

# Arnab Mandal

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## EDUCATION

### Shiv Nadar University

B.Tech in Computer Science Engineering (**8.46/10.0**)

Noida, Delhi-NCR, India

Aug'23 - July'27

### Heera Lal Public School, Class XII

Percentage : **91%**

Madan Pur Dabas, Delhi-NCR, India

May'23

### Navy Children School, Class X

Percentage : **97%**

Visakhapatnam, Andhra Pradesh, India

May'21

## EXPERIENCE

### AI Engineer Intern, DeepLure Research Pvt Ltd, Amravati

Dec'25 - Present

- Working on optimizing GPU usage and balancing hardware load during inference requests from 50+ concurrent clients.
- Business Impact: Projected Increase in resource utilization by 30% and reduction in cloud infrastructure costs by 20%.

### LLM Intern, Critical AI Pvt Ltd, Bengaluru

July'25 - Sep'25

- GenAI Audio & Image based narrative creation using Meta's **Llama-3.2-8B**

- Built multimodal RAG pipelines (FAISS, llama-cpp, OSM, TTS, STT, MongoDB) behind FastAPI microservices.
- Business Impact: Expanded feature coverage and improved functionality by over 50% of base provided console.

### AI Intern, WESEE, Ministry of Defence, New Delhi

May'25 - July'25

- Data Analysis and Report Generation Agent with MCP architecture

- Designed a LangGraph agent over SQLite (SQLAlchemy) with tool-use for reporting; and Dockerized the service.
- Business Impact: Cut SME report prep time by 90% and enabled streaming responses.

- YOLOv8 Object Detection and Tracking with automated selenium web-scraped datasets

- Trained YOLOv8 on 2000 images & 5 classes (selenium-scraped), achieving 94% on mAP@50 & 68% on mAP50-95.
- Business Impact: Improved reliability of real-time usage by more than 50%.

## PROJECTS

### Krishi AI Sahayak - empowering farmers with smarter, data-driven agriculture

- Engineered pipeline with linear regression, result validation, market-aware recommendations, and in-memory assistant.
- Built, dockerized and deployed backend, **winning Smart SNU Hackathon** among 46 competing teams.
- Technology Stack: numpy, langchain, matplotlib, pandas

### XLM-RoBERTa based Multi-Lingual sentiment analysis with auditory input support

- Developed FastAPI service that applies multi-modal analysis of input, with 5 supported languages scoring 73% accuracy.
- Architected STT service, trained transformers on text and CNNs on audio, and fused predictions via MLP.
- Technology Stack: PyTorch, scikit-learn, FastAPI, transformers

### GPT-2 Style LLM creation and Meta LLaMA-3.2 8B LoRA fine-tuning for Data Science workloads

- Implemented GPT-2 (MHA, GELU) from scratch; KV-cache raised throughput 5x on RTX 4060.
- Fine-tuned Meta LLaMA-3 8B employing PEFT training using LoRA, and quantized it to Q5K-M as a GGUF.
- Technology Stack: PyTorch, TikToken, Unslloth, Transformers, PEFT, HuggingFace

### Graph-RAG Text-to-SQL Agent for Enterprise Databases

- Engineered Text-to-SQL agent using LangGraph, tested over 43 tables and 62 relationships in a 1GB warehouse.
- Built graph-supervised, RAG-indexed pipeline to improve multi-join query generation by 33% on custom benchmarks.
- Technology Stack: Uvicorn, LangChain, LangGraph, Gemini, NetworkX, React.js

## TECHNICAL SKILLS

**Languages** Python, SQL, Rust, CUDA

**AI & ML** PyTorch, scikit-learn, Transformers, XGBoost, Optuna, vLLM, llama-cpp-python

**MLOps/DevOps** Docker, FastAPI, Kubernetes, Jenkins, MLflow, DVC, Comet-ML

## ACHIEVEMENTS

- Smart SNU Hackathon'25 Winner Led a 6-member team to build and deploy the Krishi AI Sahayak app.
- Semifinalist speaker at SMVIT Parliamentary Debate'24
- Dean's list: Monsoon'23