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AI and Big Data Analytics in Financial Markets

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ABSTRACT
Post liberalization there is tremendous impact of Artificial Intelligence (AI) and Big Data analytics in financial markets. In this paper, the author sought to understand how these technologies can change the face of business practices in areas like algorithmic trading and market risk management, market sentiment analysis and compliance. We consider how AI and Big Data are used in finance and the opportunities and problems these technologies offer and present in improving decision making, making markets more efficient, and offering competitive advantages to the actors within the financial market. Finally, this research identifies that while adopting AI and Big Data have strong advantages their implementation is linked with several significant risks including data privacy and security as well as ethical issues for further concerns.

Keywords: AI, Big Data Analytics, Financial Markets

1. INTRODUCTION
As the greatest financial markets are global, they present features such as high complexity, fast decision making and significantly large flows of information [1]. In recent years more especially of the use of the internet, new technologies, especially the AI and the big data analytics have changed the way many financial institutions have been doing their businesses. They enable faster data analysis together with instant decision-making and more credible prognosis, which provide competitive advantage in a rather tight environment.

Machine learning, deep learning and natural language processing or AI remains the key driver of innovations such as the algorithmic trading, market sentiment analysis and risk management. The capability of showing the patterns of past behaviors and making gain predictions on future ones is very advantageous in financial markets were changes matter significantly. Likewise, Big Data analytics allows institutions to process volumes of structured and unstructured data from/defined by market transactions/SOCIAL MEDIA/economic indicators [2]. These data sources provide insights into investment, risk and customer relationship management among others.

AI and Big Data technologies have also brought changes in the financial market; these are among the challenges [3]. Privacy, security, and entrustment and ethical issues relating to AI decision-making has emerged. In addition, legal requirements are still lagging in terms of innovation, leaving the financial industry in existence of legal ambiguity.

Therefore, this paper discusses the AI and Big Data in the context of financial markets and trades in terms of its usage, advantages and disadvantages [4]. It also considers the potential future development of these technologies, their possibilities in augmentation of the financial sector.

2. The Role of AI in Financial Markets
AI in financial markets has revolutionised the markets by enabling high speed, efficiency and accuracy in several operations [5]. By analyzing massive datasets, determining relationships and making decisions, immediate and accurate, AI has benefited financial institutions by enhancing optimal trading approaches, managing risks, and gaining an edge on the competition. As we examine in detail in this section, several domains of AI are now constitutive of the modern financial markets, including algorithmic trading, sentiment analysis, risk management, and fraud detection.

2.1 Algorithmic Trading
One of the most famous uses of AI now in financial markets is Algorithmic trading or notable as algo-trading or high-frequency trading (HFT). AI algorithms can carry out many transactions instantly, provided certain conditions that the trader sets down concerning price levels, timing or other parameters of the market. These

algorithms can ingest large amounts of data such as past trends of price history and present real-time data on the market in order to make calculated opportunities for buy-sell and then be able to conduct these without the need for a human figure.

AI improves algorithmic trading by incorporating intelligent learning into algorithm used in trading, so these algorithms can adapt to market conditions by learning from past information [6]. For example, AI can discover hidden features in the market or work out that some other models are blind to. This places the traders in a position where they can exploit these small price shocks before even manual traders can respond. Such trading platforms get smarter with every update, thereby reducing risks while maximizing the amount of generated revenue through machine learning techniques.

2.2 Market Sentiment Analysis

One of the highly promising fields of AI is market sentiment analysis. Relative to emotions in financial markets, the feelings and perceiving abilities of investors should be considered as an important significant factor influencing prices [7]. Earlier it was measured through paper and electronic media clippings, news clips, balance sheets and other speculative information. NLP and Sentiment Analysis has made this an artificial intelligence task released by filtering and analyzing huge volumes of unstructured communication work which includes social media, news articles, earnings call transcripts, and even speeches.

It can analyze the sentiment as regards to assets, companies or industries and see how the market is likely to react. For example, AI systems can instantly analyse the sentiment behind the release of a company's earnings or a government's economic data. In the recent past, sentiment analysis has proved to be an essential tool for both intraday and position traders as well as the long-term investors and speculators.

2.3 Risk Management

AI has drastically improved risk management practices in place within the financial markets. Financial institutions are subject to several risks such as Market risk, credit risk and operational risk. AI systems can deal with past and current data to find out the risks more effectively by recognizing different styles of risks and understanding different scenarios. By developing and implementing machine learning models, the financial institutions achieve the possibility to predict possible market fluctuations and risk factors such as price declines among others.

For example, the use of machine learning can determine the correlation between the various financial assets and give circumstances as to how movements in one market will impact other markets [8]. This assists the portfolio managers to ensure correct distribution of assets and create hedges in case of injection losses. In addition, the risk models based on AI can be updated all the time and develop the ability to form the descriptions of risks that reflect current and amended market conditions. Real-time multiple-risk data analysis conscientiously assigned with ample data set makes AI an effective measure for risk management.

2.4 Common Frauds and Regulatory Science

In fraud detection and regulation, Artificial Intelligence has gradually emerged as an essential tool for dealing with increasing threats from cyber criminals and escalating regulation. There are studies showing that scopes of AI systems include transaction pattern analysis and fraud signals detection. These systems use machine learning and can therefore identify fraud risks derived from previous incidents and preclude them from causing loss.

Another application of AI complies procedures involving decision making on financing, in fairness provisions and rules against money laundering and identification of customers. By using Artificial intelligence, huge number of transactions can be scanned by programmed algorithms to look for any irregularities which may contravene the regulations. Furthermore, applicative tools, specifically, retch ones based on AI allow the firms automate reporting and minimize the probability of compliance non-compliance, which over time could lead to significant fines as well as reputational loss.

