Pursuing a Minor in **Computer Science and Engineering**

Scholastic Achievements

- Secured All India Rank **242** in JEE Advanced among over 0.2 million candidates *(2018)*
- Secured All India Rank **123** in JEE Mains (Engineering) among over 1.3 million candidates *(2018)*
- Secured All India Rank **630** in JEE Mains (Architecture) among over 0.1 million candidates *(2018)*
- Selected to appear for the **Indian National Chemistry Olympiad** (INChO) and **Indian National Astronomy Olympiad** (INAO) conducted by Homi Bhabha Centre For Science Education *(2018)*
- Achieved State Rank **80** in Telangana State EAMCET among over 0.2 million candidates *(2018)*
- Achieved State Rank **132** in Andhra Pradesh State EAMCET among over 0.2 million candidates *(2018)*
- Recipient of the **KVPY Fellowship** by Department of Science and Technology, **Government of India** *(2016)*

Key Projects

Multi - Organ Nuclei Segmentation | Medical Deep Learning and AI Lab *(Winter'19)*
Guide: Prof. Amit Sethi | Department of Electrical Engineering | IIT Bombay

- Used state-of-the-art **image processing** techniques and **neural networks** for segmenting nuclei from Hematoxylin and Eosin (H&E) stained tissue images after **throughly reviewing** research papers in this area
- Implemented **Structure-Preserving Color Normalization** (SPCN) on stained whole-slide images (WSIs) as a **sparse non-negative matrix factorization** (SNMF) problem and made the use of **SPAMS** package
- Trained a **sliding window CNN** and a **UNet** seperately, from scratch on over **22,000** hand annotated nuclei spanning 4 different organs and tested them on 3 unseen organs for **3 classes** in Pytorch
- Adopted **iterative region growing** algorithm to convert the ternary class scores to n-ary Nuclear Maps
- Used **Aggregated Jaccard-Index** as proposed, as the accuracy metric

Student Unmanned Aerial Systems Competition | Team Rakshak *(September'19 - Present)*
Guide: Prof. Krishnendu Haldar | Department of Aerospace Engineering | IIT Bombay

- **Team Rakshak** is an IIT Bombay student initiative to develop a fleet of robust **Unmanned Aerial Vehicles** (UAVs) to support **Search and Rescue Operations** (SRO) in the event of disaster
- Worked on the task of classifying objects of interest detected by the onboard camera of UAV
- Used the python library **OpenCV** to preprocess the images before feeding it to a neural network
- Implemented deep learning models like **ResNet** and **VGG** in **PyTorch** to achieve the task

Role of Fourier Analysis in Electrical Engineering and ECG | Course Project *(Autumn'19)*
Guide: Prof. V.M.Gadre | IIT Bombay

- Made a **detailed study** on different components of the electric circuitry of an ECG machine
- Demonstrated different applications of Fourier analysis in electrical engineering and in ECG
- Was among the **top 3** teams who presented their work to students from various colleges of India as a part of **Immersive Pedagogy Workshop** under the **'KITE'** initiative of the **MHRD, Govt. of India**

Constellation Detection | Institute Technical Summer Project *(Summer'19)*
Institute Technical Council | IIT Bombay

- Devised a mechanism to detect constellations from an image, irrespective of rotation or scaling
- Processed images using OpenCV library and implemented **Geometric Hashing** for every 4-tuples of stars
- Used **similarity metrics** like L1 and L2 norms, cosine similarity and gaussian similarity to compare hashcodes
- Designed a graphical user interface using **Tkinter** library in python to check for the constellations

Sketching Images using Python | Self Project *(Summer'19)*
Python Art | IIT Bombay
- Developed an algorithm in python to sketch any given image
- Used OpenCV library to detect the edges in an image and **Turtle** library to draw them on a blank canvas

