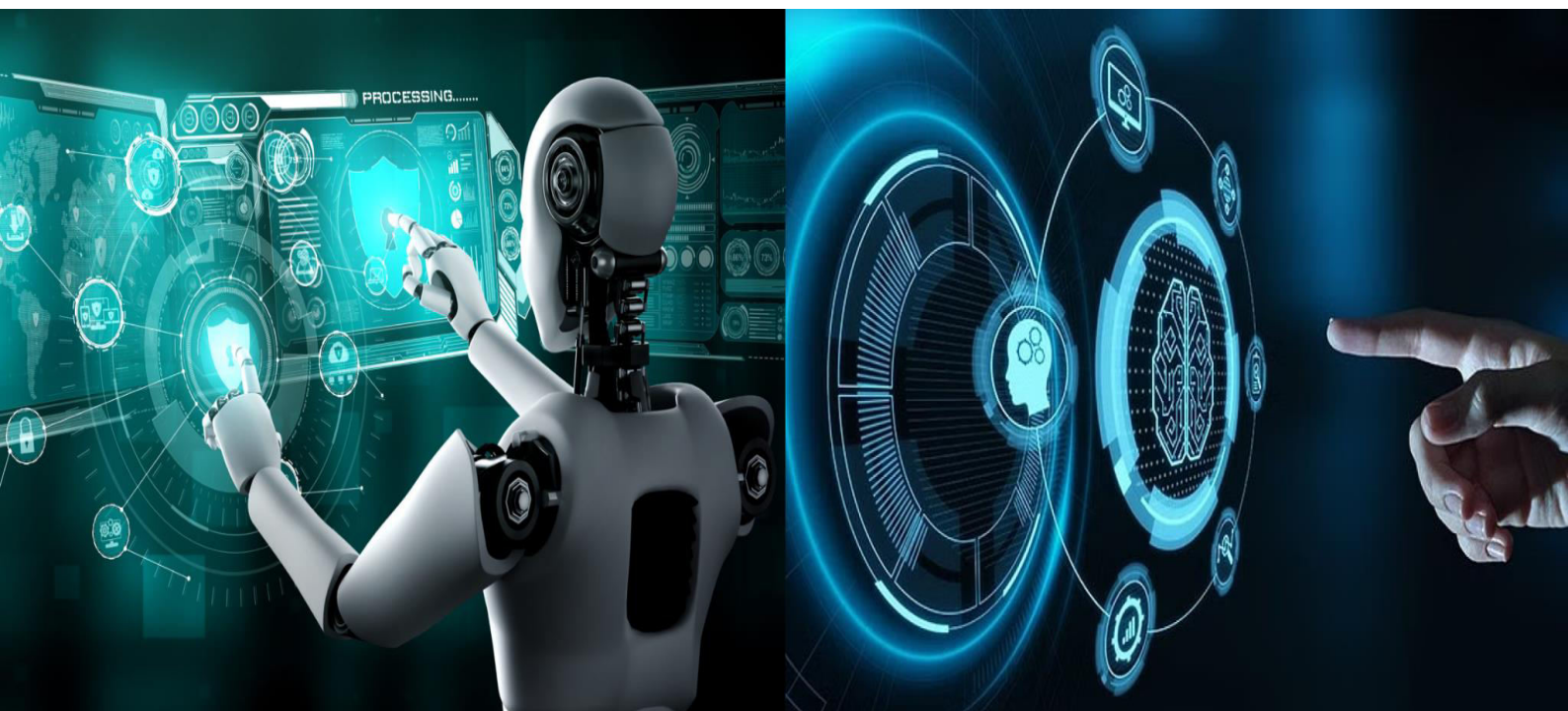


International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)





International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Stock Price Predictor: An ML-Based System for Real-Time Financial Analysis and Forecasting

Ms. Jadhav N.S., Om Meghraj Malshetti, Prashant Shankar Tupponi, Shravani Mahesh Chinchure,
Diksha Rahul Jankar

Project Guide, Department of Computer Engineering, A.G. Patil Polytechnic Institute, Solapur, Maharashtra, India

Student, Department of Computer Engineering, A.G. Patil Polytechnic Institute, Solapur, Maharashtra, India

Student, Department of Computer Engineering, A.G. Patil Polytechnic Institute, Solapur, Maharashtra, India

Student, Department of Computer Engineering, A.G. Patil Polytechnic Institute, Solapur, Maharashtra, India

Student, Department of Computer Engineering, A.G. Patil Polytechnic Institute, Solapur, Maharashtra, India

ABSTRACT: Stock market analysis is a complex task that requires access to real-time data, technical indicators, and predictive models. This paper presents a Stock Price Predictor system that integrates data aggregation, technical analysis, and machine learning-based forecasting into a unified platform. The system collects financial data from multiple APIs and processes it to generate insights such as moving averages, volatility, and risk metrics. A Linear Regression model is used to predict future stock prices based on historical patterns. Additionally, an AI-based symbol correction mechanism enhances usability by mapping user inputs to correct stock tickers. The application is developed using Python and Streamlit, providing an interactive and user-friendly interface. Experimental results demonstrate that the system provides accurate predictions, efficient visualization, and reliable financial insights, making it suitable for traders, investors, and learners.

