

# Sumanyu Ghoshal

COMPUTER SCIENCE UNDERGRADUATE · INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

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## Education

### Indian Institute of Technology Bombay

B.TECH.IN COMPUTER SCIENCE AND ENGINEERING (GRADE:9.41/10)

Mumbai 400 076, India

2018 - 2022

### Pace Junior Science College, Andheri

HIGHER SECONDARY SCHOOL CERTIFICATE(SCORE: 92.92%)

Mumbai 400 058, India

2016 - 2018

### Lokhandwala Foundation School

INDIAN CERTIFICATE OF SECONDARY EDUCATION (SCORE: 97.17%)

Mumbai 400 101, India

2003 - 2016

## Academic Achievements

- 2019 **Institute Academic Prize**, Indian Institute of Technology Bombay Mumbai, India
- 2018 **All India Rank 160**, JEE Advanced (out of 200,000+ candidates) India
- 2018 **Recommended for the Scholarship for Higher Education**, INSPIRE, Government of India India
- 2013 **Top 10 %ile among TIPsters**, Duke University (Awarded to the top 0.5%ile of applicants in India) Durham, NC, USA
- 2015 **National Finalist**, Computer Society of India Young Talent Search in Computer Programming Contest Chennai, India
- 2015 **Scholar**, Next Genius Scholarship Program India

## Technical Skills

Programming and Software Development	C++, C, Python, Java, Bash, Git
Web Development	HTML, CSS, JavaScript, Django, SQL
Data Science and Computer Vision	Matlab/Octave, Numpy, Scipy, Matplotlib, OpenCV(Basics), Tensor-Flow(Basics), PyTorch(Basics)

## Projects

### Face Recognition and Autonomous Mapping Robot (<https://github.com/tech-chef/Main>)

IIT Bombay

INSTITUTE TECHNICAL SUMMER PROJECT - 2019

Summer 2019

- Developed a robot on a Raspberry Pi 3B+ with a camera module and I/O(GPIO) pins for the input and output of motors used to control the camera and the movement of the robot
- Implemented a facial recognition subroutine based on the LBPH Algorithm using OpenCV in Python
- Mapped regions by developing an algorithm which used the distances obtained from HC-SR04 ultrasonic sensors
- Programmed point-to-point automated movements using the Wavefront Propagation Algorithm
- Designed the automated motion of the camera module to recognize faces using Haar Cascades for face detection and a subroutine for proportional integral derivative controller

### Automation of Splitting of expenses (<https://github.com/samadkoita/BOIS-Splitwise>)

IIT Bombay

PROF. AMITABHA SANYAL

Autumn 2019

- Developed a django web app to automate the addition and splitting of bills amongst various stakeholders
- Designed an SQL-based database in order to efficiently implement a feature to settle-up expenses similar to the Splitwise app
- Provided dedicated graphical insights on the kinds of expenditure made by each user using javascript and highcharts

### A Portal to Select and Evaluate Teaching Assistants

IIT Bombay

UNDERGRADUATE ACADEMIC COUNCIL

June 2019 - Ongoing

- Involved in the full-stack development of a web application to create a portal for professors to select, and then evaluate the teaching assistants
- Conceptualized of the product. Interacted with various professors and heads of departments to understand their requirements
- Designed the front-end HTML pages using HTML, CSS and bootstrap, and the back-end using django on a MySQL database

### Reconstruction and Error Correction of Images

IIT Bombay

PROF. AMITABHA SANYAL

Autumn 2019

- Reconstructed the image using the available tiles(rectangular subset of pixels) of the original image
- Filtered out noise like salt and pepper and Gaussian noise before reproducing the original image
- Implemented the program using numpy and scipy along with PIL libraries of python

## Image Representation using Principal Component Analysis

IIT Bombay

PROF. SUYASH AWATE

October 2019

- Obtained the closed representation of an image using principal component analysis on the original image, and taking the first 4 components
- Observed the error in this reconstruction from the original image using the Frobenius norm

## Dead-end Roads

IIT Bombay

PROF. AJIT DIWAN

November 2019

- Designed an algorithm to determine the roads which always lead to a dead end by simply comparing the out-degree of each node
- Developed a program in c++ to figure out the longest dead end in the graph with  $O(n+m)$  time complexity using the algorithm designed

## Efficient Simulation of Memory Management of Processes

IIT Bombay

PROF. AJIT DIWAN

September 2019

- Designed an algorithm to simulate allocation/de-allocation of memory to a process and the de-allocation of memory due to the termination of a process in polynomial time
- Implemented the algorithm on c++ using vector and list standard template libraries

## Correlating MRI Scans

IIT Bombay

PROF. AJIT RAJWADE

September 2019

- Developed a matlab script to find the correlations of 2 MRI scans, and an MRI scan with its inverse
- Found the correlations in the MRI brain using the correlation coefficient and the quadratic mutual information

## Internship

### Worxogo Solutions Pvt. Ltd

Mumbai, India

REMOTE SOFTWARE DEVELOPMENT INTERN

July - September 2019

- Developed a program to automate the nudges in the form of e-mail reminders sent to the senior management of the clients on python
- Implemented the OpenPyXL library to import data from and export information to excel sheets
- Created a Graphical User Interface (GUI) for the program using the Tkinter library

## Positions of Responsibility

### Student Alumni Relations Cell

IIT Bombay, India

TEAM MEMBER, ALUMNI STUDENT MENTORSHIP PROGRAM

April 2019 - Present

- Working on a team of 7 to co-ordinate with a pool of above 300 alumni with industrial or research background
- Co-ordinating with a mentee pool of above 500 students to ensure a strong mentor-mentee relationship
- Implementing events like Breaking the Ice and Shadow Program for improving the student-alumni relations

### Lokhandwala Foundation School

Mumbai, India

HEAD BOY

2015-2016

- Elected as the head of the School Council, comprising of 23 members amongst 2300+ students in the academic year 2015-2016
- Initiated and conducted the formal school events like the Math Quiz, General Knowledge Quiz, Farewell, and so on
- Represented the School as the Student Representative in various Competitions like the Horlicks Wizkids, Gizmo Geeks, and so on

## Extracurricular Achievements

2014	<b>Winner</b> , Horlicks WizKids Quiz	Mumbai, India
2015	<b>Runners Up</b> , Association of ICSE Schools in Maharashtra Quiz	Thane, India
2015	<b>Regional Finalist</b> , Texas Instruments Quiz	Mumbai, India
2014	<b>Regional Finalist</b> , Tata Consultancy Services IT Wiz	Mumbai, India
2018	<b>Fastest Car</b> , XLR8 (Freshmen Bluetooth-controlled car contest)	IIT Bombay, India

## Courses

<b>Computer Science</b>	Machine Learning*, Introduction to Deep Learning*, Data Structures and Algorithms + Lab, Discrete Structures, Data Analysis and Interpretation, Software Systems Lab, Design and Analysis of Algorithms*, Digital Logic Design + Lab*, Logic for Computer Science*, Computer Networks + Lab*, Abstractions and Paradigms in Programming + Lab*, Computer Programming and its Utilization,
<b>Mathematics</b>	Calculus, Linear Algebra, Differential Equations
<b>Others</b>	Introduction to Electrical Circuits, Introduction to Electronics, Quantum Physics and its Applications, Basics of Electricity & Magnetism

\*\*to be completed by January 2020

\*to be completed by April 2020