PROJECT PROPOSAL

G H PATEL COLLEGE OF ENGINEERING AND THECHNOLGY

MINI PROJECT (202040601)
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Members:
Prabhav Patel – 12302040501042
Raj Ghoniya – 12302040501048

MAT System – Momentum Based Algorithmic Trading System

1. Introduction:

1.1 Stock Market:

The stock market is a place where people buy and sell shares of companies. It helps companies raise money and allows investors to grow their money over time.

1.2 Momentum-Based Investing:

- Momentum strategy focuses on stocks that have shown good performance in the recent past.
- It is based on the idea that stocks moving upward often continue to move in the same direction for some time.
- This strategy uses past price data to identify strong stocks instead of predicting future prices.
- Momentum investing helps investors follow market trends rather than going against them.

2. Problem Statement:

- Mutual funds follow fixed rules and regulations, such as limited rebalancing frequency (for example, once in 6 months).

- Because of these restrictions, mutual funds may miss short-term market opportunities.
- Investors also face exit load charges when they withdraw or rebalance their investments early.
- There is no simple system where users can test momentum strategies with their own parameters.

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3. Motivation / Need Of Problem:

- Most investors want to generate more money than normal market returns.
- Traditional investment options often give average returns over a long time.

Index	3 Year	5 Year	10 Year
Nifty 50	13.67 %	13.69 %	14.35 %
Nifty Midcap 150	24.74 %	23.18 %	18.76 %
Nifty Midcap 150 Momentum 50	**25.13 %**	**28.25 %**	**21.76 %**

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4. Objectives:

- To aim for better returns in capital markets using a momentum-based approach.
- To design an algorithm that tracks high-momentum stocks without any expense ratio, unlike mutual funds.
- To reduce the time and effort needed for stock research and order execution through automation.
- To allow users to backtest their own momentum strategies using historical market data.

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5. Scope

Included:

- Works only on Nifty 250 stocks
- Uses a momentum-based strategy to select stocks
- Allows custom rebalancing frequency and strategy parameters
- Supports backtesting using historical market data
- Connected with Fyers API for live order execution
- Dashboard shows live portfolio value and PnL

Not Included

- Prediction of future stock prices

- Guaranteed returns or fixed profits
- Support for stocks outside Nifty 250
- Brokerage charges, taxes, and other trading costs
- Slippage between expected and executed prices
- Handling of failed, rejected, or partial orders

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6. Approach

6.1 Data Ingestion

- Initial Bootstrapping: One time ingestion of 10 + 1 years of daily OHLCV data for top 250 stocks via Yahoo Finance.
- Automatic calculation of 1-year rolling standard deviation for volatility normalization.
- Daily Sync of stock prices in the DB.
- So the backend will be automatically fetching previous day's data at 7:00 am before market open via y-finance.

6.2 Algorithm & Backtesting

- User creates a new strategy based on his/her custom parameters.
- The user parameters include:
    - **Universe:** The group of stocks the system scans (ex: Nifty 100).
    - **No of stocks:** The total number of tickers held in the portfolio (ex: 15 stocks).
    - **Lookback periods:** Timeframes used to calculate returns for scoring (ex: 6 months and 12 months).
    - **Stock price Cap:** Maximum price allowed for a single share to ensure accessibility (ex: ₹5,000).
    - **Capital:** Total funds allocated for the strategy (ex: ₹5,00,000).
    - **Rebalancing frequency:** How often the portfolio is updated to track momentum (ex: Weekly or Monthly).

6.3 Ranking & Rebalancing

- The algorithms works by creating a portfolio of top 'N' stocks based on momentum score. (equal weight).