KEYWORDS: Stock prediction, Machine Learning, Linear Regression, Financial Analysis, Technical Indicators, Streamlit, Data Visualization.

I. INTRODUCTION

The stock market plays a vital role in the global economy by enabling investment, capital growth, and financial trading. However, analyzing stock market trends is complex due to its dynamic nature, influenced by factors such as economic conditions, company performance, and market sentiment. Accurate analysis requires expertise, reliable data, and advanced tools, which are often costly and difficult for beginners to use.

With the advancement of machine learning, it has become possible to analyze historical stock data and predict future price trends. Techniques such as regression models and time-series analysis help identify patterns and generate forecasts. However, many existing systems either lack user-friendly interfaces or fail to integrate real-time data, visualization, and predictive analytics into a single platform.

To overcome these challenges, this paper presents a Stock Price Predictor system, an end-to-end application that combines real-time data collection, technical analysis, and machine learning-based forecasting. The system utilizes multiple APIs to fetch stock data and applies technical indicators such as moving averages and volatility for better trend analysis. A Linear Regression model is used to predict future stock prices based on historical data. Additionally, an AI-based symbol correction feature allows users to search stocks using natural language inputs, improving usability. The application is developed using Python and Streamlit, providing an interactive and accessible interface.

The main objective of this system is to simplify stock market analysis by integrating data visualization, prediction, and risk analysis into a single platform, making it useful for investors, traders, and learners.



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

II. LITERATURE SURVEY

Stock price prediction has been widely studied using statistical and machine learning approaches. Traditional methods include time series analysis and regression models, while recent approaches use deep learning models such as LSTM and neural networks.

Linear Regression is one of the simplest and most interpretable models used for prediction tasks. It provides fast computation and is suitable for real-time applications.

Technical indicators such as Moving Average (MA), Relative Strength Index (RSI), and volatility are commonly used to analyze stock trends. Risk metrics such as Value at Risk (VaR) and Sharpe Ratio help investors evaluate potential returns and risks.

Despite these advancements, many systems lack user-friendly interfaces and integration of multiple features such as prediction, visualization, and risk analysis. The proposed system addresses these limitations..

III. METHODOLOGY

The system follows a modular architecture combining data acquisition, preprocessing, machine learning, and visualization.

A. Data Collection

- Stock data is fetched from multiple sources such as Yahoo Finance, Alpha Vantage, and NASDAQ APIs. This ensures data reliability and availability.

B. Data Processing

- The collected data is processed using Pandas and NumPy to compute:
- Moving Averages (MA20, MA50)
- Daily Returns
- Volatility

C. Machine Learning Model

- A Linear Regression model is used for prediction:
- Input Features: Close price, Volume, MA20, Returns
- Data is normalized using MinMaxScaler
- Model is trained on historical data

D. Prediction Mechanism

- The model predicts future prices using a recursive approach, where previous predictions are used for forecasting multiple days ahead.

E. Visualization

- Interactive charts are generated using Plotly, including:
- Candlestick charts
- Volume graphs
- Prediction curves

F. AI Integration

- Google Gemini Pro is used for intelligent stock symbol correction, allowing users to search stocks using natural language.

eq. (3)

IV. EXPERIMENTAL RESULTS

The system was tested using real-time stock data across multiple companies and sectors. The results demonstrate the effectiveness of the proposed system in terms of prediction accuracy, visualization, and usability. The application successfully retrieved and displayed historical stock data with interactive candlestick charts and volume indicators. The integration of moving averages provided clear insights into trend patterns, helping users identify bullish and bearish signals.



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The machine learning model was evaluated using performance metrics such as R^2 score, Mean Absolute Error (MAE), and Root Mean Square Error (RMSE). The model achieved satisfactory accuracy for short-term predictions, making it suitable for practical usage.

The prediction module generated future price forecasts for periods ranging from 7 to 90 days. The results were visualized with confidence intervals, enabling users to understand potential variations in predicted values.

