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Exploring the Advancements, Challenges, and Implication of AI, ML-driven in Accounting Forecasting: A Review

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Abstract

This study delves into the integration of Artificial Intelligence (AI) and Machine Learning (ML) in Accounting forecasting, aiming to uncover the advancements, challenges, and broader implications for stakeholders in the financial markets. The methodology focuses on identifying empirical evidence that highlights the role of AI and ML technologies in enhancing the accuracy and efficiency of accountant predictions, while also considering the ethical and regulatory challenges posed by these advancements. Key findings indicate that AI and ML have significantly revolutionised financial forecasting, offering improved precision in market trend analysis and asset price predictions through innovations in deep learning, reinforcement learning, and hybrid models. The study concludes that while AI and ML present substantial opportunities for transforming accounting forecasting and decision-making processes, addressing the associated challenges is crucial for their ethical and effective integration.

Keywords: *Artificial Intelligence; Finance; Machine Learning; Accounting, Forecasting; Financial Sector*

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1 INTRODUCTION

The emergence of 'Big Data' and 'Alternate Data' has led to new opportunities, where machine learning can be used in the accounting and finance area very effectively. Lindsay et al. (1993) mentioned in their article that the very first use of artificial intelligence 'expert systems' can be traced at Stanford way back in the year 1960, though it became popular only in the 1990s.

(Dixon and Halperin (2019)) assert that the finance sector possesses all the essential components for the application of machine learning, including vast amounts of data, appropriate resources, the necessity for predictive capabilities, and an environment where competition drives the pursuit of advantages. However, this sector is also facing heightened scrutiny from regulators, and certain fundamental research practices are resistant to the "black-box" methodologies commonly associated with empirical or engineering approaches. Financial modelling has never been as powerful and reliable as it is today. This became increasingly apparent following the financial crisis of 2007-08, as regulatory agencies shifted their focus towards a 'data-driven' approach to regulation and oversight. (**?**) commented in their article that M.L. is seemingly the next frontier for someone involved in finance, as it is highly dependent on practical understanding. As noted by (Dhar (2013)), various Machine Learning algorithms are applicable for the financial modelling of data. (Aziz et al. (2019)) used the topography approach and studied 5,204 articles published from 1990 to 2018 and provided a comprehensive structure of machine learning applications in accounting. (Hang et al (2020)) say that due to the proliferation of accounting in the recent past, the application of machine learning has become very widespread even in the finance and banking sector.

The accounting sector of any economy is considered to be very dynamic due to the behavioural implications of its players especially that of customers and markets. Thereby, the job of analysts becomes very difficult when it comes to modelling the same. (Mullainathan et al., 2017) said in their article that the crucial role of ML in finance services is simulating the various elements of the markets such as the customers and products. According to (Domingos (2012)), machine learning is being utilised to enhance various critical aspects of the finance sector, including payment transactions, fraud detection, and the investment process, which encompasses return forecasting. (Renault (2020)) in his study analysed a million messages sent on one of the micro-blogging platforms for evaluating the effectiveness of several pre-processing methods and ML approaches for performing sentiment analysis. He concluded that "the pre-processing method and the size of the dataset have a strong impact on the correlation between investor sentiment and stock returns". (Emerson et al. (2019)) in their study also argued that machine learning has been finding its application in many areas of business, especially in the investment process including return forecasts, risk modelling, and construction of the portfolio.

1.1 Machine Learning in Financial Forecasting

The integration of machine learning (ML) in financial forecasting represents a significant shift in how data is analysed and predictions are made in the financial sector. (Muskaan and Sarangi (2020)) underscore the significance of time series analysis within this field, illustrating that machine learning techniques provide a more efficient and precise alternative to conventional statistical methods.

Their review highlights the increasing dependence on machine learning for the examination of historical data to forecast future financial trends, which is essential for effective organisational planning. Additionally, (Sonkavde et al. (2023)) delve into the utilisation of machine learning in the financial industry, with a specific focus on forecasting stock market prices. They observe the widespread application of machine learning and deep learning algorithms for various functions, such as analysing market trends, identifying investment opportunities, and optimising portfolios (**??**). Their systematic review provides a comprehensive overview of the practical applications of ML in finance, detailing the effectiveness of different algorithms such as supervised and unsupervised learning, ensemble algorithms, and deep learning models. (Wasserbacher and Spindler (2021)) discuss the application of ML in financial forecasting, planning, and analysis (FP&A). They caution against the naive application of ML for planning and resource allocation, pointing out the pitfalls in using forecasting techniques for causal inference. Their work introduces the double machine learning framework, which can address causal questions in FP&A, illustrating how ML can be effectively used for both forecasting and planning.

