

# Stock Price Analyzer with Machine Learning

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## PROBLEM

The stock market generates vast amounts of data daily, making it challenging for individual investors and analysts to identify trends and make informed decisions. Existing tools are often expensive, complex, or lack customization, leaving a gap for accessible and interactive stock analysis solutions.



## SYSTEM DESIGN

The Stock Analyzer Leverages public stock market APIs to provide real-time data visualization and analysis. The system consists of three main components:

- Data Retrieval: Fetches stock data using APIs.
- Data Processing: Cleans, processes, and prepares data for analysis.
- Visualization Interface: Interactive charts and insights displayed via a user-friendly Streamlit web application.

## VERIFICATION

Multiple test cases were implemented to validate system functionality:

- Verified the correctness of updates triggered by user interactions.
- Tested error messages and fallback mechanisms for seamless user experience.

## CURRENT SYSTEM

Current stock analysis systems include commercial platforms and APIs, such as Yahoo Finance or Bloomberg, which offer robust tools but are not easily accessible to beginners.

These systems often require technical expertise or subscription fees, creating barriers for casual or independent users.



## OBJECT DESIGN

The application is modular, with objects representing different functionalities:

- StockData: Handles API requests and data formatting.
- DataAnalyzer: Performs calculations like moving averages and volume trends.
- Visualization: Generates charts for stock performance.



## SUMMARY

The Stock Analyzer successfully provides a lightweight, accessible tool for stock trend analysis and visualization. Users can interactively explore market trends and metrics to make informed decisions. Future work includes adding advanced analytics, such as predictive modeling and portfolio tracking.

## REQUIREMENTS

Functional: Fetch historical and real-time stock data, compute key metrics (e.g., moving averages, daily price changes), and generate interactive plots.

Non-functional: Quick response time, intuitive design, and support for multiple stock symbols.



## IMPLEMENTATION

Frontend Developer

- Connected frontend widgets to backend processing for real-time updates.
- Implemented error handling for invalid user inputs or API call failures.
- Developed logic for multi-stock comparisons in the interface.



## REFERENCES

**APIs:** Alpha Vantage, Yahoo Finance.

**Tools:** Python, Streamlit, Pandas, Matplotlib, Plotly.

**Tutorials and Documentation:** Official API and library references.

