Gopi Krishna Mahankali

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Education

Indian Institute of Technology, Bombay, B.Tech in Electrical Engineering 2018 – 2022

Experience

Data Scientist, Bosch - Bangalore Sept 2022 – Present

GROW: Digital Twin Platform

- Led a team of five in a condition monitoring project for 56+ turbomachinery assets (compressors, gas turbines, heat exchangers, pumps), employing physics-driven signal processing (FFT, wavelets, kurtogram) and machine learning models. Achieved >90% accuracy in real-time condition monitoring for clients like JSW and ADNOC, reducing downtime costs by diagnosing structural fatigue and performance issues proactively.
- Researched causal graph-based fault diagnosis systems leveraging PC, SVAR and RCD algorithms, using sensor data and domain knowledge to identify root causes and optimize turbomachinery maintenance strategies.
- Trained an LSTM Autoencoder for unsupervised anomaly detection in industrial machinery, leveraging sensor data to model healthy operational patterns. The system identifies anomalies by computing reconstruction errors and furthermore using temporal aggregated RE to generate RUL degradation model.
- Implemented an LLM-powered chatbot within the Digital Twin, enabling function calling to backend APIs for asset health insights and vector database queries for fault remedies, delivering comprehensive, context-aware responses.

Knowledge Nexus

- Built a Generative AI RAG chatbot using Mistral with a custom section-based chunking pipeline and Qdrant as the vector database for embeddings to process PDFs and Docupedia content.
- Designed a hybrid retrieval system combining BM25, BGE, and ColBERT for optimal balance between exact term matching and semantic search, with cross-encoder re-ranking.
- Integrated agentic workflows via Hugging Face Agents, equipping the chatbot with tools like internet search,retrieval, table of contents navigation, and query transformation.

POC's

- Designed and implemented a knowledge graph-based chatbot using LangChain and Neo4j, leveraging structured hospital data with LLMs to deliver accurate, hallucination-free responses.
- Improved email processing efficiency and accuracy by developing an ML-based solution using NLP techniques like TF-IDF and CBOW. Delivered a high-performing model that met client expectations for accurate email classification and routing.

Projects

Neural Machine Translation 2023

- Implemented a small seq2seq model using transformer structure from scratch for the task of machine translation.
- Trained the model on parallel corpus of English to French text and evaluated using BLEU metric.

Technologies

Frameworks & Tools & Libraries: PyTorch, scikit-learn, Docker, Azure, git, LangChain, SQL, transformers

Knowledge & Skills: Python, Machine Learning, Natural Language Processing, Signal Processing, Deep Learning, Generative AI, Time Series Analysis, Predictive Modelling.

Achievements

FitFest - Bosch 24: 1st Prize in Cryptography Competition and 2nd Prize in Code Generation using GenAI Competition

JEE Advanced: All India Rank 249 among 150,000+ candidates

JEE Mains: All India Rank 115 among 1,200,000+ candidates