Aadit Deshpande

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Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Intelligent Information Systems — *Expected Dec 2024*
Selected Coursework : Introduction to Machine Learning, Advanced NLP, Search Engines, Human Language for AI

Birla Institute of Technology and Science, Pilani — Pilani, India
Bachelor of Engineering Computer Science — ***GPA: 9.64/10*** — *May 2023*
Selected Coursework : Information Retrieval, Probability & Statistics, Fuzzy Logic, Differential Equations

Experience

American Express, AI Labs — Bangalore, India (Remote)
Analyst Intern, Advanced NLP Team — *Jul 2022 - Dec 2022*

- Created novel scrapers using Reddit API to build a consumer complaints database for the **'External Perspectives'** division of project **'VoCAL'** (Voice of Customer by AI Labs).
- Customized existing unsupervised **intent detection** codebase (rule-based dependency parsing) to summarize Reddit threads and improved its efficiency by 30%.
- Developed an unsupervised **aspect-based sentiment analysis** module (sentenceBERT, nltk.vader) and conceptualized a scoring mechanism to retrieve high-engagement posts.
- Integrated the end-to-end Reddit insights pipeline into the 'VoCAL' platform for use by internal teams.

Teaching Assistant — BITS Pilani, India
CS F241 Microprocessors, Programming & Interfacing — *Spring 2022, Spring 2023*

- Designed lab assignments and reference material on assembly language programming **(x86 ALP)** for a class of 300 undergraduate students under Prof. Vinay Chamola.
- Conducted weekly lab sessions with a group of **50 students** over the semester and graded lab assignments.

Projects

Split Learning and Privacy-Preserving ML in Healthcare with Prof. V. Chamola — Jan 2023 – May 2023

- Created **decentralized (client-server)** neural networks using PyTorch for two healthcare datasets: Diabetic Retinopathy (classification: **ResNet-34**) and Chest X-ray images (semantic segmentation: U-Net).
- Formulated a **novel Split U-Net** and conducted experiments to observe the effects of varying the network 'cut' layer on training. Achieved comparable performance to vanilla U-Net (**Jaccard score 0.93**)
- Implemented two threat models - **Feature Space Hijacking attack** and Adversarial Reconstruction attack and the corresponding defensive techniques using a distance correlation metric and a **proxy adversarial network**.

Feature Selection for Diabetic Retinopathy (DR) risk factors with Prof. S. Raman — Mar 2022 – May 2022

- Designed an autoencoder-based **feature selection** approach to rank nine DR risk factors as primary/secondary.
- Proposed a novel **ranking criterion** for the risk factors, by using the hidden layer weights of an **Autoencoder**, that was trained on a dataset of **3990 patients**.

CS F469 Twitter Sentiment-Polarity Analysis | *sklearn, nltk* — Feb 2022 – Apr 2022

- Implemented a **Naive Bayes** sentiment analysis module (**Bernoulli** and **Multinomial** models) for Tweets.
- Trained the models on the **Sentiment140** Twitter dataset and achieved a maximum **0.91 F1** score. (multinomial model with chi-square feature selection). (Course project for 'Information Retrieval')

Retinal mCNV Image Analysis with Prof. S. Raman — Aug 2021 – Dec 2021

- Developed a **Retinal Image-processing** pipeline (ImageJ macro) to automate retinal analysis in myopic eyes.
- Performed a comparative study with the macro on an **expert-annotated dataset** of 48 retinal images (ophthalmologists at **Sankara Nethralaya** (tertiary care eye centre)).
- ***Published***: Deshpande, A., Raman, S., Dubey, A., Susvar, P., & Raman, R. (2023). PloS one. *'An ImageJ macro tool for OCTA-based quantitative analysis of Myopic Choroidal neovascularization'*.

Technical Skills

Languages: Python, Java, C/C++
Deep Learning: PyTorch, TensorFlow, Keras
Libraries: Sci-kit learn, NLTK, Spacy, Huggingface transformers
Tools: Docker, Unity, Git, LaTeX