

Mayank Mishra

Electrical Engineering (Power and Automation)
Senior Undergraduate
Indian Institute of Technology, Delhi

<https://mayank31398.github.io/>
Email: mayank31398@gmail.com
GitHub: <https://github.com/mayank31398>
LinkedIn: <https://www.linkedin.com/in/mayank-mishra-2118a7138/>



ACADEMIC DETAILS

Year	Degree	Institute	GPA
2016-2020	B.Tech, Electrical Engineering (Power & Automation)	Indian Institute of Technology, Delhi	8.302/10
2016	Higher Secondary School (CBSE)	Delhi Public School	94%
2013	High School (CBSE)	Delhi Public School	10/10

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 921** in JEE Advance 2016.
- Secured **All India Rank 682** in JEE Mains 2016.

PUBLICATIONS

- Adversarial Approximate Inference for Speech to Electroglottograph Conversion** *Prof. Prathosh AP, Dept. of EE, IIT Delhi*
 - Optimized the **Speech to Laryngograph encoder** using **adversarial training** for the network.
 - Created a **cosine based loss function for enforcing amplitude invariance** between ground truth and network output.
 - Used a **variational inference approach** for learning optimal representations for the speech signal.
 - Utilized **continuous wavelet transforms using Ricker wavelets** for robust peak picking.

Submitted to *IEEE Transactions on Audio, Speech and Language Processing* - Manuscript at <https://arxiv.org/abs/1903.12248>.

PROJECTS

- Adversarial attack and defense (Apr, 2019 - May, 2019)** *Prof. Prathosh AP, Dept. of EE, IIT Delhi*
 - Trained classifiers on Fashion MNIST and SVHN datasets.
 - Implemented different algorithms for generating **adversarial examples** on these classifiers.
 - Used different state-of-the-art methods to increase robustness of these neural networks against adversarial examples like
- Real-time Visual Respiration Rate Estimation with Dynamic Scene Adaptation (Apr, 2019 - May, 2019)** *Prof. Prathosh AP, Dept. of EE, IIT Delhi*
 - Used **Computer Vision** techniques to estimate the respiration rate of an individual using footage from a camera.
 - Optimized the runtime** of the algorithm for real-time detection of pneumonia in a person.
 - Deployed the optimized software on **Raspberry Pi** board.
- Lecture Summarization using Deep Learning (Feb, 2019 - Mar, 2019)** *Prof. Prathosh AP, Dept. of EE, IIT Delhi*
 - Trained **Convolutional LSTMs** for summarizing NPTEL video lectures.
 - Used **Computer Vision** techniques to find edge maps, optical flows and difference of consecutive frames of the videos.
 - Trained the model using the original RGB frames concatenated with difference, edge maps and optical flows of the video which resulted in improved performance over a model trained with raw video.

- **Deep Learning Bias Correction (Oct, 2018 - Nov, 2018)** *Prof. Prathosh AP, Dept. of EE, IIT Delhi*
 - Improved the generalization of deep learning models for better metrics across datasets.
 - Trained an **Auxilliary Classifier GAN (ACGAN)** to generate images conditionally from the MNIST dataset.
 - Used the original MNIST images and the conditionally generated images from the ACGAN to train a classifier.
 - Tested this classifier on a hand-written digits dataset collected in classroom to achieve 98% accuracy.
- **Touch-Point Prediction using Deep Learning (May, 2018 - Dec, 2018)** *Prof. Brejesh Lall, Dept. of EE, IIT Delhi*
 - Worked on improving touch-screen latency for the **SAMSUNG Flip** device without explicitly changing the hardware.
 - Trained and benchmarked Fully-Connected, Recurrent Neural Networks (RNNs) and Long-Short Term Memory (LSTM) networks and analyzed the performance of these algorithms.
 - Implemented a software to prove that touch point prediction using the said algorithms worked better than simple extrapolation.
- **Braille Tutoring Application (Jan, 2018 - May, 2018)** *Prof. M. Balakrishnan, Dept. of CS, IIT Delhi*
 - Implemented tutorials and games using Python for visually challenged students to learn Braille.
 - Created Linux based secondary software to add customized exercises or games in the application.
 - Worked on providing tactile output, sound and an external **Arduino** based serial LCD display through the RBD.
 - Deployed the application on a **Beaglebone** based **Refreshable Braille Device**.
 - Received appreciation in Open House 2018 at IIT Delhi for the same.
- **Identifying the Diabetic Neuropathic Patients using Machine Learning (Nov, 2017 - Dec, 2017)** *Prof. Tapan Kumar Gandhi, Dept. of EE, IIT Delhi*
 - Trained **variational inference** based neural networks for the identification of Diabetic Neuropathic patients.
 - Used implicit distributionns instead of tractable ones as they offer better generalization metrics.
 - Used **adversarial methods** to approximate the log ratio density of the approximate and the true priors.
 - Implemented a **WPF software** in C# to record data using an **Arduino** based pressure mat.
- **Crystal Ball Interface to View 3D Objects (Nov, 2017 - Dec, 2017)** *Prof. M. Subodh Kumar, Dept. of CS, IIT Delhi*
 - Implemented a crystal ball interface using **OpenGL** in C++ for viewing 3D objects saved in .obj file format.

COURSES UNDERTAKEN

Machine Learning, Advanced Machine Learning, Signals and Systems, Control Engineering, Digital Electronics, Analog Electronics, Data Structures, Computer Architecture, Embedded Systems Design Project, Probability and Stochastic Processes, Linear Algebra and Differential Equations, Calculus, Micro Economics

TECHNICAL SKILLS

Python, Tensorflow, PyTorch, Keras, sklearn, MATLAB, Simulink, C#, Java, C++, Verilog, Git, Linux, \LaTeX , Visual Studio, Android Studio, Eclipse, Vivado, Unreal Engine 4, Autodesk 3ds Max

EXTRA-CURRICULAR

- **Institute Academic Mentor, Linear Algebra and Differential Equations (Jan, 2018 - May, 2018)**
 - Selected as an Academic Mentor for Linear ALgebra and Differential Equations on the basis of exceptional academic performance.
 - Held weekly tutorial sessions for academically weak students, and counseled them to improve performance.