

# Anugrah Vaishnav

Lowell, MA (+1) 978-569-6430 [vaishnav.anugrah123@gmail.com](mailto:vaishnav.anugrah123@gmail.com) [linkedin.com/in/anugrah-vaishnav](https://www.linkedin.com/in/anugrah-vaishnav) [anugrahvaishnav.github.io](https://anugrahvaishnav.github.io)

## EDUCATION

### M.S. in Computer Science

University of Massachusetts Lowell

Sep 2023 - May 2025 (Expected)

Lowell, MA

B.E. in Electronics, Ramaiah Institute of Technology, Bengaluru (2017-2021)

## SUMMARY

Data Science professional with hands-on experience solving complex problems in computer vision, natural language processing (NLP), and healthcare by building scalable machine learning solutions. Proficient in working with LLMs and transformer-based models, fine-tuning them for specialized tasks, and optimizing performance through deep learning and causal inference techniques. Skilled in benchmarking against state-of-the-art methods and deploying efficient pipelines to handle large-scale data with a focus on accuracy, speed, and real-world impact.

**Roles:** Machine Learning Engineer, Data Scientist, Data Analyst, Deep Learning Engineer, AI Engineer

**Available to start:** May 2025

## EXPERIENCE

### Portcast

[ port arrival forecasting, SQL, Tableau ]

Aug 2022 - May 2023

Data Scientist

- Contributed to Port Arrival Forecasting efforts by integrating real-time maritime data and refining feature engineering pipelines, **improving ETA prediction accuracy by 7%**. Automated report generation workflows with Python and SQL, **saving 10+ hours of manual work weekly**, and built Tableau dashboards to monitor port delays and vessel performance.

### Equipped Analytical Intelligence

[ density modeling, PyTorch ]

Nov 2021 - Aug 2022

Data Scientist

- Worked on predictive modeling for cash flow forecasting, improving scenario analysis accuracy for alternative investors by integrating granular portfolio data into Minerva, the company's SaaS intelligence platform. Migrated the visualization codebase to a modern tech stack, **increasing reporting efficiency by 30%**, and automated multi-stakeholder reports using R and SQL, **saving 10+ hours of monthly manual work**.

### University of Massachusetts Lowell

[ computer vision, machine learning, NLP ]

Sep 2023 - Present

- 3D Endoscopy Procedure Reconstruction for VR | Advisor: [Yu Cao](#):** Developed a 3D reconstruction pipeline for endoscopy videos by fine-tuning the Depth Anything V2 model on two procedure-specific datasets. Benchmarked the fine-tuned model against SOTA methods, achieving **10-20% better accuracy in depth prediction**. Generated 3D meshes using Ball Pivoting algorithm, enabling VR-based medical simulations to enhance surgical training and preoperative planning.
- Effect of antidepressants on COVID-19 trajectory | Advisor: [Rachel Melamed](#):** Led research analyzing the impact of antidepressants on COVID-19 severity using causal inference techniques. Implemented machine learning models: S/T learners, TARNet, graph neural networks (GNN) and variational auto-encoder (VAE) in PyTorch to predict Individual Treatment Effects (ITE) from Electronic Health Records (EHR). Identified potential **links between antidepressant use and reduced mortality risk** in hospitalized COVID-19 patients.
- Correlated Topic Models: PyTorch implementation:** Developed an open-source PyTorch implementation of Correlated Topic Models (CTM) using Automatic Differentiation Variational Inference (ADVI). Applied scalable batched training to handle large datasets efficiently. Optimized performance, **achieving 10-15% faster processing and 8-10% higher accuracy** compared to libraries such as tomotopy, PyCTM, and topicmodels by integrating ADVI.
- Self-learning for improving LLM creativity:** Engineered a self-learning framework to improve creative reasoning in LLMs (LLaMA-3, Phi-3) by applying Instruction Fine-Tuning (IFT) and Direct Preference Optimization (DPO). Implemented creativity evaluation using BERT-based semantic analysis across four standardized tests: Remote Association, Alternative Uses, Creative Writing, and Divergent Association. Demonstrated **improved performance in divergent thinking and creative problem solving** tasks by optimizing model output through iterative self-learning strategies.
- Retrieval-Based Chest X-ray Report Generation:** Built a retrieval-based chest X-ray report generation model using Contrastive Language-Image Pretraining (CLIP), improving clinical accuracy through fine-tuning on MIMIC-CXR. Generated report labels with CheXbert and achieved a **7% improvement in BLEU score over SOTA methods**, with **F1-score comparable to SOTA**. Evaluated model performance on both text relevance and clinical correctness.
- Human-Centric Evaluation of CoT-Based Image Captioning:** Conducted analysis of image captioning models applying chain of thought (CoT) conditioning to captions generated by the LLaVA model on the VisualGenome dataset. Conducted human surveys to evaluate caption quality based on relevance, coherence, and descriptive accuracy, comparing results against CLIP and GPT preferences. Designed a systematic benchmarking framework to demonstrate that **CoT-conditioned captions better align with human judgments**, improving the model's semantic understanding and contextual accuracy.

## SKILLS

- Languages:** Python (expert), R, SQL (PostgreSQL, MySQL), NoSQL (MongoDB, DynamoDB), C++ (familiar)
- Frameworks & Libraries:** PyTorch, Tensorflow, Scikit-learn, Spark (PySpark)
- Machine Learning:** Deep Learning (CNN, RNN), Generative Modeling, Probabilistic Modeling, Time Series Forecasting, Statistics, Transformers, Computer Vision, NLP, Fine-tuning (LoRA, PEFT) Large Language/Vision Models (LLM/LVM), Graph Neural Networks (GNN)
- Tools:** Docker, AWS, Git, Tableau