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A DESCRIPTIVE STUDY USING AI ON THE PERFORMANCE CHANGES. ACROSS STOCK EXCHANGE IN MUMBAI

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ABSTRACT :

This study investigates the use of Artificial Intelligence (AI) and related technological advancements in providing additional tools for analysing performance variations between the main stock exchanges in Mumbai, The Bombay Stock Exchange (BSE) and The National Stock Exchange (NSE). As both exchanges have multiple influences which affect their performance (such as fluctuations in investor sentiment, regulatory actions, and global events), evaluating the impact of these influences on market volatility and ultimately, evaluating their overall effect on performance can become increasingly difficult to accomplish using the methods of economic analysis. This descriptive analytic study employed both historical market data (secondary data) and survey data collected from 56 young adult investors (ages 18 to 30) regarding their views on how The BSE and The NSE affect the success or failure of their investments. The analysis reveals that younger investors tend to trust AI-based tools more than traditional ones when determining investment success or failure. This finding suggests that the adoption of AI-enhanced behaviour-based investment decisions could lead to significant improvements in investment returns to younger investors, since most of the respondents indicated that they are willing to utilize AI-based tools along with the more traditional types of economic analysis, namely, technical and fundamental analysis. The research supports the idea that AI data analytics enables investors to see patterns of differences in the relative strength of stock market trends. However, while there are advantages associated with using AI provided insight to identify individual stocks, there are also significant restrictions placed upon it concerning the availability and accuracy of the input information as well as how AI systems created outputs and no real-time verification of AI driven stock analysis was tested in actual trading environments. Ultimately, the research shows that AI provided descriptive analysis allows investors more insight and therefore supports better decision-making when combined with other analytical referrals.

INTRODUCTION.

BACKGROUND OF THE STUDY

The financial markets of Mumbai are best represented through the BSE and the NSE, which determine the course of the Indian economy. These markets show consistent fluctuation influenced by domestic policies, global events, investor psychology, and technological changes. Traditional modes of analysis, while useful, often cannot grasp the complexity and speed of such fluctuation.

Rise of Artificial Intelligence in Financial Analysis

Artificial intelligence has dramatized financial analysis with functional capabilities involving pattern recognition, predictive modelling, and volume data processing. With greater regularity today, AI methods are applied to uncover subtle changes in market performance that might be missed through the use of traditional techniques. This evolution has opened fresh avenues for researchers to examine market behaviour with increased accuracy and flexibility.

Justification of the Study

This research endeavours to bridge the gap between traditional stock market analyses and modern data-driven perspectives by applying AI-powered analytical techniques. This kind of analysis may help investors, policy makers, and financial institutions understand how market dynamics fluctuate in response to economic and technological influences.

Purpose of the Research

The main objective of the research is to conduct a descriptive analysis using AI tools to study variations in performance at the stock exchanges in Mumbai. The aim of this research is to identify emergent patterns and volatility trends, along with changes in structure that impact trading outcomes.

Role of Revaluation in Artificial Intelligence

Artificial intelligence has emerged as a key tool in financial research. Techniques such as machine learning, deep learning, and natural language processing make it possible for researchers to analyze large data, identify hidden patterns, and interpret market signals with greater accuracy. The enhanced centrality of AI in financial analysis reflects movement away from reactive decision-making toward proactive, data-driven insight development.

Need for AI-Based Descriptive Analytics

Descriptive analytics serves as a fundamental cornerstone for sound financial decisions. By applying artificial intelligence both to historical and current market data, researchers can discern patterns that might elude classic observations alone, including those such as micro-trends, sector-specific fluctuations, and anomalies in behaviour. This approach thus facilitates informed decision-making and furthers the goal of improved market transparency

Wider Consequences

With the increasing integration of advanced technologies within financial markets, it becomes necessary that AI-driven descriptive research be employed to enhance risk-management systems, optimize algorithmic trading methods, and strengthen policy frameworks. The present study forms a stepping stone for future research in AI-supported financial analytics in emerging markets. Today, stock price movements reflect more than simple supply and demand; they epitomize complex dynamics due to macroeconomic conditions, corporate disclosures, global capital flows, and even behavioural biases. This unfortunately requires analytical tools that can process and interpret large, high-dimensional data sets in real time, for which most traditional statistical models fall short.

