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USE OF BIG DATA AND ARTIFICIAL INTELLIGENCE IN PREDICTING STOCK MARKET TRENDS AND IDENTIFYING INVESTMENT OPPORTUNITIES

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Abstract:

Big data and artificial intelligence (AI) are being used more frequently in the stock market, opening up new possibilities for trend forecasting and spotting investment opportunities. Big data is the term used to describe the enormous, intricate, and varied data sets that are produced from a variety of sources, including social media, news articles, and financial activities. Contrarily, artificial intelligence (AI) describes a computer system's capacity to imitate human intelligence and learn from experience. Big data and AI have the ability to completely transform the stock market's operations, making them more productive and efficient.

Key words: *Big Data, Artificial Intelligence, Stock Market Trends, Algorithms*

Introduction:

A number of factors, including economic, political, and social ones, have an impact on the stock market, which is a dynamic and complicated environment. Traditionally, stock market forecasts were made by looking at news items, financial statements, and historical data. However, the amount of data that could be captured by these technologies was restricted compared to what is currently available. Big data and AI have made it feasible to examine and analyse massive volumes of data in real-time, resulting in new discoveries and stock market forecasts. Many people now buy and sell shares via web programmes. The next phase of this web programme will entail more than just joining up and purchasing shares; it will also involve anticipating market prices for certain securities & shares.

Review of Literature:

1) Nardo et al. 2016 using a variety of methodologies to investigate the influence of online financial news, mixed results were discovered. Despite the fact that web activity can anticipate market movement, gains rarely topped 5%, according to their analysis. For stock market indices, Baluch and Jackowska (2018) experimented with using both fundamental and technical fractal analysis. Three hybrid models were compared with the outcomes of Artificial neural networks approaches, and it was found that the proposed strategy performed better.

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2) According to an empirical study by I. E. Diakoulakis and D. E. Koulouriotis (2018), selecting the right input variables can lead to more precise forecasts based on the selection of important basic factors. Numerous researchers have evaluated different stock market prediction techniques and found a consistent inconsistency in the Technical Analysis methodology (Dunne, 2017). The input parameters forArtificial neural networks that directly affect stock price and are based on intrinsic financial ratios of the stock must be carefully chosen.
3) (Sen and Mehtab, 2020) Utilize technical indicators to make stock price predictions. The study describes each model's accuracy and stock prediction performance. It supports the idea that AI/ML algorithms are appropriate for the financial sector, particularly stock price prediction.
4) G. S. Navale & Nishant Dudhwala in their research paper titled "Prediction of Stock Market using Data Mining and Artificial Intelligence" have stated that the Financial analysts who invest in stocks frequently have no idea how other variables like inflation and economic growth affect stock values. Concerning which equities to buy and sell, they lack confidence. They are easily manipulable by stock brokers. Stock values are impacted by news that occurs in news articles. A regular consumer cannot accomplish it. Our ability to generate accurate forecasts is enabled by artificial intelligence and data mining to achieve precision.
5) F. G. D. C. Ferreira et al.(2021) Artificial Intelligence Applied to Stock Market Trading: A Review enumerates the key benefits of automating financial investing activities with computer technology. It includes the elimination of decisions based on emotions, the ability to detect and study patterns that humans overlook, and the immediate and real-time intake of information.Researchers and investors frequently employ the stock market forecasting or prediction approach today in order to profit from stock trading.

Objectives of the study:

1) To explore and understand the various aspects of the use of big data and artificial intelligence in predicting stock market trends.
2) To identify the investment opportunities in stock market with the use of big data and artificial intelligence.

Research Methodology:

Data Collection: The research study is based on the primary data and secondary data. Secondary data was collected through review of relevant data to gather a comprehensive understanding of the topic and primary data was collected through structured questionnaire.

Sample design: The questionnaire was circulated among 80 respondents, wherein responses of 53 respondents were considered and the remaining responses were discarded due to irrelevance. Pie charts and bar graphs were the tools used for visualizing data and to make interpretations.

Use of big data and artificial intelligence in predicting stock market trends and identifying investment opportunities:

Big data refers to the vast volume of structured and unstructured data that a business must manage on a regular basis. The quantity of data is not important, though. What companies do with the data is what really matters. Big data analysis can yield information that aids in making more informed

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decisions in general as well as strategic business decisions.

Artificial intelligence (AI) is a term used to describe the simulation of human intelligence in machines designed to think and act like people. These machines can be trained to perform tasks that often require human intellect, such as speech and image recognition, decision-making, and language translation. In the context of big data, AI can be used to analyse and make sense of the massive amounts of data.