The risk analysis module effectively calculated metrics such as Value at Risk (VaR), Conditional Value at Risk (CVaR), and Sharpe Ratio. These metrics provided valuable insights into potential losses and risk-adjusted returns.

The AI-based symbol correction feature successfully mapped user-entered company names to correct stock symbols, improving usability and reducing input errors. Overall, the system demonstrated reliable performance in real-time data processing, accurate prediction, and efficient visualization, making it a comprehensive solution for stock market analysis.

V. SIMULATION RESULTS

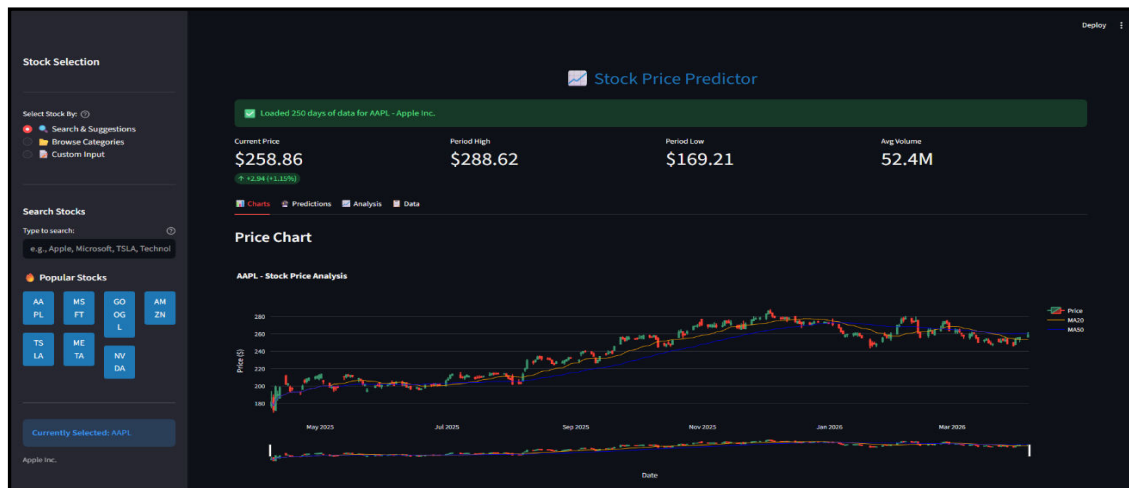


Fig. 1. Stock Price Visualization Interface with Real-Time Data and Moving Averages



Fig. 2. Interactive Price Chart with Trading Volume Analysis



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Fig. 3. Machine Learning-Based Stock Price Prediction with Confidence Intervals

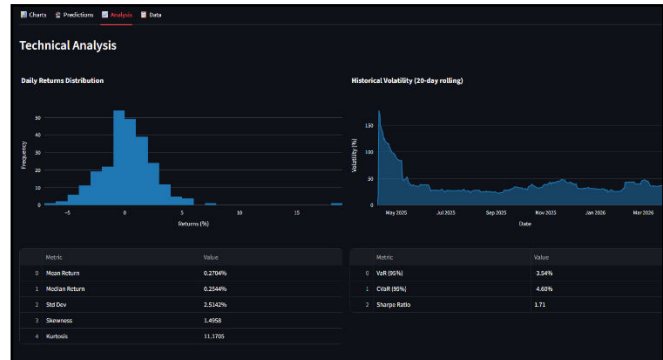


Fig 4. Technical Analysis Dashboard Showing Returns Distribution and Volatility Metrics

VI. CONCLUSION

This paper presents a Stock Price Predictor system that integrates machine learning, financial analysis, and real-time data visualization into a single platform. The use of Linear Regression enables fast and interpretable predictions, while technical indicators and risk metrics provide valuable insights for decision-making.

The system is user-friendly and accessible, making it suitable for both beginners and experienced investors. Future work may include the use of advanced models such as LSTM, improved prediction accuracy, and deployment as a scalable cloud-based application.

REFERENCES

- [1] J. Brownlee, "Introduction to Time Series Forecasting with Python," Machine Learning Mastery, 2018.
- [2] F. Chollet, Deep Learning with Python, Manning Publications, 2017.
- [3] T. Mikolov et al., "Efficient Estimation of Word Representations in Vector Space," Proc. ICLR, 2013.
- [4] Scikit-learn Documentation, "Machine Learning in Python," Available: <https://scikit-learn.org>
- [5] Yahoo Finance API Documentation, Available: <https://finance.yahoo.com>
- [6] Plotly Technologies Inc., "Interactive Data Visualization Library," Available: <https://plotly.com>
- [7] Google, "Gemini AI API Documentation," Available: <https://ai.google.dev>.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details