2.5 Portfolio Management and Robo-Advisory

AI has also impacted on portfolio management and robo-advisor which has emerged to be an automated financial advisory business. Robo-advisory is an AI-based technology where the advisors look at an investor's needs, risk profile, and market trends to create an investable portfolio for the client [9]. A growing number of these AI systems provide constant supervisory oversight to the portfolio and recalibrate based on live data feeds and market forecasts.

As finances are managed by machine learning algorithms, robo-advisors provide affordable, and efficient means of obtaining advisory services like an expensive human investment manager. The multiple portfolio management; doing thorough research to establish the best course of action; and the automatic allocation of assets all allow individual investors and institutions to experience high returns with a minimal level of human interference.

2.6 AI in Predictive Analytics

AI plays an immense role in prediction and in the current financial institutions, their investment decisions are

being influenced by this attribute of AI [10]. AI based analysis of the past trends and patterns and correlation between various economic indicators allow a machine to predict the future movement with a high level of accuracy. Stock prices, Commodity prices, interest rates and other financial indicators, can be assessed using the results derived from the AI-capable predictive models.

These AI models are most effective in quantitative finance market since traders and analysts rely on mathematical models to predict financial events. Predictive analytics is also helpful if used to recognize areas favorable for arbitrage, to have a sense of macroeconomic situations experienced, and to estimate long-term changes in the market. AI plays an important role in offering predictive analysis to hedge funds and asset managers to utilize that info in beating market competitors.

AI has recently played a huge part in the financial markets through enabling financial institutions to improve their trading, risk control, regulatory compliance and investment approaches. With its capacity to gather large amounts of data, mine them in real time, learn from patterns secorded by history and predict future movements of the market, it is revolutionizing the financial markets, making them more streamlined, safe and open. However, using AI in operations also entails some issues such as transparency, regulation, and the right usage of AI in decision making, which will be discussed under the subsequent headings.

3. Big Data Analytics in Financial Markets

Big Data analytics have thus become central in the conduct of financial markets due to the large volume of data that is produced in every second from trading, social media, economic indices and other areas. Big Data therefore is a term used for gigantic data sets that are incomprehensible to standard processing systems [11]. By employing big data concepts, financial institutions can gain insights into previously unnoticed trends, generate hypothesis-supported prognoses, and optimise their choices. In this part, we'll be describing various fields where Big Data analytics is currently being used in financial markets, such as predictive analytics, risk management, customer analysis, and customised financial services.

3.1 Data Sources and Processing

In financial markets, Big Data comes from a wide range of sources, including:

- Market transactions: Between the two, millions of buy and sell orders are processed daily leading to an enormous number of stock prices and trades data.

- Economic data: Business parameters including GNP/GDP, industry and trade unemployment rate, inflation, and exchange rate offer macroeconomic information that affect the market.

- Alternative data: social media and satellite imagery sentiment, website analytics, and other unconventional method insights give information about the market shifts.

- Company reports: Annual reports, balance sheets, profit and loss accounts, and any release containing information about the company constitute this data.

- News and social media: Proactiveness of changes in the market can be detected through mood of the public based on articles, blog posts, and social media posts.

The amount and speed of such data call for complex technology solutions for data archiving and analyzing. Big Data analytics platforms can include Hadoop or other distributed computing systems or can be based in the cloud that allows financial institutions collect and analyze these data streams in real time [12]. Demonstrating the capability to handle both structured and unstructured data has revolutionized the way these financial institutions analyze the information they gather and make their decisions.

3.2 Predictive Analytics

One of the key uses of Big Data in financial markets is in forecasting, thanks to the practice of predictive analytics. Based on historical information, and mathematical methods, and statistical models a prediction on the trends of the future is made for a particular event, like stock prices or interest rates or credit risk. Understanding complex market interactions requires analysis of large amounts of data, and machine learning, along with other related statistical methods provide the possibility for this.

For instance, hedge fund designers employ techniques in predictive analytics in search of trading possibilities basing on the trends of previous price lists, economic signs and other features. The systems can also apply hypothetical situations like policy adjustments in the channel or a specific event in geopolitics on the stock performance. This makes it easier for investors to make sufficient decisions and act immediately counteraction at any misdirection on the market.

Also, with the support of PA, financial institutions identify credit risk. Through the processing of huge amounts of borrower information such as credit history of a borrower, his expenditure pattern and many other aspects of

the external macroeconomic environment, institutions and companies can forecast the chances of a default of the loan by a particular borrower. This means that there is a reduction of credit risks and the ability to set right interest rate for its products.

3.3 Risk Management
This paper aims at identifying the contribution of Big Data analytics towards the strengthening of risk management approaches in the contemporary financial markets. [13] Handling big data in real-time enables institutions to avoid specific risks before they materialize. It continues with an examination of how Big Data analytics can be used in modeling and evaluating different kinds of risks such as market risk, operation risk and liquidity risk and credit risk.

For instance, real time analytics helps the financial institutions to keep track of the market ups and downs in order to control risks. Sophisticated models may consider such effects as sharp changes in prices or new geopolitics circumstances or changes in interest rates on the portfolio. In this respect, institutions can regularly search for situations enabling them to minimise or cope with adverse market movements with a view to preserving assets.

In addition, stress testing and scenario analysis benefit from analytics derived from Big Data. Other financial organizations and companies can employ big data to compose and assess highly speculative market scenarios in their portfolios. It assists firms to get acquainted with the weak points seen by the auditors thus grasping precautionary steps to keep the firms financially sound.

3.4 Fraud detection and Prevention
Another discovery that Big Data analytics had made an impressive achievement in is fraud detection and prevention. Banks are always exposed to fraud throughout the year especially with the increase in the numbers of transactions conducted online and the existent threat of cybercrime. Big Data analytics helps institutions to analyze huge volumes of transactional data in real-time and to establish outliers and probable fraudulent activities before great loses occur.

Using the AI approach on transactional data, institutions can recognize signs such as irregular behaviors such as spending patterns, multiple logs in attempts and massive transactions. Such systems can help identify fraud cases that require further review, to help the financial organizations minimize their loss [14].

