Analysis of artificial intelligence in stock trading

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Abstract

The financial markets are completely different now that AI makes stock trading more accurate and efficient. This paper examines the substantial impact of AI on trading and stock market prediction, with an emphasis on how AI may improve market dynamics and decision-making processes. This article looks at how artificial intelligence has changed throughout time in stock trading, looking at different models and machine learning algorithms used for market forecasting. The study addresses the key developments and difficulties in applying AI for stock market analysis, including technical and fundamental approaches, through a thorough examination of the literature. Additionally, the research offers data-driven insights that shed light on stakeholders' views and convictions on the use of AI in financial trading.in relation to AI's application in financial trading. use of AI in financial trading. The findings emphasize how important it is to take constant learning, teamwork, data diversification, and ethical considerations into account when using AI for stock trading. Additionally, the study offers helpful recommendations for enhancing the morality and effectiveness of AI-driven trading strategies, emphasizing risk assessment, long-term planning, assessment, customization, and continuous monitoring. Finally, the study emphasizes how AI has the potential to drastically change the dynamics of the stock market and how critical it is to use it wisely and sensibly in order to maximize benefits and reduce risks.

INTRODUCTION

In 1990 the computerised technology of AI was introduced in the financial trade and different kinds of stocks to enhance the way of trading and enrich the stocks of any company. Technology always tries to transfigure the stock market and its different trends. Using the proficiency of computer systems to mechanize the trading process and the financial markets to enhance the restructuring process of the books. (JAIN,2005). In the financial world AI and its different technologies are continuously improving and giving some significant importance to trade and investing in nanoseconds which we also call in electronic method after the invention of AI it is so easy to trade in nanoseconds and invest in stocks.

Artificial intelligence AI is now not only for science fiction movies. Now it is a basic tool that is required for any field if we talk about trading, games, movies or any kind of solutions regarding health issues and any education guidance. With the use of historical data and the traditional activities, artificial intelligence help us to know whether the stock is going up or down or how it may go to react in further. Furthermore, as AI employs algorithms, less time is being spent on these tasks and more money is being made by companies. Therefore, there is a direct connection between artificial intelligence and consumer welfare. Through resolving problems with access to the aforementioned resources, it seeks to maximize usefulness for users. The goal of this chapter is to discuss the parameters of consumer protection in the context of artificial intelligence as they relate to India. India just released the Consumer Protection (E-Commerce) Rules, 2020 and the Consumer Protection Act, 2019. Thus, this study provides consumers with insight into the emerging legal paradigm and its readiness for a fast-paced, dynamic, technologically enhanced world.

Stock market forecasting is a field in which the algo trading softwires are using or used by some industry experts or different kind of industries to forecast the trends accurately and security recently precisely due to their complexity and non-linear nature. To the ease and handling of the different kind of algo trading softwires trading becomes more lenient and the financial market makes their books properly in regards to the customer which continuously make changes in their portfolio so that they can easily go through the different kinds of stocks for this kind of experiment the benchmarks are being created which are an ARIMA (autoregressive integrated moving average. In this study, we present AITA (Artificial Intelligence Trading Assistant), our framework for creating trading systems that use DNN-forward testing, a novel trading method, in place of back testing or forward testing (commonly known as paper trading). Using our technique, the optimal strategy is determined by looking at the profits obtained by using candidate strategies straight for DNN prediction.

The stock market is a place where companies get listed and sell their shares for the 2 raise the amount from the customers in the form of sharing their IPO and their company shares so that they can giving to their customer stakeholders. (Wanjawa and Muchemi 2014). The traders' data are not structured, so different platforms are used to collect the historical data and analyze and give a different kind of techniques index to invest. This led to the analysis of the stock market trend using machine learning and computational intelligence techniques. Among them are the neural network, time series analysis, regression, mining association rules, support vector machine (SVM), principal component analysis (PCA), genetic algorithm, hidden Markov model, and neuro-fuzzy inference system. This research aims to perform a comprehensive, systematic review of previous studies on stock market predictions based on the fundamental and technical analyst's point of view in order to clarify the current state of the art and its possible future directions.

REVIEW OF LITERATURE

Piotroski et al. developed F-Score, an AI model to evaluate firm share values using nine financial parameters from 1976 to 1996, achieving impressive results.

