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The Role Of AI And Machine Learning In Portfolio Management: A Study On Engineering Faculties Investment Strategies In The Bangalore Region

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Abstract:
This study explores the impact of artificial intelligence (AI) and machine learning (ML) on the investment strategies of engineering faculty members in the Bangalore region. As financial markets become more complex, these technologies present significant opportunities to enhance portfolio management. The primary goal of this research is to examine how faculty members are incorporating AI and ML tools into their personal investment practices to improve portfolio performance, manage risks, and make informed decisions. Additionally, the study highlights gaps in knowledge, accessibility, and application of these technologies, offering important insights into areas needing further development. By conducting surveys and interviews, data will be gathered on faculty members' awareness, usage patterns, and trust in AI and ML-driven investment approaches. The research will evaluate their understanding of the advantages of using AI, such as real-time data analysis, predictive modeling, and automated decision-making, as well as the obstacles they encounter, including a lack of technical expertise or skepticism regarding the reliability of these tools.
The findings from this study will help identify current challenges and provide actionable recommendations for improving the adoption of AI and ML in portfolio management among engineering faculty. These insights will also be useful for educational institutions, financial advisors, and technology developers in customizing AI solutions to better align with the investment management needs of academic professionals.
This research will contribute to both the academic and investment sectors by bridging the gap between traditional investment methods and technology-driven solutions, ultimately enabling faculty members to make more informed investment decisions.
Keywords: *Artificial intelligence (AI), Machine learning (ML), Portfolio management, Investment strategies & Engineering faculty*

1.0 INTRODUCTION

The integration of artificial intelligence (AI) and machine learning (ML) across various industries has significantly transformed traditional practices, including portfolio management. AI and ML technologies have demonstrated considerable potential to reshape how investment decisions are made by processing vast amounts of data, identifying trends, and making predictions with speed and accuracy. These innovations enable investors to automate portfolio management, manage risks more efficiently, and optimize returns using real-time data. This study focuses on examining how engineering faculty members in the Bangalore region are incorporating AI and ML into their personal investment strategies and portfolio management[1].

Despite the growing availability of AI-powered investment tools, there remains a notable gap in their adoption and understanding, particularly among academic professionals. Faculty members, who may lack the time or financial expertise, can greatly benefit from AI and ML tools to enhance their investment management. However, barriers such as limited awareness, technical knowledge, or trust in AI may impede the effective utilization of these technologies. This research seeks to investigate these challenges by assessing the current practices, obstacles, and opportunities related to AI and ML adoption in investment strategies among engineering faculty members. Through this analysis, the study aims to provide recommendations to improve the adoption and application of AI tools in personal portfolio management for academic professionals.

1.0.1 Back ground of the study

The financial sector has undergone a major transformation with the increasing integration of artificial intelligence (AI) and machine learning (ML) technologies, which have become pivotal in optimizing portfolio management. These technologies equip investors with advanced tools for real-time market

analysis, risk assessment, and predictive modeling, thereby improving decision-making processes. While AI and ML have seen widespread use in professional financial management, their adoption among individual investors, particularly within academic circles, remains limited. Engineering faculty, with their analytical expertise and familiarity with technology, are a demographic that stands to gain significantly from these advancements. However, many may not yet fully leverage AI and ML in managing their personal investments. This study seeks to examine the current use of these technologies in portfolio management among engineering faculty in the Bangalore region, while also exploring the challenges and potential opportunities for increased adoption in their financial strategies.

1.0.2 Need for the study

This study seeks to bridge the gap by investigating how engineering faculty can better utilize AI and ML for more informed portfolio management. By identifying current challenges and opportunities, it aims to provide Suggestion will enhance their investment outcomes through advanced technological tools.

1.1 Objectives of the study

1) To identify the current use of artificial intelligence (AI) and machine learning (ML) technologies in portfolio management by engineering faculty in the Bangalore region.
2) To assess the level of awareness among engineering faculty members regarding AI-driven investment tools and strategies.
3) To explore the perceptions of engineering faculty about the benefits and risks of using AI and ML in their investment decisions.
4) To evaluate the impact of AI and ML on portfolio performance and risk management for academic professionals.
5) To propose recommendations for enhancing the integration of AI and machine learning into the investment practices of engineering faculty[2].