Machine Learning and Convolutional Neural Networks | Summer of Science *(Summer'19)*
Maths n Physics Club | IIT Bombay
- In-depth study of topics like regression, classification, **Support Vector Machines**, K - Means clustering, **Principal Component Analysis** and regularization
- Endeavoured to understand and implement various aspects like **backpropagation**,dropout, different activation functions like **ReLU**,gradient killing, adaptive learning rate algorithms like Momentum, Adagrad and **Adam**
- Explored CNNs like **AlexNet** and VGG16 and tried to implement them on **CIFAR-10** dataset in Tensorflow

Stop Watch | Course Project *(Spring'19)*
Guide: Prof. M.B.Patil | IIT Bombay
- Desingned a stopwatch to display in **mm:ss** format with a resolution of 1s and maximum time of 60 minutes
- Determined the logic using Decade Counters, **555 Timer** IC , AND and OR gates
- Modeled the circuit in **EAGLE** software to test the logic

Bluetooth Modulated Bot | XLR8 Competition *(Autumn'18)*
Electronics and Robotics Club | IIT Bombay
- Constructed a four-wheeled bot with **Differential** steering via H-Bridge motor driver
- Controlled the bot via **wireless interconnection** between onboard bluetooth module and a mobile app

Positions of Responsibility

Event Organizer at Techfest | IIT Bombay *(October'18)*
Asia's Largest Science and Technology Festival | Footfall: 175,000
- Helped carry out the event **Speak - Stand to Express**, hosted by the Bollywood Actress **Ms.Yami Gautam**
- Personally contacted **50+** journalists from various agencies to cover the event

Event Organizer at Mood Indigo | IIT Bombay *(December'18)*
Asia's Largest Cultural Fest | Footfall: 143,000+ | Events: 230+
- Helped carry out the event of India's **first** and only comedian illusionist **Karan Chauhan** during the fest
- Actively handled a large crowd duing various other events along with **15+** fellow organizers

Technical Skills

- **Programming :** C++, MATLAB, GNU Octave, Python, HTML, CSS
- **Software :** Git, AutoCAD, SolidWorks, MS Office, LaTeX, Gnuplot, EAGLE, Xcircuit, Ngspice
- **Miscellaneous :** PyTorch, Julia, OpenCV, Django, Arduino, Windows, Ubuntu

Relevant Courses Undertaken

Electrical Engineering : Signals and Systems*, Analog Circuits and Lab*, Electrical Machines and Power Electronics*, Digital Systems*, Digital Circuits Lab*,Machines Lab*,Electronic Devices and Circuits, Electronic Devices Lab, Network Theory, Data Analysis and Interpretation, Machines and Digital Electronics
Mathematics : Calculus, Linear Algebra, Differential Equations - I and II, Complex Analysis
Computer Science : Computer Programming and Utilization, Logic in CS, Data Structures and Algorithms*
Physics : Quantum Physics and its Applications, Basics of Electricity and Magnetism
Miscellaneous : Quantum Chemistry, Economics, Engineering Drawing, Biology, Basic Machine Learning*

**to be completed by Fall 2020*

Extracurricular Activities

- **Class Representative** of the students from various departments and years of study taking the course **CS228 : Logic in CS**, as a minor; scheduled tutorials and quizzes *(2019)*
- Successfully completed an year-long training in **Lawn Tennis** under **National Sports Organization** *(2018)*
- Contacted **100+** alumni out of a total of **12000+** as a part of Phonathon, a telephonic marathon for contacting alumni under Student Alumni Relations Cell (SARC), IIT Bombay *(2019)*
- Volunteered in **IIT Bombay Half Marathon** organized by IIT Bombay Sports *(2018)*
- Participated in the **Web Development** Bootcamp in Technical Summer School, IIT Bombay *(2019)*
- Volunteered in organizing the **Guinness World Record** event that happened at IIT Bombay where **5700** students gathered to light solar lamps together under the **Solar Urja Lamp** (SoUL) project *(2018)*
- Attended the **Vijyoshi Science Camp** organized by the **Indian Institute of Science** (IISc) *(2017)*