Jyotirmoy Konwar

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Education

Rajiv Gandhi Institute of Petroleum Technology, Integrated Dual Degree 2022 – 2027
Master of Technology in **Artificial Intelligence**
Bachelor of Technology in **Computer Science and Engineering**

Experience

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

- Developed a **multi-modal deep learning model** for driver behavior classification, integrating vehicular and physiological time-series data, ensuring robustness against missing sensor modalities.
- Designed a **three-stage training pipeline** incorporating progressive modality dropout and custom loss functions, reaching 98% accuracy and <10% drop in single-modality scenarios.
- Implemented **cross-modal attention mechanisms** and **adaptive fusion techniques**, improving model robustness against real-world sensor failures through stratified sampling.

Data Science Intern May 2023 - May 2025
Borde – Remote

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

Research Intern May 2024 – July 2024
Speech Lab, IITG – North Guwahati, Assam

- Extracted **MFCC** features from bi-lingual audio (Hindi and English) and applied feature engineering for downstream speech recognition tasks using Python and Librosa.
- Developed **SVM** and **KNN** in **C++** and **Deep Learning classifiers (ResNet and MobileNet)** in **PyTorch** to recognize spoken letters, achieving 91% classification accuracy.
- 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 [GitHub Repo]

- Engineered a high-performance Multi-Modal Architecture to predict product pricing, placing in **rank 52** out of 6,696 in the **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 robust visual feature extraction from product images.
- Developed 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 [GitHub Repo]

- Designed a multi-objective clustering framework using **NSGA-II** to automatically determine the 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** to capture lexical, general semantic, and financial domain-specific information.
- Evaluated against **ChatGPT(GPT-3.5)** and **Gemini 2.5 Flash**, achieving ROUGE-1 **(0.36)**,ROUGE-2 **(0.17)** and ROUGE-L **(0.23)**, demonstrating improved content relevance and coherence.

Agentic Medical RAG Chatbot for Skin Disease [GitHub Repo]

- Developed and deployed an **Agentic Multimodal Medical RAG Chatbot** on **Hugging Face Spaces** using Streamlit, 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 **Gemma3 270M** with HuggingFace, LangChain and ChromaDB to deliver context-aware, retrieval-enhanced medical responses from curated medical documents.

Publications

Multi-View Multi-Objective Clustering for Extractive Document Summarization

S. Mishra, ***J. Konwar***, M. Aggarwal

Manuscript in preparation: Target EACL 2025

Achievements and Extracurriculars

Ranked 52 in Amazon ML Challenge 2025 out of 6696 teams all over India.

IEEE RGIPT Chapter – Collaboration and Media Head (2024–2025), responsible for outreach and branding for technical workshops, webinars, offline seminars and hackathons.

RGIPT Music Club - Guitar Head (2023–2025), responsible for guitar-related instruments and equipment, taught guitar to music club members.

Represented RGIPT in **Udghosh, IIT Kanpur (2023)** as part of the official football team.

Secured **6th position** in **Solo Instrumental (Guitar)** at **Antaragni, IIT Kanpur (2024)**.

Served as **Music Events Head, Kaltarang 2025** — led coordination of 8 musical events with 200+ participants.

Skills

Programming Languages: Python, C/C++, Matlab, Bash, SQL, JavaScript, HTML, CSS

Areas of Interest: Machine Learning (Supervised and Unsupervised), Artificial Intelligence, 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, Streamlit, Gradio, Weights & Biases (WandB), ChromaDB, Azure, AWS, Git, VS Code, Jupyter, Linux, Postman, Raspberry Pi, Ollama