Uday Tyagi

B.Tech. Civil Engineering
UG(3rd Year V Semester)
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Registration No: B.Tech./CE/23113155/2023

Indian Institute of
Technology
Roorkee

Area of Interest

Data Structures and Algorithms, Software Development, Machine Learning

Education

Year	Degree/Examination	Institution/Board	CGPA/Percentage
2025	B.Tech. 3rd Year	Indian Institute of Technology, Roorkee	*8.34*
2023	Twelfth	CCDPS , Ghaziabad (CBSE)	*93%*
2021	Tenth	CCDPS , Ghaziabad (CBSE)	*93.2%*

Hackathons

ReImagine Hackathon   July-august 2025

MERN STACK | Web Development |Bhopal

- **Round 1:** Developed a responsive, interactive website using HTML, CSS, and JavaScript. Utilized jQuery for DOM manipulation, Swiper.js for sliders/carousels, and optimized performance with asynchronous JavaScript. Ensured compatibility across devices with responsive design principles.

- **Round 2:** Built a scalable web application with Next.js for server-side rendering, improving load times and SEO. Leveraged Tailwind CSS for rapid, modern UI design and Framer Motion with React.js for animations and enhanced user experience.

  Hosted Link: https://chintu-developers-reimagine-round2.vercel.app/

Projects

Super-Resolution of MODIS Satellite Data Using Deep Learning
Ongoing Research Project | Remote Sensing & Deep Learning | Prof. Prakhar Mishra |IIT Roorkee   *Jan.2025-present*

- Designed a deep learning pipeline to enhance **MODIS Land Surface Temperature (LST)** data from **1 km to 250 m** resolution using an upgraded **MRU-Net** architecture.

- Replaced standard **ReLU** activation with the experimental **MESH** function to improve non-linearity handling and gradient flow in high-resolution reconstruction tasks.

- Refactored existing **TIFF processing scripts** to support MODIS-specific **LST GeoTIFFs**, enabling robust and efficient data parsing for training and inference.

- Re-engineered the training framework to be **fully compatible with Windows**, removing hardcoded Linux-only dependencies (e.g., pyms) and improving accessibility across platforms.

- Updated the training dataset configuration from **4 km → 1 km** to **1 km → 250 m**, targeting higher fidelity outputs with a **4× resolution enhancement**.

- Project is under active development with ongoing improvements in training pipeline, model architecture, and data preprocessing to achieve optimal performance.
Github: https://github.com/20-uday-06/super-resolution.git

Market Segmentation AI Assistant using Fine-Tuned LLMs
Gen *AI + Web Development*   *April 2025*
•Developed an intelligent assistant that generates detailed market segmentation tables from startup idea inputs, following the MIT Martin Trust Center's framework.

• Fine-tuned two open-source LLMs (LLaMA 3.2 and Gemma 3) on a curated dataset derived from MIT's Entrepreneurship Market Segmentation PDF to align outputs with academic-quality frameworks.

• Engineered a web-based UI allowing users to input startup ideas and receive segmentation tables including fields like End User, Task, Benefits, Urgency of Need, and Example End Users.

• Customized the training data pipeline to convert PDF material into structured prompt-response pairs for domain-specific fine-tuning.

• Successfully integrated both models in a unified workflow, ensuring smooth inference and output comparison via a user-friendly web interface.
Github: https://github.com/20-uday-06/Market-Segmentation.git

Trading Finance Assistant using Multi-Agent RAG Architecture
Gen AI + FinTech + RAG + Microservices + MLOps (FastAPI, Docker, Streamlit, LangChain, Whisper)   June 2025
• Designed a modular, multi-agent system with specialized agents (API, Scraping, Retriever, Analysis, Language, Voice) orchestrated via FastAPI microservices, ensuring scalability and maintainability.
• Implemented Retrieval-Augmented Generation (RAG) pipelines using Pinecone for precise financial document and API-based information retrieval.
• Built robust data ingestion pipelines integrating custom API clients (Yahoo Finance, AlphaVantage), document loaders, and web scrapers, enhancing the system's data coverage and reliability.
• Deployed the entire system as a containerized (Docker), voice-enabled Streamlit application with Whisper STT/TTS, supporting seamless verbal and textual market brief delivery.
Github: https://github.com/20-uday-06/finance-assistant.git

Credit Card Default Prediction Using Classification and Risk-Based Techniques
Finance Club IIT Roorkee | Data Science & ML Project | Python, Scikit-learn, LightGBM, XGBoost   *May 2025*

- Built a binary classifier on 30K+ customer records to predict monthly credit card defaults; addressed class imbalance (89:11) using SMOTE.
- Performed EDA and financial feature engineering to extract meaningful behavioral insights and improve model accuracy.
- Trained and compared models including Logistic Regression, Decision Tree, XGBoost, and LightGBM; selected LightGBM as best performer.
- Achieved 94.79% Accuracy, 97.06% Precision, 92.39% Recall, 94.67% F1-Score, and 94.79% AUC-ROC.

Github: https://github.com/20-uday-06/Credit-Card-Default-Prediction.git

———— Skills

Web Development
 Frontend: HTML5, CSS3, JavaScript, React.js, Next.js, Tailwind CSS, Bootstrap, Framer Motion, GSAP,Swiper.js, jQuery
 Backend: Node.js, Express.js
 Database: MongoDB, SQL
 Tools & Deployment: Git, GitHub, Vercel, Netlify, GitHub Pages, Figma

Machine Learning, Deep Learning & AI
 Core Concepts: Supervised Learning, Unsupervised Learning, Self supervised Learning, Regression, Classification, Decision Trees, SVM, KNN, PCA, K-Means Clustering, Regularization (L1, L2), Gradient Descent, Cross-validation, Model Evaluation (Precision, Recall, F1-Score, ROC-AUC)
 Deep Learning: Neural Networks, CNN, RNN, LSTM, Transformers, U-Net, MR-U-Net, GAN, SRGAN
 NLP & LLMs: LLM Fine-tuning (LoRA, QLoRA, PEFT), Retrieval-Augmented Generation (RAG), LangChain, SentenceTransformers
 Libraries & Frameworks: Scikit-learn, TensorFlow, Keras, PyTorch, NumPy, pandas, Matplotlib, Seaborn
 Deployment: FastAPI, Docker, AWS

Operating Systems: Ubuntu Linux , Windows

Other Technical Skills :127 WPM Typing Speed (monkeytype.com/profile/0uday6)

———— Awards / Scholarships / Academic Achievements

- **Awarded Medal** on **Institute Research Day (IRD) 2024** for the Tinkering and Mentoring Project (TMI), titled **"Development of Gravity Compensation Mechanism to Meet Experimental Space Conditions."**

- **Shri Ishwar Dayal Singhal Cash Award**
Awarded ₹20,000 for securing outstanding marks in the course Geospatial Engineering, 2025, IIT ROORKEE