ANSH KHURANA
Computer Science & Engineering
Indian Institute of Technology Bombay

170050035
UG Second Year
Male
DOB: 15/07/1999

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2019	9.66
Intermediate/+2	CBSE	Delhi Public School, R.K. Puram	2017	97.60
Matriculation	CBSE	Delhi Public School, R.K. Puram	2015	10.00

Pursuing **Honors** in Computer Science and Engineering and **Minor** in Applied Statistics and Informatics

Scholastic Achievements

- Secured **All India Rank 39** in **JEE Advanced** among 220,000 aspirants *(2017)*
- Achieved **99.99 percentile** in **JEE Main** among 1.2 million aspirants *(2017)*
- Currently ranked among the **top 10** out of 122 students in the Computer Science and Engineering Dept. *(2018)*
- Awarded **AP grade** (awarded to **top 1%** out of 933 students) in Physical Chemistry course *(2017)*
- Secured perfect **10.0/10.0** grade points in all courses in the autumn semester of the freshman year *(2017)*
- Scored **438/450** in **BITSAT** (Birla Institute of Technology and Science Aptitude Test) *(2017)*

Scholarships and Recognition

- Recipient of Annual Scholarship under **National Talent Search Examination** scheme (NTSE) *(2015)*
- Recipient of the prestigious **Kishore Vaigyanik Protsahan Yojana** (KVPY) Fellowship *(2016)*
- Amongst the **top 1%** students across the nation in **NSEC** (National Standard Examination in Chemistry) and was selected to appear for the **INChO** (Indian National Chemistry Olympiad) *(2016)*
- Amongst the **top 1%** students across the state in **NSEP** (National Standard Examination in Physics) *(2017)*
- Received **Certificate of Merit** from **CBSE** for outstanding academic performance and for being among the **top 0.1 percent** candidates in the All India Senior School Certification Examination in Chemistry *(2017)*

Key Projects

Virtual Reader *Summer 2018*
Institute Technical Summer Project *IIT Bombay*

- Designed a headgear with a **Raspberry Pi 3** and a camera capable of newspaper OCR and image classification
- Preprocessed images using C++ **OpenCV** library with **Canny Edge Detection** and **Adaptive thresholding** (Wolf-Jolion method) for cropping the image to match document edges and adjusting contrast before OCR
- Solved the image classification problem using a Convolutional Neural Network (**CNN**) with **TensorFlow**
- Implemented wireless communication between the RPi and Android device via **socket programming**
- Built a companion **Android app** deployed with **Tesseract OCR** engine and a text-to-speech synthesizer

Secure Personal Cloud *Autumn 2018*
Guide: Prof. Soumen Chakrabarti | Course Project *IIT Bombay*

- Implemented a **Zero-Knowledge** based secure cloud using RSA, ARC4, Blowfish and AES-CBC block level file encryption at the client side to ensure secure end-to-end encrytion while uploading and sharing files
- Developed a server with **Django** web framework at the back-end integrated with an **SQL** database for managing multiple clients, deadlocks and synchronizing shared data among all the users
- Programmed a Linux client and a daemon which can observe a directory and sync user data actively
- Developed a **mobile-friendly** web-app using JavaScript for decrypting and rendering users' encrypted files

Moving Object Detection in Aerial Video *Ongoing*
Project Internship *ideaForge Technology Pvt. Ltd., Mumbai*

- Implementing moving object detection via the **Background Motion Subtraction** approach
- Using **Liu's optical flow** method to estimate dense motion field between neighbouring two frames in the video clip
- Performing a particle advection procedure to extract dense particle trajectories and **RSVD analysis** to estimate the dominant motion component
- Separating foreground particles by utilizing an adaptive thresholding method on the length of object motion vectors

Malarial Parasite Detection *Ongoing*
Guide: Prof. Suyash P. Awate | Winter Project *IIT Bombay*

