Aditya Raj

B.Tech, Electronics and Communication Engineering
National Institute of Technology, Patna
Expected Graduation: 2026

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Education

Degree/Certificate	Institute/Board	GPA/Percentage	Year
B.Tech, Electronics and Communication Engineering	NIT, Patna	8.1 / 10.0	2022–2026
Senior Secondary	CBSE	93.2%	2020–2022
Secondary	ICSE	90.2%	2010–2020

Achievements

Stanford AI Lab	Interviewed at Prof. Jiajun Wu's Lab for research position in computer vision	*2025*
NK Securities Research	Ranked $67^{th}/2095$ in **IV Prediction**; MSE = 1.3e-5	*2025*
M2L Summer School	Selected from **1600+** global applicants (**BTech to Industry**); Split, Croatia	*2025*
Amazon ML Challenge	Ranked $184^{th}/75,000+$; **F1 score = 0.4667** using fine-tuned **moondream**	*2024*
IIT ISM AI of GOD	**Winner**; **WER = 0.116** using **TrOCR + T5**; post-processing algorithm	*2024*
RMO	Top **0.4%** nationwide (classes 8–12) in **India**	*2019*

Findings

- **Knowledge is not localized circuits; it can be better understood as a network path of gated circuits**
  *Authors: **Aditya Raj** | MATS 9.0 (Neel Nanda) - Rejected*

Research

- **Knowledge Graph-Informed Query Decomposition(KG-IQD): Hybrid KG-RAG Reasoning in Noisy Contexts**
  *Authors: **Aditya Raj**, **Dr. Kuldeep Kurte**[PI] | Poster (ISWC 2025) - Rejected*

Experience

- **AI Research** — *India*
  QFI Research Capital — *May 2025 – Present*
  - Working on the research and development of an AI-driven internal memory layer for the Risk Compliance system, it autonomously analyzes trading and backtesting engine logs, identifying and preventing recurring performance and risk issues to enhance system reliability and strategic decision-making.
  - Worked on the trade execution part of the trading engine, fixed critical bugs which calculated few metrices differently, and built the complete internal tooling stack for workflow automation and business operations.

- **Research Intern** — *Hyderabad, India*
  IIIT-H | Dr. Kuldeep Kurte, Spatial Informatics Lab — *Apr 2025 – July 2025*
  - Achieved state-of-the-art results on a custom disaster QA benchmark, outperforming RQ-RAG by 14% and KG by 18%, by developing a neuro-symbolic framework that guides query decomposition using Knowledge Graphs and interrelates points with RAG on sub-queries for robust reasoning over structured and unstructured data.

- **Research Intern** — *Guwahati, India*
  IIT Guwahati | Dr. Arijit Sur — *June 2024 – July 2024*
  - Developed a robust GAN-based shape occlusion detection system using a UNet generator on a synthetic dataset of geometric shapes, effectively reconstructing overlapping shapes and occlusions.

Projects

- **IV Prediction - Indian Option Market** — *August 2023 – November 2023*
  Tools: Python, LightGBM, Pandas, NumPy
  - Secured a top 2% rank (67/4100) in NKSR Research by engineering a LightGBM pipeline that achieved an MSE of 1.3e-5 on sparse options data, utilizing nearest-neighbor TTE estimation and call/put-specific data representation.

- **Multimodal-reranker** — *March 2025 – Apr 2025*
  Tools: Python, CLIP, mxbai-embed-large-v1
  - Engineered a **multimodal reranking module** for an **AI search engine**, leveraging **Ollama LLM** for semantic filtering and JSON filter extraction from natural queries, combined with vision-language models and a fast **FAISS (HNSW + IVF) retriever** on **CLIP/mxbai embeddings**, reranking top-k results via cosine for refined search based on user intent and visual semantics.

- **OCR Model − LLM Re-correction** — *Link / Oct 2024*
  Tools: Python, OpenCV, LLMs, OCR — **Ranked 1st** on Kaggle; **Winner**, Annual ML Competition – IIT ISM
  - Engineered an OCR pipeline for medieval-era handwritten Spanish manuscripts by combining **TrOCR** for initial transcription with a **T5-based language model** for post-correction, fine-tuned on domain-specific linguistic features.
  - Designed and integrated a custom **text augmentation and similarity-preserving algorithm** to enhance LM robustness; achieved a **Word Error Rate (WER) of 0.116**, outperforming all competing models.

Technical Skills

Languages	Python, C++, SQL, HTML5, CSS, Typescript, MATLAB, BASH
ML/Stats	PyTorch, scikit-learn, TensorFlow, XGBoost, CNN, Transformers, LSTM, Catboost
Time Series	Gaussian processes, **signal smoothing**
DevOps & Tooling	Git, GitHub Actions, CI/CD, monitoring, logging — Bash, Linux (WSL/Ubuntu), Weights & Biases
Infra/Backend	**Docker**, **FastAPI**, **AWS**, Kubernetes (basic)