

Seamless portfolio intelligence: Real-Time Risk and Return Analysis via Model Context Protocol (MCP)

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Abstract—Investors often face difficulty in making good decisions due to scattered market data and delayed insights. This project proposes a cloud-enabled portfolio analysis platform that securely integrates live market data and user portfolio information from trusted brokerage services like Zerodha using MCP-based interfaces. The system allows users to ask simple natural language questions such as portfolio performance or risk level and receive data-driven insights instantly. It provides real-time reports, portfolio summaries, and interactive visual charts for better understanding. Basic risk indicators and performance comparisons are generated using historical and current data. The platform focuses on decision support, not financial advice, helping users make faster and more informed investment choices.

I. INTRODUCTION

This research presents a cloud-based portfolio analysis platform that integrates live market and brokerage data through secure interfaces. It enables users to access real-time performance insights and risk metrics using simple natural language queries. The system enhances investment decision-making through interactive reports and data-driven analysis without offering financial advice.

II. LITERATURE SURVEY

Recent studies highlight the challenges investors face due to fragmented financial data and lack of real-time actionable insights.

Cloud-based financial analytics systems have gained interest for their scalability and ability to process large datasets efficiently.

Natural language processing (NLP) has been explored for creating intuitive query interfaces, enabling non-technical users to interact with financial data.

Previous work has examined risk metrics and performance indicators as essential tools for supporting investor decision processes.

Real-time visualization techniques are shown to enhance comprehension of trends and risk exposure in portfolio dashboards.

Studies comparing historical and current market data highlight the benefits of dynamic benchmarking for portfolio evaluation.

Security and privacy in financial data integration remain critical concerns, driving research into secure API protocols.

Several platforms have implemented basic decision-support analytics, but few combine NLP with real-time brokerage data aggregation.

III. PROBLEM STATEMENT

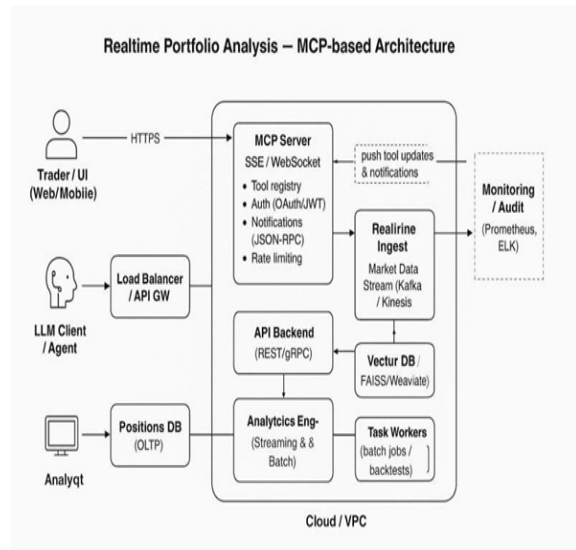
Modern investors rely on multiple sources such as trading platforms, financial websites, and manual tracking tools to monitor their investments, resulting in fragmented data and inefficient analysis. The absence of real-time, consolidated portfolio insights makes it difficult for investors to clearly assess risk exposure, asset allocation, and performance trends. Most existing systems primarily present raw financial data, requiring users to manually interpret and compute meaningful insights. This increases the possibility of delayed or uninformed decision-making.

Existing investment platforms primarily provide raw numerical data and basic charts, requiring users to manually interpret trends and calculate key performance indicators.

This not only increases cognitive load but also raises the risk of delayed, biased, or uninformed decision-making. Furthermore, many systems lack intuitive interfaces that allow non-technical users to query

portfolio data in a simple and interactive manner. Therefore, there is a need for a secure, cloud-enabled decision support system that integrates live market data and portfolio information and presents easy-to-understand analytics, visual summaries, and natural language insights to help investors make timely and informed decisions.