Kimoto et al. developed a feed-forward neural network algorithm for stock market forecasting using historical financial variables. However, it struggled to accurately predict selling signals, leading to the investigation of other machine learning algorithms for technical data prediction.

Anshul Mittal et.al. (2012) used Twitter data to establish a correlation between public sentiment and market sentiment, revealing that people's mood influences their investment decisions, despite a small English-speaking population size and simple natural language processing techniques.

Nayak et al. (2014) used ANN and neurogenetic hybrid models to forecast the Indian stock market's closing price. They evaluated four intelligent prediction models, including ANN-GD, ANN-GA, FLANN-GD, and FLANN-GA, using Bombay Stock Exchange daily closing prices, demonstrating their effectiveness.

Vanipriya's (2016) paper proposes a stock investment decision-making system that uses news articles and historical stock prices to predict future stock prices. The model aims to provide predictive power to investors in the internet era by analyzing the impact of news articles.

S Kumar Chandar et.al. (2016) developed adaptive, flexible, and scalable predictive models for foreign exchange rate, stock market price, and gold price prediction, aiming to improve business forecasting in an ever-changing economy by analyzing previous data.

V Kranthi Sai Reddy, (2018), This paper discusses the use of machine learning in stock trading, specifically Python and SVM, to predict the stock market, utilizing data from global financial markets. The model generated was found to generate higher models.

Singh Krishna Kumar, (2018), explored green computing and its potential in societal problems. Kumar used the Indian stock market for simulation of a green financial model, introducing big data analytics and a green database model using ORACLE database software.

Zhou et al. (2020) predicted the directions of stock price movements using a variety of heterogeneous data sources, including historical transaction data, technical indicators, stock posts, news, and the Baidu index. Researchers looked at the support vector machine's (SVM) ability to anticipate price movements for a single firm under various activity levels, and their results show that this method is more effective at doing so during periods of moderately and highly active trading.

Wang et al., (2021) used artificial intelligence to forecast the Shanghai Composite Index using 3,422 data points from 2005-2019. He used MA, KDJ, and MACD as technical indicators, and logistic regression and support vector machines for stock market volatility prediction. The support vector basis method was found more suitable for the model.

Carta (2021) suggests using machine learning to solve binary classification problems and forecast future share prices in the S&P 500 index. This method uses global published papers to identify influential words and features, and then uses feature engineering to predict share price fluctuations.

Artificial Intelligence Applied to Stock Market Trading: A Review (FERNANDO G. D. C. FERREIRA, AMIR H. GANDOMI, AND RODRIGO T. N. CARDOSO.) This literature study investigates the use of Artificial Intelligence (AI) in financial investment from 1995 to 2019, using 2326 Scopus papers. The review, which is divided into portfolio optimization, stock market prediction, financial sentiment analysis, and multi-approach combinations, demonstrates the evolution from basic research to current cutting-edge applications. The findings indicate a persistent and growing interest in this research topic, with the literature becoming more specialized and extensive over time.

Application of Artificial Intelligence in Stock Market Trading. (Dr. Manpreet Kaur, Sandeep Singh, Manmeet Singh) This literature review emphasizes the pivotal role of the stock market in economic success and the complexity of stock market prediction, given its dynamic and volatile nature influenced by perceptions, emotions, and human psychology. The work explores the necessity of Artificial Intelligence (AI) in predicting future stock market behavior, with a specific focus on AI's role in forecasting price actions and its potential to replace human involvement in stock market trading.

Harnessing the Power of Artificial Intelligence in Stock Market Trading (M. Vasuki, T. Amalraj Victoire, A. Karunamurthy, B. Priyadharshini) This review of the literature looks at the revolutionary impact of artificial intelligence (AI) on stock market trading, focusing on its capabilities for data analysis, predictive modeling, algorithmic trading, sentiment analysis, and risk management. The study investigates the advantages and disadvantages of AI applications in this dynamic setting, as well as ethical concerns. It provides insights into the growing landscape of technology-driven stock trading and forecasts future changes.

Applications of Artificial Intelligence in the Economy, including Applications in Stock Trading, Market Analysis, and Risk Management. (Amir Masoud Rahmani, Bahareh Rezazadeh, Majid Haghparast ,Wei-Che Chang, Shen Guan Ting) This review of the literature investigates the transformational potential of Artificial Intelligence (AI) in economics, specifically in stock trading, market analysis, and risk assessment. The paper presents a thorough taxonomy for categorizing AI applications within various fields, emphasizing key approaches and evaluation criteria. It tackles obstacles, unresolved concerns, and future directions in using AI for economic applications. This investigation highlights the tremendous influence AI could have on work, consumption, and societal development in an increasingly automated society.

