HARSHIT TIWARI | 24AG66R12

AGRICULTURAL SYSTEMS AND MANAGEMENT

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2026	M.TECH	IIT Kharagpur	8.76 / 10
2024	B.Tech (Agricultural Engineering)	S.V.P.U.A.T., MEERUT, UP	8.398 / 10
2019	HIGHER SECONDARY	Gyan Sthali Academy, Auraiya, UP	76.4%
2017	SECONDARY	S. S. A. Vidyapeeth, Agra, UP	10 / 10

INTERNSHIPS

Generative AI Intern | Euphoria Infotech India Limited [May 2025 –July 2025]

Overview: Worked on AI-driven document intelligence and multilingual retrieval using LLMs, RAG pipelines, and OCR for education.

- Built an advanced multilingual **RAG chatbot** with LangChain, **HuggingFace**, **ContextualCompressionRetriever**, and **Groq LLMs**.
- Developed retrieval pipeline with **MultiQueryRetriever**, **LLMChainExtractor**, and **ChatMessageHistory** for contextual responses.
- Implemented efficient summarization with Groq LLM, advanced chunking techniques, and **ChromaDB** for semantic document processing.
- Designed Streamlit interface supporting **language detection, multilingual translation**, and interactive real-time chatbot responses.
- Contributed to a robust secure document scanner integrating **OCR** and AES-256 encryption for academic assessment workflows.

PROJECTS

Agentic Financial Analysis AI using LangGraph and RAG | Individual Project

- Designed an agentic financial analysis platform using **LangGraph** to orchestrate, multi-step reasoning workflows across **AI agents.**
- Implemented **retrieval-augmented generation** pipeline using **LangChain** and **FAISS** for contextual querying of financial reports.
- Integrated real-time market data ingestion using yFinance to enable stock trend analysis and financial metric extraction.
- Built specialized agents for financial forecasting, report interpretation, and intelligent conversation over structured and unstructured data.
- Developed scalable **FastAPI** supporting PDF ingestion, execution, and production-ready deployment of AI-driven financial systems.

Impact of Soil Quality on Crop Growth Analysis | Prof. Subhamoy Mandal

- Conducted data-driven analysis to evaluate the influence of soil and environmental parameters on crop growth outcomes.
- Performed data cleaning, normalization, and feature engineering to prepare dataset for statistical and **machine learning** analysis.
- Applied clustering and predictive modeling techniques to study crop suitability under varying soil and climatic conditions.
- Visualized soil-crop relationships using statistical plots to interpret trends and support agronomic decision-making processes.

Walmart Sales Analysis with Python and SQL | Individual Project

- Executed data preprocessing in **Pandas**, resolving duplicates, handling missing values, and normalizing inconsistent column formats.
- Built automated Python pipeline using Kaggle API to extract and load a 10,000-row dataset into **PostgreSQL** database.
- Integrated Python and **SQL** workflows using SQLAlchemy to enable efficient data storage, querying, and analysis.
- Wrote and optimized advanced SQL queries to analyze revenue distribution, branch performance, and daily sales trends by shifts.
- Identified a 62% revenue decline in lowest-performing branches and peak 4,636 transactions during afternoon sales shifts.

ML and NLP Systems for Intelligent Spam Detection | Individual Project

- Designed an end-to-end spam detection system prioritizing business-critical precision to prevent misclassification of legitimate messages.
- Implemented **NLP** preprocessing pipeline including **tokenization**, stopword removal, stemming, and **TF-IDF** with 3000 features.
- Trained Multinomial Naive Bayes model achieving 94.9% accuracy and 100% precision by minimizing false-positive predictions.
- Experimented with stacking classifiers achieving higher accuracy, but rejected due to reduced precision and increased false positives.
- Selected final model based on domain-driven metric tradeoffs, prioritizing user trust over marginal accuracy improvements.

SKILLS AND EXPERTISE

Languages: Python, SQL
AI &Machine Learning: NLP, Generative AI, Agentic AI, Machine Learning, Deep Learning, LLMs, Retrieval Augmented Generation, Multi-Agent Workflow, Forecasting, Agents
Model Development &Optimization: LLM Fine-Tuning, LoRA, QLoRA, PEFT, Feature Engineering, Exploratory Data Analysis, Statistics
Frameworks &Libraries: Scikit-learn, Pandas, NumPy, NLTK, Hugging Face Transformers, LangChain, LangGraph, LangSmith, Matplotlib, TensorFlow
Databases &Vector Stores: MySQL, FAISS, ChromaDB
Tools &Platforms: Git, GitHub, Jupyter Notebook, Hugging Face Hub, Docker, MCP (Model Context Protocol), FastAPI
Soft Skills: Time Management, Problem Solving, Teamwork, Adaptability, Communication, Critical Thinking

COURSEWORK INFORMATION

Introduction to Programming | Geo-Informatics for Land and Water Resources | AI Applications in Agriculture | Digital Soil Mapping | Systems Approach in Agriculture

CERTIFICATIONS

Fundamentals of AI Agents Using RAG and LangChain: Coursera
Complete Data Science, Machine Learning, Deep Learning, NLP, Bootcamp: Udemy
Databases and SQL for Data Science with Python: Coursera

POSITIONS OF RESPONSIBILITY

PG Student Mentor | Student Welfare Group &Postgraduate Student's Council | IIT Kharagpur **[Sep'25-Till Date]**
Wing Representative | Pt. Madan Mohan Malaviya Hall of residence, IIT Kharagpur **[Sep'25-Till Date]**