# DHRUV MENDIRATTA

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AI Engineer | LLMs & RAG Systems | Full-Stack Developer |

## Summary

Final-year Computer Science student with hands-on experience developing Retrieval-Augmented Generation (RAG) AI systems during a Generative AI internship at EY, leveraging tools like LangChain, FAISS, and Gemini APIs. Strong foundation in cloud computing through an AWS-focused internship at Deloitte, optimizing deployments using EC2, S3, and Lambda. Published researcher in applied deep learning, with contributions in CNN, GAN, and hybrid LSTM-GRU models for finance and medical imaging. Skilled in building full-stack AI products using Python, FastAPI, React, and PostgreSQL. Passionate about developing scalable, human-aligned AI solutions that bridge research and real-world impact.

## Experience

- **Ernst & Young (EY) [🌐]** *May 2025 - Present*
  *AI Intern – Generative AI & RAG Systems* Delhi, India
  - Developed RAG-based enterprise AI chatbots using LangChain, FAISS, and Gemini APIs to enhance internal knowledge retrieval workflows.
  - Designed and optimized LLM pipelines integrated with proprietary document stores, improving response relevance and latency.
  - Built scalable ingestion systems with chunking strategies and efficient embedding models to improve contextual accuracy by 30
  - Collaborated cross-functionally to implement prompt engineering, vector store tuning, and pipeline deployment using modular workflows.
  - Contributed to internal automation tools focused on knowledge access and compliance documentation.

- **Deloitte Touche Tohmatsu India LLP [🌐]** *May 2024 – Jul 2024*
  *Software Engineering Intern – Cloud Computing (AWS)* Gurugram, India
  - Completed an intensive internship focused on cloud computing fundamentals and AWS services including EC2, S3, and Lambda.
  - Participated in the development of cloud-based solutions with guidance from senior engineers, gaining exposure to deployment workflows and infrastructure design.
  - Learned best practices in cloud architecture, cost optimization, and real-time monitoring.
  - Contributed to internal documentation and knowledge-sharing sessions around DevOps tooling and AWS ecosystem.
  - Developed adaptability, communication, and teamwork skills in a fast-paced, professional environment.

## Education

- **Manipal University Jaipur** *Sep 2022 - Present (Expected Graduation: 2026)*
  *B.Tech in Computer Science and Engineering* Jaipur, India
  - **Relevant Coursework:** Data Structures & Algorithms, Machine Learning, Artificial Intelligence, Cloud Computing, Database Systems, Operating Systems
  - **Achievements:**
    * Student Excellence Award for outstanding overall performance (5th semester & 6th semester)
    * Active Member – Google Developer Student Club (GDSC) – AI/ML & Full Stack Domains
    * Published 3 AI-focused research papers (Deep Learning, RAG Systems, Stock Forecasting)

- **The Vivekanand School** *July 2022*
  *Class XII* Delhi, India
- **Somerville School Noida** *July 2020*
  *Class X* Noida, India

## PROJECTS

- **Unified Knowledge Platform - An Enterprise RAG Chatbot:** *May 2025 - July 2025*
  *Tech Stack: [LangChain, FAISS, Gemini APIs, Python, LLMs]* [GitHub]
  - Developed an internal enterprise chatbot using Retrieval-Augmented Generation (RAG) techniques for efficient document retrieval and question answering.
  - Integrated vector search (FAISS) with Gemini APIs and LangChain pipelines for improved contextual accuracy.
  - Contributed to prompt engineering, document chunking, and embedding optimization, leading to a 30% gain in response relevance.
- **CrisisReport- A Crowd-Sourced Disaster Reporting tool:** *May 2025 - July 2025*
  *Tech Stack: [React.js, Flask, MUI, Leaflet.js, Axios, Framer Motion, REST APIs]* [GitHub]
  - Built a full-stack crowdsourced disaster reporting platform enabling real-time incident submission, live feeds, donations, and emergency resources.
  - Developed REST APIs using Flask with CORS support and integrated an interactive frontend using React, MUI, and Leaflet.js for map-based reporting.
  - Enabled secure cross-origin data flow, drag-and-drop uploads, and animated user experience, enhancing usability during critical situations.
- **Hybrid Stock Price Prediction – LSTM + GARCH** *Jan 2025*
  *Tools: [Python, TensorFlow, Keras, Pandas, ARCH, Matplotlib]* [GitHub]
  - Designed a hybrid model combining LSTM (time-series) and GARCH (volatility modeling) for S&P 500 data forecasting.
  - Achieved high prediction accuracy ($R^2$ = 0.9901, RMSE = 0.0125) and submitted findings for academic publication.
  - Conducted feature engineering, cross-validation, and error analysis using visualization tools.
- **Product Sentiment Analyzer (Full-Stack NLP App)** *March 2025*
  *Tools: [FastAPI, React, NLTK, PostgreSQL, Chart.js]* [GitHub]
  - Designed and implemented a custom sentiment analysis algorithm using NLTK, capable of classifying product reviews into positive, neutral, and negative categories.
  - Built and deployed a FastAPI backend for processing and analyzing user-submitted reviews in real-time.
  - Developed a responsive React frontend with dynamic graphs and visual sentiment indicators for improved UX.
  - Implemented keyphrase extraction to highlight core customer feedback themes.
  - Integrated PostgreSQL for data storage and created preprocessing pipelines for structured review datasets.
- **Railway Ticketing Chatbot (Rule-Based NLP)** *May 2025*
  *Tools: [Python, NLTK]* [GitHub]
  - Built a rule-based chatbot simulating a train ticket booking flow using keyword mapping and intent matching.
  - Designed a text interface and input validation pipeline for a streamlined booking simulation..
  - Applied early NLP techniques to classify queries and respond contextually.

