Saksham Khandelwal

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Education

Indian Institute Of Technology Bombay, Mumbai, India — July 2017 - May 2021
Bachelor of Technology in Electrical Engineering
GPA : 8.6

Internships

Industrial Applications of Deep Learning — *October '18 - present*
Prof. Asim Tewari |National Center For Aerospace Innovation and Research, IIT Bombay

- Using **PyTorch** to make deep neural networks for analyzing images
- Used **sequential Monte Carlo methods** and **backpropagation** to train neural networks and optimised the train time of **reinforced learning** through **CUDA**
- Applying **convnets and recurrent nets** over industrial data for optimizing manufacturing

Key Projects Undertaken

Chord Extractor — *Machine Learning, Signal Processing* — *Aug '18 - present*
India Innovation Contest Design Challenge '18

- Aim to build a device to extract **chords** and **beats** from a track playing in vicinity
- Analyzed various convex optimization techniques and chose **Stochastic Gradient Descent** over **Pitch Class Profile** vector obtained through optimized routines
- Used mini batches optimiser in **SGD** getting a **95% train** and **85% test** accuracy
- The contest is in association with **Texas Instruments** and **Govt. of India**

Competitive Coding — *Reading Project* — *Summer '18*
Web and Coding Club, IIT Bombay

- Studied the essential **Data Structures and Algorithms** and their underlying theory
- Researched different **Programming Paradigms** and their uses in various problems
- Practically applied all the concepts in **Competitive Coding** on various online judges
- Covered topics like Dynamic Programming, Graph Algorithms, BackTracking and more

Stopwatch — *Digital Logic Design* — *Spring '18*
Guide : Prof. M.B. Patil |Course Project

- Prepared a stopwatch using **7490 decade counters**, and seven segment displays.
- Used the 555 timer as an **astable multivibrator** by chosing appropriate parameters
- Employed a **7447 decoder** to provide input to the four seven segment displays used

Heart Beat Monitor — *Analog Circuit Design* — *Summer '18*
Prof. Siddharth Tallur |Course Project

- Implemented reflective **Photoplethysmography** to measure the heart beat
- Utilised IR LED-phototransistor pair **TCRT5000** to detect the PPG signal
- Successfully displayed the heart beat signal on **DSO** in suitable frequency band

Maze Runner and Line Follower Bot — *Robotics, Control Theory* — *Spring '17*
Electronics and Robotics Club, IIT Bombay

- Analysed and mapped the maze using **distance sensors** and stored the moves of the bot
- Implemented **optimal algorithms** to obtain the shortest path to solve the maze
- Employed **Proportional Integral Derivative (PID)** technique from control theory to ensure the smooth running of the bot

Achievements

- Secured All India Rank **186** in **JEE advanced** among 0.2 million Aspirants {*'17*}
- Achieved an **All India Rank 644** in **JEE Mains** among 1.2 million Aspirants {*'17*}
- Bagged Gold medal for being in the **Top 35** student in **INChO** (Chemistry Olympiad) {*'16*}
- Among top 1% in **NSEP** and **NSEA** and selected for **INAO** (Astronomy Olympiad) {*'16*}
- Recipient of the **KVPY** fellowship by the Govt. of India securing **All India Rank 173** {*'15*}
- Awarded the **NTSE** Scholarship by NCERT among **1000** students across India {*'15*}
- Presented with a gold certificate for securing **AIR 44** in **Technothlon** by IIT Guwahati {*'14*}

Technical Skills

- **Programming:** MATLAB, JavaScript, C/C++, Python, Java, Raspberry Pi, Arduino
- **Libraries:** PyTorch, TensorFlow, Scipy, Theano, MLpack, SciKitlearn, OpenCV
- **Software:** GNU Octave, Git, Github, LaTeX, GNUplot, Jupyter, Eagle, SPICE, AutoCAD

Positions Of Responsibility

Joint Secretary — Electrical Department Council *Apr '18 - Present*
Department of Electrical Engineering, IIT Bombay

- Conducted an introduction of the discipline to the incoming batch of **140 students**
- Planned events including Department **Sports Day** and **Cultural Day** and ideated on treks and trips to increase the bonding of the students of electrical engineering discipline

Coordinator, Media and Public Relations *Apr '18 - Present*
Student Alumni Relations Cell (SARC), IIT Bombay

- Part of the 8 member media and public relations team of **IIT Bombay's SARC**
- Articulated **monthly newsletters** for the alumni and wrote **2 blogs** for the cell

Coordinator, Informals — Mood Indigo, IIT Bombay *Apr '18 - Present*

- Incentivised participation for flagship competitions by facilitation of opportunities for winners
- Conceptualizing integrations to facilitate interactive **BTL activations** for various sponsors
- Spearheaded negotiations with artists and professionals to curate unique events in the festival

Key Courses Undertaken

- **Electrical:** Electronic Devices & Circuits, Introduction to Electrical Systems, Network Theory, Signals & Systems**, Digital Systems**, Analog Systems**, Electrical Machines & Power Electronics**
- **Mathematics and Statistics:** Calculus, Linear Algebra, Differential Equtions 1 & 2, Complex Analysis, Data Interpretation & Analysis
- **Other Courses:** Quantum Physics & Applications, Physical Chemistry, Economics*, Computer Programming & Utilization, Biology, Basis of Electricity & Magnetism
- **Online Courses:** Data Structes and Algorithms by Princeton, Machine Learning by Andrew NG, Computer Vision(CS231N) by Stanford, Do Your Venture by IIMBx

*(** to be completed by May '19)*
(to be completed by Nov '18)*

Extra Curricular Activies

- Attended the **Vijyoshi Camp** which serves as a forum for interaction between bright young students and leading researchers in the fields of Science and Mathematics
- Gave a performance in the convocation hall in front an audience of **2000** as a keyboardist during **Surbahaar**, the flagship event of IIT Bombay's Music Club **Symphony**
- Underwent one year long training in **Keyboard** and its theory under NSO