Machine learning algorithms may use big data sets to identify hidden patterns, correlations, and insights that are impossible to find by people. Better decisions may be made as a result, which would improve overall business outcomes.

Predictive analytics and natural language processing are the two main types of big data and AI used in the stock market. In order to determine the possibility of future events, predictive analytics uses data, statistical algorithms, and machine learning approaches. This can be used to forecast stock market patterns, trends, and prices. On the other hand, the use of AI to process and analyse natural language data, such as that found in news articles and social media messages. This provides useful information for investment decisions by identifying sentiment and opinions about a specific stock or sector. There are several uses for big data and AI in the stock market, including:

Predictive modelling: Predictive models are useful for predicting patterns in stock prices, trends, and movements. Investors may be able to discover possible investment opportunities and make wiser choices as a result. Portfolio optimization: By identifying equities that are anticipated to do well in the future, big data and AI can be utilised to optimise a portfolio of investments.

Risk management: In order to recognise and control risk in the stock market, big data and AI can be leveraged. Predictive models, for instance, can be used to spot trends that point to a high level of risk, enabling investors to take precautions to reduce it.

Algorithmic trading: Big data and AI can be utilised to create trading algorithms that automate the process and increase its effectiveness.

Analysis of data collected:

Analysis of the data collected using online survey methodology:

Age Group	No. of respondents	Percentage
18-25 years	40	75.5%
26-40 years	6	11.3%
41-60 years	6	11.3%
Above 60 years	1	1.9%
Total	53	100%

The majority of responses, at 75%, are between the ages of 18 and 25. 11% are each between the ages of 26 and 40 and 41 to 60.

1) How familiar are you with the concept of big data and its applications in the stock market?

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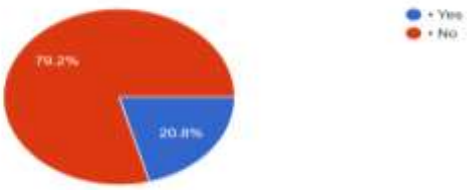
In the 53 respondents used for this study, 32% were not aware of the idea of artificial intelligence (AI) or its applications in the stock market, while 51% were somewhat familiar. 17% of people are extremely familiar.

2) To what extent do you believe that big data and artificial intelligence can help predict stock market trends?

36% of respondents say they have some faith in big data and AI to assist them predict stock market trends, compared to 49% who have some faith and 15% who have no faith at all.

3) Have you ever used big data and artificial intelligence in your investment decisions?



21 % of the respondents prefer AI tools for investment decision making whereas approx. 80% prefer to make investment decisions based on their own knowledge and experience.

4) How effective do you believe big data and artificial intelligence are in identifying investment opportunities in the stock market?

Nearly 38% of those surveyed think Big Data and AI can be useful tools for spotting stock market investment opportunities, while 51% aren't sure and 11% aren't at all interested.

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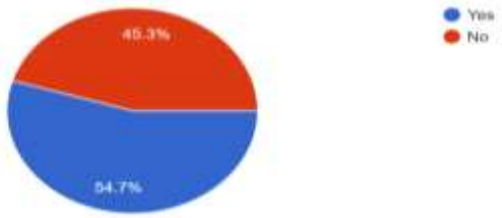
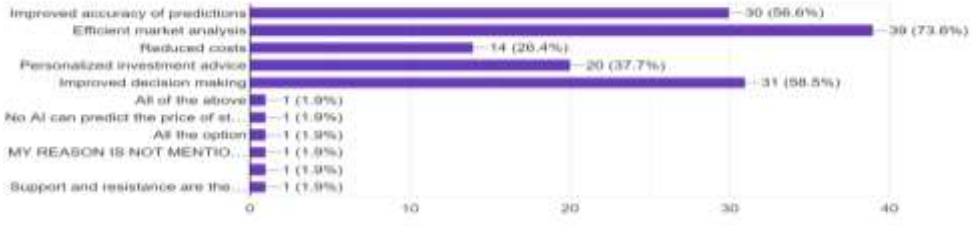
5) Are there any specific concerns or limitations you have when it comes to using big data and artificial intelligence in the stock market?



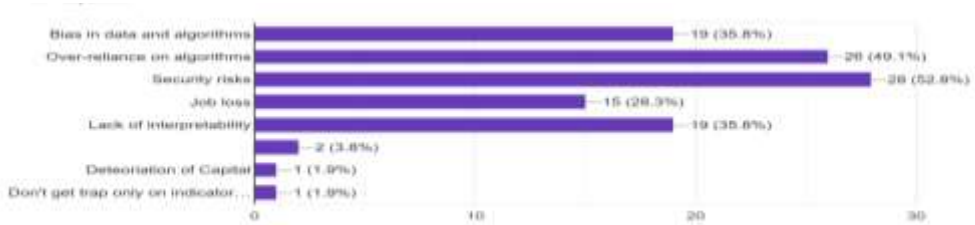
55% consider the concerns and limitations associated with using big data and AI in the stock market with regard to lack of transparency, bias in data and algorithms, overreliance on technology whereas 45% don't have any concerns with its use.

