M Rupesh Kumar Yadav | **24M0319**
Geoinformatics | **M.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 21/03/2003

Examination	University	Institute	Year	CPI / % Credits
Post Graduation	IIT Bombay	IIT Bombay	2026	9.45 **Core:** 72 **| Total:** 120
Graduation	NIT, Andhra Pradesh	NIT, Andhra Pradesh	2024	8.56
Graduation Specialization: Computer Science and Engineering				
Intermediate	BIEAP	Sri Chaitanya Junior College	2020	9.86
Matriculation	BSEAP	Narayana E.M High School	2018	10

SCHOLASTIC ACHIEVEMENTS

- Achieved **97** Percentile in GATE **Computer Science and Information Technology**.

PUBLICATIONS

- Enhancing Hyperspectral Imagery Classification using CNN and **Vision Transformer**, submitted to **PReMI 2025**.
- Co-authored, **Graph-Based Stance Grouping in Multi-Participant Discussions** published at ICSICE 2024.
- **Quantum Convolutional Neural Networks for Slum Classification using Sentinel-2 Imagery**, under review at Quantum Information Processing (**QIP**) **Journal 2025**.

PROFESSIONAL EXPERIENCE

- **Intern | Center for Artificial Intelligence and Robotics (CAIR), DRDO** *[May'23-Jul'23]*
  - Developed and integrated YOLO models(v7,v8,Complex) for 2D/3D object detection using camera & LiDAR data.
  - Utilized **ROS2** to integrate and deploy custom detection models for **real-time**, on-vehicle testing and validation.
  - Achieved a mAP of **0.865** across diverse weather conditions by fine-tuning models on a proprietary in-house data.
- **Machine Learning Intern | Hindustan Aeronautics Ltd (HAL)** *[May'22-July'22]*
  - Engineered a **predictive** maintenance model leveraging **13 years of SQMS data** to forecast snag dispositions.
  - Attained **98.76%** testing accuracy by benchmarking a suite of ML algorithms including SVM and XGBoost etc.
  - **Delivered analytics dashboards** reducing manual reporting time by **80%** and enhance **workflow efficiency**.

KEY PROJECTS

- **AI models for Urban Informal Settlement Detection** | *M.Tech Project* *[Jun'25–Present]*
  Guide: Prof. Avik Bhattacharya
  - Benchmarked **OBIA** & machine learning models (Random Forest, XGBoost) for slum detection using Sentinel-2.
  - Developed Deep Learning pipelines using CNNs and **Quantum CNNs** for urban informal settlement classification.

  Future Work:
  - Utilize **Small Vision-Language Models** (sVLMs) like Presto for slum detection & domain generalization tasks.
  - Integrate LLMs for **advanced reasoning** and **contextual interpretation**, by incorporating geospatial context.
- **Quantum-CNN for Image Classification** | *M.Tech Seminar* | *Guide: Prof. B. Krishna Mohan [Jan'25–May'25]*
  - Implemented NEQR, FRQI, & MCQI quantum image encoding techniques for multi-band remote sensing imagery.
  - Built MQCNN for Sentinel-2 LULC classification, delivering **5%** higher accuracy than a comparable CNN baseline.
- **Deep Learning for Hyperspectral Imagery Classification** | *BTech Project* *[Feb'24-Apr'24]*
  | *Guide: Asst. Prof. Nagesh Bhattu Sristy* | *NIT Andhra Pradesh*
  - Benchmarked diverse architectures (SVM, 3DCNN, GCNs, Autoencoder, Transformers) to guide final model design.
  - Engineered a novel, **transformer**-based model for hyperspectral classification in a low-data regime (10% training).
  - Achieved state-of-the-art accuracy, including **99.80%** on the Indian Pines and **97.54%** on the PaviaU datasets.
  - First-authored a research paper on the model, presented at ICICA-2024 conference, submitted to **PReMI** 2025.
- **ProdHub: AI-Powered Personal Productivity Hub** | *Self Project* *[Jul'25-Aug'25]*
  - Architected a serverless productivity hub using **React**, **Firebase** and **gcloud** for integrated project management.
  - Integrated the Google **Gemini API** to power an AI engine for smart scheduling and context-aware task suggestions.
  - Developed an **AI based** goal decomposition feature to automatically structure high-level goals into project plans.
  - Enabled a **unified** schedule view by securely syncing Google Calendar data using secure, read-only **OAuth 2.0**.
- **Intelligent Multi-Agent Knowledge Assistant** | *Self Project* *[Jun'25-Aug25]*
  - Engineered a multi-agent system using LangChain & **Gemini** to route queries to specialized HR and Tech agents.
  - Implemented a dual-source **Hierarchical RAG** pipeline with **FAISS**, optimizing information retrieval by using **Parent-Child chunking**, Query Expansion, and **Flashrank re-ranking**, along with external python,web tools.
  - Built a robust agentic workflow with **Guardrail** & **Triage** layers, ensuring reliable, domain-specific query handling.
- **Semantic Paraphrase Identification** | *Self Project* *[Sep'24-Nov'24]*
  - Developed a **Siamese LSTM network** for NLP task of semantic paraphrase detection using the MRPC dataset.
  - Enhanced **semantic representation** using pre-trained **GloVe embeddings**, achieving **91.4% test accuracy**.
  - Built an **end-to-end** pipeline with **transfer learning** and Early Stopping, integrating **MLflow for tracking**.

