Jyotirmoy Konwar

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Education

Rajiv Gandhi Institute of Petroleum Technology 2022 - 2027
Integrated Dual Degree (B.Tech in Computer Science & M.Tech in AI)

Experience

VANET Lab, IIT Jodhpur May 2025 - July 2025
Research Intern *Jodhpur*

- Architected a **multi-modal deep learning model** for driver behavior classification, ensuring high robustness against real-world sensor failures and missing data.
- Engineered a **three-stage training pipeline** with progressive modality dropout, achieving **98% accuracy** with minimal performance degradation 10% drop in single-modality scenarios.

Borde May 2023 - May 2025
MLOps Intern *Remote*

- Improved data quality for a **120K+ image dataset** by applying preprocessing pipelines including labeling, annotation, augmentation and segmentation using Python and OpenCV.
- **Fine-tuned and deployed YOLOv5 models on AWS and Azure GPU instances**, improving overall model accuracy by 60% and enhancing precision on low-performing labels by 150%.

Speech Lab, IIT Guwahati May 2024 - July 2024
Research Intern *Guwahati*

- Applied **Machine Learning (SVM, KNN)** and **Deep Learning (ResNet, MobileNet)** models to a Speech Recognition task, achieving **88%** and **96%** accuracy, respectively.
- Built a GUI-based cluster visualization tool using **MFC in C++** to display audio feature groupings from classification models using **t-SNE**.

Projects

- **Smart Product Pricing Ensemble Model**: October 2025
  - Engineered a high-performance Multi-Modal Architecture to predict product pricing, achieving **rank 52** out of 9k+ teams in **Amazon ML Challenge 2025**.
  - Implemented a dual-stream feature extraction pipeline, leveraging **DeBERTa** and **ELECTRA** for deep semantic analysis of textual data and **CLIP-ViT** for visual feature extraction from product images.
  - Designed a novel fusion mechanism using **attention layers** to dynamically weigh text and image embeddings, and integrated **residual blocks** to stabilize the final prediction head, significantly boosting model accuracy.
- **Multi-View Multi-Objective Extractive Summarizer**:
  - Designed a **multi-objective clustering framework** using **NSGA-II** (Non-dominated Sorting Genetic Algorithm) to automatically determine optimal number of clusters by optimizing Silhouette Score, PBM Index, and Davies-Bouldin Index.
  - Integrated **multi-view document representations** by combining **TF-IDF, BERT, and FinBERT embeddings**.
  - Evaluated against **ChatGPT (GPT-3.5) and Gemini 2.5 Flash**, achieving **ROUGE-1 (0.36), ROUGE-2 (0.17), ROUGE-L (0.23)**, demonstrating improved content relevance and coherence in extractive summarization.
- **Agent Derma Doc Chatbot**: September 2022 - October 2022
  - Developed and deployed an **Agentic Multimodal Medical RAG Chatbot** on **Hugging Face Spaces** using Gradio, combining a **fine-tuned Swin Transformer** for real-time skin disease classification with a **Retrieval-Augmented Generation (RAG)** pipeline for accurate medical question answering.
  - Fine-tuned and integrated **Qwen 2.5 1.5B** with HuggingFace, LangChain and Pinecone to deliver context-aware, retrieval-enhanced medical responses from curated medical documents.

Publications

- P. Saikia, **J. Konwar**, **"Image Deepfake Generation and Detection: Survey"**, (Manuscript in preparation for IEEE Transactions, 2025)

Achievements

- **Ranked 52 in Amazon ML Challenge 2025** all over India.

Skills

- **Programming Languages**: Python, C/C++, Matlab, Bash, SQL
- **Areas of Interest**: Machine Learning, AI, Data Science, Deep Learning, NLP, Computer Vision, Generative AI, RAG, MLOps, LLMOps, Transformers
- **Libraries & Frameworks**: PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, Hugging Face, NLTK, LangChain, LangGraph, Librosa, NumPy, Pandas, Matplotlib, Seaborn, MongoDB, PostgreSQL, Power BI
- **MLOps & Deployment**: MLflow, DVC, Apache Airflow, Docker, FastAPI, Flask, Weights & Biases (WandB), ChromaDB, Pinecone, Azure, AWS, AWS Sagemaker, Git, VS Code, Jupyter, Linux, Postman, Raspberry Pi, Ollama, llama.cpp