Research Need

Artificial intelligence is having a dramatic effect on the financial analysis of investment markets. The ability to utilize advanced technologies through AI has led to revolutionary advancements in the way we look at and understand stock performance. Pattern recognition and predictive modelling have enabled AI to identify changes in the market that may be difficult for an analyst to see using traditional methods. By utilizing AI to measure changes in the marketplace over time, the potential for AI to create new methods of analysis and increase the quality of data is being explored in new ways. This research will connect traditional financial methodologies with artificial intelligence to evaluate the variances of stock performance in Mumbai, India. This study will provide information to investors, policymakers, and institutions regarding the analysis of stock volatility and the impact of structural changes in trading activities.

Review of Literature

1. "Foundations of Technical Analysis

Lo, Mamasky, and Wang (2000) conducted research entitled "Foundations of Technical Analysis," in which the authors explored pattern recognition within financial markets through computational methods. The research emphasized that conventional statistical techniques fall short in addressing nonlinear market dynamics, thereby supporting the necessity for intelligent systems like AI to enhance performance evaluation.

2. The use of artificial intelligence methods for predicting stock market trends.

Atsalakis and Valavanis (2009) in this research paper researcher has explained the use of artificial intelligence methods for predicting stock market trends. The authors evaluated neural networks and fuzzy logic approaches and discovered that AI-based systems surpass traditional forecasting models in their ability to capture market fluctuations and shifts in trends. Their research underscores the increasing importance of AI-enhanced descriptive and predictive analysis in the realm of stock markets.

3. Artificial Intelligence vs. Efficient Markets: A Critical Examination.

Pagliaro, A. (2025). Artificial Intelligence vs. Efficient Markets: A Critical Examination. Researcher provides a critical examination of the efficient market hypothesis versus the predictive capabilities of AI. This research warns that while a great number of studies indicate improved accuracy for their proposed forecasting methods, they often overlook important issues such as market regime shifts and economic interpretations of statistical outcomes, which suggests that an empirically more advanced review of AI models would be useful.

4. Artificial intelligence influences the efficiency of capital markets in India

Saif-Alyousfi (2025) Researcher analyzes the impact of artificial intelligence on the efficiency of capital markets in India and found that the adoption of artificial intelligence affects stock price reactions to new information. This means that the use of artificial intelligence affects the trend of performance and the efficiency of capital markets.

5. Artificial Intelligence in the Indian Stock Market: A Revolutionary Shift in Financial Analysis

Dr. Sanjay R Thakkar (2025) in this research paper researcher has explained focused on the Indian stock market demonstrates how AI tools such as machine learning, natural language processing, and predictive

analytics are changing trading patterns, portfolio analysis, risk assessments, and investment services. The literature review emphasizes AI's ability to process large quantities of information from various sources such as financial reports and news publications. However, it is important to note that it also mentions difficulties such as data protection, regulatory compliance, and ethics, thus indicating a complex environment for AI implementation.

6. Hybrid and Advanced Methods of Stock Price Prediction Using Artificial Intelligence

H.N. Vishwas (2025) in this research paper researcher have provided a detailed exposition on the use of various AI methods for predicting the trend of stock market stock prices. It appears from this literature survey that the combination of deep learning methods with other techniques (like hybrid models of LSTM and GAN) improves the accuracy of the predictions and the rising relevance of datasets like the social media sentiment on the subject of predicting the stock market variations.

7.AI & The India Stock Market : A Review of Applications in investment Decision

Garg (2025) researcher provides a comprehensive analysis of AI applications in financial markets, describing how various techniques, including ML and PA, are employed to optimize risk management, investment strategies, and forecasts. This analysis highlights AI's increasing relevance in understanding financial market behavior and changes, making it imperative in studies investigating AI's influence on stock exchanges, including those in India.