Moreover, Big Data analytics assists in AML operations by monitoring and analyzing the transaction to help identify them. As structures and relation between various accounts show operations related to money laundering, financial institutions can prevent the escalation of illicit activities.

3.5 Email Marketing for Customer Insight and Customisation
Another important benefit of Big Data application in the financial markets is the opportunity to produce customers' knowledge and individualization of services. This enables the evaluation of extensive information about the customer through spend patterns, purchase, transaction history, and social media trends.

For example, using behavioral analytics, banks will be able to determine which of its customers will be most likely to engage in an offer or segment, say loans, credit cards or investment products [15]. This puts institutions in position to consistently target their markets in the right way and offer clients' solutions that suit their financial needs.

Moreover, Big Data analytics helps to use information for create a personal investment portfolio. For instance, advisors apply Big Data to evaluate an individual investor or his/her risk profile, financial objectives, and market characteristics, to help him or her design and facilitate effective management of custom-made investment portfolios. The level of customization at this level improves the relationship with clients since clients are provided with personalized financial solutions.

3.6 Legal Requirements Reporting
The daily experience in the financial industry and recent research also points to continually increasing regulatory pressure to which financial institutions are exposed in the present world. To enable firms, achieve the above goals and objectives, the use of big data analytics leads to enhanced compliance process and achievement of the set regulatory reporting. This means that using technology tools to collect, analyze and report, financial institutions can be able to minimize the time it takes to adhere to the compliance measures while at the same time being accurate.

For instance, regulating authorities get voluminous reports on the financial operations to minimize fraud, money laundering, and other unlawful works [16]. The use of Big Data analytics helps institutions accumulate and analyse the required data to follow such legislation as Dodd-Frank Act, Basel III, and MiFID II. Also, Big Data makes it possible for firms to avoid compliance risks by get a head start in terms of discovering what regulatory changes are a potential problem and then keeping track of them to avoid legal violations.

Big Data analytics as a major tool has revolutionized the financial markets including financial institutions to process big datasets and endow them with concrete insight for making decisions promptly. In discipline such as predictive analyses, risk management, customer segmentation, and fraud detection, Big Data has touched nearly all areas of the operations of these financial institutions. However, Big Data also has its limitations which coupled with concerns over data privacy and security and meeting regulatory requirements before the innovation of those technologies fully pervaded financial markets. **Figure 1 to 7**, shows various graphical representation of AI and Big Data Analytics in Financial Markets.
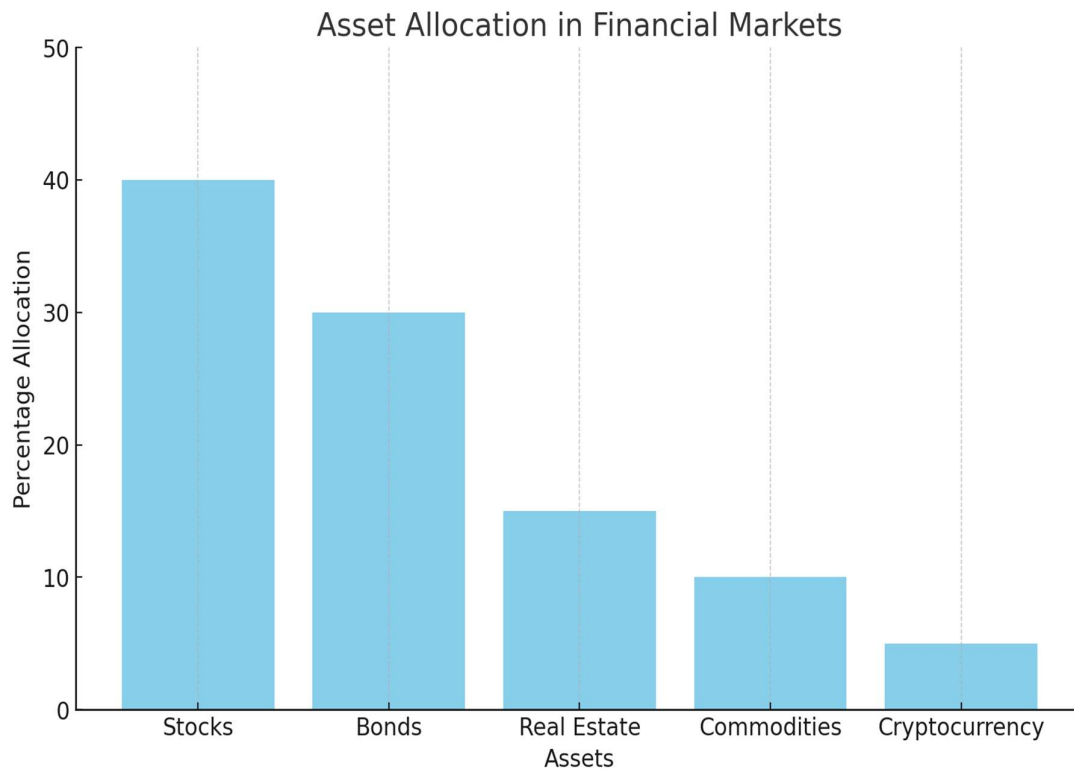
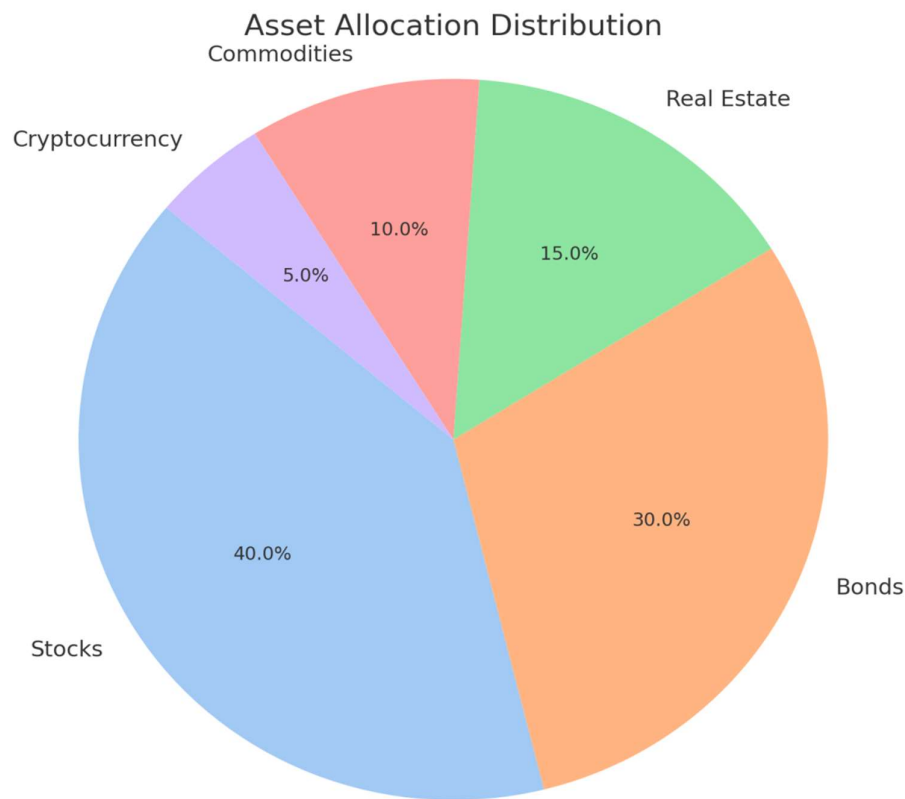**Figure 1** Asset Percentage Allocation in Financial Markets