The utilisation of machine learning for financial forecasting marks a considerable progression within the finance sector. The ability of ML algorithms to process and analyse large volumes of complex data has led to more accurate and efficient financial predictions, which are essential for effective organisational planning and decision-making. As ML technology continues to evolve, it is likely to play an increasingly important role in shaping the future of financial forecasting.

1.2 Concept of Artificial Intelligence and Machine Learning

The word "artificial" implies man-made as against natural. Artificial intelligence (AI) has to do with "man-made machines mimicking man". It is a progressive attempt to make the computer learn, memorise, think and act in human-like manner. (Shaffer et al., (2020)) opined that AI is man-made or machine intelligence that is ca-

pable of simulating logical functions. They went on to define artificial intelligence as the use of computing tools to solve problems that traditionally require human intelligence. Machine Learning (ML), according to (Shimamoto (2018)), is the ability of a computer to recognise and apply patterns, create its algorithms based on those patterns, and enhance those algorithms based on feedback. In other words, machine learning technology enables the computer to learn, understand and retain knowledge over time and subsequently be empowered to make decisions from those experiences. ML uses algorithms to analyse data to carry out specific tasks, such as making predictions, without relying on explicit programming as in rule-based expert systems. Machine Learning uses pattern recognition and inference to learn from data.

1.3 Review of Previous Studies on Machine Learning and Accounting

(Masrom et al. (2023)) developed a machine-learning prediction model to assess professional accountants' money laundering compliance. They used models to study protection motivation. The research was published in the International Journal of Advanced and Applied Sciences and is available online. The authors noted that machine learning can improve professional accounting anti-money laundering (AML) compliance prediction. The study collected data from Malaysian professional accountants using surveys and analysed it using machine learning techniques. The study found that machine learning algorithms accurately predicted professional accounting AML compliance. (Chukwuani and Egiyi (2020)) emphasised the significance of artificial intelligence in today's context of business process automation and conducted a thorough examination of the potential for transformative effects through automation within the domain of management accounting. The research employed a survey approach to gather data from accounting professionals located in Nigeria. The study's findings indicate that the accounting sector is significantly influenced by artificial intelligence (AI), with a notable degree of progress observed in the automation of accounting processes inside firms. The study also demonstrated that accounting professionals must adjust to the integration of automation within the accounting business to sustain their competitiveness within the labour market. The research undertaken in this study is subject to many limitations, one of which is a significantly restricted sample size. Moreover, it is crucial to recognise that in the context of this research, no machine learning algorithms were intentionally created or employed with the specific objective of examining the behaviour of accountants.

(Lee and Tajudeen (2020)) examined Malaysian companies' adoption and use of AI-based accounting software. The authors stressed the potential of AI to improve accounting process performance, accuracy, and insights. They also recognised the risks, notably in replacing human accountants. Nine companies used AI-based accounting software, and representatives from each were interviewed face-to-face. The researchers systematically investigated the acquired data using the continuous comparison technique, finding a variety of ways these businesses have deployed AI-based accounting software.

(Kumar Doshi, Balasingam, and Arumugam (2020)) underscored the dual influence of artificial intelligence as a disruptive factor within the domain of accounting in their research. The authors observed that this technology could simultaneously produce both possibilities and risks. This study utilised a mixed-methods research strategy to collect data from accountants based in India. The findings of the study suggest that the field of accounting is subject to substantial impact from artificial intelligence. The limitations of the study include the relatively limited number of participants and the exclusive focus on accountants in India, which may restrict the generalisability of the findings to other contexts.