6) In your opinion, what are the benefits of using big data and artificial intelligence in the stock market?



73% think effective market analysis is possible, 26% think expenses have decreased, 37% think personalised investment advice is possible, and 58% think decision-making has improved.

7) In your opinion, what are the potential risks of using big data and artificial intelligence in the stock market?



49% believe there is an overreliance on algorithms, 52% believe there are security concerns, 28% think there are job risks, and 35% say there is a lack of interpretability. 35% say there is a risk of bias in data and algorithms.

8) How would you like to trade in stock market ?

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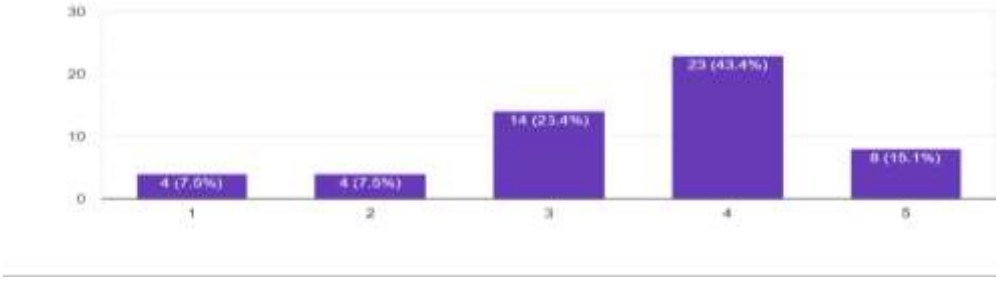
60% or more people want to trade stocks using algorithms and their own analysis, compared to 11% who want to use broker advice, 21% who want to use their own analysis, and 5% who wish to use algo bots.

9) How much do you think will be the use of algorithms and big data in future, on scale of 1-5



In future, big data and algorithm use is predicted by 15% to be extremely high, 43% to be high, and 14% to be moderate. 7.5% think it will be of little use.

Limitations :

The data collected is from limited sample size hence may vary with large sample size.

Advanced statistical tools are not used, Interpretations are on the basis of data analysis with the help of pie charts and bar graphs.

Findings:

The complexity of the stock market, limited historical data, overfitting, unforeseen events and changes, and bias in data and algorithms can impact the accuracy of AI models in making predictions, making it important to use them in conjunction with other tools and strategies and with proper oversight. 80% of people may not use AI in investment decisions due to factors such as lack of awareness, trust in personal knowledge and experience, cost, technical expertise requirement, and complexity of AI tools. The effectiveness of big data and AI in identifying investment opportunities in the stock market depends on the quality of data, algorithm design, market conditions, and the incorporation of human insight.

Using big data and AI in the stock market has concerns and limitations, including lack of transparency, biased data and algorithms, overreliance on technology, lack of human insight, and increased volatility. It's important to carefully consider these factors when using AI in stock market investments. People believe that the use of algorithms and big data in the stock market is expected to increase with approximately 50% of people believing this due to the benefits it provides such as improved decision making, increased efficiency, better customer experience, predictive analytics, and cost savings.

Conclusion:

Big data and AI can be used in the stock market to analyze various data sources and find trends, helping investors make more informed decisions. Machine learning algorithms can be trained on this data to discover patterns and predict future market movements. However, it is important to keep in mind that AI-based stock market predictions are not always reliable and there are limitations to its use. Therefore, AI should be used as one tool among several and not relied upon as the main factor in making investment decisions. It is also important to understand the limitations of AI in stock market investing and to carry out extensive research and consultation with a professional before making any financial decisions.

Also staying updated with developments in the

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stock market is important, and raising awareness about the use of big data and AI in stock market investments requires a comprehensive strategy using different tools and platforms to reach different types of investors. To diminish the danger associated with exploiting big data, it is important to ensure that investors have access to the necessary data and resources for making wise investment decisions.

The conclusion is that to reduce the potential risks associated with using big data in the stock market, a multi-faceted approach is necessary. Implementation of strategies such as ensuring data quality, implementing data security measures, adhering to privacy regulations, developing explainable models, regularly validating the models and algorithms, incorporating human oversight, and considering ethical considerations.

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