



+1-857-398-8159

# ABHISHEK VARSHNEY

[✉ abhishek3754v@gmail.com](mailto:abhishek3754v@gmail.com)



[avarshn](#)



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(F-1 Student | Eligible for OPT Work Authorization)

## EXPERIENCE

### AI Researcher | 8 months

Kolachalama Lab, Boston University

(Sep 2024 - Apr 2025)

Boston, MA

#### Multimodal Modeling of Digital Voice for Cognitive Assessment

- Designed AI model for early **dementia** detection, using ~ 1 hr long neuropsychological interviews **transcribed by Whisper**
- Learned joint **acoustic-linguistic** representations via a custom **TCN, BERT-based & Cross-Attention multimodal encoder** model, leading to **0.92 AU-ROC** and **0.86 accuracy** - a ~7% **improvement** over baseline in dementia classification

### Associate Data Scientist | 2+ Years

Morningstar

(Jun 2021 - Aug 2023)

Mumbai, India

- Built ML pipelines** for financial data extraction from tables and paragraphs in **HTML documents**, using **TF-IDF** and **XGBoost**, integrated with **DL / rule-based methods** tailored to market-specific formats, **achieving 60–70% recall**
- Pretrained **BERT models** on financial corpora using **MLM** and **NSP techniques**, and fine-tuned on **token classification task (NER)**, enhancing **entity extraction F1-score to 0.97**
- Prototyped a **Retrieval-Augmented Generation (RAG)** pipeline using **transformer-based LLMs**, reducing **development cycles from 3-4 weeks to 1 week**, and significantly accelerating the iteration of **document extraction capabilities**
- Boosted **table classification accuracy** from **70% to 75%** by fine-tuning **LayoutParser** object detection models on a custom table dataset (**FinTabNet**), enabling robust **table detection in PDFs** and seamless **OCR integration via AWS Textract**
- Collaborated with **Quantitative Research Analysts** and **QA teams** to incorporate **domain-specific feedback** into model improvements and **validate document pipeline outputs**
- Contributed to **NLP and CV systems development** for automating **financial data extraction**, reducing **manual processing time by 15%** and **FTE costs** through production-ready solutions

## ACHIEVEMENTS

- Secured **3rd Place (Globally)** - **EReL@MIR Track 1 Challenge**, WebConf 2025, Sydney, Australia  
*1st Workshop on Efficient Representation Learning for Multimodal Information Retrieval (EReL@MIR)*
- Research Week With Google, 2022** - Selected to attend an exclusive AI Symposium hosted by Google Research India

## PERSONAL PROJECTS

Multimodal RAG Retrieval System for Document Search [🔗 PDF Retrieval](#) | [🔗 Wikipedia Search](#) (Feb 2025 – Mar 2025)

- Built a scalable retrieval system for **PDF documents and Wikipedia articles**, supporting multimodal queries by leveraging **ColPali-based embeddings** for both **textual content** and **visuals (images, tables, charts)**
- Improved search accuracy over traditional text-only methods, effectively retrieving **document page numbers** and **relevant articles**

Brain MRI Segmentation Generalized to Unseen Labels using UniverSeg [🔗 Code](#)

(Feb 2024 – Apr 2024)

- Trained **UniverSeg** model on **2D Brain MRI coronal slices** with 24 labels (20 for training, 4 for testing), using diverse augmentations and **TensorBoard** to improve generalization and monitor training progress
- Leveraged **query-support learning** to segment unseen anatomical labels **without any fine-tuning**, achieving a **Dice score of ~0.738** and demonstrating strong few-shot generalization

## TECHNICAL SKILLS

<b>Programming</b>	Python, PyTorch, Transformers, scikit-learn, Java, MATLAB, C
<b>Data Processing</b>	Pandas, Seaborn, Matplotlib, NumPy, NLTK, OpenCV, Librosa, Beautiful Soup
<b>Technologies</b>	AWS (EC2, ECS, Lambda, S3), Distributed Training, HPC Clusters, Docker, Linux (Bash), Git

## EDUCATION

### Boston University

Master of Science in Computer Science - GPA: 3.78/4

(Boston, MA, US)

(Sep 2023 - May 2025)

### Birla Institute of Technology and Science Pilani

B.E. (Hons.) Electrical and Electronics Engineering - CGPA: 9.28/10

(Hyderabad, India)

(Aug 2017 - Jul 2021)

Minor in Data Science

## PUBLICATIONS ( [📄 Google Scholar](#) )

- Varshney, A.; Ghosh, S.K.; Padhy, S.; Tripathy, R.K.; Acharya, U.R. Automated Classification of Mental Arithmetic Tasks Using Recurrent Neural Network and Entropy Features Obtained from Multi-Channel EEG Signals. Electronics 2021, 10, 1079 ([Link](#))
- A. Varshney, R. Loka and A. M. Parimi, Fast Frequency Response Using Model Predictive Control for A Hybrid Power System, 2021 IEEE 9th International Conference on Smart Energy Grid Engineering (SEGE), 2021, pp. 104-110 ([Link](#))