A Systematic Review of Fundamental and Technical Analysis of Stock Market Predictions. (Isaac Kofi Nti , Adebayo Felix Adekoya, Benjamin Asubam Weyori) This analysis of the literature looks at 122 research papers on stock market prediction using machine learning that were published between 2007 and 2018. The study examines factors such as dataset nature, data sources, timescale, machine learning algorithms, tasks, accuracy measurements, and software packages, categorizing methodologies into technical, fundamental, and integrated analysis. The results suggest that technical analysis is the most common (66%), followed by fundamental (23%), and combination (11%). Most of the research (89.34%) make use of a single data source, with support vector machine and artificial neural networks emerging as the primary machine learning methods for stock market prediction.

SCOPE OF THE STUDY

The research study delves into the efficacy of artificial intelligence (AI), specifically machine learning (ML), in the realm of stock market prediction. Two primary analyses take center stage: technical analysis, leveraging historical price data for stock price trend predictions, and fundamental analysis, which involves classifying public sentiment derived from news and social media to assess its impact on stock market forecasts.

The paper offers a comprehensive exploration of the challenges associated with stock market prediction and the development of AI strategies tailored to tackle these issues.

RESEARCH METHODOLOGY

The research delved into an in-depth analysis of machine learning model performance, considering the various evaluation metrics. Insights were provided on the efficacy of artificial intelligence in predicting stock market trends and behaviors, fostering a comprehensive discussion of the study's findings.

Research Design: The research is descriptive in nature. The study explains the impact of AI on Stock Trading

Sample Size: 122

Collection Of Data: Primary and Secondary Data

Method of Data Analysis: Machine Learning, Natural Learning Process

OBJECTIVES OF THE STUDY

To analyse the role of artificial intelligence in real world

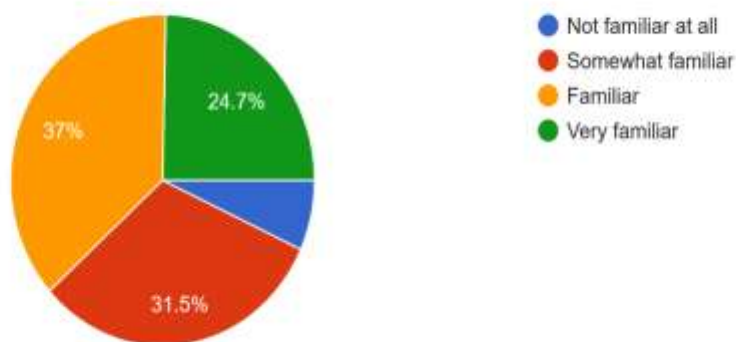To examine the role of artificial intelligence in stock trading

To suggest measures which can be taken to enhance accuracy in stock trading with the help of artificial intelligence

DATA ANALYSIS AND INTERPRETATION

CHART 1

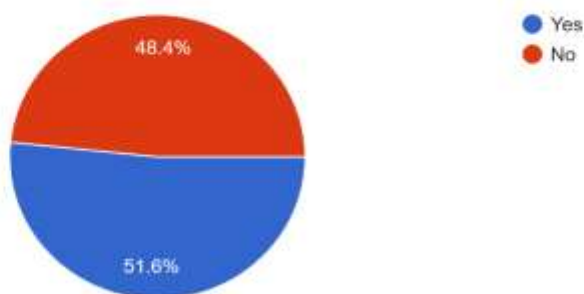How familiar are you with the concept of Artificial Intelligence (AI)?
73 responses

The Pie Chart Shows: 6.8% are Not familiar at all, 31.5% are Somewhat familiar, 37% are Familiar, 24.7% are Very familiar.

