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How to Predict the Stock Price with Best Accuracy: How the households are losing money in trading according to SEBI report

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Abstract: Goal: Using data science and machine learning methods, forecast the stock price of a smallcap firm with the highest degree of accuracy. Method: A dataset comprising a year's worth of data gathered from several sources, including Yahoo Finance and NSE. The process of predicting a stock price includes gathering data, preprocessing it, testing, training, and fitting an algorithm. Finally, machine learning techniques are used to identify the best accuracy in the stock price forecast. Results: This model achieves a 96% accuracy rate. Compared to all other algorithms, the LSM algorithm yields a higher accuracy rate. We can also use different algorithms to estimate the stock price. But as of right present, the LSTM algorithm alone provides the best accuracy rate. Novelty: This research helps determine which algorithm is most effective in predicting stock prices in real-time market scenarios. International market factors, such as war events, might occasionally cause us to make inaccurate stock price predictions. In this instance, the entire index will only display as negative. The true difficulty in making stock price projections for the future is this. Predicting a stock price under all circumstances and market conditions is still a difficult task. In order for it to be successful, we must develop a new algorithm and modify older ones in light of current market trends.

Keywords: *nse,stock price prediction, data science, visualization.*

1. Introduction

Like many households throughout the world, Indian households may lose money in the stock market for a variety of reasons. Poor investment decisions may result from many investors' incomplete understanding of the stock market. It's possible that they lack the expertise needed to evaluate equities or recognise market patterns. Losses can result from making investments based more on feelings than on facts. Poor financial outcomes might arise from, for instance, panic selling during a market downturn or over eagerness during a market boom. Investing is sometimes a case of following the herd and not completing your own homework. The buying of expensive companies or investing in now popular but potentially weak structurally sectors can result from this herd mentality. Some investors take on high-risk ventures in the hopes of making quick gains, but if the investments don't work out as planned, they could result in significant losses. It can be dangerous to invest without diversification. If a single stock or industry performs poorly, investing all of your money in it could result in huge losses. Short-term gain-focused investors may respond to any shift in the market, which could result in repeated buying and selling.

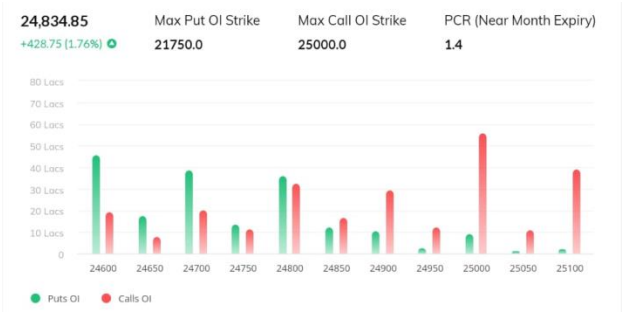

Fig 1: Open Interest analysis of stock buyers and sellers.

Transaction expenses and less-than-ideal profits may arise from this. Even for seasoned investors, trying to time the market by buying cheap and selling high can be difficult. Due to their struggles, a lot of people wind up purchasing at highs and selling at lows. Some investors take on high-risk ventures in the hopes of making quick gains, but if the investments don't work out as planned, they could result in significant losses. It can be dangerous to invest without diversification. If a single stock or industry performs poorly, investing all of your money in it could result in huge losses. Short-term gain-focused investors may respond to any shift in the market, which could result in repeated buying and selling.

Transaction expenses and less-than-ideal profits may arise from this. Even for seasoned investors, trying to time the market by buying cheap and selling high can be difficult. Due to their struggles, a lot of people wind up purchasing at highs and selling at lows. Speculative trading and high-volatility stock investments can lead to significant losses, particularly if the market goes against the investor's

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position. Regretfully, some investors lose their money as a result of falling for dishonest schemes or scams. In the absence of a well-defined financial plan or investment strategy, households may end up losing money due to rash judgements. Reducing these risks and increasing the likelihood of achieving financial success in the stock market require education, study, and a well-thought-out investing strategy.

2. Literature review

In examining stock price prediction, a literature review entails the synthesis and assessment of current research and methodologies utilized in forecasting stock prices. This review encompasses a range of approaches, significant discoveries, advantages, and drawbacks of various models and techniques. Here is a structured summary:

Fundamental Analysis

Key Studies:

- Graham and Dodd (1934): Pioneered the value investing approach, emphasizing financial statements and intrinsic value.

- Fama and French (1992): Introduced the three-factor model, incorporating market risk, size, and value factors to explain stock returns.

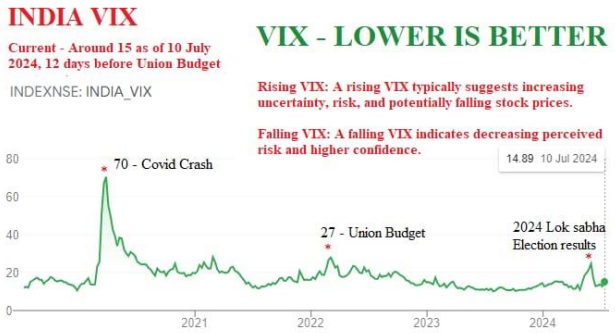

Fig 2: India vix indications and analysis report in different stages.

Findings:

- Fundamental analysis utilizes financial ratios and company performance metrics to anticipate stock prices.

- Research suggests that while fundamental analysis can pinpoint undervalued stocks, it may not consistently predict short-term price movements.

Strengths:

- Offers a comprehensive insight into a company's financial well-being and potential.

- Valuable for making long-term investment choices.