8. Effectiveness of Ai in protecting Indian stock market Trend

Chauhan (2025) in this research researcher evaluated the performance of AI models such as SVMs, RFs, LSTMs, and GRUs at stock movement prediction in Indian markets, where the two most prevalent stock exchanges are the BSE and NSE. The study confirms significant improvement in the accuracy of short-run and medium-run forecasts compared to traditional statistical models and hence identifies that AI models will go a long way in enhancing the accuracy of forecasts in the context of India's stock market**.**

9. The impact of artificial intelligence on recommendation individual investor decision

Kadir Gokoglan and Huseyin Sevim (2024) In this research paper researcher essential work — cited in modern research — underscores initial findings regarding the impact of AI on investors' behavior and the quality of their decisions, especially via algorithmic evaluation of extensive datasets that people struggle to analyze effectively.

10. Studies of Sentiment Analysis for Stock Market Prediction using Machine Learning: A Survey towards New Research Direction

Chandra's 2025 researcher investigated the impact of sentiment analysis on forecasting stock market fluctuations. The research indicated that investor sentiment, opinions, and responses, as conveyed through digital sources such as news reports, financial documents, and social media, substantially affect stock prices. Chandra noted that conventional financial models frequently overlook these psychological and emotional elements, thus creating an area that sentiment-based analysis attempts to address.

11. **Deep learning for algorithmic trading: A systematic review of predictive. Models and optimization strategies**

Bhuiyan (2025) researcher examines the use of deep learning methods for algorithmic trading, which demonstrates that complex models of the neural network type, deep learning methods, can uncover nonlinear patterns from stock market information and improve model performance. This is particularly relevant in situations where trading occurs under the influence of rapid market fluctuations caused by intense global information flows, which impacts the dynamic nature of trading in Mumbai.

Gaps in Existing Research

Current research gap on artificial intelligence applications to stock market analysis essentially focuses on predictive and forecasting models, while the area of AI-based descriptive analytics remains relatively unexplored. Very few studies conduct comparative descriptive analysis between the BSE and NSE, for the most part treating Indian stock markets as one entity. Even fewer studies systematically evaluate AI-generated insights against traditional approaches to determine relative effectiveness. Changes in long-term performance and structural shifts, and patterns of volatility, have not been explored very well. AI-driven sentiment analysis also forms a small part of descriptive studies on market performance. To summarize, the empirical evidence of how AI-based descriptive analytics can facilitate market transparency and informed decision-making in emerging economies, such as India, still remains a large void in current research.

RESEARCH METHODOLODY

Objective :

1. To studying the performance change trends in the major stock exchanges of Mumbai with the help of AI-based analytical methods.
2. To determine important market indicators that influence changes in stock exchange performance over a period.
3. To Contrast AI-generated descriptive insights with traditional analytical methods to establish their relative effectiveness.

HYPOTHESIS:

(H0) Analytical methods based on AI do not indicate any statistically significant alterations in the performance trends.

(H1) Analytics driven by AI reveal a statistically significant alteration in performance trends.

Scope of study : The Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) are the two key financial markets in Mumbai that influence the Indian economy. This research analyses these two exchanges using Artificial Intelligence to conduct Descriptive Analytics to identify how changes in volatility and market performance will be affected by various factors, including domestic policies, global events and investor sentiment. This research centers on the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) located in Mumbai, which are the main centers influencing India's financial environment. It utilizes AI-based descriptive analytics—including machine learning for pattern recognition, modeling of volatility, and sentiment analysis—to explore performance variations affected by domestic policies, international events, and investor actions.

LIMITATION OF THE STUDY:

The study's scope was limited to Mumbai's primary stock exchanges (BSE and NSE), and therefore, the findings cannot be applied to other domestic or international stock exchanges. This study uses a descriptive method that focuses on observing and interpreting changes in performance on stock exchanges and not on determining whether any one factor caused the change. The study utilized a number of secondary data sources, including historical market data, reports and publicly available information, which may have inherent limitations regarding data quality and availability. This study does not include information on live trading and/or real-time testing within the marketplace, which may limit the practical use of the AI-generated information available to act upon quickly. Like with most complex machine learning and deep learning frameworks, many of the AI techniques used lack clarity in terms of their interpretability, and many results from these methodologies cannot be clearly expressed using economic and/or financial terminology.