In their study, (Ucoglu (2020)) emphasised the potential of machine learning in augmenting the data analysis capabilities of accountants and auditors. The research also addressed the many difficulties and possibilities associated with the integration of machine learning techniques within the accounting and auditing profession. The research design employed in this study was content analysis, which aimed to investigate the machine learning tools and platforms that have been developed by the Big Four corporations. The study's results indicate that the Big Four firms have successfully developed a range of machine-learning tools. These tools are employed to ensure consistent audit coordination and management, conduct fully automated audits (primarily in specific domains such as cash audits), performing data analysis, assessing risks, and extracting pertinent information from various documents. The study moreover delineated the ethical dilemmas and prospective hazards associated with the utilisation of machine learning programs in the fields of accounting and auditing, particularly in relation to security breaches and infringements of privacy rules. The research findings indicate that the Big Four corporations continue to augment their assortment of machine-learning initiatives. Consequently, the establishment of ethical and legal frameworks has to provide advice and supervision specifically tailored to accounting and auditing firms. The study is subject to some limitations, namely its exclusive emphasis on the Big Four corporations and the resulting inability to generalise the findings to other situations.

1.4 Aims and Objectives of the Study

The primary aim of this study is to explore the application of machine learning (ML) in the field of accountant reduction, assessing its potential, challenges, and implications. In pursuit of this goal, the research is directed by the subsequent specific objectives such as:

1. To Evaluate the Effectiveness of ML Techniques in Accountant Behavior Prediction.
2. To Identify and Analyze the Challenges in Implementing ML for Accountant behaviour.
3. To Explore the Opportunities Presented by ML in Enhancing Accounting and Financial Market, Administration and Policy.
4. To Provide Recommendations for Future Research and Development in ML for financial sector Prediction.

2 Materials and Methods

This section outlines the methodology employed in conducting a systematic literature review and content analysis on the topic of "Machine Learning in Accounting Forecasting: A Review - Exploring the Advancements, Challenges, and Implications of AI-driven Predictions in Financial Markets." The methodology is designed to ensure a comprehensive and systematic examination of the relevant literature, adhering to predefined criteria for inclusion, exclusion, and data analysis

The study is an empirical one conducted with 250 employees. The study was conducted in February 2024. The sample respondents are selected using the convenient sampling method. The opinion of the respondents towards the role of AI in accounting has been observed using the questionnaire (google form). Webster and Watson's method of systematic literature review served as the basis for our study. (Wetering (2022)).There are two steps to this process: (1) a search of recent publications was done to find relevant databases and keywords. (3) The research gaps were discovered, and the articles were sorted into subject-based categories based on their contents. Analysis, interpretation and results

Out of the 9 areas identified, the impact of AI has been identified in the Smarter homes (5.82), followed by increased efficiency (5.59). The impact of AI in voice assistants (5.12). Though there is a difference in the impact of the AI in each area, the overall role of AI is measured and tested later, the following table (Table 1) shows the significance in the mean rank of each area of AI. Hence it is concluded that smart homes are higher than other areas

2.1 Data Sources

The primary data sources for this study include academic databases, journals, and conference proceedings that are recognised for their contributions to the fields of finance, artificial intelligence, and machine learning. Key databases such as IEEE Xplore, ScienceDirect, and the Web of Science were systematically searched. Additionally, grey literature sources, including technical reports and white papers from reputable financial institutions and regulatory bodies, were also considered to capture a broad spectrum of insights and developments in the field.

2.2 Search Strategy

A comprehensive search strategy was developed to identify studies related to AI and ML in Accounting forecasting. The search strategy combined keywords and phrases related to "machine learning," "artificial intelligence," "financial forecasting," and "accounting markets" with Boolean operators to ensure a wide coverage of relevant literature. The search was limited to documents published in English from 2006 to 2024, to focus on the most recent advancements and trends

2.3 Inclusion and Exclusion Criteria for Relevant Literature

The inclusion criteria were designed to capture studies that specifically focus on the application of artificial intelligence (AI) and machine learning (ML) within the realm of accountant behaviour prediction. This encompasses research that provides empirical evidence on the advancements, challenges, or implications of AI-driven predictions in financial markets, ensuring that the literature reviewed contributes directly to the understanding of the study's core themes. Eligible literature included works published in peer-reviewed journals, conference proceedings, or as part of reputable institutional reports, which are recognised for their contribution to the academic and professional discourse on finance and technology. Conversely, the exclusion criteria were established to filter out studies not directly related to accounting behaviour prediction and financial forecasting or those that do not specifically address the use of AI and ML technologies. This includes literature focusing on financial markets unless the findings are broadly applicable or comparative, which could offer valuable insights into the global context of AI in financial forecasting.