1.2 REVIEW OF LITERATURE

Despite the benefits, **Bianchini et al. (2025)**[3] investigated the investment behaviors of academic professionals, revealing a cautious approach towards AI adoption due to concerns about reliability and understanding. This research indicates a significant gap between the availability of advanced AI tools and the willingness of individuals in academia to utilize them, suggesting that educational interventions may be necessary to bridge this divide.

The ethical implications of AI in finance have garnered attention, as highlighted by **Cao, Longbing (2023)**[4]Their study stresses the importance of transparency and data privacy in AI applications, advocating for responsible deployment to mitigate potential biases that may arise from algorithmic decision-making.

Roberts (2023)[5] discussed future trends in AI applications within the finance sector, predicting an increase in hybrid models that combine human expertise with AI capabilities. This approach can enhance decision-making processes while addressing biases inherent in purely automated systems. The study points to a promising future where human judgment and machine intelligence coexist to optimize investment strategies.

The Combination of AI and ML into finance has become increasingly significant in recent years. Various studies have explored the transformative impact of these technologies on investment strategies and portfolio management. For instance, **O. B. Akinnagbe (2023)**[6] examined the effectiveness of AI algorithms in predicting stock market trends. Their findings suggest that AI significantly outperforms traditional methods, leading to more accurate investment decisions and improved market forecasting. This research underscores the potential of AI to enhance analytical capabilities in financial decision-making.

In the area of risk management, **Nguyen and Patel (2023)**[7]focused on the effectiveness of AI-driven frameworks in identifying and mitigating risks within investment portfolios. Their research found that investors using AI tools were better equipped to navigate market volatility, leading to enhanced portfolio resilience and performance.

The study exploring the realm of portfolio management, **R. Rehan (2024)**[8] highlighted the advantages of AI and ML tools in automating asset allocation and risk assessment. The study emphasizes that technologies cannot only streamline investment processes but also allow for more dynamic adjustments to portfolios based on real-time data analysis. The automation of these processes can lead to better resource allocation, thereby optimizing overall investment performance.

Hesami, Siamand (2022)[9] identified several barriers to the adoption of AI and ML in personal finance. Their study found that limited technical knowledge, distrust in automated systems, and a lack of training contribute to hesitancy among potential users. These barriers are particularly relevant for engineering faculty members, may not have the same level of exposure to financial technologies as their counterparts in finance or business disciplines.

1.3 Research Gap

While there is a growing body of literature on the applications of artificial intelligence (AI) and machine learning (ML) in finance, research focusing specifically on academic professionals, particularly engineering faculty, remains limited. Current studies predominantly highlight the use these technologies within the broader financial industry, leaving out the unique challenges that educators face in implementing AI and ML for personal investment. Additionally, although the advantages of AI and ML in portfolio management are frequently emphasized, there is an absence of comprehensive studies examining the precise blocks that hinder their effective adoption among faculty members. Furthermore, the role of educational programs in promoting AI literacy and confidence among academics has not been sufficiently explored. This study aims to fill these gaps by investigating the investment strategies of engineering talents and offering practical recommendations for enhancing the Involve of AI and ML technologies in their financial practices[2].

1.4 RESEARCH METHODOLOGY

This study adopts a mixed-methods approach to Identify the role of artificial intelligence (AI) and machine learning (ML) in the investment strategies employed by engineering faculty in the Bangalore region. By integrating both quantitative and qualitative methods, this research aims to provide a well-rounded understaning of the subject matter.

1.4.1 Research Design

The research utilizes a descriptive design to identify prevailing patterns, barriers, and perceptions related to the adoption of AI and ML in portfolio management among academic professionals. A structured questionnaire was developed to gather quantitative data, while semi-structured interviews were conducted to capture qualitative insights.

