60** submissions. Was able to classify **3 types** of garbage into **plastic, metal** and **trash** out of all the littered objects found on its way along a street.
- Used **YOLO** for object detection and image processing, **ROS** for simulation and Implementation of **SLAM** Algorithm and designed a **custom gripper** to serve our purpose of garbage collection.

### Basic Image Processing and Graph Plotting

Autumn-2020

Guide: Prof Amitabha Sanyal — Course Project

IIT Bombay

- Used the **Kmeans++ algorithm** and the python **SciPy** Library to smoothen high contrast images
- Utilised **Matplotlib, Numpy, Pandas** and **SciPy** libraries to draw **2D, 3D-surface plots** of any arbitrary continuous function (also their **derivatives**) over 1D and 2D real intervals respectively

### Multi-Cycle Processor

Spring-2020

Guide: Prof Virendra Singh — Course Project

IIT Bombay

- Designed and Implemented an 8-register 16-bit Multi-Cycle Processor in VHDL and added components like Arithmetic Logic Unit, Finite State Machine, to the Network Architecture

### Socket Programming

Spring-2020

Guide: Prof Vinay Riberio — Course Project

IIT Bombay

- Built **ARQ** protocol on top of **UDP** protocol using c++ and tested it by establishing connection between two different ports. Compared performance of different versions of **TCP** using **wireshark** software

## TECHNICAL SKILLS

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#### Programming

C++, Python, Bash, Arduino, AWK, Sed, SQL, Prolog, Socket, VHDL

#### Softwares & OS

MATLAB, Git, L<sup>A</sup>T<sub>E</sub>X, AutoCAD, ROS, SolidWorks, Linux, MacOS

#### Web-Development

HTML, Java-Script, AngularJS, CSS, Bootstrap

## COURSES UNDERTAKEN

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Advanced Image processing

Design & Analysis of Algorithms

Logic for CS

Data Structures & Algorithms

Data Analysis & Interpretation

Computer Networks

Probability Theory

Artificial Intelligence & Machine Learning\*

Computer Architecture\*

Operating Systems\*

Foundations of Intelligent & Learning Agents\*

(\*) Ongoing

## POSITIONS OF RESPONSIBILITY

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**Teaching Assistant**, CS101, Introduction to programming

Nov'20-Mar'21

- Conducted tutorial sessions for a batch of 13 students in association with Prof. Bhaskaran Raman
- Responsible for **teaching** and **evaluating** them, providing feedback to the Instructor in-charge.

**Department Academic Mentor**, Computer Science

Jun'21-present

- Mentoring 8 sophomores of CSE department to assist them in navigating department-specific curriculum
- Is among the 34 candidates selected after extensive interview process out of a total of 74 applicants.

**Institute Technical Summer Project Mentor**,

May'21-Jul'21

- Mentored 4 students to build an autonomous dust cleaning mechanism using image processing and SLAM

**Summer Of Science Mentor**,

May'21-Jul'21

- Guided mentee in a reading project to analyse use-cases of different Data structures and Algorithms

## EXTRACURRICULARS

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- Secured and **Certified 6 star badge** in problem Solving section of **Hackerrank** Platform (2020)
- Mentored academically and emotionally **25** school students of **11th & 12th** standard preparing for **JEE Entrance Exam**, affected by Covid-19 Crisis under **CovEd India** initiative. (2020)
- Secured Rank **8** in **SARCASM-2.0** conducted by **SARC-IIT Bombay** (2020)
- Participated in 10-Days **Annual Training Camp** (ATC) organised by National Cadet Corps (2019)