2.4 Selection Criteria

The selection process involved a two-stage screening. Initially, titles and abstracts were screened based on the inclusion and exclusion criteria to identify potentially rel-

Table 1: Challenges in Adopting Machine Learning in Accounting & Finance Area

Variables	Mean	Std. Deviation	Mean Rank	No.
Voice assistants	3.29	1.363	5.12	III
Smarter homes	3.10	1.325	5.82	I
Personalised Experiences	3.12	1.412	5.11	IV
Improved Healthcare	3.04	1.427	5.02	VI
Increased Efficiency	3.17	1.311	5.59	II
Enhanced security	3.09	1.351	4.42	IX
Job Displacement	3.34	1.346	5.07	V
Improved language translation	3.25	1.387	4.44	VIII
Fraud detection	3.16	1.345	4.62	VII

evant studies. Subsequently, full-text articles were retrieved and assessed for eligibility. Any discrepancies in the selection process were resolved through discussion or consultation with a third reviewer to ensure consistency and objectivity in the selection of literature for review.

The future of AI in accounting is not about replacing humans but augmenting human capabilities. Accountants will need to embrace AI as a tool that enhances their skills and expertise, enabling them to focus on higher-value tasks that require human judgment and creativity. This collaboration between humans and AI will lead to more innovative and effective accounting practices, driving greater efficiency and value for organisations

Applications of artificial intelligence in the future may include self-driving robots, digital assistants, and smart cities. In the workplace, AI might streamline routine activities while also fostering more opportunities for teamwork and innovation. The future of artificial intelligence is certain to be fascinating, and the possibilities are limitless. The result of hypothesis testing is given in Table 2 below.

Table 2: Kendall's Coefficient of Concordance

N	250
Kendall's W	0.004
Chi-Square	6.017
df	8
Asymp. sig	0.643

The non-parametric test Kendall's W test shows that the calculated value of ChiSquare (6.017) for the degree of freedom 8 is found insignificant (p-0.643). Hence, it is concluded that the difference in the mean ranks across different factors is not significantly vary.

The respondents had less experience with the automation of repetitive tasks (2.69) and Human-like decision-making (2.65). The respondents moderately experienced prefer Data-driven Decision Making (2.52), Improved Customer Experience (2.56) and Increased Innovation (2.71).Highly experienced Accountant (2.90) and Risk management (2.26). The F values from ANOVA test show that there is significant difference in the means of various reasons according to the level of experience of the respondents.

2.5 Data Analysis

Data analysis was conducted through content analysis, focusing on identifying, coding, and categorising themes related to the advancements, challenges, and implications of AI-driven financial forecasting. This involved a qualitative synthesis of the findings from the selected literature, with an emphasis on extracting insights related to the application, performance, and regulatory considerations of AI and ML in financial markets. The analysis also included a quantitative assessment of the literature, such as publication trends over time and the distribution of studies across different areas of focus within the topic. The findings from the content analysis were then integrated to provide a comprehensive overview of the current state of AI and ML in financial forecasting, highlighting key trends, challenges, and future directions. By employing a systematic literature review and content analysis, this study aims to provide a structured and evidence-based examination of the role of machine learning and artificial intelligence in financial forecasting, contributing to a deeper understanding of the field and providing future research ventures and practices.

3 Results

The utilisation of Machine Learning (ML) within the financial sector has gained significant traction, propelled by the demand for advanced and efficient analytical instruments in a complex and swiftly changing market landscape. The essential tenets of ML in finance focus on employing computational algorithms to scrutinise extensive datasets, discern patterns, and forecast trends and behaviours in financial markets. A key aspect of ML

Table 3: Opportunities Presented by ML in enhancing Accounting and Financial Market.

Reason	Level of experience	N	Mean	Std. Deviation	F	Sig.
Data-driven Decision Marketing	Less	45	2.21	1.171	0.376	0.667
	Moderate	125	2.52	1.121		
	More	80	2.51	1.025		
	Total	250	2.52	1.112		
Improved customer experience	Less	45	2.54	1.077	0.0235	0.969
	Moderate	125	2.56	1.0444		
	More	80	2.46	1.121		
	Total	250	2.25	1.039		
Risk management	Less	45	2.19	1.035	1.079	0.341
	Moderate	125	2.04	1.066		
	More	80	2.26	1.018		
	Total	250	2.15	1.033		
Product Development	Less	45	2.43	1.158	0.868	0.431
	Moderate	125	2.79	1.179		
	More	80	2.90	1.194		
	Total	250	2.50	1.150		
Increased innovation	Less	45	2.32	1.148	0.278	0.712
	Moderate	125	2.71	1.121		
	More	80	2.45	1.019		
	Total	250	2.25	1.163		
	Less	45	2.69	1.150	0.134	0.128

