Shaan ul Haque

Electrical Engineering | Indian Institute of Technology, Bombay

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Examination	University	Year	CPI/%
Graduation	IIT Bombay	2022	9.43
Intermediate/+2	Delhi Public School, Ranchi	2018	92.7
Matriculation	Delhi Public School, Ranchi	2016	10

SCHOLASTIC ACHIEVEMENTS

- Pursuing a Minor Degree in **Computer Science and Engineering** [Present]
- Awarded **Undergraduate Research Award-01** (URA-01) for research on **RADAR Imaging** ['20]
- Secured **All India Rank 111** in JEE Advanced among selected 172,000 aspirants ['18]
- Bagged a rank of **481** in JEE Mains among 1.2 million students across the whole country ['18]
- Stood among the **state wise top 1%** in National Standard Examination in Chemistry (NSEC) ['18]
- Recipient of fellowship by the **Indian Institute Of Science (IISc), Banglore** for securing All India Rank of 847 in **Kishore Vagyanik Protsahan Yojana (KVPY)** ['17]
- Cleared **National Talent Search Examination (NTSE)**, standing among top 1000 students from the whole country and receiving scholarship from Government of India ['16]

Research Experience

- **Micro-Doppler Effects in RADAR** [May '20 - Present]

  Prof. V.M. Gadre | Research
  - Studied the effects of Micro-Doppler in RADAR Imaging and **Inverse-Radon Transform** based analysis
  - Devised an algorithm by employing **Bessel function** of first kind to express the demodulated signal and use the expression to filter the signal into its different Micro-Doppler components
  - Explored the accuracy of the proposed algorithm as the number of signal samples are reduced and came up with a mathematical formulation on what should be the reduction limit
  - Analyzed the use of **L-Statistics** in the removal of Micro-Doppler components for the estimation of **Body-Doppler** parameters and proposed a different approach to assess the same

Technical Projects

- **Autonomous Security Bot** [July '19]

  Institute Technical Summer Project (ITSP)
  - **Developed an autonomous security bot** installed with **Raspberry-Pi** as a microprocessor which could be used as a substitute for security personnel in an industrial or residential complex
  - Successfully employed **Wavefront Mapping Algorithm** to map the area, avoid any obstacle and find the shortest path possible to take the authorized person to his destination
  - Implemented the idea of **Face Recognition** through **OpenCV** to identify if a person is stranger or already known in the database of the bot and then take actions as required

- **Image Inpainting via Sparse Representation** [July '20]

  Self-Learning Project
  - Explored relevant papers on signal recovery via **Orthogonal Pursuit Matching** and **K-SVD** algorithm to design a **Dictionary** for sparse representation of a signal
  - Implemented **lasso regression** to obtain a sparse representation of an image and use it to hide the target patch in it, such that the texture and style of the patch matches with the background

- **Convolutional Neural Networks** [July '20]

  Self-Learning | Coursera
  - Implemented **YOLO algorithm** along with **non-max suppression** to detect cars in an image
  - Applied **Neural Style transfer** to create a new image with style and content taken from two images

- **Natural Language Processing with Classification and Vectors Spaces** [July '20]
  Self-Learning | Coursera
  - Performed **sentiment analysis** of tweets using logistic regression and naive Bayes
  - Learnt the notion of **vector space models** to vectorize words and use it for language translation

- **Prototype of digital display on LED matrix** [April '19]
  Prof. M.B. Patil | Introduction to Electronics (Course Project)
  - **Designed a circuit** to light up specific grid points on the matrix to generate a smiley face on it
  - Employed **555 Timer** with a potentiometer and applied the concept of **persistence of vision of human eye** to show the effect of resistance in timer on the voltage supplied to matrix
  - Made use of **decoders** and various **logic gates (74xx series)** to create the logic circuit which alternatively changes the voltage provided to a row based on the input voltage to the circuit

- **Immersive Pedagogical Practices and Twinning Activities** [Oct '19]
  Prof. V.M. Gadre | Network Theory (Course Project)
  - Explored how the application of **moving average filters** helps in noise reduction
  - Demonstrated the application of **Central Limit Theorem** for **Digital Noise Generation**

TECHNICAL SKILLS

- **Programming Languages and Software** - C++, Python, MATLAB, Keras, NumPy, HTML, GNUPlot, LaTeX, SolidWorks, NgSpice, Microsoft Packages, Quartus, Eagle, AutoCAD, XCircuit

KEY COURSES

- **Electrical engineering-** Digital Signal Processing*, Communication Systems*, Electromagnetic Waves*, Signal and Systems, Digital Systems, Analog Circuits, Network theory, Electronic Devices
- **Mathematics and Statistics-** Probability and Random Processes*, Data Analysis and Interpretation, Complex Analysis, Calculus, Linear Algebra, Ordinary Differential equations, Partial differential equations
- **Computer Science-** Design and Analysis of Algorithms*, Fundamentals of Digital Image Processing*, Machine Learning for Remote Sensing-1, Data Structure and Algorithm, Computer Programming and Utilization

(*To be completed by Nov '20)

POSITIONS OF RESPONSIBILITY

- **Activity Associate | Green Campus, National Service Scheme, IITB** [Apr '19 - Apr '20]
  NSS is the largest student volunteer body in IITB, serving 1 Million+ people nationwide
  - **Worked in a team of 7 members** and **mentored 100+ volunteers** for the rejuvenation and preservation of flora and fauna of the institute
  - **Content Editor** for an online forum **Prakriti** to discuss and create awareness about various **ongoing environment related issues** throughout the world
  - **Marketing coordinator at Flare-Igniting Social Conscience** a pan-India socio-art competition which targeted over 25000+ schools and colleges to increase nature awareness among youth
  - Maintained **NSS Nursery** and sensitized the students about the environment by donating saplings, carrying out sapling collection drives and plantation drives in hostels
  - Played an integral role in the coverage of **Invisible Humans of IITB**, a Facebook series

EXTRA CURRICULAR ACTIVITIES

- Participated in **Van Mahotsav 2019-Tree Plantation Drive** organised by IIT Bombay
- Completed **80 hours** of social work under the **National Service Scheme, IIT Bombay**
- Awarded **silver medal** for achieving 2nd rank in shot put in **General Championship (GC)**, IIT Bombay
- Represented school in a science quiz, **Jharkhand State Level**, organised by **CSIR** in Jamshedpur
- Won First Prize in group singing in **Pandit Uma Dutt Sharma Sangeet Mahotsav, Jammu**
- Participated in **painting competition** conducted by **Jammu and Kashmir pollution board**
- Fluent in four languages - **English, Hindi, Urdu, Arabic**