ESSHAAN MAHAJAN

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EDUCATION

University of Virginia, Engineering and Applied Sciences, Charlottesville, VA ***August 2023 - December 2024***
Masters of Computer Science: GPA- 3.9/4

Guru Gobind Singh Indraprastha University, New Delhi, India ***August 2019 - May 2023***
Bachelors of Technology (Computer Science and Engineering)
University School of Information, Communication and Technology (USICT): GPA - 3.95/4, Silver Medalist.

SKILLS

- **Programming Languages**: Python, C++, C, Java, MySQL, HTML, CSS, JavaScript
- **Technical Skills**: Programming, Machine Learning, Data Analysis, Web Scraping, Database Management, Software engineering, Version Control, Git, Testing, DevOps, Cloud infrastructures and services, Automation, Generative AI, LLMs
- **Tools and Technologies**: Pandas, Keras, Scikit-learn, Numpy, PyTorch, Matplotlib, OpenCV, Tensorflow, NLTK, Microsoft Office Suite, Tableau, Database Management, SQL, data extraction, validation, and cleaning, .NET, PostgreSQL, Software Testing, AWS, Quality Assurance, Google Cloud Platform (BigQuery), Microsoft Power BI, and Microsoft Excel.

EXPERIENCE

NLP Developer, **UVA McIntire School of Commerce,** Charlottesville ***May 2024 - Present***

- Created a new multimodal architecture for the detection and analysis of anxiety and depression in consumers, especially public figures like CEOs, caused by different social media platforms. Used Llama, BERT, Roberta-base, XLM, and ViT models to beat the state-of-the-art models by at least 3.05%.

NLP Research Intern, **Delhi Technological University(DTU),** New Delhi ***November 2021 -November 2022***

- Designed a deep learning ensemble-based multilingual hate speech and cyberbully detector with an increase in efficiency by at least 4.44% in the F1 score. A paper on the same was published at Expert Systems With Applications. Furthermore, collaborated and presented a paper about a novel linear time complexity sorting technique at ICGNC.

Deep Learning Research Intern, **Indian Institute of Tropical Meteorology (IITM), Govt. of India,** Pune ***April 2022 - October 2022***

- Devised and implemented a novel approach to estimate global canopy heights for the period 1980-2020 leveraging NASA GEDI LiDAR, meteorological datasets, Google Earth Engine, and GPUs on Pratyush HPC, fastest in India. Model was able to beat all previous attempts to accurately predict canopy height of a location, with an RMSE score of 2.02.

NLP Research Intern, **Indraprastha Institute of Information Technology (IIITD),** New Delhi ***November 2021 - July 2022***

- Led a research problem of classifying entities in multimodal meme data into respective relevant types. Deployed BERT embedding and CLIP models to maximize macro F1 score upto 45.01.

PROJECTS

*Industry Project***, Multimodal Chatbot,** Virginia ***February 2025 - Present***

- Developing a multimodal chatbot leveraging GPT-4 for mental health detection, intervention, and consumer companionship, integrating multi-agent collaboration capabilities for the school of commerce UVA.

NLP Intern, **Entity Classification in Memes,** New Delhi ***January 2022 - July 2022***

- Classifies entity present in a meme into hero', villain', victim' or other' based on OCR and image features, using CLIP models combined with BERT embedding. Maximized macro F1 score through hyperparameter tuning and finding best combination of CLIP model and end classifier.

Summer Research Program (Utkrisht), **Rhyme and Reason,** New Delhi ***August 2021 - September 2021***

- Built a contemporary poem generator using Markov Chain and LSTM which outputs novel poems. The corpus data was collected and processed from scratch. The project was chosen to be among the top 5 projects of the program.

Personal Project, **Blind People Navigator,** New Delhi ***June 2021 - July 2021***

- Created a tool to help blind people navigate and understand their environment. The tool takes images of its surroundings and uses MLP, RNN, CNN, Language models, Word embeddings, and Transfer learning approaches to produce a caption which is then spoken into the ear of the person using it.

PUBLICATIONS

- "EnsMulHateCyb: Multilingual Hate Speech and Cyberbully Detection in Online Social Media", Expert Systems With Applications (Published)
- "Hunch Emplacement Sort", International Conference on Graphs, Networks and Combinatorics (Presented)