in finance involves the classification and examination of financial data through the application of both fundamental and technical indicators. Fundamental indicators involve analysing a company's financial health, market position, and economic factors, while technical indicators focus on statistical trends based on market activity, such as price movements and volume. (Alonso, Carbo, and Marqués (2023)) investigate the application of machine learning in the analysis of climate finance, an area that necessitates the handling of extensive climate-related datasets and the modelling of intricate, non-linear relationships. This highlights the versatility of ML in addressing diverse financial challenges, including those at the intersection of finance and environmental sustainability

The incorporation of machine learning in the financial sector necessitates tackling issues associated with data quality, model interpretability, and ethical implications. It is crucial to guarantee the precision and dependability of financial forecasts generated by machine learning models, alongside the requirement for clarity regarding the methodologies these models employ to reach their conclusions. As ML continues to evolve and become more integrated into the financial sector, addressing these challenges will be crucial for maintaining trust and efficacy in ML-driven financial analysis. In summary, the fundamental principles of ML in finance center on the use of advanced algorithms to analyze and interpret large datasets, predict market trends, and inform financial decision-making.

3.1 Overview of Machine Learning Techniques in Financial Prediction

Machine Learning (ML) techniques have become integral to financial prediction, offering sophisticated tools for analysing market trends and forecasting stock prices. The application of various ML algorithms has revolutionised the way financial data is processed and interpreted, providing investors and analysts with more accurate and efficient means of predicting market movements. One of the primary ML techniques used in financial prediction is regression analysis networks. Studies like those conducted by (Ahuja et al. (2023) and Gunturu et al. (2023)) provide valuable insights into the strengths and weaknesses of various ML algorithms, guiding investors and analysts in selecting the most suitable models for their specific needs. In summary, the overview of ML techniques in financial prediction reveals a diverse and sophisticated array of tools available for market analysis. From regression models to advanced deep learning algorithms, ML provides a comprehensive framework for understanding and forecasting market trends. As the field continues to evolve, the integration of these techniques is likely to become even more prevalent, offering enhanced accuracy and efficiency in financial prediction.

3.2 How to Use Machine Learning Effectively in Accounting and Finance

There are many players in developing models in the area of accounting. (Bracket et al. (2019)) in their article identified at least six stakeholders, who are involved in creating and deploying an accounting model. Out of those six players; four are directly involved in creating and deploying the architecture as developers; first- and second-line checkers and management responsible for the application. The other two stakeholders look after the regulatory part. Thereby, the success or failure of any ML model developed for any problem in the accounting and finance sector will primarily depend on the knowledge, experience, understanding of financial theories, and behavior of customers and markets of developers as well as checkers. To make DL/ML models work effectively in the financial sector, the quality of data used for modeling is of paramount importance. To deal with the high noise data, (**?**) suggested adopting back-testing protocols to tackle the low signal-to-noise ratio of financial data. (Bracket et al. (2019)), introduced a model to address the 'black box' issue prevalent in various machine learning applications by employing the QII technique developed by (Datta et al. in 2016) in a real-world example. ML model is used to predict mortgage defaults in the black box. (Rundo et al. (2019)) argued in their article that ML-based financial models outperform traditional accounting models as they identify significant information from presumably irrelevant information and can process and analyse a large amount of data including alternative data very effectively and efficiently.

Figure 1: AI Trust Framework Key Pillars (Mylrea & Robinson, 2023).

3.3 Challenges in Adopting Machine Learning in Accounting & Finance Area

The global landscape is experiencing continuous expansion in the utilisation of machine learning models across various fields, particularly in accounting and finance. There are many success stories propelling us to seek confidence in the adoption of ML/DL modeling in the accounting and finance area, but we have an equal number of anecdotal stories as well if not more. Numerous funds relied on machine learning or deep learning models; however, they did not attain the anticipated performance levels, and some even experienced total failure. Not only this, there are many examples when predictions about stock price, exchange rates, valuation of securities, and financial health of institutions using machine language models failed; raising fingers at the very idea of adopting ML in the area of accounting. The accounting and financial modeling involve understanding the behavior of customers and markets. So, experts developing financial models need to have strong knowledge of behavioral finance other than financial concepts, theories, and of course coding experience. The next challenge in applying machine learning in the accounting is 'over-fitting'. (Huang etal. (2020)) summarized three important aspects of deep learning applications in their study and presented unfavorable impacts of over-fitting and sustainability while applying ML models in providing solutions. Machine learning in accounting and finance can be computationally very expensive due to the dynamic and volatile nature of the sector.