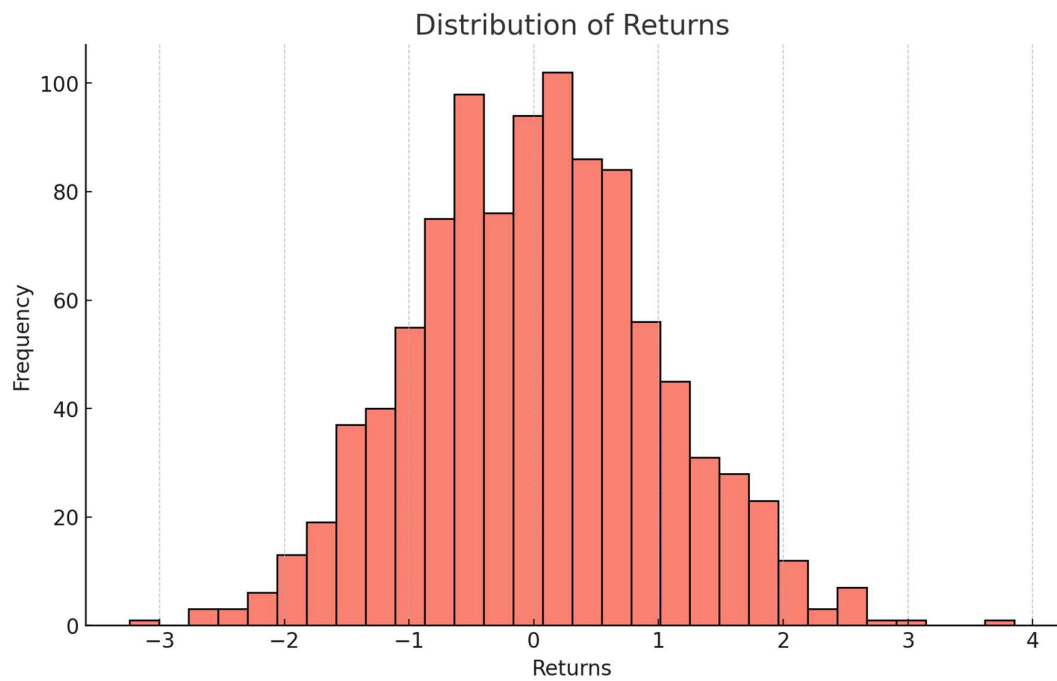**Figure 2** Asset Allocation percentage Distribution

