Lakshya Kumar Singh | **16D070064**
Electrical Engineering | **Dual Degree (B.Tech. + M.Tech.)**
Indian Institute of Technology, Bombay | **Gender: Male**
Specialization: Communication & Signal Processing | **DOB: 02-09-1997**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	
Intermediate	CBSE	Gurukul - The School	2015	92.20%
Matriculation	ICSE	St. Xavier's Sr. Sec. School	2013	92.80%

Scholastic Achievements

- Achieved **99.23** percentile among 1.1 million candidates in **JEE Main**
- Awarded certificate of merit in **National Mathematics Olympiad** contest
- Secured **10/10 grade** for excellent performance in Digital Circuits Lab
- Scored 95+ marks in Mathematics and Chemistry in twelfth standard
- Scored 95.96 percentile in quantitative reasoning of Problem Solving Assessment by CBSE
- Represented school in **Zonal Level GK Quiz Competition** in matriculation
- Awarded **Certificate of Appreciation** in Devinette event of technical festival in intermediate school

Positions of Responsibility

Teaching Assistant July '20 - Present

Introduction to Electrical And Electronics Circuits

- Managing logistics and assisting professor in ensuring smooth functioning of the course
- Responsible for assisting students in live sessions and conducting & evaluating exams for **250+ students**

Coordinator | Events Mar '17 - Dec '17

Annual science and technology festival of IIT Bombay

- Lead team of **10+ organizers** to ensure smooth execution of 3 days of festival
- Handled the responsibility of **publicity, planning** and proper **execution** of Ozone
- Volunteered in **Cyclothon** - pedal for heart **impacting** a crowd of **1000+ people**

Organizer | Hospitality July '16 - Dec '16

Annual science and technology festival of IIT Bombay

- Successfully executed **CURED** (Social initiative to aware the masses of causes & effects of diabetes)
- Catered to the accommodation and other hospitality needs of over **2600 participants** during the fest
- Managed the **booking of hotels** in Mumbai for various delegates

Vice Captain | Matriculation Apr '11 - Feb '12

Second highest position of responsibility for a student in school

- Selected by teachers on the basis of **excellent academic** record and **leadership** skills among 90 students
- Lead students within my house, ensuring high levels of enthusiasm & participation from all

Internship

Analyst | MeDAL Lab May '19 - June '19

Medical Image Analysis using Deep learning | Prof. Amit Sethi

- Implemented **data pre-processing** on CAMELYON'16 dataset for detection of metastasis in breast cancer
- Programmed **PyTorch** dataloader generating coordinates of small patches from gigapixel whole slide images
- Overhauled code to successfully produce manageable-dimension images from gigapixel images of dataset
- Created a program to analyze image patches and prepared trainable dataset using file handling

Research Experience

Anomalous Activity Detection | Masters Thesis July '20 - Present

Identification of abnormal human & object behaviour in video feed using deep learning | Prof. Rajbabu Velmurugan

- Built CNNs and dataloader for **MNIST** & **Fashion-MNIST** from scratch and achieved **99.23%** & **92.5%** accuracy
- Focusing on utilizing autoencoders & implementing **novel** approach of **Pose-Conditional Variational Auto Encoders**
- Aiming to implement **3D convolution** to add additional temporal information making the model **more versatile**

Advanced Encryption(AES) Robustness Testing | Research Project May '18 - June '18

Assessment of Advanced Encryption Standard algorithm for randomness in ciphers | Prof. V.R.Sule

- Created a C++ program to run AES-128 encryption algorithm in **Counter (CTR)** mode
- Analyzed randomness in AES cipher-texts using DieHarder battery of tests & achieved **98% success rate**

Key Course Projects

Deep Neural Style Transfer Aug ’19 - Nov ’19

Prof. Sunita Sarawagi | *Foundations of Machine Learning*

- Implemented **deep learning** based approach to portray an image in style of another image
- Utilized feature space provided by **19 layer VGG** network with 5 pooling layers
- Followed **novel approach** of implementing **regularization** on total loss from state of the art research

Color Image to Pencil Sketch Converter Aug ’19 - Nov ’19

Prof. Shabbir N. Merchant | *Image Processing*

- Generated pencil sketch equivalent for a given image using simple filters
- Obtained grey tones using **unsharp masking filter** & edges using canny edge detector technique
- Utilized the Color Dodge technique to change lightness level in image **achieving** more visually pleasing results

Facial Recognition System Jan ’19 - April ’19

Prof. Vikram Gadre | *Digital Signal Processing*

- **Developed** a facial recognition system in MATLAB capable of **learning faces** and **identifying people**
- Utilized method of **eigen-faces** to find covariance matrix & performed recognition by comparative analysis
- Achieved an accuracy of **92%** in correct identification

Smart Power Socket Jan ’ 19 - Apr ’ 19

Prof. Joseph John | *Electronic Design Lab*

- Designed a **power outlet** capable of **measuring voltage(V) & current(A)** of the plugged-in device
- **Programmed** and connected **arduino** to display values of current & voltage in **real time** on pc
- Achieved **accurate measurements** in conditions of upsurge and plummeting of voltage supply

Game of Reaction Jan ’18 - Apr ’18

Prof. Madhav P. Desai | *Digital Systems Lab*

- Developed a **reaction time measuring** game calculating response time in pressing button to a **blinking LED**
- Programmed **Finite State Machine** using **VHDL** and displayed cumulative score for 8 rounds on LED screen
- Implemented multi-client execution of commands to remove, return, store and insert key values

Pipelined Multicycle Risc Microprocessor Design Oct ’18 - Nov ’18

Prof. Virendra Singh | *Microprocessors*

- Designed and Implemented a six-stage Pipelined RISC processor and a Multicycle RISC processor in VHDL
- Implemented Data **Forwarding** and **Branch Control** to prevent structural and **control hazards**

Digital Filter Design Jan ’19 - April ’19

Prof. Vikram Gadre | *Digital Signal Processing*

- Designed **IIR Bandpass** & **Bandstop** filters from analog **Butterworth** & **Chebyschev** filters by **bilinear transform**
- Used **Kaiser Window** in MATLAB for designing FIR filters

Relevant Courses and Skills

- Advanced Machine Learning*, Introduction to Machine Learning, Foundations of Machine Learning, Image Processing, Topics in Cryptology, Digital Signal Processing, Signals and Systems **ongoing*
- **Mathematics**: Probability and random processes, Data interpretation and Analysis, Linear Algebra, Differential Equations, Complex Analysis
- **Languages and Packages**: C++, **Python**, **Pytorch**, Numpy, Pandas, C++ STL, MATLAB, EAGLE

Other Interests and Extra-curricular activity

- Performed as **Drummer** during Republic day(2018) practice sessions of NCC at IIT Bombay
- Completed **two** 10-days certified **Annual Training Camp** under NCC at IIT Bombay
- Awarded **certificate** of successful completion for **B-Level** program conducted by NCC at IIT Bombay
- Awarded **Gold** & **Silver** medals in inter-house **Basketball** & **Kho-Kho** competitions in matriculation