Mayank Shrivastava

Final Year Undergraduate
Major in Electrical Engineering with Minor in Machine Learning and Cognitive Sciences

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2016 - Present	B.Tech	Indian Institute of Technology, Kanpur	9.8*/10
2016	CBSE (XII)	Delhi Public School Ghaziabad	97.2%
2014	CBSE (X)	R.A.N. Public School	10/10

Key Scholastic Achievements

- Secured **All India Rank 1239** in JEE Advanced 2016 and **All India Rank 258** in JEE Mains 2016
- Awarded prestigious **Anita & Santosh Mehra Foundation Scholarship** for securing highest CGPA in EE department.
- Awarded **A*** for exceptional performance in **eight courses** (Machine Learning,Calculus, Complex Analysis, Electrodynamics)
- Awarded **Students Undergraduate Research and Graduate Excellence 2018** by IIT Kanpur
- Awarded **Academic Excellence Award** awarded to top 10 % for excellent academic performance by IIT Kanpur
- Awarded the **KVPY fellowship (2014-15 and 2015-16)** by the Department of Science and Technology, India
- Secured **State Rank 6 in UPSEE 2016** and **0.1% Merit Certificate** in Physics, CBSE 2016

Professional Experience

- **Data Augmentation using Generative Modelling** (*May, 2019 - July, 2019*)
  Summer Internship in Samsung Electronics, South Korea
  - Implemented a Conditional Variational Auto encoder (CVAE) for speech data augmentation by converting speakers.
  - Generated voice from speakers of existing DB to different speakers by VAE, and utilized them as an additional training DB.
  - Nearly doubled the size of training dataset by augmentation.
  - Incorporated the VAE model with Automatic Speech Recognition pipeline.
  - Increased the accuracy of baseline model trained from limited DB upto 90 percent (2 percent increase).
- **Worldquant :** ***Research Consultant*** (*Jan, 2019 - April, 2019*)
  - Studied the fundamentals of finance, trading basics and attended webinars on developing trading algorithms
  - Developed more than 90 trading algorithm using with more than 50 in production based on trading basics
  - Simulated more than 100 alphas exploring the relation between different datasets and the market trend

Key Projects

- **Towards Meaningful Physics from Generative Models** (*August 2019 - November 2019*)
  Undergraduate Course Project, Dr. Vipul Arora
  - Generated lattice samples for LQCD data using Hybrid Monte Carlo techniques.
  - Implemented various VAE architecture to learn a generative model in Pytorch
  - Implemented H/G VAE model to produce a separation in the latent space based on KT transition temperature.
- **State of Art in Variational Autoencoders** (*August 2018 - November 2018*)
  Course Project for Introduction for Machine Learning, Dr. Piyush Rai
  - Implemented recent **VAEs research papers in PyTorch** and compared them to established baselines.
  - Explored the different metrics for disentanglements in VAEs by comparing the quantitative and qualitative results obtained.
- **Amortized Variational Inference** (*January 2019 - April 2019*)
  Course Project for Probabilistic Inference, Dr. Piyush Rai
  - Implemented semi-amortized variational inference to improve accuracy of standard variational autoencoders.
  - Extended the approach to create a tighter lower bound which achieved results comparable to the current state of the art.
- **Visual Recognition** (*Jan, 2019 - April, 2019*)
  Course Project for CS783A under Dr. Vinay P. Namboodri, Assistant Professor, IIT Kanpur
  - Performed **unsupervised muti-object tracking** using techniques such as domain adaptation, **YOLO+SORT**.
  - Implemented deep image matching using **DELF** and fine-grained classification using **Bi-linear CNN**.

Projects

- **Optimised Pre-Processing for Discrimination Prevention** (*May, 2018 - July, 2018*)
  Research Track Exploration Project under Dr. Siddharth Garg, Assistant Professor, NYU Tandon School of Engineering
  - Investigated the various deep learning methods used for Discrimination Control in Supervised Learning Algorithms
  - Explored Mutual Information Estimation algorithms using Neural Networks and privacy using Information minimisation
  - Implemented a framework to learn Privacy Protected Encodings with utility preservation using Adversarial Training
- **mmWave Wireless Sensor Network** (*May, 2018 - July, 2018*)
  SURGE Program under Dr. Aditya K. Jagannatham, Associate Professor, IIT Kanpur
  - Worked on Optimal Transmit Precoding for Distributed Estimation in Coherent Wireless Sensor Network
  - Devised a system model for MISO transmission in mmWave incorporating transmitter preprocessing over high fading channel

  - Proposed an optimal precoder for beamforming to minimise noise variance and demonstrated considerable improvement
- **Humanoid Robot :** Science and Technology Council, IIT Kanpur (*2016 - 2018*)
  - Worked on SVL using mic array and implemented FFT, GCC-PHAT algorithms for Sound Localisation through Scipy
  - Developed our own multi-channel audio receiving unit using Arduino and Audio Amplifier circuitry using Op-Amps

Internships

- **Sensor Mobile Interface** (*Kritsnam Winter '17 Internship - Dec 2017*)
  - Established communication through Audio Jack of mobile using FSK(Frequency-Shift Keying) and microcontroller
  - Using Arduino, implemented to-and-fro data transfer from USB port to sensor and read received data on an Android App
- **Development Intern at NYC Office** (*NYC Office '18 Internship May, 2018-July, 2018*)
  - Wrote a script to create migration file from different database states during consecutive commits using Migra library
  - Documented API endpoints using Postman and corrected location headers in email verification

Relevant Courses Undertaken

Topics in Probabilistic Modelling and Inference	Visual Recogniton
Machine Learning for Signal Processing (∗)	Information Theory
Digital Signal Processing(*o*)	Convex Optimisation(*o*)
Introduction to Machine Learning	Data Structure and Algorithms
Signals and Systems	Probability and Statistics
Econometrics	Linear Algebra
Communication Systems(∗)	Foundations of Cognitive Science

(*o*) : Ongoing (∗) : Outstanding performance

Positions of Responsibility

- **Secretary, Robotics Club** (*2017 - 18*)
  - Conducted workshops on Arduino and other hardware and Assisted in the organisation of Institute wide lectures on Robotics
- **Academic Mentor, Calculus and Linear Algebra, Counselling Service** (*2017 - 18*)
  - Coordinated with the Counselling Service, conducted Lectures and Remedials for students for the course MTH101-102

Technical Skills

- **Programming Languages :** Python, C++, Java,C,LaTeX
- **Software,Libraries and Utilities :** PyTorch, Tensorflow, Octave, Pandas, OpenCV, Android Studio, Git, Phabricator

Extracurriculars

- Part of the team that won Psuedorandom (Science Coffee House Event) in Takneek 2017 (intra-college competition)
- Participated in Robobasket, an IMU-based robot making competition in Takneek 2016