



# Aviral Joshi

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## Education

Carnegie Mellon University - School of Computer Science

Pittsburgh, PA

Master of Computational Data Science | QPA: 3.56

December 2020

Coursework: Machine Learning, Deep Learning, Interactive Data Science, Neural Networks for NLP, Cloud Computing

PES University - Computer Science Department

Bangalore, India

Bachelor of Technology in Computer Science and Engineering | GPA: 8.86 / 10

June 2019

Coursework: Machine Learning, Advanced Algorithms, Image Processing, Data Analytics, Linear Algebra, Natural Language Processing

- Secured **First Class with Distinction** and received a certificate of **Specialization in Data Science**

## Experience

Robotics Institute - Carnegie Mellon University

Pittsburgh, PA

Research Assistant

May - Aug 2020

- Developing a **visual dialog-based navigation system** for an autonomous agent in **Malmo Minecraft simulator**
- Designed a **data collection pipeline** using Python to collect over **10K** annotated image, dialog pairs from **MTurk**

VMware

Bangalore, India

Research and Development Intern

January - June 2019

- Upgraded VMware's on-disk metadata analyzer to support Spanned and Grown Volumes on the new VMFS6 filesystem and designed data structures for efficient in memory caching of filesystem metadata

VISIO.AI

Bangalore, India

Cofounder, Artificial Intelligence Analyst

May 2017 - May 2018

- Designed a **Face Verification algorithm** which utilized a Resnet-18 architecture trained with triplet-loss to authenticate employees of a small business (under 50) with guaranteed **less than 1% error rate** in real-world setting
- Developed a **License Plate Recognition** system which operated in **high traffic environments** with end-to-end latency of **less than 100ms**. Successfully deployed the solution in **Chief Minister's office** (Lucknow, India)
- Patented** a method to monitor **driver fatigue** which requires the computational power of a microcomputer to operate

## Projects

Language Generation from Structured Data

Carnegie Mellon University | Spring 2020

- Developed a **prototype-based language generation** model using LSTM with Dual-Attention to **generate textual descriptions** from tables present in the WikiBio dataset; prototypes were selected using **locality sensitive hashing**
- Outperformed autoregressive models** on the BLEU score metric by over **20 points**

Semi-Supervised Subtomogram Classification (In review at BMVC)

Carnegie Mellon University | Spring 2020

- Developed a **novel semi-supervised** clustering approach to identify macro-molecular structures in 3D Cryo-ET images
- Outperformed state-of-the-art** on all datasets and achieved an improvement of over **3x** on model inference time

Unsupervised Scene change identification

Carnegie Mellon University | Spring 2020

- Introduced a **novel generative approach** that uses a Beta-VAE to **identify scenes changes** in videos by measuring KL divergence between images. This approach **reduces manual effort** in **annotating data** for downstream tasks

Speech to Text for English

Carnegie Mellon University | Spring 2020

- Designed a **speech-to-text translation** system using a **Pyramidal Bi-LSTM + Attention** architecture for English speech
- Improved BLEU by 10 points** over baseline by adding Gumbel Noise, varying teacher forcing and using Beam Search

YouTube Trending Analytics ([Project Website](#))

Carnegie Mellon University | Spring 2020

- Analyzed factors that govern the YouTube trending page and **visualized** the presence of **user and platform bias**
- Constructed a Machine Learning pipeline with **XGBoost** classifier to **predict which YouTube videos can trend**

Stance Detection to Identify Fake News ([Demo Video](#)) ([Full Thesis](#)) ([Draft Paper](#))

PES University | Spring 2019

- Developed a LSTM model with **state-of-the-art** Contextualized word Embeddings **ELMo**, to detect discrepancies between claim present in a news article and other authoritative news sources to identify potential fake news

Unconstrained Face Recognition ([Publication Link](#))

PES University | Spring 2018

- Introduced a **novel pipeline architecture** for face recognition which used the highly optimized **CloudForest algorithm** to achieve **10-15x** training time improvement over other ensemble classifiers such as Random Forest.

## Skills

- Programming:** Python, C, Java, JavaScript, R.
- Databases:** MySQL (Intermediate), MongoDB (Basic).
- Machine Learning:** Pytorch, TensorFlow, Scikit-Learn, Google AutoML and Azure Cognitive Services.
- Data Analysis and Processing:** Pandas, Plotly, Tableau, Docker, Elastic MapReduce, ETL, OpenCV, Python Multi-threading, Bash

## Recognition and Achievements

- 2018:** My start-up VISIO.AI was listed amongst **"20 Most Promising AI Providers of India"** by C.I.O. review
- 2017:** Received recognition from **news media** outlets for work done on **Driver Fatigue detection** system
- 2016:** Won **2<sup>nd</sup> runners-up** at a **Hackathon** for developing an **automobile crash alert** detection **Android application** using gyroscopic and acceleration sensors present within Smart Phones.