ZenAlgorithm - Product Specification Document

Product Specification Document: ZenAlgorithm

1. Purpose

ZenAlgorithm is a high-performance automated trading platform designed to bridge manual strategy execution with AI-driven intelligence. It provides traders with a robust engine to run multiple strategies simultaneously while leveraging Large Language Models (LLMs) for market sentiment analysis and trade validation.

2. Target Audience

* Quantitative traders looking for automated execution.
* Python developers creating custom trading strategies.
* Algorithmic trading enthusiasts who need a reliable dashboard and performance tracking.

3. Core Features

3.1. Trading Engine

* Multi-Strategy Core: Execute multiple independent strategies in parallel.
* Dual Modes: Seamlessly switch between Paper Trading (simulation) and Real Trading (live).
* Broker Integration: Native support for Kotak Neo API V2 with WebSocket-based live price caching.
* Latency Monitoring: Real-time tracking of broker API response times.

3.2. AI Brain (Gemini Integration)

* Market Intelligence: Automatic detection of market regimes (Trending/Sideways).
* Trade Validation: AI analyzes strategy signals before execution to reduce false positives.
* Dynamic Risk Assessment: Real-time detection of portfolio risks.
* AI-Generated Reports: Daily and weekly PDF reports summarizing performance and strategy health.

3.3. Dashboard & UI

* Live Monitoring: Real-time PnL tracking and "Thinking Logs" for strategy decision-making.
* Performance Analytics: Visualized CAGR, Max Drawdown, Win Rate, and Equity Curves.
* Strategy Management: One-click toggle to enable/pause strategies.
* Heatmaps: Win/Loss distribution across time and price ranges.

4. Technical Architecture

* Backend: FastAPI (Python) for asynchronous performance.

* Frontend: React (Vite) with Vanilla CSS (Modern Aesthetics).
* Database: MongoDB for trade records and strategy states.
* AI: Google Gemini (Direct Integration via Generative AI SDK).
* Notifications: Telegram integration for real-time trade alerts.

5. User Workflow

1. Configuration: Set API keys for Kotak Neo and Gemini in .env.
2. Strategy Selection: Choose or create strategies in the backend.
3. Execution: Start the server; the UI automatically connects and displays live data.
4. Monitoring: Track "Thinking Logs" in the UI to see AI/Strategy reasoning.
5. Review: Analyze generated PDF reports for long-term consistency.