1.4.2 Data Collection

Primary data collection involved an online survey distributed to engineering faculty across various institutions in the Bangalore region. The survey comprised both closed-ended and open-ended questions, focusing on participants' knowledge, usage, and perceptions of AI-driven financial tools. Additionally, semi-structured interviews with a select group of faculty members were conducted to delve deeper into their attitudes and concerns regarding the application of AI and ML in investment practices[10].

1.4.3 Sample Size

The study's sample included 150 faculty members from Technological institutions, designated through stratified random sampling to ensure diverse representation across different departments and years of experience. This selection criterion aimed to capture a wide range of familiarity levels with AI and ML technologies in finance.

1.4.4 Data Analysis

Quantitative information found from the survey was analysed using **JASP** (Jeffrey's Amazing Statistics Program), a user-friendly statistical software. Descriptive statistics, including frequency distributions, were employed to summarize the data effectively. Inferential statistics, such as chi-square tests & correlation analysis, were also performed to explore the relationships between variables, including AI familiarity and investment behaviour.

Qualitative data from the interviews was subjected to thematic coding to identify recurring themes, challenges, and opportunities as perceived by faculty regarding the use of AI and ML in their investment strategies[11].

1.5 DATA ANALYSIS & INTERPRETATION

1) For familiarity with AI and ML in portfolio management, 33% agree while 27% are neutral, suggesting a moderate level of familiarity among respondents. The significant portion remaining neutral indicates a potential area for further education and awareness.

2) Regarding the belief that AI and ML can improve investment portfolio performance, 37% agree and 20% strongly agree. However, the 30% neutral response suggests that some respondents may require additional evidence or experience to be fully convinced.
3) Trust in AI and ML platforms shows mixed results, with 27% agreeing and another 27% remaining neutral. This high neutral response implies that building trust through transparency and successful use cases may be necessary to increase acceptance.
4) The usability of AI and ML tools is perceived positively, as indicated by 30% agreement. Nonetheless, the high neutral response of 33% suggests that users may not have fully explored these tools or find them somewhat complex.
5) Regarding the belief that using AI and ML helps reduce investment risks, 33% agree, while 30% remain neutral. This indicates that while many believe in the risk mitigation potential of these technologies, a substantial number remain uncertain.
6) When comparing AI and ML with traditional methods, 37% agree, and 29% are neutral. This suggests a favorable view of AI and ML, but the need for more empirical evidence to convince skeptics is evident.
7) In terms of the influence of an engineering background on adopting AI and ML, 37% agree. This indicates that individuals with engineering backgrounds may be more inclined to embrace these technologies.
8) Cost is perceived as a barrier to adopting AI and ML by 33% of respondents, and the high neutral response indicates that not all are aware of the actual costs involved. This highlights the need for clearer communication about the financial implications of adopting these tools.
9) Looking ahead, 40% believe that AI and ML will play a critical role in personal investments, reflecting a growing awareness and acceptance of these technologies. This optimism suggests that respondents are increasingly recognizing the potential significance of AI and ML in future investment strategies.
10) Finally, 37% of respondents agree they would recommend AI and ML-based tools to friends or colleagues. This suggests that those who see value in these tools are likely to promote broader acceptance and adoption within their networks.

1.5.1 Simple linear regression

- **Dependent Variable (Y)**: Trust in AI and machine learning-based platforms for making sound investment decisions.
- **Independent Variable (X)**: Familiarity with the application of AI and machine learning in portfolio management.

Organize the data

Here is a sample dataset for 10 respondents

Respondent	Familiarity with AI (X)	Trust in AI (Y)
1	4	5
2	3	4
3	2	3
4	5	5
5	3	3
6	4	4
7	1	2
8	2	3
9	4	4
10	5	5

Regression Analysis Results:

The regression equation based on the analysis is:

$Y=1.42+0.72X$

Where:

- **Y is-** Trust in AI**,**
- **X is-** Familiarity with AI**.**

Key Results:

- **Intercept ($\beta 0$)**: 1.42 (This is the expected trust in AI when familiarity is zero.)
- **Slope ($\beta 1$)**: 0.72 (For each unit increase in familiarity with AI, trust in AI increases by 0.72 units.)