- **Pansharpening-using-PCA-for-Satellite-Imagery** | *Course Project* *[Nov'24-Dec'24]*
  GNR607 | *Guide: Prof. B. Krishna Mohan*
  - Implemented a PCA-based **pansharpening** algorithm to enhance the spatial resolution of multispectral imagery.
  - Developed a data pipeline to automatically extract and process satellite imagery from Google Earth Engine (**GEE**).
  - Deployed the image enhancement model as an interactive web application using **Flask** with **PostgreSQL** database.
- **Emergency Services & Flood Zones Locator** | *Self Project* *[Oct'24-Nov'24]*
  - Developed cross-platform disaster response app with flood modeling, **PostGIS** analysis, and live emergency data.
  - Implemented **FastAPI** backend with **GiST** indexing and **Redis caching**, reducing location query times by **99**%.
  - Developed a responsive **Leaflet.js** map with interactive filters, live geolocation, and deployed on **google cloud**.
- **GeoWebClient: Interoperable GIS Web Application** | *Course Project* | *GNR629* *[Jan'25-Feb'25]*
  Advances in Geospatial Standards, Interoperability and Knowledge Discovery | *Guide: Prof. Surya S.Durbha*
  - Developed a **web client** for WMS, WFS & WCS web services using **React**, enhancing data retrieval & display.
  - Configured a full-stack GIS server using **PostGIS**, GeoServer, and Tomcat to serve spatial data via OGC services.
  - Implemented **XML parsing**, **spatial querying**, **multi-layer support** and integration with **external servers**
- **SOS WebClient: A Sensor Data Visualization Interface** | *Course Project* *[Mar'25-Apr'25]*
  GNR629 | *Guide: Prof. Surya S.Durbha*
  - Built a lightweight webclient to visualize real-time data from OGC Sensor Observation Service (**istSOS**) endpoints.
  - Implemented real-time sensor discovery, interactive map-based filtering to streamline data exploration & analysis.
- **Image Super-Resolution** | *Self Project* *[Feb'25-Mar'25]*
  - Designed a lightweight CNN in PyTorch for **4× image super-resolution** on 4,500 gaming-scene LR–HR pairs.
  - Applied **residual learning**, **PixelShuffle** upsampling, & **mixed-precision** resulting 0.56 score on joint metric.
  - Converted & deployed the model using **TorchServe** & **ONNX** for efficient inference; evaluated via PSNR, SSIM.
- **Pedestrian Tracking using DeepSort & YOLO** | *Self Project* *[Mar'24-Apr'24]*
  - Engineered and deployed a modular end-to-end **YOLOv5** + **DeepSort** pedestrian tracking pipeline via **FastAPI**.
  - Achieved 87% re-identification accuracy across different camera views using a **ResNet-50** feature extraction model.
- **RIBS Identification, Labelling and Segmentation using FPN** | *Self Project* *[Feb'22-Apr'22]*
  - Built a deep learning pipeline for rib segmentation and labeling in chest X-rays using U-Net++ (EfficientNet-B0).
  - Achieved a **Dice score** of **0.834** on the VinDr-RibCXR dataset, validated model performance on JSRT dataset.
- **Time Series Forecasting for Financial Market** | *Self Project* *[Nov'23-Dec'23]*
  - Performed **EDA** on stock market data, visualizing closing prices to uncover patterns, trends, and seasonality.
  - Applied **ADF, hypothesis tests, ACF, PACF**, and **decomposition** to assess stationarity and data quality.
  - Built ARIMA, SARIMA, & LSTM models, with stateful-LSTM achieving best performance (RMSE:10.3, R^2:0.83).
- **Financial News Sentiment Analysis** | *Self Project* *[Aug'23-Sep'23]*
  - Leveraged the Financial **PhraseBank dataset** (4,840 expert-annotated sentences) for **sentiment classification**.
  - Benchmarked BERT & DistilBERT, achieving best performance with fine-tuned **FinBERT**(Acc: 90.9%, F1: 0.91).
- **Triple GAN** | *Self Project* *[Feb'23-Apr'23]*
  - Implemented the TripleGAN architecture to generate synthetic MNIST images, reaching a peak accuracy of **99.1%**.

Academic Cources

Advanced Database Systems | Deep Learning for Vision | Big Data Engineering | Applied Machine Learning | Natural Language Processing | Social Network Analytics | Affective Computing | Human Resource Management | Soft Skills

TECHNICAL SKILLS

Programming Languages	:	Python, C/C++, Java, Javascript, SQL
AI & Data Science	:	Tensorflow, Pytorch, OpenCV, Scikit-learn, NLTK, spaCy, DVC, MLFlow, Langchain, OpenAI SDK, Hugging Face, Matplotlib
Web/App Development	:	Node.js, React, Express.js, Flask, Streamlit, FastAPI
Tools & Platforms	:	Linux, Git, MySQL, MongoDB, Tableau, PowerBI, ArcGIS, PostgreSQL, Apache Airflow, Docker, GCP, Azure, BigQuery, PySpark

POSITION OF RESPONSIBILITY

- **General Secretary | Taskforce | NIT Andhra Pradesh** *[Aug'23–Apr'24]*
  - Led **10+ institute-wide** initiatives with **45+ members**, aligning with **national programs** (ODOP, Swachh Bharat 3.0); organized **1,500+ participant** events. Directed flagship **technical & cultural festivals**, managing **15 cross-club** teams, **Rs.2.5M+** budgets, and **40+ major events**.
- **Joint Secretary | Computer Science and Engineering Association (CSEA) | NIT AP** *[Aug'22–May'23]*
  - Spearheaded CSEA initiatives (**workshops, webinars**, coding/design contests, **TECH EXPO**), engaging **500+ participants** & **industry experts**; headed design, coding & management teams, & served as **acting secretary**.

Hobbies

Swimming | Sudoku | Badminton| Photography | Gaming | Blogging | Squash