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Notice for the PhD Viva Voce Examination

Mr Chandraves Chaudhari, Registration Number: 2070003, PhD Scholar at the Department of Commerce, School of Commerce, Finance and Accountancy, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Wednesday, 10 September 2025 at 10.45 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru – 560029, Karnataka, India.

- Title of the Thesis** : **Advances in Stock Price Prediction Using Machine Learning**
- Discipline** : **Commerce**
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The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar (Academics)

Place: Bengaluru

Date: 03 September 2025

ABSTRACT

The stock market can be immensely profitable if one can predict whether a stock price will increase or decrease. For more than a century, researchers have sought techniques to forecast stock prices. Stock prices depend on multiple modalities consisting of various variables such as fundamental analysis ratios (numerical data), public sentiments (text data), and trading data (time series). Machine learning can identify patterns beyond human capability, though it has been less successful due to comparatively smaller data size available around stocks than other domains. This research examines advancements in stock market prediction, transitioning from single modalities to multimodal approaches. Building on prior studies, it explores the integration of quantitative data (financial ratios) and qualitative data (sentiment analysis) through multimodal learning to enhance stock price movement predictions. A stock movement model, developed using financial ratios data from all BSE-listed companies (2006–2020), was rigorously tested across all companies on data spanning January 2020 to September 2022. The model achieved an impressive quarterly prediction accuracy of 76.68%, demonstrating its robustness and generalizability across the entire dataset.

The study employs sentiment analysis models to derive sentiment scores from tweets of BSE-listed companies in the information technology industry, averaging them over monthly, semimonthly, and daily time frames. These averaged sentiment scores, combined with predictions from financial ratio models, are used in decision fusion models to predict stock movements from January 2022 to September 2022. The analysis of decision fusion accuracy across different time frames reveals notable trends. Monthly predictions yield the highest average accuracy improvement of 20.84% due to enhanced model calibration and information aggregation. Semimonthly predictions follow with a 13.10% improvement, demonstrating strong adaptability. Daily predictions, while providing the least improvement of 8.36% due to higher data variability, still effectively enhance prediction accuracy. Further analysis examines different combinations of financial ratios to determine which ones result in the most accurate and effective machine learning models for predicting stock price movements. The results show that combinations including variables from all groups of financial information, such as liquidity, profitability, efficiency, coverage, and valuation ratios, create the best-performing models. To gain a deeper understanding of financial ratios within the context of machine learning, Financial ratios are ranked based on their importance in predicting stock price movement. Financial variables such as BV per Share and EPS are found to be highly effective for enhancing the performance of machine learning models for predicting stock price movement.

In conclusion, this research found that the combination of financial ratios and sentiment analysis can provide a highly predictive model using multimodal learning. Datasets should include all types of financial ratios for better performance. Ranking financial ratios helps understand the degree of influence each variable has in stock price movement prediction. Future research should focus on creating explainable dashboards with multiple modalities and allowing adjustments to enable the art of investment to flourish with automation.

Keywords: *Stock market, Prediction, Financial Ratios, Machine learning, Decision Fusion, Sentiment Analysis*

Publications:

1. **Chaudhari, C., & Purswani, G. (2022).** Stock Market Prediction Techniques Using Artificial Intelligence: A Systematic Review. In Congress on Intelligent Systems (pp. 219-233). Singapore: Springer Nature Singapore.
2. **Chaudhari, C., & Purswani, G. (2023).** Hybrid Subset Feature Selection and Importance Framework. In 2023 IEEE International Conference on Contemporary Computing and Communications (InC4) (Vol. 1, pp. 1-6). IEEE.