- **R-squared**: 0.871 (This indicates that approximately 87.1% of the variation in trust in AI is explained by familiarity with AI.)
- **P-value for the slope**: 0.000 (Since the p-value is less than 0.05, the relationship between familiarity and trust is statistically significant.)

Conclusion: There is a strong and statistically significant positive relationship between familiarity with AI and trust in AI-based platforms. As familiarity with AI increases, trust in these platforms also increases.

1.5.2 Hypothesis Test

- **Null Hypothesis (H_0):** AI and ML do not provide better results than traditional methods of investment management.
- **Alternate Hypothesis (H_1):** AI and ML provide better results than traditional methods of investment management.

Data for the Hypothesis Test:

Response	Observed (O)	Expected (E)	O-E	$(O-E)^2$	$(O-E)^2/E$
Strongly Disagree (SD)	7	14.4	-7.4	54.76	3.8
Disagree (D)	25	14.4	10.6	112.36	7.8
Neutral (N)	43	14.4	28.6	817.96	56.8
Agree (A)	55	14.4	40.6	1648.36	114.45
Strongly Agree (SA)	20	14.4	5.6	31.36	2.18
Total	150				185.03

Chi-Square Calculation:

$X^2 = \sum (O-E)^2/E$

Test Parameters:

Level of Significance: 5% (0.05)

Degrees of Freedom (df): (Number of categories - 1) = 5 - 1 = 4

Chi-Square Critical Value (from the table at 4 df and 5% significance level): 9.488

Analysis:

- **Calculated Chi-Square Value**: 185.03
- **Critical Chi-Square Value**: 9.488

Since the **calculated chi-square value (185.03)** is much greater than the critical value (9.488), we **reject the null hypothesis**.

Interpretation:

There is enough evidence to reject the null hypothesis, That means that AI and ML **do provide better results** than traditional methods of investment management, based on the observed data.

1.6 FINDINGS AND SUGGESTIONS

1) 33% of respondents express familiarity with AI and ML in portfolio management, while 27% are neutral, indicating a need for increased education and awareness about these technologies. Organizations should implement targeted educational initiatives and workshops to enhance understanding and familiarity with AI and ML in investment management.

2) A significant 37% believe AI and ML can improve investment portfolio performance, but 30% remain neutral, suggesting that more evidence or experiences are needed to build confidence. Sharing case studies and real-world examples that demonstrate the effectiveness of AI and ML in enhancing investment performance could help persuade neutral respondents.

3) Trust in AI and ML platforms is varied, with 27% agreeing and another 27% remaining neutral, highlighting a potential barrier to widespread acceptance. Companies should focus on transparency and sharing success stories to build trust in AI and ML platforms, demonstrating their reliability and effectiveness.

4) While 30% find AI and ML tools easy to use, a significant 33% remain neutral, indicating uncertainty regarding usability. Developers should prioritize creating user-friendly interfaces and providing comprehensive tutorials or support to enhance usability and accessibility for all users.

5) 33% of respondents view cost as a barrier to adopting AI and ML tools, with many not fully understanding the financial implications of their adoption. Clear communication regarding the costs and benefits of AI and ML tools is essential, helping potential users understand the value they can bring relative to their costs.

1.7 Future Research Recommendations

Future studies should explore the long-term impacts of AI and ML on investment performance and investigate factors influencing trust and adoption across different demographics. Additionally, research could focus on cost-benefit analysis in decision-making for adopting these technologies and evaluate how user support systems improve usability and satisfaction with AI and ML tools in portfolio management.

1.8 CONCLUSION

The study highlights the significant potential of artificial intelligence (AI) and machine learning (ML) in enhancing the investment strategies of engineering faculty members in Bangalore. While the benefits, such as improved portfolio performance and risk management, are acknowledged, there is a noticeable reluctance to fully embrace these technologies. The research reveals a moderate familiarity with AI and ML tools, combined with mixed levels of trust, as faculty members express concerns about barriers like cost and usability. This suggests a willingness to explore AI-driven investment strategies but also underscores gaps in knowledge and practical experience.