Figure 3 Distribution of Returns for frequency

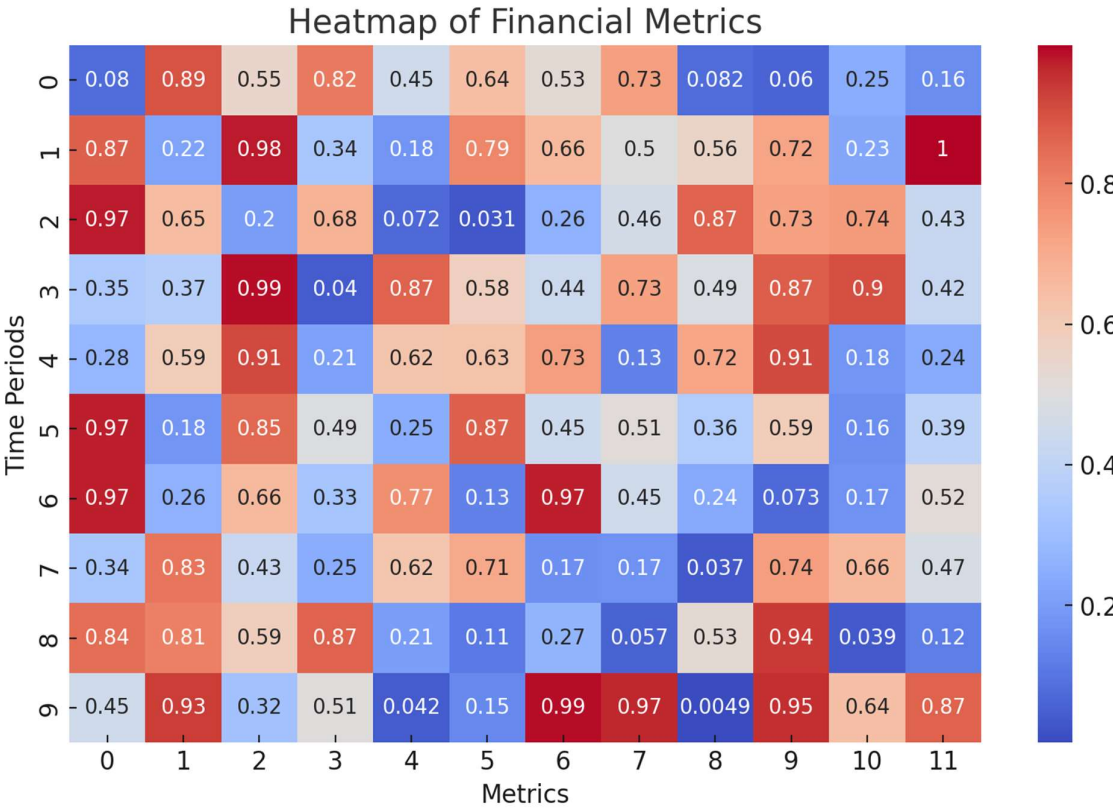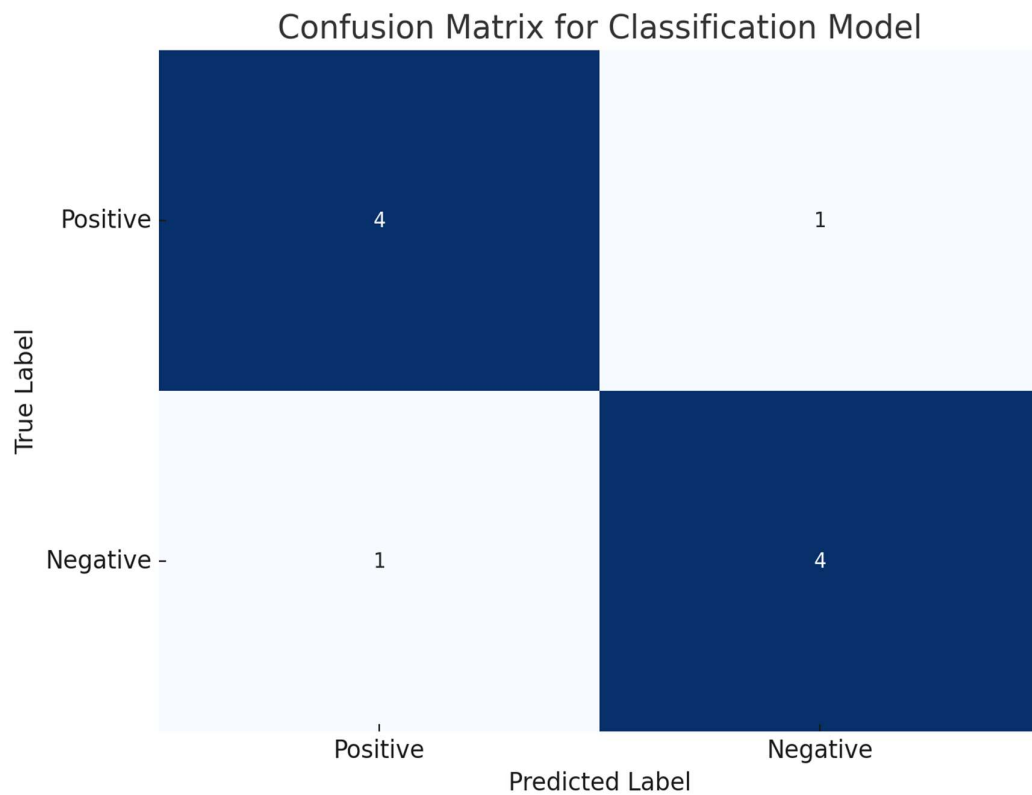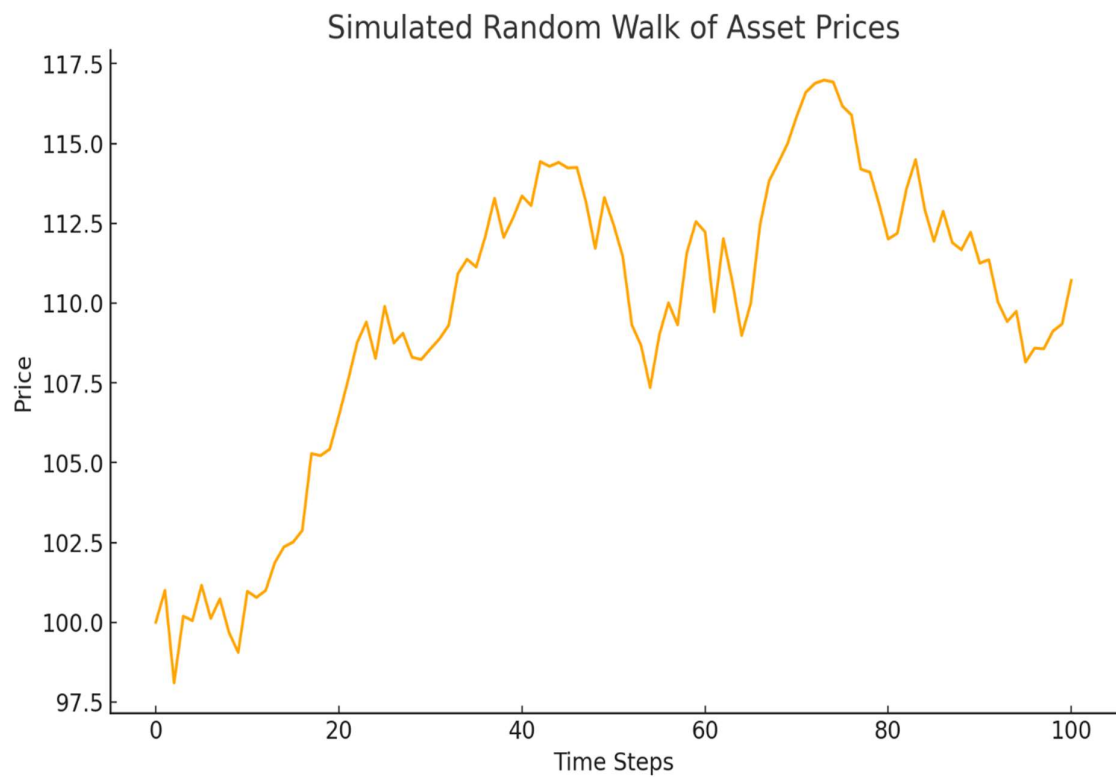**Figure 4** Simulated Asset values on Price Movement Over Time