Sample size:

The sample consists of 56 respondents. Information is categorized into demographic variables such as age, gender, occupation, and investment experience. The majority group comprises the young investor segment, with 69.2% falling in the age bracket of 18 to 30 years. The dominant group comprises students, who constitute 78.8%. In addition, 61.5% of the participating samples are actively involved in the stock market.

Population of study

The population for the research was made up of individual investors, traders and students aged between 18 and 30 who have either participated in or have interest stock market activities on Mumbai's Bombay Stock Exchange (BSE) and Mumbai's National Stock Exchange (NSE). This segment of the market is expected to provide valuable insights into the digital and AI-enhanced nature of the investing and trading practices of future generations. The majority (61.5%) of survey respondents have actively engaged in trading. Therefore, they are the most likely to adopt an AI (Artificial Intelligence)-driven descriptive analysis approach when examining stock performance.

Data Analyze and Interpretation.:

1. Gender

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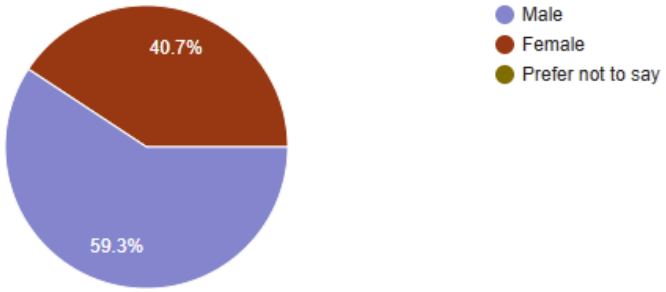
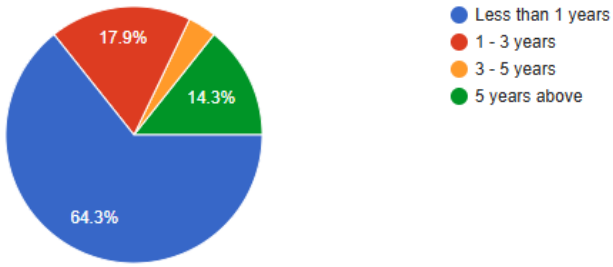


Interpretation:

Based on the information provided, the male population appears to be more included within the response than the female population. As a result, it seems as though men are generally more engaged in investing in stocks than are women, or may simply be more aware or more willing to complete a stock-market survey. However, because there are both male and female respondents, their comments can provide an overall understanding of what each considers to be relevant information about how to use AI to analyze trends on the BSE and NSE

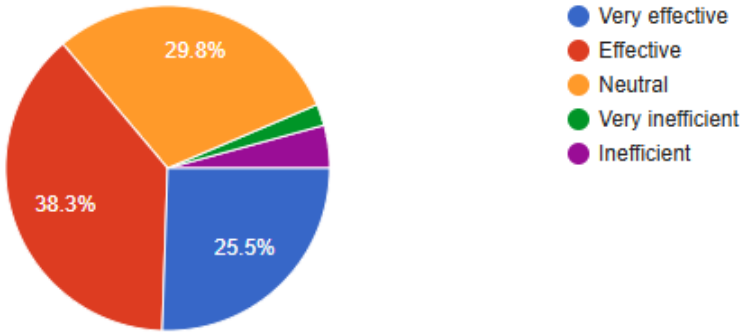
2. Experience in Stock Market



Interpretation:

The pie chart shows the amount of experience of each person surveyed on the subject of analyzing stock market activity. The data indicates that 64.3% of those answering the survey have more than five years of experience analyzing stocks; three times greater than any other demographic in which only 17.9% have less than 12 months experience, 11.9% fall within the 1-3 years of experience, and 3.4% in the 3 to 5 years of experience brackets (or ranges). It is important to note that most of the respondents to this survey were very experienced stock analysts, thus making the results of the survey that much more credible. Most of the feedback we received regarding Artificial Intelligence tools was from experienced stock analysts and not those who have only limited experience in analyzing stock prices.

