

PROJECT REPORT: AI QUANTUM TRADING BOT

Automated Algorithmic Trading & Market Analysis System

1. ABSTRACT

In the high-frequency environment of modern stock markets, manual trading is often hindered by human emotion and slow reaction times. Quantum Sentinel V10.0 is a fully autonomous algorithmic trading agent designed to solve this problem. Built on Python 3.11, the system operates 24/7, leveraging the Yahoo Finance API for real-time data, Natural Language Processing (NLP) for sentiment analysis, and the Twilio Enterprise API for instant mobile alerting. The system also features a self-contained "Paper Trading" engine to simulate strategies with a virtual portfolio of ₹10,00,000, ensuring risk-free validation of trading logic.

2. PROBLEM STATEMENT

- **Latency:** Human traders cannot scan 200+ stocks simultaneously to spot breakout patterns in real-time.
- **Bias:** Emotional decision-making often leads to poor trade execution.
- **Missing Opportunities:** Markets move while traders sleep or work; a manual trader misses 60-70% of swing opportunities.

3. PROPOSED SOLUTION

An autonomous "Hedge Fund in a Box" that:

1. **Wakes up automatically** at key market hours (09:15 AM, 12:00 PM, 03:00 PM).
 2. **Scans the entire market** using a multi-factor decision matrix.
 3. **Executes virtual trades** to track performance.
 4. **Notifies the user** instantly via WhatsApp only when high-probability setups are found.
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4. SYSTEM ARCHITECTURE

The system is divided into four distinct modules:

A. The "Omni-Scanner" (Data Acquisition)

- **Source:** Uses yfinance to fetch live OHLCV (Open, High, Low, Close, Volume) data.
- **Scope:** Monitors a dynamic watchlist of 200+ NSE stocks (e.g., RELIANCE.NS, HDFCBANK.NS).

- **Self-Healing:** An autonomous "News Hunter" script scrapes the web for trending tickers and updates the local stocks.csv database, removing delisted assets (e.g., handling the UBS.NS error automatically).

B. The "Council Vote" (Decision Logic)

A trade is only approved if it passes a 3-Layer Filtration Process:

1. Technical Layer:

- **RSI Check:** Must be between 30 (Oversold) and 70 (Momentum).
- **Volume Shock:** Current volume must be $>2x$ the 20-day average.
- **Trend:** Price must be above the 50-Day SMA.

2. Fundamental Layer:

- Filters out companies with high Debt-to-Equity ratios or negative ROE.

3. Sentiment Layer (AI):

- Uses **TextBlob (NLP)** to analyze news headlines. If sentiment is negative ($\text{Polarity} < 0$), the trade is vetoed.

C. The "Ledger" (Paper Trading Engine)

- **Technology:** JSON-based local database (paper_portfolio.json).
- **Function:** Starts with ₹10,00,000 virtual cash. automatically calculates position sizing (risk management), records entry prices, and updates P&L (Profit & Loss) daily.

D. The "Messenger" (Alert System)

- **API:** Twilio Enterprise API (WhatsApp).
- **Latency:** <2 seconds from detection to notification.
- **Format:** Delivers a structured message containing Ticker, Entry Price, Technical Reasoning, and Time.

5. TECHNICAL STACK & LIBRARIES

Component	Technology Used	Purpose
Core Language	Python 3.11	Logic & Automation
Data Analysis	Pandas, NumPy	High-speed calculation of indicators
Market Data	yfinance	Fetching live stock prices

Component	Technology Used	Purpose
AI / NLP	TextBlob, Feedparser	Analyzing news sentiment
Alerts	Twilio API	WhatsApp notifications
Reporting	SMTP (Gmail)	Daily Email Summaries
Scheduling	Python schedule	Automating wake-up times (09:15, 12:00, 15:00)

6. KEY ALGORITHMS

The "Volume Shock" Algorithm

Python

```
# Detects institutional buying pressure
vol_shock = current_volume / (20_day_avg_volume + 1)
if vol_shock > 2.0:
    score += 5 # Strong Buying Signal
```

The "Sentiment" Algorithm

Python

```
# Analyzes market mood via News Headers
analysis = TextBlob(news_headline)
if analysis.sentiment.polarity > 0.1:
    verdict = "Positive"
elif analysis.sentiment.polarity < -0.1:
    verdict = "Negative" (Trade Vetoed)
```

7. PROJECT OUTPUTS

1. Terminal Interface

The system runs in a CLI (Command Line Interface) providing real-time logs:

Plaintext

🚀 MODE: MIDDAY | Hunting for Opportunities...

🌐 Checking RELIANCE.NS... HIT! (Score: 8/10)

✅ WhatsApp Sent for RELIANCE.NS

💰 BOUGHT (Virtual)!

2. WhatsApp Alert (User Side)

Plaintext

🚀 BUY ALERT: TATAPOWER.NS

💰 Price: ₹435.50

🔥 Logic: RSI 65 + Vol Shock 3.2x

⌚ Time: 12:01 PM

3. Email Report

At the end of every session, an HTML-formatted email is sent summarizing:

- Top Picks of the Day.
- Virtual Portfolio Performance (Current P&L).
- Market Flash News.

8. CONCLUSION & FUTURE SCOPE

Quantum Sentinel V10.0 successfully demonstrates that institutional-grade trading logic can be automated on personal hardware using Python. The system minimizes emotional error and maximizes market coverage.

Future Enhancements:

- Deployment to AWS Cloud (EC2) for true 24/7 uptime without a laptop.
 - Integration with Zerodha Kite API for *real* money execution.
 - Deep Learning (LSTM) models for price prediction.
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