Figure 5 Heatmap of Financial Metrics on time periods

Figure 6 Confusion Matrix for Classification Model on both labels

Figure 7 Simulated Random Walk of Asset Prices between price and time steps

4. Challenges

Although the AI and Big Data analytics have revolutionized the financial market empowering it by streamlining the tasks, sharpening the decision-making procedures, and improving the risk management, still there lie several issues [17]. These challenges are derived from problem areas concerning data protection, security, legal, and other compliance measures, and moral questions on the AI-based decision-making model. To this end, this part of the paper aims at outlining the major issues facing financial institutions as they seek to implement AI and Big Data analytics solutions.

4.1 Data Privacy and Security

The main issues in the use of Big Data analytics within the financial markets involve data protection and security [18]. They process a lot of information that includes consumers' financial details, identify data, and transactions associated with the organization. Big Data solutions are becoming increasingly popular today, but so are worries about the safety and confidentiality of this data. Loss of such info can impact a business financially, mar its image and result in fines and penalties in compliance with regulations.

Big Data systems are prone to cyberattacks by their nature because of the high degree of complexity and the multiple sources of information collected by the system. This is in addition to the exposure of Big Data to external threats, such as the growing usage of cloud technology for data storage and processing. This is because data in the financial institutions need protection from data breaches, unlawful access, and other cyber threats among others.

Furthermore, the collection and processing of the customers' data for the purposes of AI analysis are a subject to numerous customer privacy concerns. Rules like the GDPR applied throughout Europe and the CCPA in the United States set very specific policies on data collecting, storing, and utilization. These are regulatory environments through which financial institutions must pass to have correct policies and procedures in its collection and use of customers' data.

4.2 Responsibility and Bias

This paper aims to identify that the application of AI in financial markets raises some ethical issues mainly related to transparency, accountability, and fairness. Machine learning AI systems are to some extent opaque, so referred to as black box systems; the steps leading to the formation of decisions are often not clear. This lack of explainability hinders stakeholders for being able to comprehend how an AI system arrives to a specific decision, particularly in high-risk situations, including investment and loan financing.

One major ethical issue of AI is that AI system can provide biased results. These systems use historical data in model training, and if these data sets have biases, for instance, gender, racial, or even socioeconomic data biases, AI systems can deliver those biases at the system output and can even magnify them [19]. For instance, if a credit scoring model is trained on a dataset that has provided better credit to certain demography, then the same demography will be provided the same treatment when determining creditworthiness. This can culminate in prejudice in credit, investment, and employment in the emerging efficiency of the financial sector.

Mitigating AI bias must carry out through regular monitoring, utilizing diverse dataset, ensuring that algorithms used meet fairness norm. However, achieving fairness and simultaneously meeting the high standards of profitability for rapidly developing AI models is quite a dilemma for financial institutions.

4.3 Concerns hard coded Into Regulations

Due to the growth of AI & Big Data in the financial marketplace, rules relating to these technologies are still in their infancy and cannot keep up with the pace at which they are introduced [20]. Therefore, the mechanisms of AI and Big Data implementation are ambiguous regarding compliance with the regulation in financial institutions. Although it is apparent that existing regulatory structures support the use of these technologies as beneficial to the efficient and transparent markets, they indeed point out to these dangers including the systemic risk, algorithms mistakes and manipulations.

Some reasons that regulators are worried are that there is no clarity on the way that AI bots work, and they may cause unfair trades and manipulation of markets. For example, HFT algorithms based on artificial intelligence can make trades at a rate that is just impossible for a human to achieve, which brings concerns connected with flashes and volatility. Since more and more financial institutions begin to implement algorithmic trading in their operations, the U.S. Securities and Exchange Commission (SEC) and the European Securities and Markets Authority (ESMA) have recently stepped up regulating HFT activities to ensure market integrity.

In addition, financial institutions are held to account by the rising stringent legal provisions and requirements of AML and KYC. As for TASK 3 Compliance can also be boosted through AI and Big Data by automating specific suspicious activities detection and updating reporting systems. However, the level of technical integration of these systems means that institutions cannot guarantee total compliance given that regulations are constantly being changed.

The problem comes with trying to use innovation while keeping theFDA involved. There is a need for financial organizations to be in the compliant with the present rules and regulations while at the same time having a view on the coming rules and regulations that are bound to be set by the authorities soon due to the rising trends in the use of AI and Big Data.

4.4 BI Data Quality and Integration
It is also important to note that for any AI and Big Data analytics to work, the quality of the data used must be the best. Some of the main problems which can be met while working in a financial institution include low quality of data [21]. If data is inaccurate then the forecasts and risks measurements will be wrong and investment solutions will not be as effective. Challenges like unsupervised data, time-sensitive data and differing structure of data can have a negative impact on the data driven AI models.

Also, institutions in the financial sector experience data silos whereby different branches within the same institution store data in different ways. These silos hamper the notion of having a single, harmonised platform in which the data can be integrated and then fed into the AI algorithms. The way to deal with this challenge is for financial institutions to embrace data investments centred around data architecture and management standards which ensure quality, compliance, and availability of data in the organisation.