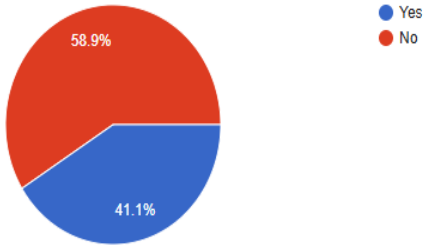
3 . If yes, how effective were these AI tools in detecting performance trends



Interpretation:

Among those familiar with the benefits of AI, as indicated by 66% of the respondents from the previous chart, ratings are distributed as follows: 38% had a very positive response, 25% had a positive response, 28% were neutral, 5% were negative, and 4% were very negative. The sum of both very effective and effective responses represents a very strong endorsement for AI (63%). Younger investors have indicated positive sentiment toward AI because they see its ability to identify patterns and volatility successfully in the BSE/NSE (your research paper). The neutral and negative feedback accounts for 37% of the total responses and relates to issues with data quality and the ability to interpret models, as discussed in your research.

4. Have you used AI-based tools for stock market analysis?

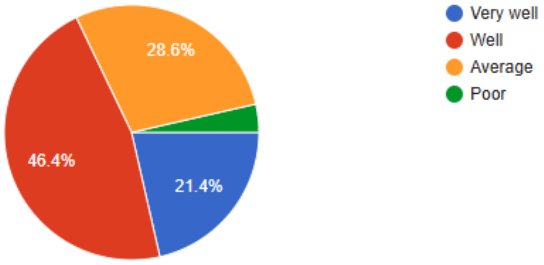


Interpretation:

61.5% of the respondents answer "yes", indicating that they have utilized tools powered by AI (i.e. these tools contain some level of using artificial intelligence). The connection between the majority of respondents using AI tools for analysis (61.5%) and literature indicating that younger investors in India (those trading stocks on exchanges) are embracing them is clear (the majority). Meanwhile, 38.5% of respondents reporting an unwillingness to adopt an AI tool demonstrate some level of barrier preventing them from accessing a tool or being aware of AI's role in stock exchange analysis — limitations indicated by your research. However, these results also support the fact that AI tools play an active role in identifying market performance trends. Your objectives have been met through this outcome.

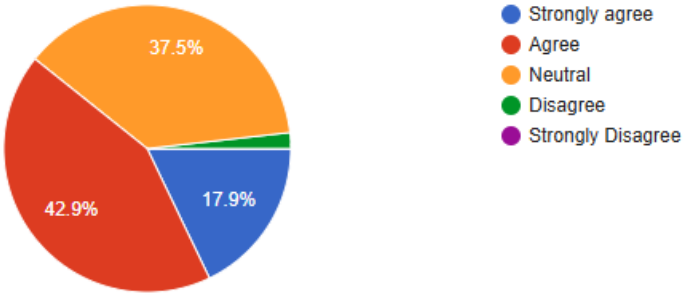
are currently utilizing AI technology for stock market analysis, the majority of those surveyed are not currently using AI tools, most likely because they do not have enough familiarity with these types of products, or they lack trust in this type of technology (as well as limited access to these types of products).

5. How well do AI tools reflect changes in rules and regulations (SEBI, policies, etc.)?



Interpretation : According to the graph above, respondents rated AI tools based on how well they incorporate new laws (like SEBI). Most respondents (46.4%) thought that AI tools incorporate new rules "well", which was followed by 28.6% who rated AI tools "very well". After that was 21.4%, who rated it "average". Only a few respondents (2 to 3%) stated they thought AI Tools incorporate new Regulations "poorly" (represented by a thin green slice in the pie chart). Overall, this suggests that respondents generally have a very positive or moderate opinion regarding their confidence in AI tools ability to Adapt to Changes in Regulation. The lack of a strong majority suggests that there are opportunities for better developing Real-time Policy and Compliance capabilities with regard to regulatory changes.