CHART 2

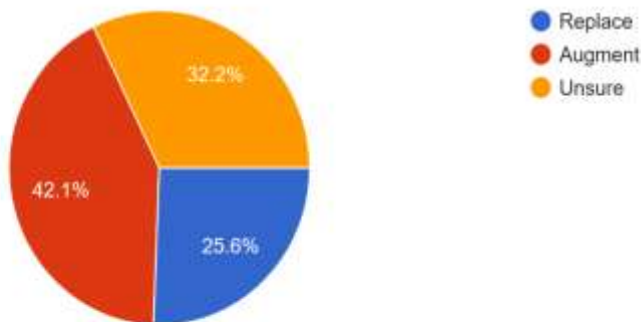Have you heard of AI being used in financial trading?
122 responses

The chart shows that 51.6% have heard about the AI being used in financial trading and 48.4% are not aware of AI being used in financial trading.

CHART 3

Do you think AI will eventually replace experienced traders or simply augment their capabilities?
121 responses

● Replace
● Augment
● Unsure

The chart shows that 42.1% of respondents believed that AI would augment the capabilities of experienced traders.32.2% of respondents believed that AI would eventually replace experienced traders. 25.6% were unsure.

CHART 4

On a scale of 1 (strongly disagree) to 5 (strongly agree), how much do you agree with the following statements about AI in trading?
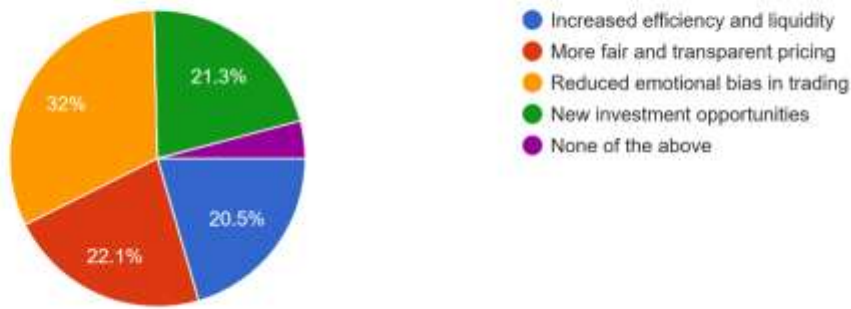122 responses

● 1
● 2
● 3
● 4
● 5
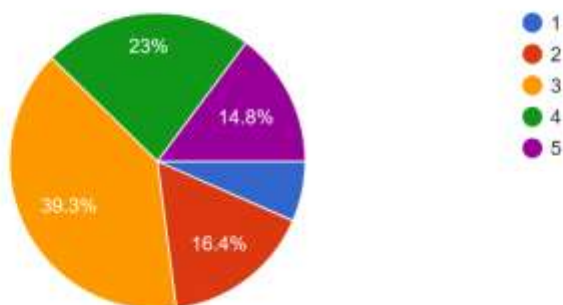
The pie chart shows that the majority of respondents 14.8% agree with the statement that "AI in trading is a risky activity". 23% of respondents somewhat agree, 39.3% are neutral, 23% somewhat disagree, and 6.6% strongly disagree.

CHART 5

If AI were widely used in trading, what benefits do you expect for the market?
122 responses

- Increased efficiency and liquidity
- More fair and transparent pricing
- Reduced emotional bias in trading
- New investment opportunities
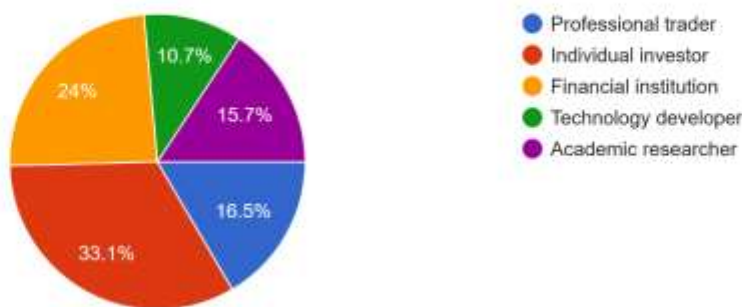- None of the above

The chart shows that 20.5% of respondents believe that AI would lead to increased efficiency and liquidity in the market, 22.1% of respondents believe that AI would lead to more fair and transparent pricing in the market, 32% of respondents believe that AI would lead to reduced emotional bias in trading. 21.3% of respondents believe that AI would lead to new investment opportunities. 4.1% of respondents believe that AI would not have any of the benefits listed above.