The integration of data is made difficult by the fact that data in financial markets may be of different types. For example, business data from markets requires integration with other form of data which may include tweets, articles and even the sentiment analysis. The fact that multiple such data types exist, and all these types must be properly integrated and analyzed is a challenging task that cannot be solved without proper tools and advanced AI methods.

4.5 Market manipulation and Systemic risk
New challenges are associated with a rapidly developing technology such as AI and Big Data, containing threats of market abuse and systemic risks. Another commonality between most of the cases of algorithmic trading is that they can process and execute thousands of trades in a matter of microseconds. Nevertheless, these systems offer substantial benefits in the administration of processes, at the same time giving rise to opportunities for their manipulation [22]. For instance, AI intricacies can be designed to front-run or jackpot; carry out a technique known as quote stuffing, where traders place bid sizes and orders in vast numbers then cancel them in a bid to deceive the market; or spoofing, where they submit fake bids and offers with the intention of putting up a fake outlook of demand or supply.

Furthermore, the applicative AI systems, which are deployed across the financial markets may contain systemic risks. When a high number of market players employs similar AI-based algorithms, these systems tend to even increase market fluctuations at turbulent times. For instance, during the uncertainty such as a bearish market, A trading algorithms may sell its portfolios concurrently thus deepening the decline in prices and more instabilities in markets. These systems are bad for the simple reason that they lack human watchful eye which perhaps may trigger financial calamities such as flash crashes or things that affect liquidity.

4.6 The Right Approach to Customer Data
It also provides information of the ethical compliance and usage of data for customer-driven AI based personalisation and predictive analytics [23]. Is the Commercial Bank, where an organization gets tailored financial products like investment advisory or credit decision based on the analysis of Big Data. Where consumer personalisation creates added value, it also leads to questions over the level of My Private data held by financial institutions.

For instance, it is quite easy for such systems to rely on such data as user credit data, data from social networks or other non-financial data to fairly assess the credit worthiness of a particular individual; essentially this would result in discrimination based on factors that do not indicate the appropriateness of the individuals being granted credit. Also, the customers often do not know how and for what purpose their details are being used, hence there is no trust between the financial institutions and their customers. Due to this, financial institutions are between a rock and a hard place in terms of using customer data for business advancements and the rights protecting consumers' personal information. Particularly, the questions regarding collection, storage, and usage of the data, as well as the ways these processes occur, need to be transparent, while the chief ethical dangers include the violation of customers' rights, uncontrolled data usage, and the misuse of data by the corporation. **Table 1** represents the challenges of AI and Big Data in financial markets.

Table 1 The challenges of AI and Big Data in financial markets

Challenge	Description
Data Quality and Integrity	Ensuring that data is accurate, complete, and reliable.
Scalability Issues	Difficulty in managing large volumes of data and computations efficiently.

Regulatory Compliance	Adhering to financial regulations while using AI and Big Data.
Algorithmic Bias	Potential biases in algorithms leading to unfair treatment.
Data Privacy and Security	Protecting sensitive financial data from breaches and unauthorized access.
Integration with Legacy Systems	Challenges in merging new technologies with existing financial systems.
Skill Shortage in Data Science	Shortage of skilled professionals to manage AI and Big Data initiatives.
Interpretability of AI Models	Understanding how AI models arrive at decisions and predictions.
High Costs of Implementation	Significant financial investment required for AI and Big Data technologies.
Rapid Technological Changes	Need for constant updates and adaptation to new technologies.
Ethical Considerations	Ethical implications of AI applications in finance.
Market Volatility Impact	Sensitivity of models to sudden market changes and shocks.

5. Future Implications

AI and Big Data technologies continue to become more ingrained in financial markets and are poised to have an even greater impact in over the next few years [24]. Thus, as these technologies advance, they will improve the efficiency and decision-making not only innovating opportunities, but new risks and ethical questions too. In this part, the prospects of applying AI and Big Data in financial markets are described, with emphasis on technologies, surveillance by humans, changes in financial industry, and other effects.

5.1 AI and Predictive Nature

Likely, the future of AI in financial markets will reveal even higher levels of predictive analytical functionality. Technological advancements entail that there would be enhancement of AI algorithms to handle ever-complicated data feed in real-time to generate better and improved market trend forecasts, asset price predictions and economic changes. This will significantly improve capacity to forecast changes in the market and manage risks and opportunities in the market for any financial institutions.

The application of reinforcement learning as well as quantum computing is expected to take predictive analytics to another level. There is quantum computing that can analyze large sets of data and solve optimization issues exponentially faster than the current classical computers together with outstanding accuracy. This could provide the first movers with quite a substantial edge into the market and possibly see inefficiencies and or trends before independent market participants do.

Yet, the rising use of AI solutions to gleaning predictive intelligence aggravates market standardization fears. The matrices can stabilize more markets with sectors relying on similar models of AI calculations and again cause more systemic shocks if these models cease to work.

5.2 Artificial Intelligence Used in Financial Products and Services

Artificial Intelligence and Big data will remain central to the delivery of new and 'better suited to the consumer's preference' products and services in the financial markets. Robo-advisors and other automated financial planning tools will grow to be more sophisticated and with our customers' data and requirements changing over time the models will become hyper-personalized. This form of democratization of financial services will enable those who cannot afford services by wealth management firms to get products which have investment information within a fraction of the price.

Aside from individual advisory-based investment options, as well as advisory ones, the focus will be set on the AI and Big data driven lending marketplace segments. These platforms will employ other sources of data, which include social media, demeanour and propensity to purchase, to evaluate creditworthiness in real time. This could extend credit to the excluded individuals and groups thus making the service provision of financial services a reality.

AI also powered by Blockchain technology will revolutionize financial dealings through use of smart contracts. These contracts will be able to execute themselves when specified conditions are realized, thereby eliminating the middlemen and making the costs of transactions to be lower. This has implications for areas such as cross border payments, trade finance which has been severely affected by the current global recession, and insurance claims processing.

