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Research Article

Artificial Intelligence in Financial Risk Management: Insights from Stock Market Investors

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Abstract: AI significantly impacts stock market expenditures and has helped investors manage risk more. Investors are seeking AI aids, and this research shows how investors use AI for risk management. The concern for market investors has been growing AI's help in the stock market's fraud detection mechanisms. The increasing utilization of AI in finances exemplifies how its growth results in lower risks during stock purchases, constructing portfolios, suggesting less volatile stocks to new clients, aiding decision making, and even spotting trends in financial markets that would not be identified with previous techniques. Because the AI concept is still new and targeting particular demographics, stock market investors may not have learned exposure for getting muted by AI for reduced risks. Apart from the mentioned aspects, this research is focused on computational aids that investors could go beyond the standard risk management computations that might not be easy to perform with population stock market investors. Competitive AI provides deep learning algorithms that investors in new frontal years. AI also saves the time of investors as they do not need much assistance while aiming to improve investment results in the new market. Investors need less assistance in planning and strategizing for risk factors in stocks.

Keywords: Artificial intelligence [AI], Risk management, Investment, Deep Learning, Portfolio Optimization, Investment Decision-Making, Financial Risk Analysis, Computational Finance.

INTRODUCTION

The rapid evolution of technology has transformed the financial landscape, and the stock market is no exception. In recent years, Artificial Intelligence (AI) has emerged as a game-changer in the financial sector, revolutionizing the way investors manage risk and make informed investment decisions. AI's potential to analyze vast amounts of data, identify patterns, and predict market trends has made it an attractive tool for investors seeking to optimize their investment portfolios.

The stock market is inherently volatile, and investors face numerous challenges in navigating its complexities. Traditional risk management strategies often rely on historical data and statistical models, which may not be sufficient to capture the nuances of modern financial markets. AI-powered risk management tools offer a promising solution to this problem, enabling investors to make more informed decisions and mitigate potential losses.

This study aims to explore the role of AI in financial risk management from the perspective of stock market investors. By examining the benefits and challenges of AI adoption in the financial sector, this research seeks to provide valuable insights for investors, policymakers, and regulators. The study's findings will contribute to a deeper understanding of AI's potential to transform the financial landscape and provide recommendations for harnessing its power to improve investment outcomes.

The increasing pace of change in financial markets, risk management has become more relevant than ever before for investors and especially for stock market participants. The traditional ways of risk management are somehow effective but usually fail to cope with the complexities and volatilities of today's markets. This brings us to Artificial Intelligence, which shows a new paradigm in enhancing decision-making and mitigating potential losses.

AI-driven financial risk management tools tap into vast reams of historical data, advanced algorithms, and machine-learning models in order to evaluate, predict, and reduce risk exposure. AI can also help stock market investors recognize patterns and predict trends, as well as assess the risk of individual assets or whole portfolios in real time. The tools can also learn from new conditions on the market and hence provide timely insight that would allow an investor to take appropriate decisions under uncertainty.

The most relevant benefits accruing to an investor with AI adoption would be: first, increased accuracy of risk assessment; second, less time to react to market changes; and third, the possibility to conduct back-testing under various scenarios for many investment strategies. More

granularities in portfolio management is allowed because AI better balances risk across sectors, assets, and types of investment. Next will be a project integrating AI into the financial risk management strategies, focusing on how it can be applied in decision-making optimization and investment protection within the dynamic environment of the stock market. State-of-the-art technology is helping investors become competitive and resilient in their approach toward dealing with financial risks.

Need and importance of the study

The need for this study arises from the growing importance of Artificial Intelligence (AI) in the financial sector, particularly in stock market investments. With the increasing volatility and complexity of financial markets, investors face significant challenges in making informed investment decisions. AI has the potential to revolutionize financial risk management by providing predictive analytics, identifying patterns, and optimizing investment portfolios.

However, despite its potential, AI adoption in financial risk management is still in its infancy. Investors, policymakers, and regulators need to understand the benefits and challenges of AI in financial risk management to harness its potential effectively. This study aims to bridge this knowledge gap by exploring the role of AI in financial risk management from the perspective of stock market investors.

The importance of this study lies in its potential to provide valuable insights for investors, policymakers, and regulators on the effective use of AI in financial risk management. The study's findings will contribute to a deeper understanding of AI's potential to transform financial risk management and provide recommendations for harnessing its power to improve investment outcomes.

SCOPE OF THE STUDY

The proposed study aims at the use of AI in financial risk management strategies by the investors in stock markets. The AI technologies involve machine learning, predicting market trends, enhancing risk management strategies, creating and optimizing portfolios, identifying emerging risks, detecting market frauds, supporting decision making of the investors. AI helps the investors by making more informed decisions, improving the accuracy, providing insights which help the investors to mitigate the risks and improve overall portfolio performance.

