# 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 **2nd runners-up** at a Hackathon for developing an **automobile crash alert** detection **Android application** using gyroscopic and acceleration sensors present within Smart Phones.