Aadit Deshpande

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Education

Birla Institute of Technology and Science, Pilani — Pilani, India
Bachelor of Engineering Computer Science; GPA: 9.53/10 — *Expected 2023*

Selected Coursework : Information Retrieval, Compiler Construction, Principles of Prog. Languages, Design & Analysis of Algorithms, Database Systems, Fuzzy Logic, Graphics, Differential Equations, Probability & Statistics

Experience

American Express, AI Labs — Bangalore, India
Analyst Intern, Advanced NLP Team — *July 2022 - Present*

- Created novel scrapers using Reddit API to build a consumer complaints database from Reddit data for the **'External Perspectives'** project by the Advanced NLP team.
- Modified existing unsupervised **intent detection** code (rule-based dependency parsing) to summarize Reddit post discussions and improved its efficiency by 30%.
- Built an unsupervised **aspect-based sentiment analysis** module (sentenceBERT, nltk.vader) and developed a scoring mechanism to retrieve high-engagement posts.
- Integrated the end-to-end Reddit insights pipeline into the 'VoCAL' platform (Voice of Customer by AI Labs).

Boston University — Boston, MA (remote)
Research Intern, CV Lab — *Feb - Apr 2022*

- Helped Prof. Donglai Wei with the **HMS Teledenistry** project (deep learning for dental plaque detection).
- Coordinated with the HMS team to prepare an expert-annotated dataset of dental X-ray and RGB images.
- Experimented with PyTorch transformers and MMCV for **semantic segmentation**.

Happiest Minds Technologies — Bangalore, India
Machine Learning Intern — *June – July 2021*

- Worked on key feature extraction from official statements of work to expedite financial document analysis.
- Used a Faster **R-CNN** model for optical character recognition and achieved **87.3%** accuracy.

Research Experience

Feature Selection for Diabetic Retionpathy (DR) risk factors with Prof. S. Raman — Feb – June 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**.
- Evaluated the effects of secondary risk factors on the prognostic capacity (AUC Score) of primary risk factors using five **traditional ML classifiers**.
- Co-authored the paper [1] on this study, submitted to Ophthalmic-Epidemiology.

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

- Developed a **Retinal Image-processing** pipeline (ImageJ macro) to automate retinal analysis in myopic eyes.
- Experimented with **Local adaptive thresholding** algorithms for vessel skeletonization and introduced new vascular parameters like fractal dimension and tortuosity (macro published on Zenodo)
- Performed a comparative study with the macro on an **expert-annotated dataset** of 48 retinal images (ophthalmologists at **Sankara Nethralaya** (Eye hospital)).
- Authored the paper [2] on this study, submitted to PLOS ONE.

Publications

[1] A Vyas, **A Deshpande**, S Raman, R Raman (2022). 'The Role of BMI, Age, and Gender in predicting Diabetic Retinopathy'. Under review.

[2] **A Deshpande**, S Raman, A Dubey, and Pradeep (2022). 'An ImageJ macro tool for OCTA-based Quantitative Analysis of Myopic Choroidal Neovascularization'. Under review.

Teaching Experience

Teaching Assistant, CS F241 Spring 2022

CS F241 Microprocessors, Programming & Interfacing *BITS Pilani, India*

- Worked closely with Prof. Vinay Chamola for the course CS F241: **'Microprocessors, Programming & Interfacing'**, (total 300 students).
- Designed and graded lab assignments on assembly language programming **(x86 ALP)** and created reference material for advanced topics.
- Conducted weekly lab sessions with a group of **50 students** over the semester, helped debug ALP code.

Projects

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

- Implemented a **Naive Bayes** sentiment analysis module (**Bernoulli** and **Multinomial** models) for short-form text (Tweets). (Course project for 'Information Retrieval')
- Performed dimensionality reduction with **TSNE** and experimented with two **feature selection** methods (Chi-Squared and Mutual information).
- Trained the models on the **Sentiment140** Twitter dataset and achieved a maximum **0.91 F1** score. (multinomial model with chi-square).

CS F363 Compiler Construction | *C* Jan – Apr 2022

- Wrote a **compiler** in C, to translate a **strongly-typed language** (primitive and complex data types) into equivalent machine code. (Course project for 'Compiler Construction')
- Built efficient lexical analyzer, top-down predictive parser, and type-checking (semantic analysis) modules over two stages.

Semantic Segmentation with U-Nets | *TensorFlow, Keras* Sept 2021

- Implemented the **U-Net** Convolutional Neural Network architecture, proposed by Ronneberger et al. (2015) using Keras API.
- Trained the model on a 2841 satellite images (Kaggle dataset) for **water body segmentation** and achieved **0.748 Mean IoU**.

Awards

Institute Merit-based Scholarship, Birla Institute of Technology and Science, Pilani 2019-2022

- Awarded to the **top 2%** of an undergraduate student body of 1000 students. Recipient of this scholarship for **five** consecutive semesters.

Technical Skills

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

Certifications

DeepLearning Specialization, Coursera Aug - Nov 2021

- Build Basic Generative Adversarial Networks (GANs) *(Nov 2021)*
- Convolutional Neural Networks *(Sep 2021)*
- Structuring Machine Learning Projects *(Aug 2021)*
- Improving Deep Neural Networks: Hyperparameter Tuning, Optimization *(Aug 2021)*
- Neural Networks and Deep Learning *(Aug 2021)*

Community Outreach

NeurIPS 2021, Queer in AI affinity workshop Dec 2021

- Corresponded with panelists and moderated the Social: **'Critical Approach to Algorithmic Fairness'** at the Queer in AI Workshop, NeurIPS 2021.