LIMITATIONS

AI depends fully on the data, and if the data is inaccurate or outdated, then the predictions of AI can be inaccurate. The market conditions are dynamic and in nature. If AI does not adapt to the rapidly changing market conditions, then the predictions may be inaccurate. The AI may be expensive especially for the small investors. This creates a gap between large and small investors.

Research Gap

This study identifies a significant research gap in understanding the role of Artificial Intelligence (AI) in financial risk management from the perspective of stock market investors. Despite AI's growing importance in finance, its adoption in financial risk management is still in its infancy, and there is limited empirical evidence on its effectiveness. Furthermore, investors' perceptions and attitudes towards AI in financial risk management are not well understood, and the challenges and limitations of AI in this context have not been fully explored. This study aims to address these research gaps by exploring the current state of AI adoption in financial risk management, its effectiveness, and the perceptions and attitudes of investors towards AI in this context. By doing so, this study seeks to contribute to a deeper understanding of AI's role in financial risk management and provide valuable insights for investors, policymakers, and regulators.

REVIEW OF LITERATURE

(Chopra, 2024) Highlights the use of artificial new line intelligence (AI) and, more particularly, artificial neural networks (ANNs), in the new line forecasting of the stock market is becoming increasingly common in scholarly writing. New line. This thesis aims to accomplish three objectives. First, the thesis attempts to determine new line the most suitable explanatory variables for forecasting the returns of the Nifty 50 index. New line Second, the thesis aims to identify an appropriate AI-based model for forecasting stock new line market returns in India. Third, the thesis attempts to derive implications for investor's new line to improve stock returns using a model based on AI. To achieve the first objective, a new line comprehensive list of economic and financial factors that have been used to forecast new line stock returns in the existing literature is developed.

(Mohammad El Hajj, 2023) This study examines the integration and impact of Artificial Intelligence (AI) and Machine Learning (ML) in financial markets. Using a mixed-methods approach, the research reveals the increasing adoption of AI and ML technologies in financial institutions, with applications in algorithmic trading, risk management, and fraud detection. The study identifies key themes, including adoption trends, challenges, regulatory considerations, workforce transformation, and ethical concerns. It emphasizes the need for financial professionals to develop new skills and for organizations to address challenges related to data privacy, regulatory compliance, and ethics. This study enhances the understanding of artificial intelligence and machine learning in the financial sector, offering valuable insights for policymakers, regulators, and industry professionals regarding the advantages and challenges associated with these technologies.

(Reyes Michaela Denise Gonzales, how can we use artificial intelligence for stock recommendation and risk management? A proposed decision support system, 2022) stock market decision-making is complex, requiring substantial trading expertise and knowledge. Investors are often overwhelmed by the vast array of stock options, making it challenging to select the most suitable investments. Additionally, financial institutions struggle to provide personalized stock recommendations that align

with individual investors' unique trading strategies.

(Patalay, 2021), the stock market has become a top investment destination for individual and retail investors, offering potential for substantial profits. However, its dynamic nature and complexity make it challenging for common investors to understand. To mitigate risks, investors must create diversified portfolios, but many incur significant losses due to speculative decisions based on short-term technical indicators. The reliability of investment advice from financial advisory firms and online tools has been inconsistent, failing to meet rigorous quantitative and rational stock selection standards. Furthermore, the integration of Artificial Intelligence (AI) and Machine Learning (ML) techniques with fundamental variables and long-term value investing is lacking in the financial domain. Although some stock portfolio tools utilize AI/ML techniques, they are often built using technical indicators, making them suitable only for general trend predictions and intraday trading, rather than long-term value investing. This limitation is due to wide variances and reliability issues associated with these tools.
N.I. Lomakin (2020) proposes a neural network to assess financial risk for time-series VAR-methods, aiming to reduce financial risk in stock exchange trading. The study demonstrates that utilizing an AI-system, trained on a combined dataset of digitalized market fluctuations and candlestick charts, can enhance the accuracy of futures price forecasts and ensure financial risk evaluation using VAR-methods. This approach can effectively hedge uncovered positions with PUT options. The research highlights the growing trend of trade systems, or "trade robots," in stock activities, with a notable subset employing artificial intelligence (AI) for decision-making.

OBJECTIVE

- To use the ai in building a low risk portfolio for the investors
- How ai can be used in improving the accuracy in investment decisions
- To analyse the use of AI in financial risk management for investments in stock market.
- To understand how AI can be useful in decision making for investors for stock market investments
- To analyse the perception of investors to manage risks of stock market with inclusion of AI tools.

RESEARCH METHODOLOGY

This study utilizes a mixed-methods methodology, combining data from both primary and secondary sources. Primary data was collected through a standardized questionnaire, with respondent answers subjected to in-depth analysis. Supplementing this, secondary data was gathered from conference proceedings and published literature, providing a comprehensive foundation for the study.