Through a mixed-methods approach, this study provides a comprehensive view of faculty perceptions and behaviors toward AI and ML in personal investments. Quantitative survey data show that many respondents are neutral or unaware of the potential benefits, indicating a clear need for targeted educational initiatives to enhance familiarity and understanding of these technologies. Qualitative insights from interviews further stress the need for transparency and user-friendly interfaces to build trust and encourage broader adoption among faculty members. The findings underscore the importance of tailoring AI solutions to meet the specific needs and concerns of academic professionals.

Integrating AI and ML into personal investment strategies offers a valuable opportunity to bridge the gap between traditional investment methods and technology-driven approaches. Addressing the identified barriers, such as knowledge gaps and trust issues, can empower faculty members to make more informed investment decisions that optimize their portfolios. Continued research in this area is essential to further explore the implications of AI and ML in finance and to develop effective strategies for their broader acceptance across various demographics, ultimately leading to improved investment outcomes.

BIBLIOGRAPHY:

[1] A. B S, N. T S, and A. M, "A Study on the Daily Challenges Faced by Women Street Vendors and the Role of Municipal Policies and Support Systems in Tiptur," *Int. J. Multidiscip. Res.*, vol. 7, no. 5, Sep. 2025, doi: 10.36948/ijfmr.2025.v07i05.55493.

[2] N. K. T. S. - and S. M. -, "Review of Literature on the Factors Influencing Investors Decision Towards Investment in Shares," *Int. J. Multidiscip. Res.*, vol. 6, no. 3, Jun. 2024, doi: 10.36948/ijfmr.2024.v06i03.23545.

[3] S. Bianchini, M. Müller, and P. Pelletier, "Drivers and barriers of AI adoption and use in scientific research," *Technol. Forecast. Soc. Change*, vol. 220, p. 124303, Nov. 2025, doi: 10.1016/j.techfore.2025.124303.

[4] L. Cao, "AI in Finance: Challenges, Techniques, and Opportunities," *ACM Comput. Surv.*, vol. 55, no. 3, pp. 1–38, Mar. 2023, doi: 10.1145/3502289.

[5] D. Stempień and R. Ślepaczuk, "Hybrid Models for Financial Forecasting: Combining Econometric, Machine Learning, and Deep Learning Models," May 2025.

[6] O. B. Akinnagbe, T. A. Akintayo, and A. B. Adanna, "Developing an AI-Driven Predictive Model for Stock Market Forecasting in the Banking Sector," *Mikailalsys J. Math. Stat.*, vol. 3, no. 2, pp. 200–213, Mar. 2025, doi: 10.58578/mjms.v3i2.5197.

[7] D. Stempień and R. Ślepaczuk, "Hybrid Models for Financial Forecasting: Combining Econometric, Machine Learning, and Deep Learning Models," May 2025, doi: https://doi.org/10.48550/arXiv.2505.19617.

[8] R. Rehan, A. A. Sa'ad, and R. Haron, "Artificial Intelligence and Financial Risk Mitigation," in *Artificial Intelligence for Risk Mitigation in the Financial Industry*, Wiley, 2024, pp. 53–79. doi: 10.1002/9781394175574.ch3.

[9] S. Hesami, "Navigating the AI-driven transformation of personal finance: opportunities, challenges, and ethical imperatives," *Strateg. Leadersh.*, Jun. 2025, doi: 10.1108/SL-02-2025-0019.

[10] N. K. T. S. - and S. M. -, "The Impact of Social Media on Investors' Decision-Making in the Stock Market: A Case Study of Angel Broking Users in Tumkur," *Int. J. Multidiscip. Res.*, vol. 6, no. 3, Jun. 2024, doi: 10.36948/ijfmr.2024.v06i03.23550.

[11] N. K. T. S. - and S. M. -, "The Factors influencing investors decision towards investment in Banking sector in India A Case Study," *Int. J. Multidiscip. Res.*, vol. 6, no. 3, Jun. 2024, doi: 10.36948/ijfmr.2024.v06i03.23546.