

# ESSHAAN MAHAJAN

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## EDUCATION

**University of Virginia**, Charlottesville, VA  
Masters of Computer Science: GPA- 3.9/4

August 2023 - December 2024

**Guru Gobind Singh Indraprastha University**, New Delhi, India  
Bachelors of Technology (Computer Science and Engineering): GPA - 3.95/4, Silver Medalist

August 2019 - May 2023

## SKILLS

- Programming Languages:** Python, C++, Java, SQL, JavaScript, HTML5, CSS3
- Machine Learning & AI:** Machine Learning, Deep Learning, Generative AI, LLMs, NLP, Computer Vision, Data Analysis, Model Deployment
- Frameworks & Libraries:** PyTorch, TensorFlow, Scikit-learn, Keras, Pandas, NumPy, Matplotlib, OpenCV, NLTK, React.js, Node.js, Express.js, Bootstrap 5
- Databases & Cloud:** PostgreSQL, MySQL, MongoDB, GCP, AWS, SQL/NoSQL Databases
- Tools & Development:** Git/GitHub, REST APIs, Docker, DevOps, Automation, Tableau, Power BI
- Web Development:** Full-Stack Development, Front-End (React.js, Bootstrap, Responsive Design), Back-End (Node.js, Express.js, REST APIs), Authentication & Deployment

## EXPERIENCE

*AI Software Engineer, Charlottesville Fine Arts LLC*, Charlottesville

August 2025 – Present

- Built an AI copilot with multi-agent systems and RAG to automate interior design workflows, reducing manual effort by ~70%. Developed a full-stack web interface with Node.js, Express.js, and JavaScript, delivering an intuitive front end that streamlined project management for designers.

*NLP Researcher/Software Developer, University of Virginia*, Charlottesville

February 2025 – September 2025

- Developed a multi-agent RAG framework with risk-aware triage and multi-voice argumentation, deploying DeBERTa models with distributed inference on AWS and a new influence metric to cut covert influence risks by 30% in financial conversations, enabling safer AI-driven investment recommendations and improving user trust.

*Software Engineer Intern, Delhi Technological University*, New Delhi

November 2021 - November 2022

- Developed an ensemble-based multilingual hate speech and cyberbullying detector using BERT, LSTMs, and traditional classifiers, improving F1 score by 4.44% and releasing a full-stack prototype with API endpoints, web-based interface, and database integration for real-time content moderation. Also contributed to algorithmic research on linear-time sorting techniques, later published and presented.

*Software Engineer Intern, IITM (Govt. of India)*, Pune

April 2022 - October 2022

- Developed a deep learning pipeline for global canopy height estimation (1980–2020) using NASA GEDI LiDAR, meteorological datasets, and Google Earth Engine, optimized on Pratyush HPC. Achieved RMSE 2.02 (state-of-the-art) and delivered scalable workflows in Python and TensorFlow with deployment via Flask REST API, React.js dashboard, and PostgreSQL for climate data visualization.

## PROJECTS

*Industry Project, Multimodal Mental Health Detection*, Virginia

May 2024 – December 2024

- Designed and developed a multimodal AI system combining BERT, ViT, BLIP, and LLaVA-1.6 to detect anxiety, depression, and burnout from 100K+ social media posts, achieving a 3.05% improvement over state-of-the-art models. Built an end-to-end pipeline with PyTorch, HuggingFace, and Scikit-learn, and deployed results via a React.js dashboard and REST API for real-time monitoring.

*NLP/CV Research Project, Entity Classification in Memes (IIITD)*, New Delhi

November 2021 - July 2022

- Led development of a multimodal meme classification system integrating BERT embeddings, CLIP image models, and OCR pipelines to identify entities (hero, villain, victim, other) in 50K+ samples, improving performance by 20% over baselines.
- Engineered a scalable pipeline with Python, PyTorch, and Scikit-learn, deploying as cloud-hosted APIs with interactive dashboards and relational database integration on AWS to enable real-time meme analysis and visualization.

## PUBLICATIONS

- EnsMulHateCyb: Multilingual Hate Speech and Cyberbully Detection in Online Social Media*. **Expert Systems with Applications**, 2023.
- Hunch Emplacement Sort*. **International Conference on Graphs, Networks and Combinatorics (ICGNC)**, 2022.