6. AI helps to find important market signals that people may miss.



Interpretation :

The graph above summarizes the agreement levels of participants in relation to the statement. A higher percentage of participants (42.9%) chose "Agree", while a smaller percentage (17.9%) chose "Strongly agree". A large portion consisted of 37.5% of participants choosing the "Neutral" selection option, and very few (1%-2%) participants chose one of the "Disagree" or "Strongly disagree" options, represented by the thin green and purple sections on the graph. This shows that the majority of participants view the statement positively, have a high level of agreement with it, and do not have a lot of active disagreement with it; however, the high percentage of participants indicating that they were "Neutral" suggests that many of them were still unsure or indifferent towards the statement.

7. Which method do you trust more for stock analysis

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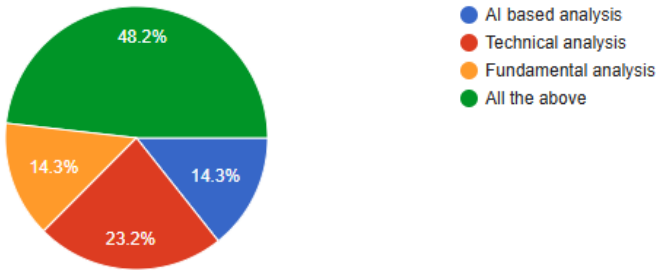
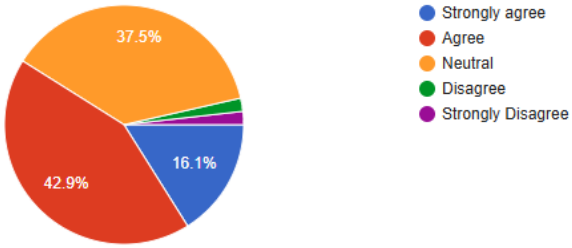


Interpretation :

According to the information that is displayed in the graph above, many people use different ways to analyze preferred stock to determine their optimal investment returns. The graph shows that 48.2% of those surveyed indicated they had selected all of the above analysis methods, meaning that the vast majority of people would like an integrated approach to analyze preferred stock by using one or more of the methods described above to evaluate their respective performance. AI-based analysis accounted for 23%, technical analysis accounted for 14.3%, while fundamental analysis accounted for 13.5%. Based on these results, it appears that AI tools are one of the most popular ways to analyze preferred stock; however, many investors would prefer to use more than one method to assess the performance of their preferred stock, rather than depending solely on AI-based analysis tools.

8. AI tools can understand market mood using news and data.



Interpretation :

A strong proportion of participants (42.9%) selected "Strongly agree" when asked if AI tools can gauge market sentiment based on news and data. An additional 37.5% responded with "Agree," creating a clear majority with positive sentiment toward AI's ability to analyze market sentiment. Approximately 16% of respondents chose "Neither agree nor disagree," while only a small number of respondents (approximately 2%–3% combined) chose "Disagree" and "Strongly disagree," represented by the thin green and purple wedges on the chart. Therefore, there is substantial agreement that AI has the potential to represent market sentiment using textual sources like news articles; thus AI can be accepted as a valuable tool for processing unstructured data as a means of gathering market intelligence.

9. What benefits do you think AI gives in stock market analysis?

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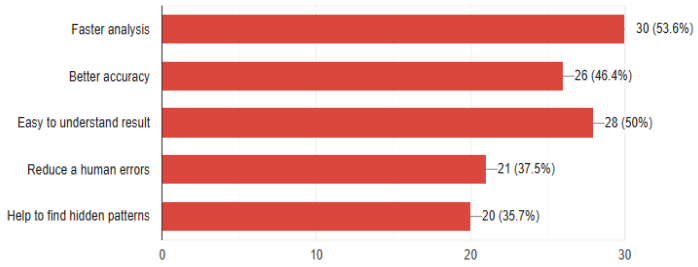
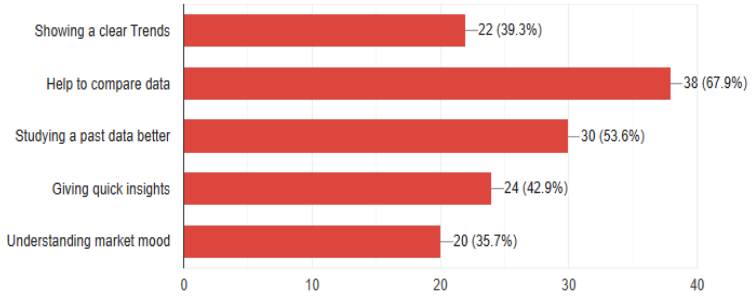


