

# ANJALI MUDGAL

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## OBJECTIVE

Machine Learning Engineer specializing in LLM development and optimization, with expertise in fine-tuning techniques such as LoRA, QLoRA, and PEFT. Skilled in building AI agents and search-oriented systems using frameworks like LangGraph and CrewAI. Experienced in deploying production-ready models and optimizing processes for seamless scalability. Excited to contribute by creating and deploying innovative technologies to enhance delivery experiences and drive customer satisfaction.

## RELEVANT WORK EXPERIENCE

### Data Scientist

Mar 2023 - Present

Enquire AI

Washington, DC

- **AI Assistant Speed Optimization using LangGraph:** Developed customized AI agents with multithreaded document search, migrating from AWS Bedrock to LangGraph architecture, resulting in 30% faster response time.
- **Predictive Modeling:** Implemented automated LLM model fine-tuning pipeline using cronjobs on EC2 instances.
- **Optimizing Search Speed using Vector Database and Redis:** Accelerated profile search speed by 40% through efficient document retrieval, integrating pgvector on Postgres for BERT embeddings to enhance user experience.
- **Advance SQL and Statistics:** Proposed and implemented a novel approach using Mean Average Precision with Common Table Expressions in SQL, boosting correctly matched profiles from 50% to 70%.

### Data Scientist

Mar 2024 - May 2024

World Bank

Washington, DC

- **Interactive Coding Assessment:** Designed assessment tools for World Bank's Data Science skill certification program.

### Software Engineer (Machine Learning, Mobile)

Jan 2019 - July 2022

Samsung Research & Development

Noida, India

- **Real-time Speed Optimization:** Reduced sensor-to-application **image frame latency by 100ms** for **image processing pipeline** in phones, through optimization techniques, significantly enhancing operational efficiency.
- **Custom Mobile Net Architecture:** Reduced RAM usage from 500MB to 80MB by developing space-efficient MobileNet and QLoRA for real-time image segmentation, enabling bokeh effect in cameras suitable for low-budget smartphones.
- **Mentor, Research and Development:** Actively guided 5 interns, leading to their successful patent filings.

## PATENT AND PUBLICATIONS

- Mudgal, A., Kush, U., Kumar, A. et al. Multimodal fusion: advancing medical visual question-answering. Neural Comput & Applic (2024). [Link](#) | [View](#) | [GitHub](#)  
Developed a multimodal architecture(vision-language) that interprets radiology images and answers user questions specific to that image, helping patients understand medical findings from their scans.
  - Boosted BLEU and ROUGE scores from 0.12/0.15 to 0.37/0.40 by fine-tuning BLIP and its subcomponents on a medical dataset. Designed custom Multimodal Architecture, achieving BLEU and ROUGE scores of 0.41 and 0.44.
- Authored A2 grade patent with Samsung, "Enhanced Optical Flow Video Stabilization for Multimedia Content", application number 202211062410.

## TECHNICAL PROJECTS

- **Mindful Tweet Hub** Accelerated real-time **search speed to 10ms** by creating **vector similarity index using Hierarchical Navigable Small World(Faiss HNSW) on BERT embeddings** for similar tweet matching. [GitHub](#)
- Efficient LLM fine-tuning with LoRA and QLoRA. [Medium](#) | [GitHub](#)

## EDUCATION

**Master of Science in Data Science**, The George Washington University (GPA: 4.00/4.00)

Aug 2022 - May 2024

Relevant Coursework: Machine Learning, Deep Learning, NLP, Linux for DevOps, Time Series Forecasting

**Bachelor of Technology in Communication & Computer Science**, LNMIIT

Aug 2015 - May 2019

## TECHNICAL SKILLS

**Programming Languages**

Python, C++, R, JAVA, MATLAB, Streamlit

**Libraries & Frameworks**

LangGraph, TensorFlow, Pytorch, Pandas, Transformer, pgvector, Matplotlib, Sklearn

**Technologies & Tools**

GitHub, Huggingface, Tableau, Docker

**Cloud Services**

AWS (Elastic Beanstalk, S3 buckets, EC2, SageMaker, Bedrock, Glue), Groq

**Database**

SQL, PostgreSQL, Redis, Opensearch, MongoDB

**Development & Operations**

Agile Development, Software Architecture, estful APIs, Kubernetes

## CERTIFICATION

- AWS Certified Cloud Practitioner (CLF-C02).