- Programming a python script for detecting Plasmodium malariae in digital images of thin blood films
- Trained a **random forest** classifier to perform pixel-wise classification through a moving patch
- Utilizing StainTools for normalizing brightness and stain colours of images to improve model accuracy

CorRacketify *Spring 2018*
Guide: Prof. Amitabha Sanyal | Course Project *IIT Bombay*

- Built an efficient spell check and correction software on a dynamic dictionary in **Racket**
- Integrated spell check using **Bloom filter**, a probabilistic data structure backed with 13 instances of **MurmurHash3** hash function to minimize false positives and optimize space requirements
- Implemented the **Burkhard-Keller Tree** data structure to support the dynamic dictionary based on the **Damerau-Levenshtein** edit distance metric to predict suitable alternatives for incorrectly spelled words
- The project involved a **multi-paradigm** approach including functional, imperative and OOP paradigms

Line Follower Bot *Spring 2018*
Electronics and Robotics Club *STAB, IIT Bombay*

- Built a fully autonomous line follower bot that could sense contrasting colors using IR LEDs and follow the path
- Implemented a **proportional-integral-derivative** controller on an **Arduino** board for automated navigation

Other Projects

- **SAT Solver :** Programmed a SAT solver in Racket using the Davis-Putnam-Logemann-Loveland **(DPLL)** procedure to check the satisfiability of a boolean proposition in its conjunctive normal form *(Course Project)*
- **Regex Matcher :** Implemented a minimalistic version of egrep in Racket by parsing the regular expression into a **trie** and building a **DFA** graph to check whether a string matches the regular expression *(Course Project)*
- **Handwritten Digit Classification :** Trained a 3 layer Neural Network in MATLAB using a self-implemented **backpropagation** algorithm to achieve **95.68%** accuracy on the MNIST handwritten digits dataset *(Self Project)*
- **Competitive Coding :** Successfully completed **Seasons of Code** by WnCC, implemented standard algorithms covering topics like Dynamic Programming and Graphs and participated in competitions over various online judges *(Web and Coding Club, IIT Bombay)*

Technical Skills

Programming	C++, C, Python, Bash, Java, Racket(PLT Scheme), SWI-Prolog, MySQL
Web Development	HTML5, CSS, Bootstrap, JavaScript, jQuery, AJAX, PHP, Django
Data Science	Tensorflow, Pytorch, OpenCV, MATLAB/GNU Octave, Scikit-learn, Matplotlib
Software	Android Studio, Git, LaTeX, SOLIDWORKS, AutoCAD, Inkscape, Arduino

Positions of Responsibility

Teaching Assistant *Jul 2018 - Nov 2018*
MA 105, Calculus

- Conducted help sessions for 150+ freshmen under the guidance of Professor Shripad Garge
- Covered and explained the concepts of Calculus, solved their doubts and helped them to prepare for examinations

Volunteer *Apr 2018 - Present*
Web and Coding Club, IIT Bombay

- Speaker for Scratch Day and Introduction to Git session conducted for students of the institute
- Responsible for managing the club's website and organizing events to develop the coding culture among freshmen

Tech Secretary *Aug 2018 - Dec 2018*
Hostel 8, IIT Bombay

- Responsible for conducting various workshops, talks and hands-on sessions for the students of the hostel
- Accountable for ensuring students' participation and performance in inter-hostel tech competitions

Extracurriculars

- Successfully completed a year long course under **NSO** in **Weightlifting** in the freshman year *(2018)*
- Engineered an app-controlled bot as a part of XLR8 competition organized by ERC (STAB, IIT Bombay) *(2017)*
- Built a binary clock with LEDs as a part of Arduino Hackathon organized by ERC (STAB, IIT Bombay) *(2017)*
- Completed Summer of Science in Data Structures and Algorithms under the Institute Technical Council *(2018)*
- Among the top performers of the TIMES NIE Think and Learn Challenge, qualified for city level finals *(2015)*
- Worked as an organizer for Mood Indigo and handled artists for multiple concerts (Pronites) *(2017)*