- Momentum Score is defined by :

  Momentum Score =

$$\left(0.5 \times \frac{\text{Return}_{LB1}}{\sigma_{1Y}}\right) + \left(0.5 \times \frac{\text{Return}_{LB2}}{\sigma_{1Y}}\right)$$

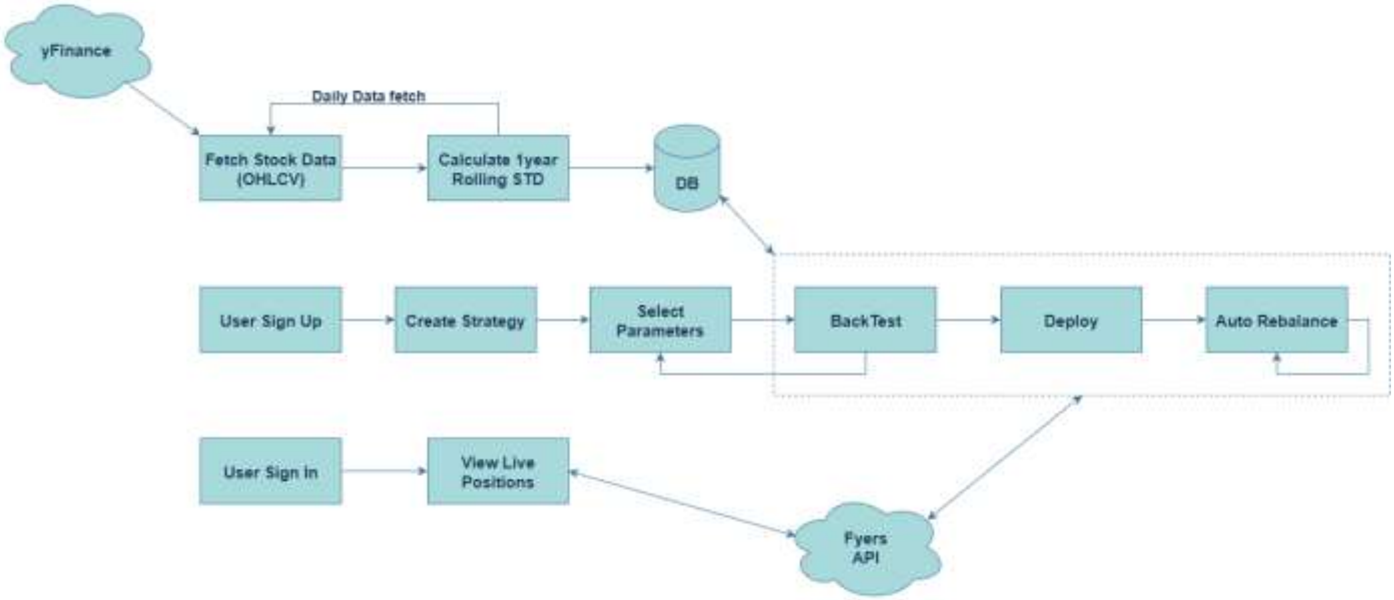
    - This process repeats at each rebalancing date after data ingestion (7:00am).

- The old portfolio is compared with new target portfolio and based on the difference and available capital , new orders are calculated and punched at market open (9:00am) automatically via Fyers API.

6.4 Monitoring

- At last the user is able to monitor his deployed strategy via the portal.
- The dashboard shows the current portfolio along with its live market value.
- Performance metrics like max drawdown, PnL, Cagr will be displayed.
- This live feed will be possible by websockets provided by the fyers api.

7. Diagram



8. Tools & Technologies

- Programming Language: Python
- Frontend & Dashboard: HTML, CSS, JavaScript, React.js
- Backend Framework: FastAPI
- Database: PostgreSQL
- Data Handling & Backtesting: Pandas, NumPy
- Historical Data: yfinance
- Trading & Order Execution: Fyers API
- Version Control: Git & GitHub

9. Conclusion

- The MAT System shows how momentum-based strategies can be implemented using algorithms.
- The project highlights the use of automation in trading, from data analysis to order execution.
- Gives Practical exposure to broker APIs and live market data handling.
- The system provides a platform to experiment and learn without relying on fixed investment rules.
- Hands-on experience in building end-to-end financial systems (data → logic → execution → dashboard).
- Overall, the project bridges software engineering and financial markets.

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10. References

- **NSE India – Historical Market Data :** **https://www.nseindia.com/all-reports**
- **Nifty Indices Documentation:** **https://www.niftyindices.com/market-data/return-profile**
- **Fyers API Documentation:** **https://myapi.fyers.in/docsv3**
- **yFinance Docs:** **https://ranaroussi.github.io/yfinance/reference/index.html**
- **Momentum Investing:** **https://groww.in/blog/momentum-funds**