



# Nitish Bhardwaj

B.Tech. Graduate  
in Artificial Intelligence and Data Science  
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Portfolio

## EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B. Tech.	Indian Institute of Technology Jodhpur	8.31	2021-2025
Senior Secondary	CBSE Board	95.8%	2021
Secondary	ICSE Board	98.0%	2019

## WORK EXPERIENCE

### • Generative AI Research and Development Intern

Jodhpur, Rajasthan

Ministry of Education (Project under IIT Jodhpur) | Supervisor: Dr. Angshuman Paul

May 2024 – Nov 2024

- Designed the architecture of a **generative model** that captures the **spatial** and **temporal** patterns of **traffic scenarios** for 90 different locations in Jodhpur city and generates future timestamp scenarios constrained by urban town planning.
- Developed and implemented various **loss functions** related to **generation**, **causality**, and **pollution minimization** for model training.
- Achieved a **10% decrease in pollution levels** in the current base model, as evidenced by different pollutant level criteria in simulation comparisons using VISSIM software.
- Integrated an LLM using the **Chain-of-Thought Prompting** technique to take additional **user input** and perform conditioned generation of traffic scenarios.

## COURSE PROJECTS

### • SafeLens - Foundational Model for Safe Content

Oct. 2024 - Nov. 2024

Instructor: Dr. Mayank Vatsa | Tech Stack: Python, Transformers, Numpy, Pandas, Matplotlib, PyTorch

Github

- Curated the SafeLens dataset with **900 samples** across text, image, and audio modalities, divided into safe and unsafe content, and further classified into specific categories.
- Fine-tuned **nine pre-trained models** across different modalities for binary classification and benchmarked their performance on metrics like **accuracy**, **precision**, **recall**, and **F1-score**, identifying strengths and limitations of each model in nuanced unsafe categories.
- Integrated the best-performing models, **OpenAI CLIP for images**, **OpenAI Whisper for audio**, and **Twitter RoBERTa for text**, into a unified system for evaluating content across all three modalities.

### • Taxi Demand Forecasting

April 2024 - May 2024

Instructor: Dr. Angshuman Paul | Tech Stack: Python, Numpy, Pandas, Matplotlib, PyTorch

Github

- Worked with a dataset of over **100,000 NYC taxi trip records**, handling missing values through **linear interpolation** and normalizing features for improved model performance.
- Implemented deep learning models (**LSTM**, **RNN**, **GRU**) and introduced **SeasonalNet** for enhanced seasonality handling, alongside **Periodicity-preserving Sequences (PPS)** for capturing long-term periodicity.
- Achieved a **54.8% improvement in MSE** with **LSTM + SeasonalNet and PPS**, reducing MSE from 0.000601 to 0.000273.

## OTHER PROJECTS

- Link Prediction for Knowledge Graphs Using R-GCN**: Designed and trained an **R-GCN** with **RoBERTa-based embeddings** for node and relation features using the **CoDEX dataset**. Visualized embeddings with **t-SNE**, applied **margin-based ranking loss** for link prediction, evaluated using **MRR (0.2488)** and **Hits@10 (53.39%)**, and optimized through hyperparameter tuning. | Github | Oct. 2024
- Sentiment Analyzer**: Fine-tuned a **RoBERTa model** for financial sentiment analysis (accuracy: **13% to 87%**) and deployed a **Streamlit app** for comparing results with **NLTK analyzers**. | Github | Certificate | July 2024
- Vehicle Detection and Tracking**: Build a real-time vehicle tracking system using **YOLOv8** and **SORT** algorithm, enhancing traffic management. | Github | March 2024
- Writer Verification**: Designed a model combining a **Siamese Network** and **KNN**, achieving an **85% AUC** for detecting fake authorship in documents. Ranked among the top 10 competitors nationwide in NCVPRIPG 2023. | Github | May 2023 - July 2023

## SKILLS

**Programming**: Python (MTA Certified 2022), C++, R, HTML, CSS, JavaScript | **Data Science**: Pandas, Numpy, Matplotlib, Scipy, Plotly, R Shiny | **Databases**: SQL, MongoDB, Neo4j | **ML/CV**: Scikit-learn, PyTorch, TensorFlow, OpenCV | **Model Deployment**: Flask, Streamlit, MLFlow, Docker | **Web Scraping**: Selenium, BeautifulSoup | **OS/ Others**: Windows, Linux, Git, Github, VirtualBox, Tkinter | **Research Skills**: Literature Survey, Benchmarking

## RELEVANT COURSES

Pattern Recognition and Machine Learning, Data Structures and Algorithms, Linear Algebra, Probability and Statistics, Artificial Intelligence, Deep Learning, Computer Vision, Time Series Analysis, Foundational Models and Generative AI