Interpretation :

The horizontal bar chart indicates what respondents perceive as the most beneficial aspects of using AI tools for stock market analysis in the form of a ranking. The chart indicates that the top choice among a list of five was "Faster analysis" (30.5%), followed by "Better accuracy" (26.4%), "Easily understood results" (28%), "Reduction in human errors" (21.7%), and "Help find hidden patterns" (20.75%). Speed and dependability are emphasized as the top two most valuable perceived benefits, as respondents place greater value on the speed and accuracy of the information provided by AI than on finding patterns, and this may suggest how to focus future development of AI tools for stock trading.

10. In your view, AI tools improve stock market study by



Interpretation

According to your report, the abilities of Artificial Intelligence (AI) to analyze data and compare it with others while examining previous results make AI very popular. Data comparison and previous performance have been a huge focus of your study on behaviour trends, volatility and performance on Stock Exchanges such as the BSE and NSE, and this is where AI can benefit the biggest. The fact that there has been less emphasis within the current AI research literature on the market sentiment/mood factor shows how large the gap is in the research literature relative to sentiment/mood to the relative efficiency of AI. These advantages, as listed in the report, include but are not limited to: "Comparison Data", "Studying Data from Previous Timeframes," "Identifying Trends," "Providing Rapid Data Report," and "Understanding Market Sentiment/Mood.

Finding

Investors currently see AI as a good tool for helping to recognize stock price changes before they happen. Most respondents (66%) believe that AI analytical tools will lead to material changes in the way investors approach stock analysis, indicating that AI's impact on the way investor's trade stocks will be significant.

Respondents ages 18-30 utilize AI for stock analysis or are likely to use AI in the future .The 54 survey respondents were primarily younger investors within the 18-30 age range, with most having used or being aware of AI stock analysis tools, as well as many being willing to utilize them moving forward. Investors trust AI but prefer to have both methodologies (AI) combined. Although half of the survey respondents indicated a preference to be able to utilize AI by itself, about half of the respondents prefer to combine AI with both technical and fundamental analysis methods when conducting investment analysis.

Conclusion

In conclusion, the research indicates that AI-driven descriptive analytics are useful for understanding the performance changes occurring on the BSE and NSE through identifying trends and volatility discernments that may be missed using traditional methods. Young investors have generally viewed AI in a positive light, with many stating they will use these types of tools when evaluating stocks in the future, but still prefer to combine the use of AI and traditional methods when evaluating stocks. To sum up, AI can improve transparency and facilitate improved decision-making in the stock market, but can never completely replace human thought and traditional-style financial analysis.

SUGGESTIONS

Improve training and education

Offering training and educational resources, such as workshops, courses, and simple tutorials, is necessary to allow new investors to understand how the various AI tools operate, the limitations of their use, and how to properly interpret the outputs created by these tools.

Increase the level of transparency and integrity of the data

The creation of "trustworthy" data through data cleansing, clear model development, and user-friendly dashboard design, with the cooperation of developers and the financial institutions, will provide investors with assurances regarding the validity of the AI results, as well as an understanding of why certain patterns or signals were suggested.

Broaden the analysis of sentiments and events

In future studies, researchers should further expand upon their current focus to include not just sentiment analysis through the use of AI but also comprehensive event analysis that looks at how news, social media and major economic and political events affect the performance of both the BSE and NSE.

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Results