

SAPTAK BANERJEE

Full-Stack AI Developer · Quantitative Systems · Open-Source Builder

BCA First Division (IGNOU) · 2 shipped open-source plugins · game-theoretic trading engine · MERN · PHP · Python

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CORE SKILLS

PHP Stack: PHP · MySQL · XAMPP · Chart.js · REST APIs · CRUD architecture

MERN Stack: MongoDB · Express.js · React · Node.js

JS Dev Stack: TypeScript · JavaScript · CSS · Obsidian API · SVG · DOM manipulation

Python / Quant: Python · NumPy · Pandas · QuantLib · Backtesting · HSMM · Regime Modeling

Languages: Python · TypeScript · JavaScript · PHP · SQL · COBOL · C · Java · Lisp

AI & Cloud: Azure AI (pursuing) · LLM integration · Prompt engineering · System Administration

Tools: Vim · Git · Linux (WSL) · Obsidian · Jupyter · Anaconda

Design: UX/UI — Google/Coursera Certified · CSS component architecture

OVERVIEW

NOW → Full-stack AI developer building production tools across web, quant, and plugin ecosystems — Open-source contributor with live, community-used projects on GitHub.

NEXT → Targeting AI-integrated product engineering roles — companies building intelligent tools, developer infrastructure, or applied AI systems.

GOAL → AI development + product leadership — building and managing teams at the intersection of applied AI, systems design, and business outcomes.

I'm a full-stack AI developer who builds across the entire stack — frontend interfaces, backend systems, quantitative engines, open-source tooling — and I've always done it by picking up whatever the problem actually needed, not what I already knew. Frontend is where I spend a lot of time: the part of the product real people touch, where technical decisions and user experience stop being separate concerns. Two of my projects are live on GitHub, actively used, shaped by real community feedback — that's what open-source teaches you that solo work doesn't: how to build for people you'll never meet and respond to problems you didn't anticipate. That's the kind of ownership I want inside a team building something with AI at the core. The goal isn't just to stay in the code forever.

PROJECTS

Obsidian Plugins — pill-view & Hill-Chart-Interactive Open Source · github.com/nilarkian 2025 – Present

- ▶ Shipped **2 production TypeScript plugins** against Obsidian's plugin API — each a fully custom Bases view with real-time UI interactions.
- ▶ Built **pill-view**: pill-tab navigation switching Bases views on click — **zero page reload**, pure DOM manipulation.
- ▶ Built **Hill-Chart-Interactive**: draggable SVG progress curve synced bidirectionally to note frontmatter via property watchers — inspired by Basecamp's Hill Chart.
- ▶ Mastered **TypeScript · CSS component architecture · Obsidian API** independently; both plugins publicly documented and installable.

Kinetic Regime Synchronization — Quantitative Trading Engine Independent Research 2023 – Present

- ▶ Architected **Hidden Semi-Markov Model (HSMM)** with Poisson-Driven Jump-Duration enforcing **25-round minimum persistence** — regimes as latent states, not post-hoc filters.

- ▶ Engineered **zero-memory Relative Price Flux ($\Delta+$ / $|\Delta-$)** with **≥ 1.6 Pareto-tail threshold** — eliminates estimator inertia in moving-average systems.
- ▶ Built **Python/Pandas/NumPy walk-forward backtesting engine** — Online Viterbi Decoding, adaptive threshold tuning & payoff stability diagnostics.
- ▶ Grounded in **Tit-for-Tat (TFT) game theory** — payoff matrix analysis (CC/DC/DD/CD) models cooperation-defection dynamics in intraday price action.

Financial Management System — Peer Performance Index Academic Project · PHP Stack 2024 – 2025

- ▶ Built **full-stack financial platform** — PHP, MySQL, XAMPP, Chart.js — covering auth, CRUD, reporting & interactive KPI dashboard.
- ▶ Designed **Peer Performance Index**: custom scoring metric benchmarking individual financial behavior against cohort averages.
- ▶ Delivered **end-to-end system architecture** — database schema through data visualization layer.

Currency Market Volatility Model Final Year Project · Python / QuantLib Dec 2021 – 2022

- ▶ Built **multi-asset FX volatility model** in Python and QuantLib — translating academic pricing theory into a working quantitative tool.
- ▶ Modeled **price dynamics across currency pairs** enabling quantitative risk assessment of FX positions.

EXPERIENCE

Content Writer & Researcher LBB Kolkata Jan 2019 – Jul 2020

- ▶ Identified **high-converting content patterns** by tracking which editorial topics drove reader spending — applied behavioral observation at publishing scale.
- ▶ Published F&B sector editorial covering price competition, market saturation & venue differentiation.
- ▶ Researched **seasonal transport patterns** and linked mobility shifts to consumer spending across dining, retail & entertainment sectors.

Content Writer Nitch (Remote) Jun 2020 – Dec 2020

- ▶ Authored **6 months of long-form editorial** tracking structural evolution of the global music industry — streaming economics & independent artist growth.

EDUCATION

BCA — Bachelor of Computer Applications IGNOU (Indira Gandhi National Open University) Jul 2022 – Dec 2025

First Division · 67.61% · 1893 / 2800 · 99 Credits

Coursework: Data Structures · Algorithms · OOP (Java/C++) · DBMS · Web Programming · Computer Networks · Software Engineering · Statistical Techniques · E-Commerce

ICSE — Science National Gems Higher Secondary School 2018

CERTIFICATIONS

Google UX/UI Design — Coursera · Certified

Currently Pursuing — Microsoft & LinkedIn Learning:

- ▶ Microsoft Azure **AI Essentials** Professional Certificate
- ▶ Career Essentials in **Data Analysis** — Microsoft & LinkedIn
- ▶ Career Essentials in **System Administration** — Microsoft & LinkedIn

LEADERSHIP & COMMUNITY

- ▶ Coordinated events and managed operations at **MUN Circle, Kolkata**.
- ▶ Conducted **3 awareness campaigns** as Youth Organizer — Art of Living.