PRITAM PATRA

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EDUCATION

Guru Nanak Institute of Technology 2024 – Present
Bachelor of Technology in Computer Science & Engineering (3rd Year) CGPA: 8.90

Salkia Hindu High School 2024
Higher Secondary (Science), WBCHSE Score: 82%

Salkia Hindu High School 2022
Secondary, WBBSE Score: 91%

EXPERIENCE

Vicharanashala Lab for Education Design (VLED Lab), IIT Ropar July 2026 – Present
Summer Intern Rupnagar, Punjab

- Contributed to real-world, open-source software projects focused on India-centric educational problems.
- Engaged as an assigned contributor on live, publicly accessible repositories, ensuring code commits and project enhancements were professionally executed and documented.

TECHNICAL EXPERTISE

Languages:	C++, C, JavaScript, TypeScript, Python
Frontend:	HTML5, CSS3, React, Tailwind CSS, Vite
Backend & APIs:	Node.js, Express.js, Django, FastAPI, REST APIs, GraphQL, WebSockets
Databases & Tools:	PostgreSQL, MongoDB, Redis, Prisma ORM, Appwrite, Vector Databases, Docker
Machine Learning / AI:	PyTorch, NumPy, Pandas, Scikit-Learn, Seaborn, Matplotlib, LangGraph, RAG Pipelines, Unsupervised ML, Advanced ML Algorithms
Core Competencies:	Data Structures and Algorithms, System Architecture, Object-Oriented Programming (OOP)

PUBLICATIONS & PEER-REVIEWED RESEARCH

OmniML: A Multi-Agent LLM Framework for Human-in-the-Loop AutoML *LangGraph, PyTorch, LIME, SHAP*
Authors: Srijeet Prasad Banerjee, Pritam Patra (Co-Author), Ayushman Mukherjee, Tridib Chakraborty, et al.

- Co-authored and developed an autonomous, end-to-end AutoML pipeline engineered using a LangGraph-based Directed Acyclic Graph (DAG) to orchestrate 13 specialized LLM agents spanning the full ML lifecycle.
- Designed a novel LLM-to-architecture compilation engine that translates natural language problem constraints into typed React Flow JSON graphs, automatically compiled into valid PyTorch models via topological sort chains.
- Integrated dual global (SHAP) and local (LIME) mathematical explainability layers coupled with automated literature benchmarking against ArXiv APIs to produce structured, regulatory-grade compliance documentation.

SELECTED ENGINEERING PROJECTS

Orbital Sentinel - Real-Time Satellite Tracker | *FastAPI, WebSockets, Python, SGP4, React, CesiumJS*

- Engineered a real-time satellite tracking and conjunction-awareness prototype that ingests TLE data and propagates orbital paths accurately using the SGP4 algorithmic library.
- Implemented a low-latency real-time telemetry distribution platform using WebSockets to project paths onto an interactive 3D CesiumJS globe interface.
- Designed proactive alerting parameters for demo collision scenarios alongside structural preflight maneuver gateways.

Live Sports Scoreboard Engine | *Node.js, Native ws, PostgreSQL, Drizzle ORM, Arcjet*

- Architected a high-throughput real-time sports scoreboard system broadcasting play-by-play text analysis and scoreboards with sub-second transmission delays.
- Utilized native Node.js WebSockets infrastructure to support high concurrent consumer thread connections securely under strict Arcjet rate-limiting policies.

LOBO - Polymorphic Local Marketplace | *MERN Stack, Google Maps API, Conversational LLM Platform*

- Refactored a legacy monolithic appointment framework into a highly generic marketplace abstraction utility handling arbitrary business service profiles.
- Implemented location tracking markers using Google Maps visualization frameworks combined with an LLM conversational agent to execute bookings directly via text.

X10V AI-Headless Browser Command Swarm | *Document Picture-in-Picture Engine, Semantic Automation*

- Designed a headless, semantic workflow automation engine living inside browser nodes utilizing the native Document Picture-in-Picture layout as a floating command center.

Geoverse - Real-World Asset Platform | *Blockchain Infrastructure, Web3 Presentation Layer*

- Created decentralized application configurations focusing on secure user interaction flows for real-world asset tokenization schemas.

AWARDS & EXTRACURRICULAR ACTIVITIES

- **Hackathon Awards:** First Place Winner at the ISA Kolkata Ideathon; Top 10 Finalist out of competitive teams at the Lovable Hackathon; 5th Position overall finish at the Celo Hackathon.
- **Technical Engagements:** Active builder and problem-solver across 10+ major hackathon formats including Celo, Stellar, Hackolution, Hacktropica, and Diversion events.
- **Community Leadership:** Core Active Member of the 'Bit 2 Byte' technical coding society at Guru Nanak Institute of Technology.
- **Athletics & Soft Skills:** Active competitor on the GNIT Varsity Volleyball team; formerly represented at the District Volleyball Tournament track (2017).
- **Linguistic Fluency:** Professional working verbal and written communication capacity across English, Hindi, and Bengali.