IV. SYSTEM DESIGN



V. METHODOLOGY

1. Data Collection

Data is collected from trusted brokerage platforms and live market data providers through secure APIs and MCP-based interfaces. This includes historical price data, real-time stock prices, portfolio holdings, transaction history, and benchmark indices.

2. Data Preprocessing

The collected data is cleaned, validated, and transformed to ensure consistency and accuracy. Missing values, duplicate records, and anomalies are handled, and features such as returns, volatility, and asset allocation percentages are calculated for further analysis.

3. Model Selection

Appropriate analytical and statistical models are selected based on system objectives. Risk assessment models, performance comparison metrics, and basic predictive analytics techniques are chosen to generate meaningful portfolio insights.

4. Model Design and Implementation

The system architecture is designed using a cloud-based framework to ensure scalability and security. Analytical models and NLP-based query processing modules are implemented to allow users to interact with the system using natural language.

5. Model Evaluation

The performance of the models is evaluated using historical data, accuracy of calculated metrics, response time, and consistency of generated insights. Validation ensures reliable risk indicators and performance summaries.

6. Deployment

The platform is deployed on a secure cloud environment to enable real-time data processing and user access. APIs are configured to ensure seamless integration with brokerage services and market data providers.

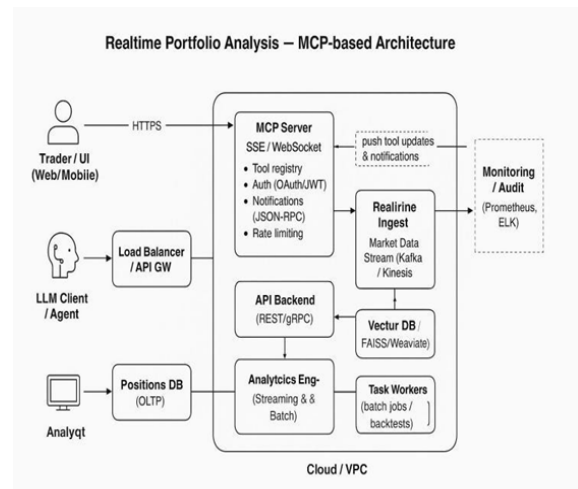
7. Monitoring and Maintenance

System performance, data accuracy, and security protocols are continuously monitored. Regular updates are performed to maintain compatibility with external APIs and evolving market conditions.

8. Iterative Improvement

User feedback and performance metrics are analyzed to enhance system functionality. Models and visualization techniques are refined periodically to improve accuracy, usability, and overall decision-support effectiveness.

VI. ARCHITECTURE:



VII. RESULTS



VIII. CONCLUSION

search presents a cloud-enabled portfolio analysis platform designed to address the challenges of fragmented financial data and limited real-time insights faced by modern investors.

By integrating live market data and brokerage portfolio information through secure interfaces, the system provides consolidated, accurate, and timely analytics. The use of data preprocessing techniques, risk indicators, and performance comparison metrics ensures meaningful interpretation of complex financial information.

Overall, the proposed solution improves transparency, analytical efficiency, and decision-support capabilities, empowering investors to make more informed and timely investment decisions while maintaining a clear distinction from direct financial advisory services.

IX. FUTURE ENHANCEMENT

The proposed system can be further enhanced by integrating advanced machine learning models for predictive analytics, enabling more accurate forecasting of portfolio trends and risk patterns.

Incorporating AI-based recommendation engines could provide personalized investment insights based on user behavior and historical performance data, while still maintaining its role as a decision-support system.

Future versions may also include multi-broker integration to support a wider range of trading platforms and asset classes such as mutual funds, ETFs, cryptocurrencies, and international equities.

Enhanced risk assessment techniques, including scenario analysis and stress testing, can further improve portfolio evaluation capabilities.

Additionally, implementing advanced data security mechanisms such as end-to-end encryption and multi-factor authentication will strengthen user trust and data protection.

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