CHART 6

What is your primary role or interest in the financial markets?
121 responses

- Professional trader
- Individual investor
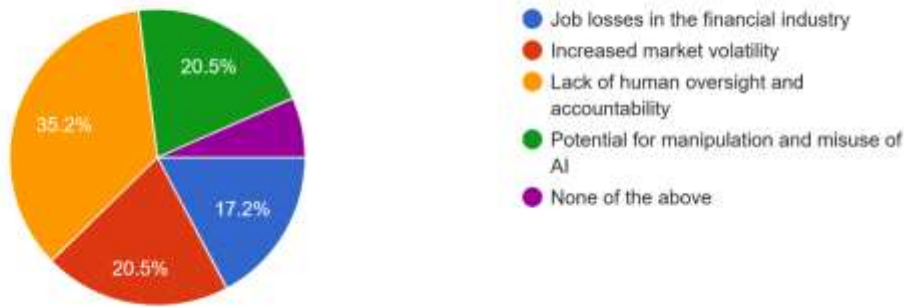- Financial institution
- Technology developer
- Academic researcher

The pie chart shows 33.1% are "Individual investors", 10.7% are "Technology developers", 24% are "Financial institutions",16.5% as "Professional traders" and 15.7 % as "Academic researchers".

CHART 7

What are your main concerns about the widespread use of AI in trading?
122 responses

- Job losses in the financial industry
- Increased market volatility
- Lack of human oversight and accountability
- Potential for manipulation and misuse of AI
- None of the above

The chart shows 20.5% of respondents are concerned about the potential for manipulation and misuse of AI. 17.2% of respondents are concerned about job losses in the financial industry. 6.6% of respondents have no major concerns about the widespread use of AI in trading. 35.2% of respondents are concerned about a lack of human oversight and accountability. 20.5% of respondents are concerned about increased market volatility.

CHART 8

Would you be more likely to invest in a company that openly uses AI-based trading algorithms?
122 responses

- Yes
- No
- Maybe
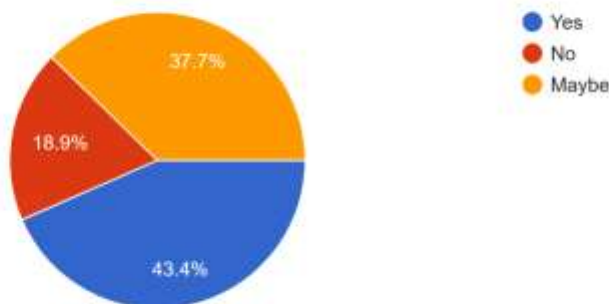
The chart shows 43.4% of respondents are more likely to invest in a company that openly uses AI-based trading algorithms, 18.9% of respondents are not likely to invest and 37.7% may invest.

Suggestions:

❖ Encourage traders and investors to keep up with the most recent developments in artificial intelligence (AI) technology and trading tactics. In an everchanging market context, increasing returns and limiting risks will need constant learning and adapting to new approaches.

❖ Data Source Diversification: Stress the significance of data source diversification for trading algorithms powered by artificial intelligence. Predictive models can be made more accurate and reliable by including a variety of data, such as financial indicators, sentiment analysis from news and social media, and macroeconomic trends.

❖ Collaboration and Knowledge Sharing: Encourage scholars, technology developers, and industry personnel to collaborate and share knowledge. To spur innovation and enhance trading results overall, promote alliances and forums where knowledge and best practices can be shared.

❖ Ethics and Regulatory Compliance: In Ai driven trading, emphasize the importance of ethical issues and regulatory compliance. To maintain consumer confidence and market integrity, investors should place a high priority on accountability, fairness, and openness in algorithmic decision-making processes.

❖ Promote the adoption of strong risk management techniques to reduce the possible hazards connected to trading using artificial intelligence. To protect against unanticipated market volatility, investors should diversify their portfolios, establish explicit risk tolerance limits, and utilize stop-loss devices.

❖ Perspective on Long Term Investments: When employing Ai driven trading algorithms, investors should be encouraged to take a long-term investment approach. Long-term investing objectives and fundamental analysis must be prioritized for sustained wealth building, even though artificial intelligence (AI) can offer insightful information for short-term trading decisions.

❖ Evaluation and Validation: Before deploying AI models and trading algorithms, they must be carefully evaluated and validated. To evaluate the resilience and dependability of AI-driven trading methods under different market circumstances, investors need carry out thorough testing, back testing, and validation processes.

