

# ANUGRAH VAISHNAV

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## EDUCATION

**University of Massachusetts Lowell, Lowell, MA** Expected May '25  
*M.S. in Computer Science*

**Ramaiah Institute of Technology, India** Aug '17 - May '21  
*B.E in Electronics Engineering*

## TECHNICAL SKILLS

**Languages** Python, R, SQL  
**Tools** Pandas, NumPy, PyTorch, TensorFlow, Scikit-Learn, PySpark  
**Data Science** Graph Neural Networks (GNN), Computer Vision, Natural Language Processing (NLP),  
Generative-AI, Fine-tuning Large Language/Vision Models (LLM/LVM)

## PROFESSIONAL EXPERIENCE

**Data Analyst** | *Portcast (Remote - India)* Aug '22 - May '23

- Automated report generation; created daily performance dashboards for clients; performed root cause analysis of marine vessel ETA issues.

**Data Analyst** | *Equipped Analytical Intelligence (On site - India)* Nov '21 - Aug '22

- Spearheaded development and delivery of dashboards of important KPIs; migrated dashboard source code from legacy version to use more modern features

## RESEARCH EXPERIENCE

**Real-Time Depth-Based 3D Modeling in Endoscopy Imaging** | *Advisor: Dr. Yu Cao* Sep '24 - Present

- Implemented 3D reconstruction pipeline for endoscopy videos using Monocular Depth Estimation (MDE) techniques (Dense Prediction Transformers (DPT) and Depth Anything V2).
- Conducted a comparative study for real-time depth estimation to construct 3D models in Virtual Reality (VR).
- Evaluated reconstruction quality using 3D IoU (Intersection over Union) and RMSE.

**Elevating Image Captioning via Chain-of-Thought Conditioning** | <https://sor.bz/B1qTf> Jan '24 - May '24

- Analyzed image captioning models by comparing performance with and without chain of thought reasoning.
- Established benchmarking system using human, LLaVa, and CLIP evaluations to compare captioning models.
- Revealed chain-of-thought conditioning significantly enhances caption quality (BLEU score), showcasing its potential to improve AI's understanding of visual content.

**Research Assistant: Biomedical Data Science** | *Advisor: Dr. Rachel Melamed* Sep '23 - May '24

- Led research on the impact of antidepressants on COVID-19 severity using causal inference techniques.
- Implemented machine learning algorithms (S/T learners, TARNet, GNN, VAE) using PyTorch to predict Individual Treatment Effect (ITE) from observational data.
- Found that use of antidepressants may be linked to reduced risk of death in patients hospitalized with COVID-19.

## PROJECTS

**Retrieval-Based Chest X-ray Report Generation** | <https://sor.bz/PpWNd> Jan '24 - May '24

- Implemented retrieval-based model for generating chest X-ray reports using CLIP, focused on clinical accuracy.
- Fine-tuned the CLIP model on the MIMIC-CXR train subset; generated report labels using CheXbert.
- Evaluated model effectiveness using BLEU (0.073), F1-score (0.274).

**Correlated Topic Models: PyTorch Implementation** | <https://sor.bz/ZbrNF> Sep '23 - Dec '23

- Built an open-source implementation of CTMs using Automatic Differentiation Variational Inference (ADVI).
- Implemented ADVI in PyTorch to allow batched training, scaling to large datasets.
- Benchmarked the accuracy and speed of the model against existing libraries (not using ADVI): tomotopy, PyCTM, topicmodels.