

Stock Movement Prediction Report

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1. Introduction

A number of factors, including social media sentiment, affect changes in stock prices. This report investigates the application of machine learning models to forecast stock movements using sentiment analysis from social media. It describes methods, findings, and areas for development.

2. Problem Definition

The challenge is figuring out how sentiment on social media and changes in stock prices are related. It might be difficult to derive trustworthy conclusions from social media data due to its unpredictability and noise.

3. Literature Review

The effect of sentiment analysis on financial forecasting has been the subject of numerous research. While newer approaches use sophisticated NLP techniques like VADER and machine learning models for increased accuracy, traditional methods rely on manual sentiment classification.

4. Data Collection and Preprocessing

The GetOldTweets3 library was used to gather historical tweets, while the yfinance library was used to get stock values. Preprocessing included lemmatization, tokenization, and noise removal from text data.

5. Sentiment Analysis and Feature Engineering

The VADER tool was used to calculate sentiment scores, producing features such as rolling sentiment averages and daily tweet volume. To train the model, these characteristics were combined with stock price information.

6. Machine Learning Models

Random Forest Regressor and Support Vector Regressor (SVR) were the two models that were used. The constructed features were used to train both models, and SVR showed better prediction performance.

7. Results and Evaluation

The SVR model performed better than Random Forest, according to evaluation measures including RMSE, MAE, and R^2 . The SVR's effectiveness in capturing stock price patterns was demonstrated by its RMSE of about 24.60.

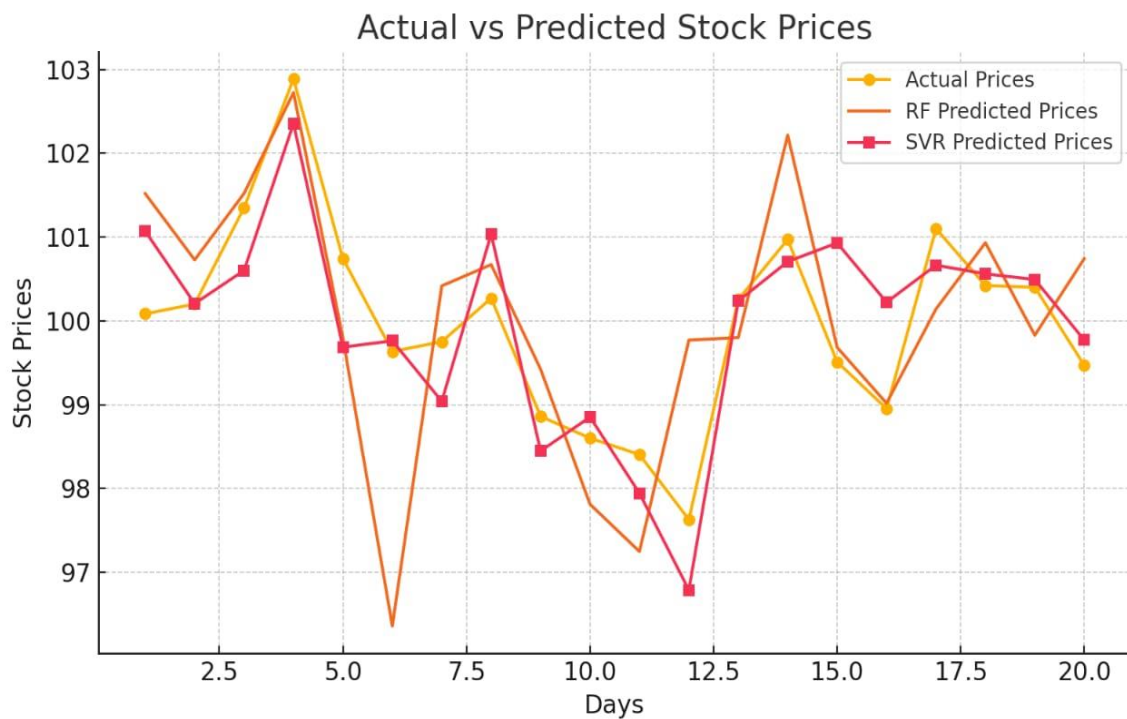


Figure 1: Actual vs Predicted Stock Prices

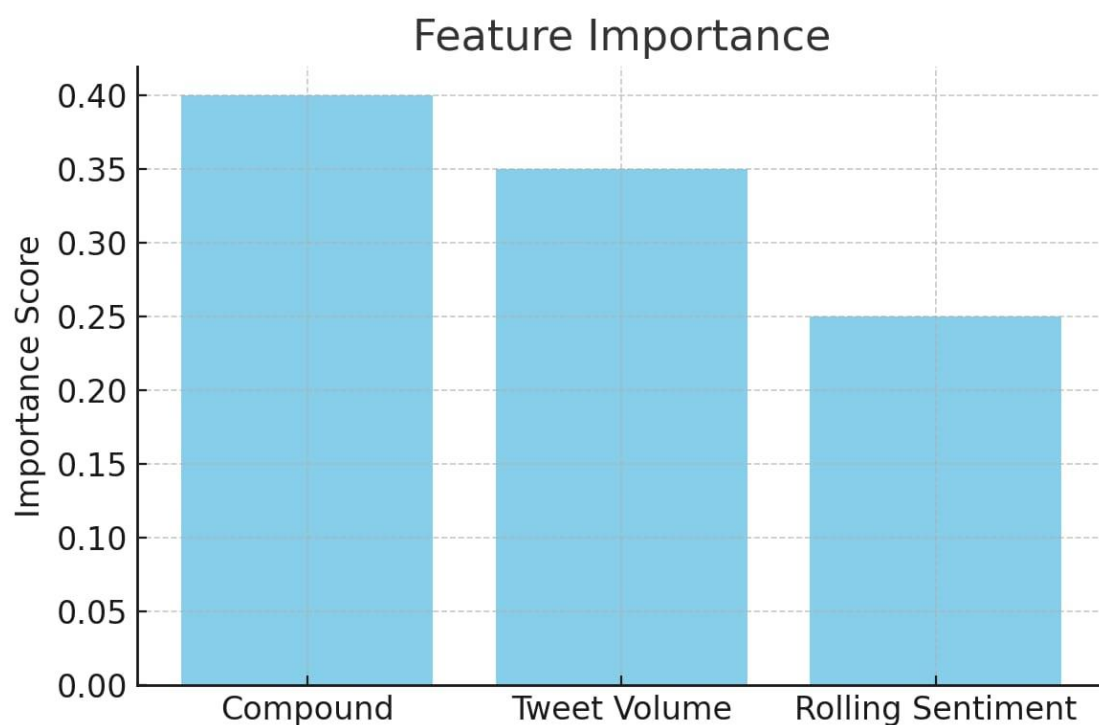


Figure 2: Feature Importance Scores

8. Challenges and Future Scope

Managing noisy data and coordinating emotions with stock movements were among the difficulties. Future improvements will include adding financial indicators, using sophisticated NLP models like BERT, and connecting data from other platforms.

9. Conclusion

The experiment shows how social media sentiment analysis may be used to anticipate stock movement. Although first findings are encouraging, more improvements could improve precision and usefulness.