3.4 How Artificial Intelligence (AI) will Improve Accounting Practice

The merits of AI in the profession and practice of accounting will basically be the extension of the merits of traditional computerisation in the performance of accounting functions. In other words, all the improvements we have seen from accounting system automation and much more will form part of the benefits of AI in the profession and practice of accounting. Artificial Intelligence however has its down side including initial high cost of implementation, displacement of human labour and the fact that machines do not possess the initiative, empathy and decision-making ability of humans and as such cannot fully operate without human intervention. Another challenge with AI systems is its susceptibility to easily being compromised or breached or even displays unwanted characteristics. The Microsoft experiment "Tay" from 2016 is a prime example of this manip-

ulation. It took less than 24 hours for Twitter to thoroughly corrupt this AI robot, which was impersonating a typical female user and spewing sexist, racist, and other offensive comments in response to a dialog.

Figure 2: Artificial Intelligent Component.

3.5 Current State-of-the-Art in Financial Machine Learning.

The current state-of-the-art in financial machine learning (ML) encompasses a wide array of models and techniques designed to navigate the complexities and volatilities of financial markets. These advancements have significantly enhanced the predictive capabilities in financial forecasting, offering nuanced insights into market trends and investment opportunities. (Joiner et al. (2022)) provide a comprehensive review of algorithmic trading and short-term forecasting for financial time series using ML models. These emerging trends and future prospects in financial ML point to a landscape ripe with opportunities and challenges. The continued evolution of ML models, coupled with the increasing volume and complexity of financial data, necessitates innovative solutions that can enhance predictive accuracy and operational efficiency. Moreover, the ethical considerations and potential biases associated with algorithmic decision-making call for a balanced approach that ensures fairness, transparency, and accountability.

3.6 Evolution of Machine Learning Techniques in Finance.

The evolution of machine learning (ML) techniques in finance has been marked by significant advancements and innovations, reshaping the landscape of quantitative finance, credit scoring, bankruptcy prediction, and portfolio optimisation. This evolution reflects the increasing complexity and sophistication of financial markets and the growing demand for more accurate, efficient, and automated financial analysis and decision-making processes. The study emphasises the importance of selecting the most appropriate ML methods for specific datasets to enhance model performance. This evolution in credit scoring and bankruptcy prediction illustrates the growing role of ML in enhancing the decision-making capabilities of financial institutions, particularly in assessing credit risk and financial stability.

4 Conclusion

The study has systematically explored the integration of Artificial Intelligence (AI) and Machine Learning (ML) in financial forecasting, highlighting significant advancements and identifying persistent challenges. Key findings reveal that AI and ML technologies have revolutionised financial forecasting by enhancing accuracy, efficiency, and the ability to process and analyse vast datasets. Innovations in deep learning, reinforcement learning, and hybrid models have shown particular promise in predicting market trends and asset prices with unprecedented precision. However, challenges related to data quality, model interpretability, and ethical considerations remain significant hurdles to the universal adoption and optimisation of AI-driven financial forecasting. Looking ahead, the future landscape of AI in finance is poised at the intersection of burgeoning technological advancements and the critical need for robust regulatory frameworks. The potential for AI to further transform financial forecasting and decision-making processes is immense, offering opportunities for more personalised financial services and enhanced risk management. Yet, this potential comes with challenges, notably in ensuring data privacy, addressing algorithmic biases, and maintaining the transparency of AI decision-making processes. The evolving regulatory landscape will play a crucial role in shaping the ethical use of AI technologies, balancing innovation with consumer protection and market integrity. To navigate the complexities of AI integration in financial forecasting, financial leaders and policymakers are advised to focus on fostering an environment that encourages innovation while ensuring ethical standards. This includes investing in AI literacy and skills development, promoting interdisciplinary research to address technical

and ethical challenges, and developing clear guidelines for the ethical use of AI in finance. Furthermore, policymakers should prioritise the establishment of international standards and collaborative regulatory frameworks to address the global nature of financial markets and AI technologies. Engaging with stakeholders across the financial ecosystem will be essential in developing policies that support sustainable growth and innovation in AI-driven financial services.

