Aniruddha Chattopadhyay

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Education

Indian Institute of Technology, Kharagpur 2017 – 2022
B.Tech + M.Tech in Industrial Engineering (Industrial Electronics) CGPA: 8.66/10.0
Minor in Computer Science (9.31/10) with Micro specialization in AI (8.74/10)

Experience

Senior ML Engineer | ***Full Time*** Apr. 2025 – Present
PVX Partners *Singapore*

- Researching and developing **multimodal AI agents** capable of generating real-time commentary for mobile game ads by interpreting video, audio, and on-screen text signals.
- Leveraging **vision-language models (VLMs)** and **LLMs** in a coordinated agentic framework to describe gameplay events and player actions with contextual flair reducing manual overhead by over **4hours** a day .
- Designed a **reinforcement-feedback loop** for evaluating commentary quality using engagement and semantic coherence metrics, enabling continuous model refinement.
- Optimizing the agent pipeline for **low-latency (sub 800ms), on-device (edge) inference**, allowing scalable deployment across diverse ad formats and geographies.

Applied LLM Engineer | ***Full Time*** Mar. 2024 – Apr. 2025
Maxim AI *Bangalore,India*

- Developed **LLM-based evaluators** for automated assessment using optimized **Chain-of-Thought prompting** and adaptive **LangChain** callback mechanisms reducing token spend by **90 percent**.
- Fine-tuned a **LLaMA model** on the **AI4Privacy** dataset integrated with **Presidio**, achieving **98 percent** fidelity on detection and anonymization of PII in textual data.
- Authored the **maxim-py SDK**, enabling structured logging and quantitative evaluation of LLM workflows with sub **200ms latency** overhead.
- Developed autonomous **AI red-teaming agents** using the **Garak** framework to simulate vulnerability assessments in generative AI systems.

Data Scientist | ***Full Time*** Aug. 2022 – Mar. 2024
Anheuser-Busch InBev (parent company of Budweiser, Corona) *Bangalore, India*

- Researched and deployed **unsupervised clustering models** across six European markets, informing strategic segmentation worth $2M+.
- Developed **delay-risk prediction models** for US and Canada logistics, improving forecast precision and operational reliability.
- Enhanced existing ML pipelines, achieving a **25% F1-score gain** and demonstrating significant EBITDA uplift.
- Awarded the **Pint Award** for excellence in data science research and impact delivery.

Lead ML Engineer | ***Volunteer*** Nov. 2022 – Present
Turn The Bus, NGO *Remote*

- Led research on **multimodal retrieval-augmented generation (RAG)** using ColPali over NCERT textbooks for automated doubt resolution.
- Designed the full **RAG pipeline** and model-serving stack using Flask backends and React/Kotlin interfaces.
- Integrated **OpenEDX** and Django resources to improve educational content accessibility and evaluation workflows.

Research

- **A. Chattopadhyay**, et al. — *Metatuning: Model-Grounded Symbolic Artificial Intelligence Systems Learning and Reasoning.* In: **Neurosymbolic Learning and Reasoning Conference (NeSy 2025)**, San Diego, May 2025. Proceedings to appear in *Journal of Machine Learning Research (JMLR)*. Extended version submitted to the *Neurosymbolic Artificial Intelligence (NAI)* journal. [Paper Link]

  - Developed "Metatuning" to refine LLM reasoning via iterative symbolic feedback loops.
  - Benchmarked on math and video datasets, revealing critical physical reasoning limitations.

- Evaluated with Chain-of-Thought, revealing diminishing returns for reasoning-capable architectures.
- Published in JMLR; demonstrated data-efficient alignment without expensive parameter updates.

- **D Kumar, A. Chattopadhyay**, et al. — *Tracing the Evolution of Research Topics in an Academic Genealogy Graph.* In: **Social Science Research Network**, Dec. 2024. [Paper Link]
  - Analyzed 3.2M papers of 275k researchers to model topic evolution and quantified research drift using LDA and KL-Divergence metrics.
  - Correlated topic stability with higher H-index and academic impact.
  - Awarded *Best Masters Thesis Project among a cohort of 1200 students.*

- **K Halder, A. Chattopadhyay**, et al. — *EduTree: Analysis of the Academic Genealogy of Education.* In: **ACM/IEEE Joint Conference on Digital Libraries (JCDL 2020)**, Aug. 2020. [Paper Link]
  - Designed an academic genealogy graph modeling mentorship lineages and institutional influence.
  - Applied graph-theoretic centrality and topic modeling to quantify researcher impact.
  - Revealed high-centrality mentors, pioneering institutions, and thematic research trajectories.

Entrepreneurship

2Vid | Link 2023–2025
- Developed a **UGC video generation platform** enabling AI-created content through automated **storyboarding**, **text-to-speech**, **face-swapping**, **lip-syncing**, and compositing.
- Designed and implemented **AI-driven video pipelines** using **DeepFaceLab**, **Wav2Lip**, and **OpenCV** for seamless facial reenactment and synchronization.
- Built an automated **B-roll generation system** leveraging web scraping, **video understanding models** (**Qwen2.5-VL**, **Video-LLaMA**), and **Unreal Engine** for physics-based storytelling.
- Optimized **GPU-accelerated microservices** for text-to-speech and face-swapping, achieving fast, scalable video synthesis.

Care4U (Acquired) | Link 2017–2019
- Built an AI-driven elderly healthcare app using **TensorFlow Lite** for on-device fall detection.
- Developed an **LSTM model** leveraging accelerometer and gyroscope data to detect falls in real time.
- Integrated emotion recognition, medicine reminders, and caregiver connectivity modules.
- App gained national media coverage, later **acquired by Govt. of West Bengal**, now serving **1M+** elderly users.

Competitions and Awards

International Hackathons | Link 2025
- **Winner – Daft-Daytona Hackathon:** Built an AI agent for interior design using **Gemini nano Banana** and **Nano VLM**, enabling layout-preserving redesigns; won **First Prize**.*[Link]*
- **Winner – Neo4J x SambaNova Hacknight:** Created a persistent memory system for coding agents using **Neo4J** and **SambaNova**, winning the **SambaNova Track**.*[Link]*
- **YC Overnight Hackathon:** Invited participant at the prestigious **Y Combinator** Overnight Hackathon in San Francisco.

National Hackathons | Link 2017–2024
- **Winner – EF GenAI Hackathon (2023):** Built a **prompt-to-video** engine with intelligent image selection, sentiment-based BGM, and multilingual support; winner from 200+ participants.*[Link]*
- **Winner – HSBC AI Hackathon (2018):** Built a conversational AI using **tkinter** and **MLP networks** mapping symptoms to diseases via **Neo4J**; 1st among 98 teams.*[Link]*
- **Winner – vesAIthon (2019):** Created **Care4U**, an AI-driven elderly healthcare app with fall detection, mood recognition, and chatbot; later acquired by Govt. of West Bengal.*[Link]*
- **Other Achievements:** Runners-up at **Smart India Hackathon** (2020); Finalist among 1400+ teams at **NEC AI for Transportation** Hackathon (2021); Finalist in 5+ national AI hackathons focused on social good and automation.*[Link]*