Statistical tools: Statistical analysis was performed using Single Factor ANOVA and Chi-square tests to examine the relationships and significant differences between the variables under study.
Data Analysis

HYPOTHESIS

H0- There is no significant different between investment in stock market with relying on AI algorithm to make investment decision.

H1- There is significant different between investment in stock market with relying on AI algorithm to make investment decision.

ANOVA TEST

ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
how often you invest in stock market	142	470	3.309859	1.747278
How comfortable are you with the idea of relying on AI algorithms to make investment decisions on your behalf?	142	358	2.521127	0.818699

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	44.16901	1	44.16901	34.42666	1.24E-08	3.874645
Within Groups	361.8028	282	1.282989			
Total	405.9718	283				

Interpretation: The findings imply that investors are typically less at ease depending on AI to make financial decisions because the average investment frequency (3.31) is higher than the comfort level with AI (2.52). The ANOVA test rejects the H0 hypothesis and accepts the H1 hypothesis since it produces an F-statistic of 34.43, which is much higher than the crucial value of 3.87, and a very low p-value (1.24E-08).

HYPOTHESIS

H0/There is no significant different between gender with usefulness in accessing the risk in stock investments.

H1/ There is significant different between gender with usefulness in accessing the risk in stock investments.

CHI SQUARE TEST

CHI -SQUARE

Results						
	strongly agree	agree	neutral	disagree	strongly disagree	*Row Totals*
Male	12 (11.24) [0.05]	32 (33.72) [0.09]	26 (25.69) [0.00]	5 (3.75) [0.42]	1 (1.61) [0.23]	76
Female	8 (9.02) [0.12]	30 (27.06) [0.32]	21 (20.62) [0.01]	1 (3.01) [1.34]	1 (1.29) [0.06]	61
Prefer not to say	1 (0.74) [0.09]	1 (2.22) [0.67]	1 (1.69) [0.28]	1 (0.25) [2.30]	1 (0.11) [7.57]	5
Column Totals	21	63	48	7	3	142 (Grand Total)

The chi-square statistic is 13.5548. The *p*-value is .094133. The result is *not* significant at $p < .05$.

Interpretation: The findings demonstrate that the chi-square test looked at the connection between response distribution and gender identity. The result is not statistically significant at the 0.05 level, as indicated by the chi-square statistic of 13.5548 and the p-value of 0.094133. This suggests that there is no significant correlation between gender identity and replies, so we are unable to reject the null hypothesis. Although there are some differences between the groups, they are not substantial enough to imply a major relationship.

FINDINGS

- It has been noted that 54% of female investors and 60% of male investors, respectively, reported regular stock market investment activity.
- According to this survey, young investors (18–25 years old) were less likely than seasoned investors to make regular stock market investments.
- Regular investors expressed challenges integrating AI with current systems, with a key concern being a lack of experience.
- 30% of investors who reported difficulties with AI integration expressed willingness to explore new plans with AI assistance.
- 63% of investors uncomfortable with relying on AI algorithms for investment decisions expected training, education, and technical support to improve their investment portfolios.
- Among investors who expressed confidence in AI, 50% identified accessibility, ease of use, improved portfolio performance, and risk reduction as important considerations for incorporating AI into their investment strategy.
- This study finds that Income-earning individuals (employees, professionals, businessmen) invested more frequently in the stock market compared to non-earning individuals (graduates, postgraduates) reliant on parental/guardian income.
- Most investors believed AI implementation in risk management offered benefits, including improved risk accuracy, decision-making, and enhanced risk management capabilities.

SUGGESTIONS

Suggestions for the improvements in better managing risks associated with AI investments:

1) Better training programs
2) Enhanced risk assessment tools
3) Improved regulatory frameworks
4) Increased collaboration with experts
5) AI driven encryption techniques
6) Increase in data quality

CONCLUSION

The study examines the role of Artificial Intelligence (AI) in financial risk management from the perspective of stock market investors. The findings suggest that AI significantly impacts stock market expenditures and helps investors manage risk more effectively. The majority of investors believe that AI implementation in risk management offers benefits, including improved risk accuracy, decision-making, and enhanced risk management capabilities.

However, concerns relating to AI, such as data quality, rapidly changing market conditions, and data privacy issues, need to be addressed. The study recommends better training programs, enhanced risk assessment tools, improved regulatory frameworks, increased collaboration with experts, and AI-driven encryption techniques to improve the effectiveness of AI in financial risk management.

The research highlights the need for investors to adapt to AI-driven risk management strategies, and for policymakers and regulators to provide a supportive framework for AI adoption in the financial sector. As AI continues to evolve, it is likely to play a crucial role in shaping investment decisions, strategies, and managing stock market risks.

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