5.3 Human supervisory and Some ethical Issues

It is expected that with the advancing presence of AI within decision making for financial institutions, the part of human supervision will appear even more crucial. Although AI can analyze and execute trading, risk control, and

even fraud prevention it cannot match human discretion most particularly in precarious or uncertain scenarios. Organizational users of financial analytics will increasingly become involved with managing the AI systems themselves, post-processing the output from them, and handling the ethical issues associated with the decision-making.

More specifically, the acquisition of explainable AI (XAI) will be important in this regard. In their simplest terms, XAI seeks to explain to humans how an AI system made a given decision. This will be especially useful in the areas such as credit decisions, where the AI model outcomes affect people's lives' directly. There will also be concerns with respect to the explainability and non- discrimination of the system used to make the decisions.

This will similarly lead to the establishment of ethical AI governance because as we have seen the use of AI in the financial industry raises concerns over data privacy, fairness, and ability to fake data. Lenders and other financial institutions are going to have to set down more ethical rules for lending and investing and are also going to have to develop advanced artificial intelligence governance systems. This may involve regulation, codes of practice or best practice including restricting the reliance on certain forms of data in credit decisions, the use of non-bias data in training AI models and actively minimizing bias in decision-making algorithms.

5.4 Regulatory Evolution
That is why regulators must develop adequate regulatory frameworks that would correspond to additional AI and Big Data tendencies in the Financial Market. Other future laws will most likely aim on enhancing the informativeness of Artificial Intelligence code, especially concerning trading, credit rating and or fraud analysis. There can also be new Algorithmic accountability principles where financial institutions prove how the key models work and how they prevent unjust practices.

The functions of reteach, or regulatory technology, will also grow. Reteach solutions with the use of AI and Big Data will foster the way financial institutions capture and report regulatory obligations and assess corresponding compliance in real time. Announced technologies will help regulators be more proactive insofar as they will investigate suspicious cases, potential violations, or risks before they develop into major ones.

The effectiveness of global cooperation in the regulation of AI and Big Data in the FM industry will become more prominent as more financial transactions and data become more global in their nature. Global organizations may collaborate in the formulation of common policies that enhance the management of the effects of AI-based solutions with particular concern to the soundness of the financial sector and customer's interests.

5.5 Impact on the Workforce
The implications of AI and Big Data will be vast on the financial workforce. The more forms of automation and artificial intelligence are adopted in the financial sector, and engage in tasks like data processing, compiling compliance reports, and simple trading, some positions will either disappear or be performed in a limited manner. Bland, repetitive, data, or manually intensive tasks will be streamlined away which will change the nature of the demand for skills in the labor market.

However, in line with prognoses, AI is predicted to complement the work force by assuming routine tasks leaving financial workers to do more of complex tasks. Experts in data sciences, AI governance, and risks will be more demanding, as well as decision making in partnership with AI systems.

Organizations and banks will have to put a lot of effort into rebuilding their human capital in the form of training for the new age [25]. This means that employees who will be willing and able to move and learn new technical skills as well as embrace new AI tools will be of immense benefit to companies. Also, there are the necessity of human employment in the spheres like ethical AI management, decision-making, and client interaction will remain essential for financial companies.

5.6 Social Concerns and Credit Access
I believe that the role of AI and Big Data, especially in the financial markets will not be limited to the financial industry only. One of the biggest promise areas of these technologies is the improved state of financial inclusion. Big Data and AI offer a level of technique innovation that can be used to solve the problem of the lack of access to the financial services for, for instance, the population of developing countries or people who are, in general, not covered by the conventional banking system.

Self-employed and low information customers will benefit from automated lending platforms and advisors regarding investment advice in the management of their wealth and loans. These may go a long way in helping to address economic inequality since businesses around the globe, regardless of geographical location or level of income can now access financial services in a cheap and sustainable manner. But, with the upholding of the AI and the Big Data usage in finance, there are also some of the risks given below. For instance, existing risks can be aggravated where: AI models tend to embed existing prejudices, credit assessment may be unfair and prejudiced, or the manufacturing of financial products may rely on data that discriminates one group against the

other. Designing AI controlled financial systems to be fair and inclusive will however be a decisive factor in unlocking the full potential of these technologies. **Table 2** contains the future implications of AI and Big Data in financial markets.

Table 2 The future implications of AI and Big Data in financial markets

Implication	Description
Enhanced Decision-Making	AI will enable more informed and timely decisions based on data analysis.
Personalized Financial Services	Big Data will allow for more tailored financial products and services to meet individual needs.
Improved Risk Management	Enhanced risk assessment models will lead to better risk management strategies.
Increased Operational Efficiency	Automation and AI will streamline operations, reducing costs and errors.
Real-Time Analytics	The ability to analyze data in real-time will facilitate quick responses to market changes.
Automated Trading	AI algorithms will enable faster and more efficient trading decisions.
Regulatory Technology (RegTech)	Use of AI in compliance and regulatory processes to enhance transparency and reduce risks.
Advanced Fraud Detection	AI systems will identify and mitigate fraudulent activities more effectively.
Greater Market Accessibility	AI and Big Data will open up financial markets to a broader range of participants.
Collaborative AI	Collaborative AI systems will enhance decision-making through collective intelligence.
Decentralized Finance (DeFi)	Integration of AI in DeFi will promote transparency and reduce reliance on traditional institutions.
AI-Powered Financial Advisory	AI-driven platforms will offer personalized financial advice to consumers.

6. CONCLUSION

AI and Big Data analytics are rapidly transforming the most essential features of financial markets. These include the acceleration of the efficiency of trading algorithms, managing risks more efficiently or even increasing customers' personalization. For that, they also pose problems associated with data privacy, security, ethical issues and regulation that are not avoidable. It is quite for sure that soon, these financial markets will be steered by the evolution of natural intelligence as regards to Artificial intelligence and Big Data analytics. Despite these, these technologies can be adopted by financial institutions to achieve a competitive edge, as well as drive improvement in efficiency, compliance, and stability within the financial sector.

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