

TEJAS JADHAV

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EDUCATION

Purdue University

M.S. Computational data Science

Aug 2023 – May 25

- **Relevant Courses:** Applied Regression, Time Series Analysis, Statistical Machine Learning, Natural Language Processing.

EXPERIENCE

IU Luddy School of Informatics

Research Assistant

Aug 2024 – May 2025

- Built a dementia-detection pipeline that fine-tuned BERT and RoBERTa with 13 Adapter configurations and 9+ task-specific adapters (Emotion, Grammar, NER, etc.) on the ADReSS and DementiaBank transcripts.
- Reached 90.4% accuracy and 0.899 F1 on the ADReSS test set, surpassing baseline models for early-stage dementia screening.
- Delivered clinician-interpretable output by creating an XAI dashboard with LIME, Layer Integrated Gradients, and LIT for token-level rationale visualization.

Purdue University

AI Engineer

Jan 2024 – May 2024

- Bootstrapped 2000+ sample QA corpus by prompting an LLaMA-405B model in JSON-constrained format, automating data generation and cutting manual labeling time by ≈ 60 hours.
- Fine-tuned LLaMA-2-7B with 4-bit QLoRA (NF4) and LoRA-rank 64 adapters, achieving a 70 % model size reduction, 40 % faster inference, and 15 % higher answer correctness, enabling deployment on a single 16 GB GPU.
- Distilled LLaMA-2-7B into Gemma-2B using KL-divergence on mixed-precision logits; student model achieved comparable performance while inferring over 2 times faster and using 70% less memory at runtime.

PROJECTS

Airline Customer Support RAG Chatbot [\[GitHub\]](#)

- Designed an agentic chatbot with LangGraph, GPT-4, ChromaDB, and Typescript that delegates tasks to modular agents (flight, hotel, car, excursions) while maintaining context via stateful dialog management.
- Supported uninterrupted multi-turn conversations across 4+ services, allowing dynamic task-switching mid-chat and routing safe vs. sensitive tools to prevent accidental bookings or cancellations.
- Downloaded & time-shifted SQLite travel DB, built airline-policy vector store with OpenAI embeddings, and bound domain tools (search, update, cancel) to each agent for real-time actions.

Fine Tuning Embeddings for Domain-Specific RAG [\[GitHub\]](#)

- Built a synthetic-QA fine-tuning pipeline, auto-generated QnA pairs from Lyft & Uber annual reports with GPT-3.5, then adapted the BAAI embedder in LlamaIndex for domain-specific retrieval.
- Outperformed baselines model, reached 0.86 hit-rate and 0.74 precision, improving state-of-the-art by 5-6% and lifting downstream MRR, MAP, and NDCG across finance QA tasks.
- Strengthened RAG answer quality by plugging the fine-tuned index into a GPT-3.5 query engine, yielding more accurate, citation-grounded responses without increasing inference latency or model size.

Bias Mitigation in LLMs using Causal Reasoning and Reflective Prompting [\[GitHub\]](#)

- Reduced social bias in LLMs on ambiguous QA tasks where outputs often reflected stereotypes like age, gender, and race.
- Built a causal, bias-aware prompting pipeline using Deepseek R1 and GPT-3.5, combining causal graph extraction with reflective in-context interventions.
- Improved BBQ accuracy by 10% and reduced bias score by $\sim 65\%$, with no performance drop on disambiguated questions.

Text to Image Synthesis using Deep Fusion Adversarial Network [\[GitHub\]](#)

- Built and trained a one-stage DF-GAN in PyTorch, reducing model complexity and achieving a 32.9 FID score, outperforming StackGAN's 35.7 FID.
- Generated realistic 256 \times 256 bird images with fine-grained detail, increasing the Inception Score to 4.7, improving visual quality.

SKILLS

Languages: Python, R, SQL, SAS, TypeScript

ML / DL: PyTorch, TensorFlow, Scikit-learn, Keras, RAG, LangChain, Tableau, Computer Vision

Data & Viz: Pandas, NumPy, Matplotlib, Seaborn, Tableau

Cloud & DevOps: AWS, Docker, Git/GitHub