

# 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 <sup>th</sup> /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 <sup>th</sup> /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 mathematical olympiad(classes 8–12) in India, out of 250k students	2019

## Findings

- Knowledge is not localized circuits; it can be better understood as a network path of gated circuits  
Application: MATS 9.0 (Neel Nanda)

## Research

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

## Experience

- Founding AI Research Engineer India  
QFI Research Capital May 2025 – Present
  - Working on the data processing pipelines and statistical models to forecast timelines (e.g., product launch dates) and quantify their impact (e.g., projected revenue, market share shift), integrated with a real-time sentiment analysis engine to evaluate the outcome of market-moving events and capture both short/long-term alpha.
  - Working on the research and development of an internal memory layer for the Risk Compliance system, to autonomously analyze trading and backtesting engine logs, identifying and preventing recurring performance and risk issues to enhance system reliability and strategic decision-making.
  - Worked on the metric calculation part of the trading engine, fixed critical bugs which calculated a few metrics 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.

## Projects

- Investigating Conditional Knowledge Circuits in LLMs – TinyLlama 1.1B docs | Aug 2025 – Sept 2025  
Tools: Hugging Face, PyTorch, DPO/RLHF, Red Teaming
  - Demonstrated that LLMs retain multiple competing factual knowledge simultaneously, retrievable via trigger-activated gates without erasing original knowledge, and identified sparse mid-layer attention heads as the locus of conditional computation, revealing mechanisms for dormant knowledge and circuit interference.
  - Proving that red teaming will always be successful, as knowledge is a gated network with dams inside an LLM. Even if one circuit is removed—knowledge editing—there are others which can trigger it and are unknown until triggered, as these dams (trigger), circuit gates are interconnected with other circuits.
- 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.

## Technical Skills

Languages	Python, C++, SQL, BASH, TypeScript, MATLAB, Triton (basic)
ML/Stats	PyTorch, Hugging Face (Transformers, PEFT), TensorFlow, JAX (basic), scikit-learn, NumPy
Time Series	Gaussian processes, signal smoothing
AI Alignment	RLHF, DPO, PPO, Instruction-Tuning, Constitutional AI, Supervised Fine-Tuning (SFT)
DevOps & Tooling	Docker, Git, GitHub Actions, CI/CD, monitoring, Linux (WSL/Ubuntu), W & B
Model Interop	Logit Lensing, TransformerLens, CircuitsVis, SAE, Activation Patching, etc.