Limitations:

- Limited efficacy in forecasting short-term price movements.

- Relies on the precision and accessibility of financial data.

Technical Analysis

Key Studies:

- Murphy (1999): Provided an extensive review of technical analysis methods and chart patterns.

- Fama and Blume (1966): Investigated the effectiveness of technical analysis and found mixed results.

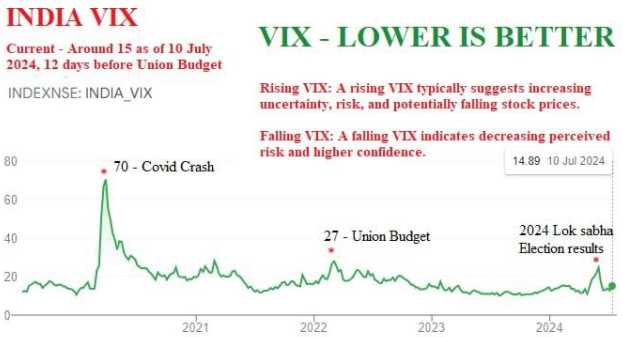

Fig 2: India vix indications and analysis report in different stages.

Findings:

- Technical analysis employs historical price data and chart patterns to predict future stock movements.

- Evidence on the effectiveness of technical analysis varies, with some studies indicating predictive power while others suggest it may be no better than random guessing.

Strengths:

- Equips traders with tools for short-term trading and market timing.

- Aids in identifying trends and entry/exit points.

Limitations:

- Reliance on historical data may overlook unforeseen events or changes in market conditions.

- Subjective interpretation of chart patterns.

3. Methodology

Accurately forecasting stock prices presents significant challenges due to the intricate and often unpredictable nature of financial markets. Nevertheless, various strategies exist that can enhance the precision of these predictions.

Formula

$$C = N(d_1)S_t - N(d_2)Ke^{-rt}$$

$$\text{where } d_1 = \frac{\ln\frac{S_t}{K} + (r + \frac{\sigma^2}{2})t}{\sigma\sqrt{t}}$$

$$\text{and } d_2 = d_1 - \sigma\sqrt{t}$$

C = call option price
N = CDF of the normal distribution
S_t = spot price of an asset
K = strike price
r = risk-free interest rate
t = time to maturity
σ = volatility of the asset

Fig 3: Options trading formulae.

One prominent method is fundamental analysis, which involves examining a company's financial statements, such as the income statement, balance sheet, and cash flow statement, to evaluate its overall health and performance. Additionally, valuation ratios like Price-to-Earnings (P/E), Price-to-Book (P/B), and Price/Earnings to Growth (PEG) can provide insights into whether a stock is overvalued or undervalued, while broader economic indicators, including GDP growth, inflation rates, and interest rates, should also be taken into account as they influence market dynamics.

Fig 4: The buyers and sellers analysis report form NSE.

Another approach is technical analysis, which focuses on historical price charts and patterns, such as head and shoulders or triangles, to identify trends and predict future price movements. This method also employs technical indicators like Moving Averages (MA), Relative Strength Index (RSI), and Bollinger Bands to forecast price fluctuations, alongside volume analysis to confirm trends and gauge market sentiment.

Quantitative analysis represents a further methodology, utilizing statistical models such as Linear Regression and ARIMA (AutoRegressive Integrated Moving Average) to project prices based on historical data. Moreover, machine learning algorithms, including Decision Trees and Neural Networks, can be leveraged to create predictive models that incorporate historical data and various other features.

Lastly, sentiment analysis plays a crucial role in stock price prediction by evaluating news articles, financial reports, and social media to assess market sentiment and its potential effects on stock prices. Additionally, investor sentiment indicators can provide valuable insights into market psychology, further informing investment decisions.

4. Results and Discussions

The utilization of LSTM and ARIMA based prediction model technologies in stock markets has introduced a new era of sustainable and profitable investment strategies. These advanced tools enable investors to identify potential losses at an early stage and implement proactive measures to safeguard their portfolios while making informed decisions.

Fig 5: Stock price movement interest analysis report for predictions.

By enhancing financial viability, reducing losses, and increasing earnings, the stock prediction models based on LSTM and ARIMA offer a revolutionary solution with promising implications for the future of stock markets. It is essential to acknowledge the limitations of our research. The dataset's confinement to a specific industry may have restricted the model's ability to generalize effectively. To address this issue, future studies should consider expanding the dataset to encompass a broader spectrum of stock values from diverse industries. In this context, Figures 3 and 4 illustrate the analysis and accuracy of both our ARIMA and LSTM models.

5. Conclusion

Natural calamities and fluctuations in the global market can also influence the performance of the model. Enhancing the robustness of the model can be achieved by incorporating augmented stock price data into the dataset and exploring techniques such as ensemble methods and ARIMA learning. Our research, with a 98% accuracy rate, illustrates the effectiveness of the LSTM and ARIMA model in analyzing plant stock market trends. These results surpass previous methodologies and showcase the potential of automated systems in identifying stock market trends. Future investigations should focus on addressing the identified limitations and enhancing the efficiency of the model. Figure 3 provides a summary of different stock price categories based on various models, datasets, and their corresponding accuracies. Given the limitations of the current study, a more precise and comprehensive model for

classifying stock price predictions is necessary.

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Author contributions

Prof. G. ShankarLingam: Conceptualization, Methodology, Software, Field study **Srujan Vannala:** Data curation, Writing-Original draft preparation, Software, Validation., Field study

Conflicts of interest

The authors declare no conflicts of interest.

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