## PUBLICATIONS

C=CONFERENCE, J=JOURNAL

**[C.1]** Dhruv Mendiratta, et al. (2025). **Skin Disease Detection using Deep Learning: A Comparative Analysis of CNN Models on the ISIC Dataset**. In *2nd International Conference on Computing and Machine Learning (CML 2025), Sikkim Manipal University*

- Designed a hybrid model combining CNN, GAN, and XGBoost to classify skin diseases from dermoscopic images.
- Achieved 96.3% accuracy, outperforming EfficientNet and ResNet; used Grad-CAM and saliency maps for interpretability.

**[C.2]** Dhruv Mendiratta, et al. (2025). **Enhanced Stock Market Forecasting Using Hybrid BiLSTM-GRU Models** . In *ICAESRTA – 2K25, Karmaveer Bhaurao Patil College of Engineering*

- Developed a hybrid deep learning model for S&P 500 stock prediction, integrating BiLSTM and GRU architectures.
- Achieved $R^2$ = 0.9901, MAE = 0.0101, and RMSE = 0.0125 using rigorous preprocessing and cross-validation.

**[J.1]** Aryan Gupta, Dhruv Mendiratta, Author 3, et al. (Year). **Driving Medical Diagnostics Forward: The Role of AI in Innovation and Implementation** . *Cuestiones de Fisioterapia*, Vol. 52, Issue 2, pp. 155-184. DOI: Cuest.fisioter.2025.54(2):155-184

- Reviewed the role of AI in radiology, dermatology, and pathology, with focus on diagnostic accuracy, clinical integration, and ethical challenges..
- Explored applications of AI-driven image analysis, disease classification, and workflow automation in healthcare systems.

## Skills

- **Programming Languages:** Python, C, SQL, HTML, CSS, JavaScript
- **Data Science Analysis:** NumPy, Pandas, Matplotlib, Seaborn, GARCH, ARCH, Feature Engineering, Model Evaluation ($R^2$, RMSE, MAE)
- **Database Systems:** PostgreSQL, MySQL, MongoDB
- **Data Science & Machine Learning:** Scikit-learn, TensorFlow, Keras, CNN, LSTM, BiLSTM-GRU, GANs, XGBoost
- **Cloud Technologies:** AWS (EC2, S3, Lambda), Gemini APIs, Cloud Architecture Optimization
- **DevOps & Version Control:** Git, GitHub, CI/CD Basics, Docket, VS Code
- **Specialized Area:** LLMs, LangChain, Retrieval-Augmented Generation (RAG), Prompt Engineering, FAISS
- **Mathematical & Statistical Tools:** ARCH/GARCH models, Time Series Analysis, Probability & Stats, Regression Analysis, Statistical Inference
- **Other Tools & Technologies:** FastAPI, React, Node.js, Chart.js, REST APIs,JIRA
- **Research Skills:** Comparative Model Evaluation, Academic Writing, Dataset Curation, Paper Presentation, Literature Review, Explainability Techniques

## Honors and Awards

- **Student Excellence Award - August 2024** *Sept 2024*
  *Manipal University Jaipur*
  ◦ Awarded for learning and contribution during the AWS-focused internship at Deloitte Touche Tohmatsu LLP
- **Student Excellence Award - March 2025** *May 2025*
  *Manipal University Jaipur*
  ◦ Honored by university for publishing peer-reviewed research on AI-driven medical diagnostics in an international journal
- **HACKX Hackathon – Round 2 (2024)** *2024*
  *HACKX, Manipal University Jaipur*
  ◦ Advanced to the final round of a university-level hackathon hosted by Manipal University Jaipur
- **Paper Presentation – CML 2025, Sikkim Manipal University** *2025*
  *Sikkim Manipal University*
  ◦ Presented research paper on Skin Disease Detection using Deep Learning
- **Paper Presentation – ICAESRTA 2K25, KBP College of Engineering** *June 2025*
  *KBP College of Engineering*
  ◦ Presented research on hybrid stock forecasting using BiLSTM-GRU models

## Certifications

- **Deloitte:** Internship Certificate – Cloud Computing & AWS (EC2, S3, Lambda)
- **Ernst & Young:** Internship Certificate – Summer Intern - RAG System)
- **NPTEL:** Design & Analysis of Algorithms (SWAYAM, Govt. of India)
- **Oracle:** Java Foundations
- **AWS Academy:** Cloud Foundations
- **Cisco:** Certified Cybersecurity Specialist
- **IBM:** Getting Started with Enterprise AI
- **Vanderbilt University:** MATLAB for Data, Signal & Image Analysis
- **Great Learning:** HTML Tutorial
- **Great Learning:** CSS Tutorial
- **Great Learning:** Introduction to JavaScript

## Additional Information

**Languages:** English (Fluent), Hindi (Native)
**Interests:**Generative AI, Research Writing, Financial Markets, Technology Blogging, Building AI Bots