❖ Customization and Personalization: Stress the advantages of adjusting AI-powered trading techniques to suit different risk tolerances and investment philosophies. Algorithms can be customized over time to maximize returns and improve performance based on particular investment goals and market conditions.

❖ Encourage investors to keep a close eye on and evaluate the results of AI-driven trading techniques on a regular basis. Establishing methodical processes for monitoring enables prompt modifications and enhancements to accommodate evolving market circumstances and minimize any damages.

Conclusion and future scope

- ❖ Investigating the application of artificial intelligence (AI) in the context of financial trading reveals a revolutionary environment where conventional approaches meet state-of-the-art technology.

- ❖ This research emphasizes the significant influence artificial intelligence (AI) has had and will continue to have on the stock market through a thorough assessment of the literature and in-depth analysis of consumer perceptions.

- ❖ Historically, the use of AI in financial trading has shown promise, with several models and algorithms proving effective in decision-making and stock market prediction.

- ❖ Trading paradigms have been transformed by the emergence of Ai driven methods, which offer new opportunities for investors and market participants, starting with Piotrowski's F-Score and continuing with modern machine learning approaches. Finally Investigating how Artificial Intelligence (AI) can be used in the financial trading industry reveals a revolutionary environment where conventional approaches meet state-of-the-art technology.

- ❖ This study highlights the significant impact artificial intelligence (AI) has had and will continue to have on the stock market through a thorough assessment of the literature and thorough analysis of consumer perceptions.

- ❖ AI has historically shown promise in financial trading, with several models and algorithms proving effective in stock market prediction and decision-making.

- ❖ The emergence of AI-driven methods has changed trading paradigms and opened new opportunities for investors and market players, starting with Piotrowski's F-Score and continuing with modern machine learning approaches.

- ❖ In conclusion: An innovative environment where conventional approaches and state-of-the-art technology collide is revealed by the investigation into the incorporation of Artificial Intelligence (AI) in the financial trading industry.

- ❖ This report highlights the significant impact AI has had and will continue to have on the stock market through a thorough assessment of the literature and a thorough analysis of consumer perceptions. The use of AI in financial trading has historically shown promise, with several models and algorithms proving effective in predicting the stock market and making decisions.

- ❖ The development of Ai driven methods has changed trading paradigms and opened up new opportunities for investors and market players, starting with Piotrowski's f- Score and continuing with modern machine learning approaches.

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LINKS

(PDF) Effectiveness of Artificial Intelligence in Stock Market Prediction based on Machine Learning (researchgate.net)

view content.CGI (csusb.edu)

IJCRT2006190.pdf

(PDF) A Bibliometric Analysis of Artificial Intelligence-Based Stock Market Prediction (researchgate.net)

ANNEXURE

QUESTIONNAIRE

1. How familiar are you with the concept of Artificial Intelligence (AI)?

    a. Not familiar at all

    b. Somewhat familiar

    c. Familiar

    d. Very familiar

2. Have you heard of AI being used in financial trading?

    a. Yes

    b. No

3. If yes to Q2, what do you understand about how AI is used in trading?

4. Do you think AI will eventually replace experienced traders or simply augment their capabilities?

    a. Replace

    b. Augment

    c. Unsure

5. On a scale of 1 (strongly disagree) to 5 (strongly agree), how much do you agree with the following statements about AI in trading?

    a. 1

    b. 2

    c. 3

    d. 4

    e. 5

6. If AI were widely used in trading, what benefits do you expect for the market?

    a. Increased efficiency and liquidity

    b. More fair and transparent pricing

    c. Reduced emotional bias in trading

    d. New investment opportunities

    e. None of the above

7.What is your primary role or interest in the financial markets?

    a. Professional trader

    b. Individual investor

    c. Financial institution

    d. Technology developer

    e. Academic researcher

8. What are your main concerns about the widespread use of AI in trading?

    a. Job losses in the financial industry

    b. Increased market volatility

    c. Lack of human oversight and accountability

    d. Potential for manipulation and misuse of AI

    e. None of the above

9.If you could envision your ideal use of AI in trading, what would it look like?

10. Would you be more likely to invest in a company that openly uses AI-based trading algorithms?

    a. Yes

    b. No

    c. Maybe

11.What specific skills do you think will be most in demand for traders in an AI-driven trading environment?