AADITYAAMLAN PANDA Portfolio

Bachelor of Technology, Indian Institute of Technology Kanpur

Major: Chemical Engineering | Minor: Economic Sciences

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ACADEMIC QUALIFICATIONS

Year	Degree/Certificate	Institute	CPI/%
2022 - 2026	B.Tech	Indian Institute of Technology Kanpur	**9.41/10**
2022	ISC (XII)	St. Joseph's Convent Higher Secondary School, Sambalpur	97.25%
2020	ICSE (X)	St. Joseph's Convent Higher Secondary School, Sambalpur	96.40%

SCHOLASTIC ACHIEVEMENTS

- Conferred **Ajai Agarwal Memorial Prize** by **Director, IIT Kanpur** for the best 4th year UG student in Chemical Engineering
- Awarded **Aedunuthula Prasad Memorial Scholarship** for the highest CPI at the end of 6th semester in Chemical Engineering
- Recipient of **Arakere and Karen Vasudev Scholarship** for the highest CPI at the end of the 2nd year in Chemical Engineering
- Bestowed with **Academic Excellence Award thrice** for consistently being among top 10% academic performers at IIT Kanpur
- Secured an **All India Rank of 4429** in **JEE Advanced 2022**, conducted by IIT Bombay, among 2,00,000+ qualified candidates
- Awarded **Pratibha Scholarship** for the years 2022-23, 2023-24, and 2024-25 by Aditya Birla Group for academic performance

WORK EXPERIENCE

Student Mentor Intern | **Rankguru Technology Solutions Pvt. Ltd. (Infinity Learn)** | Certificate *(Oct'24 – Jan'25)*

AI prototyping, API integration, and mentorship for school-level innovation initiatives

AI & API Integration	• Integrated **Cohere API** and **10 Microsoft Azure APIs** into prototypes, engineering **modular prompt flows** • Made **error-handling pipelines** and **async request orchestration** layers ensuring multi-service communication
Prototyping & Frontend	• Built **8 Python + HTML/CSS/JS** lightweight models demonstrating **E2E user flows** via **component reuse** • Achieved **60% less frontend complexity** across prototypes, adopted by **30+ hackathon teams** across events
Vision & Automation	• Developed **5 OpenCV + MediaPipe** pipelines for real-time **frame capture** and **preprocessing** for live inference • Architected a **landmark-based gesture logic** augenting **cross-demo repeatability**, and **modularity**
Mentorship & Delivery	• Prepared **12+ problem statements** and **18 working prototypes** driving **15+ school innovation initiatives** • Enabled **30+ teams** to redesign and amplify solutions through structured delivery in hackathons independently

KEY PROJECTS

Fusion RAG Pipeline for Code-Grounded Algorithm Q&A | GitHub | Live Demo *(Apr'26 - May'26)*

Overview	• Built a **RAG pipeline grounding algorithm Q&A** in ∼**1 GB** of source code from Algorithms and William Fiset
Approach	• Created **hybrid BM25 + dense retrieval** (ChromaDB, Cohere embeddings) fused via **Reciprocal Rank Fusion** • Devised **cross-encoder reranking** and query processing pipelines to improve ranking quality and retrieval precision • Engineered **language-aware chunkers** for C++/Java/Py/MD with **confidence gate** rejecting queries below **0.25**
Results	• Attained **0.87 context precision** and **0.75 context recall** on RAGAS; **30+ tests** pass including **LLM failover**
TechStack	• Python, ChromaDB, BM25, LangChain, Cohere (Embeddings + Reranker), Groq Llama 3.3 70B, RAGAS, pytest

Full-Stack VR Learning Platform with Spaced-Repetition Backend | GitHub | ▶ Play Demo *(Mar'26 - May'26)*

Overview	• Engineered a **navigable VR learning app** encoding **114 concepts**, backed by a **REST API** and an **SR engine**
Approach	• Built a **Java 21 Spring Boot REST API** with **PostgreSQL**, Spring Data JPA, and a **CSV offline fallback** • Implemented **Meta Quest based VR interaction**, raycasting selection and **WebGL + Meta Quest** deployment • Orchestrated a **priority-scored spaced-repetition** algorithm with user progress tracking and spatial encoding.
Results	• Pilot showed **+7.7 pp quiz accuracy gain**, **60.8% faster response times**, and **8.5/10 learning efficacy** rating
TechStack	• Unity 6 (URP), C#, Meta SDK, Spring Boot 3.5, Java 21, PostgreSQL, Spring Data JPA, REST APIs, WebGL

ML Attack Pipeline for XOR-Arbiter PUF Classification & Decoding | GitHub *(Mar'25 - Apr'25)*

Overview	• Designed a **polynomial feature** pipeline to model **XOR-Arbiter PUF** challenge-response using **linear classifiers**
Approach	• Derived an **85-D feature map** from PUF equations with **deg-2 polynomial** and **cumulative product kernels** • Applied a **sparse** $\pm\frac{1}{2}$ **matrix decoder** recovering per-stage hardware delay vectors from a **65-D weight vector**
Results	• Optimized the configuration to train in **0.243s** — a **25× runtime reduction** over equivalent l1-penalized variants
TechStack	• Python, NumPy, Pandas, scikit-learn (LinearSVC, RidgeClassifier), Polynomial Feature Engineering, Linear Algebra

Constrained Numerical Optimisation & PID Control for Industrial Process Simulation | GitHub *(Feb'25 - Mar'25)*

Overview	• Simulated an **industrial EB plant**, minimizing the **Total Annualized Cost** via **constrained optimisation**
Approach	• Ran **4-stage sequential sensitivity sweeps** in Aspen Plus, cutting energy load from **3,690 kW to 3,483 kW** • Deployed **MATLAB** `fmincon` over 3 variables and tuned **9 PID controllers** against ±10% feed disturbances
Results	• Reduced **TAC by 47.6%** ($3.29M → $1.72M/year) with <**0.1% steady-state error** under all disturbance cases
TechStack	• Aspen Plus, MATLAB (fmincon), Fortran, Python, PID Control, Sensitivity Analysis, Techno-economic Analysis

TECHNICAL SKILLS

Languages	C, C++, Python, Java, C#, SQL, Fortran
AI / ML & Backend	LangChain, ChromaDB, BM25, Cohere (Embed + Rerank), RAGAS, scikit-learn, NumPy, Pandas, OpenCV, MediaPipe, Spring Boot 3.5, PostgreSQL, Spring Data JPA, REST APIs, pytest
Tools & Platforms	Unity 6 (URP), OpenXR, Meta Quest SDK, WebGL, Aspen Plus, MATLAB, Git, GitHub, LaTeX

EXTRA CURRICULAR ACHIEVEMENTS

Weightlifting Team, IITK *Nov'22 – Dec'24*	• Represented IIT Kanpur at the **56th and 57th Inter-IIT Sports Meet**, contributing to strategy and performance • Secured overall **Silver Medal** at **Udghosh 2024** (IIT Kanpur Sports Festival) in under 77 kg weight category • Honoured with **Silver Medal** at **Kanpur District Weightlifting Competition, 2024** in the Junior division
Poet, Writer & Translator *Jan'20 – Present*	• Co-authored **9+ international anthologies**; received **International Youth Icon Award 2022–23** from SLF • Appointed **Literary Captain at Storymirror** and achieved **international rank 7** in Storymirror W.W.C., 2023 • Placed among honorary **top 50 Special Members** at Writer's Club, Greythoughts Info creative writing community • Translated ***"Paranani"* to English**, published in *Matruakshar* magazine as the **sole Odia-to-English translation**