Name - Mayank Kumar Singh

Homepage - https://mayank-git-hub.github.io
GitHub - https://github.com/mayank-git-hub

My Vision is to be able to unravel the mysteries of how humans are able to solve complex tasks and recreate this intelligence using the existing technologies we have.

Scholastic Achievements

- Secured All India Rank of **108 in JEE Advance 2016 in General Category** among 198,228 candidates
- Secured All India Rank of **1484 in JEE Mains 2016 in General Category** among 1,207,058 candidates
- Recipient of prestigious **KVPY fellowship with All India Rank of 363 (/60,000)**

Projects

Research Projects

- **Deep Audio Visual Source Separation** - *Guide Prof. Rajbabu Velmurugan and Naoya Takahashi, SONY Corp.*
  - Enhanced ConvTasNet to work with lip video features on the AVSpeech dataset
  - Achieved State of the Art Results on it, beating Google and Oxford's implementation
- **Segmentation of Medical Image** - *Guide Prof. Amit Sethi*
  - Applied **NN**, **SSNMF**, **NMF**, **SVM** algorithms to do pixel-level segmentation on Hyperspectral Images
  - Implemented the initial steps for detecting cancer by segmenting epithelium, stromal and goblet cells.
- **Unsupervised Initialization of Deep Learning models**- *Guide Prof. Amit Sethi*
  - Aim was to address scarce availability of reliable data and using less data to reach state-of-the-art results.
  - Used **weakly supervised methods**, **Siamese triplet networks** on state-of-the-art ImageNet models
- **ISBI 2018: Diabetic Retinopathy, Segmentation of lesions**- *Guide Prof. Amit Sethi*
  - Aim - Segmentation and classification of the lesions in patients of Diabetic Retinopathy
  - Applied state-of-the-art algorithm **fusion-net** for segmentation and **Zoom-In Net** for classification.
- **Graph Convolution for Text Recognition** - *Guide Prof. Shubhasis Chaudhari*
  - Implemented the CRAFT text-detection training model based on weak supervision https://github.com/autonise/craft-remade
  - Working on incorporating graph convolution and language model to create end-to-end text detection and recognition
- **Whole Slide Image Stitching using DC motor video** - *Guide Prof. Amit Sethi*

Self Projects

- **Kaggle Competition: *iMaterialist Challenge (Furniture) at FGVC5***
  - An orthodox classification competition with **highly skewed class size** and high intra class and low inter class variation.
  - Trained **ResNet-152**, **NASNet** model using extensive class specific data augmentation.
  - Got a **rank of 30** under the team name 'Artificial incoherence'
- **Text Detection and Recognition on Documents**
  - Implemented Pixel-Link for Text Detection on https://github.com/mayank-git-hub/Text-Recognition
  - Achieved an F1-score of 74% which is **6% more than Google's on our custom dataset** consisting of passports, aadhar cards, driving license cards and other documents which we annotated using our own annotation tool built using javascript.

Internships

- **Research Internship, SONY Japan** : *May - July 2019*
  - Worked with Audio Technology Research Department in SONY Japan, Osaki to improve Deep Audio Visual Source Separation
  - Used **WaveNet** like architecture, Temporal Convolution for audio speech separation and used visual features for improving separation **SISNR** and surpassed current SOTA implementations.
- **Research Internship, HDFC Life** : *May - July 2018*

- Automated customer interaction by automating questions asked using **Reinforcement Learning**.
- **Feature Engineering** and **Clustered Customer data** for extracting useful statistics and analysis of the algorithm

Education

Institution	Specialisation	Year	GPA/Percentage
Air Force School, VN, Pune (SSC)	None	2014	10
Air Force School, VN, Pune (HSC)	Computer Science	2016	93.8%
Indian Institute of Technology, Bombay	Electrical Engineering, B.Tech	2019(Ongoing)	8.88

Courses Undertaken

Computer Vision	Probability and Random Process	Data Analysis and Interpretation
Network Theory	Data Structures & Algorithms	Linear Algebra
Computer Networks	Signals and Systems	Micro-Processors

Technical skills

- **Programming Languages:**
  Proficient in: C, C++, Python, JAVA, Javascript
  Specific libraries for Machine Learning - Tensorflow, Pytorch
  Also basic ability with: Matlab, Shell Script, Arduino, NgSpice, VHDL, AutoCad, Solidworks.
- **Deep learning models:**
  Classification - Res-Nets, Inception-Net, Alex-Net, Capsule-Net, Zoom-In-Net, NASNet
  Segmentation - U-net(Variants - ResNet-UNet, Fusion-Net)
  Feature Extraction - Siamese doublet/triplet networks, AutoEncoders, Variational AutoEncoders.
  Audio Separation - WaveNet, ConvTasNet, TasNet
- **Web & Android Development:**
  Server Side - Django, Flask, AWS
  Client Side - Android-Studio(JAVA), HTML, JS, D3JS, Three JS.

Position of Responsibility

- **Cofounder and Director**, Autonise AI
  - Founded a team of 8 with the vision to act as Technical Consultant in the field of Machine Learning.
  - Targeted the domains -
    Text Detection and Recognition, **Quant Algorithms**, **Facial Segmentation**
- **Mentoring**
  - **GyanAngels** - Mentored two mentees in 10th Grade in Machine Learning and Advanced Mathematics in a startup.
  - **Summer of Science** - Mentored a group of freshers and cultivated a basic understanding of ML concepts.
  - **Institute Technical Summer Project** - Supervised a team for building a handwritten letter recognition, working in real time.
- **Hostel Positions of Responsibility**
  - Sports Secretary, 2017
  - Technical Councillor, 2018

References

- **Professor Shubhasis Chaudhuri**, Director of Indian Institute of Technology, Bombay
  Contact info: sc@ee.iitb.ac.in
- **Professor Amit Sethi**, Electrical Engineering, Indian Institute of Technology, Bombay
  Contact info: asethi@ee.iitb.ac.in
- **Professor Rajbabu Velmurugan**, Electrical Engineering, Indian Institute of Technology, Bombay
  Contact info: rajbabu@ee.iitb.ac.in