CONFLICT OF INTEREST

The corresponding author, representing all authors, confirms the absence of any conflict of interest.

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REFERENCES

[1] Azizam, N. A., Dzulkipli, M. R., Shamimi, N. I., Maon, S. N., John, D., Belawing, J., ... & Yahaya, N. (2020). Applicability of theory of planned behavior and protection motivation theory in predicting intention to purchase health insurance. *Advances in Business Research International Journal*, 6(1), 1-9.

[2] Azman, N. L. A., & Vaicondam, Y. (2020). Behavioral intention in forensic accounting services. *International Journal of Psychosocial Rehabilitation*, 24(2), 1837-1846.

[3] Bhatt, S. and Singh, P. (2023). A Comprehensive Review of AI-Enabled Financial Domain: Past, Present & Future Aspects," 2023 3rd *International Conference on Innovative Sustainable Computational Technologies (CISCT)*, Dehradun, India, 2023, pp. 1-5. DOI: 10.1109/CISCT57 197.2023.10351219

[4] Bhavsar, Y. B., & Waghmare, K. C. (2019). Intrusion detection system using data mining technique: Support vector machine. *International Journal of Emerging Technology and Advanced Engineering*, 3(3), 581-586

[5] Eleonora P.S. (2018). How artificial intelligence is challenging accounting profession. *Journal of International Scientific Publication.* Vol 12. pp.126-140

[6] Emerson, et al. (2019). Trends and Applications of Machine Learning in Quantitative Finance. *8th International Conference on Economics and Finance Research (ICEFR 2019).*

[7] Huang, et al. (2020). Deep learning in finance and banking: A literature Review and classification. *Frontiers of Business Research in China*, 14, 2-24.

[8] Huang, Z. (2018). Discussion on the Development of Artificial Intelligence in Taxation.

[9] Kumar Doshi, H. A., Balasingam, S., & Arumugam, D. (2020). Artificial Intelligence as a Paradoxical Digital Disruptor in the Accounting Profession: An Empirical Study amongst Accountants. *International Journal of Psychosocial Rehabilitation*, 24,873-885. https://doi.org/ 10.37200/IJPR/V24I2/PR200396.

[10] Lee, C. S., & Tajudeen, F. P. (2020). Usage and Impact of Artificial Intelligence on Accounting: 213 Evidence from Malaysian Organizations. Asian Journal of Business and Accounting, 13, 213-240.

[11] Mohammad, S. J. et al. (2020). How Artificial Intelligence Changes the Future of Accounting Industry. *International Journal of Economics and Business Administration*, 8,478-488. https://doi.org/ 10.35808/ijeba/538

[12] Mullainathan, S., & Jann, S. (2017). Machine Learning: An Applied Econometric Approach. *Journal of Economic Perspectives*, 31(2), 87-106.

[13] Mallikarjunaiah, N., Jain, R.S., Vinay K. R., Navada, S.S. and Pramod T.C. (2023). Data Visualisation of Time Tradable Assets Using Machine Learning," *2023 International Conference on Network, Multimedia and Information Technology (NMITCON)*, Bengaluru, India, 2023, pp. 1-6.

[14] Nicholas, M., & Bagui, S. S. (2021). Associating Fundamental Features with Technical Indicators for Analyzing Quarterly Stock Market Trends Using Machine Learning Algorithms. BOHR. *International Journal of Computer Science*, 1(1), 88-103. DOI: 10.14646/bijcs.014

[15] Sonkavde, G., Dharrao, D. S., Bongale, A. M., Deokate, S. T., Doreswamy, D., & Bhat, S. K. (2023). Forecasting stock market prices using machine learning and deep learning models: A systematic review, performance analysis and discussion of implications. *International Journal of Financial Studies*, 11(3), 94. DOI: 10.3390/ijfs11030094

[16] Tarakci, F., Ozkan, I. A., Yilmaz, S., & Tezcan, D. (2023). Diagnosing rheumatoid arthritis disease using fuzzy expert system and machine learning techniques. *Journal of Intelligent& Fuzzy Systems*, 44(4), 5543-5557.

[17] Ucoglu, D. (2020). Current machine learning applications in accounting and auditing. *PressAcademia Procedia*, 12(1), 1-7.