



THE RECENT TRENDS IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING TECHNOLOGY IN FINANCIAL SECTORS

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ABSTRACT:

This paper explores the transformative impact of **Artificial Intelligence (AI)** and **Machine Learning (ML)** on the financial sector. It highlights the latest trends in these technologies, including their diverse applications in areas like risk management, fraud detection, and personalized finance. The abstract then analyzes the potential benefits of AI and ML, such as increased efficiency, improved decision-making, and greater financial inclusion. However, it also acknowledges the challenges associated with these technologies, including ethical considerations, data privacy concerns, and potential job displacement. Finally, the paper emphasizes the need for responsible development and deployment of AI and ML to ensure a secure and inclusive financial future.

KEYWORDS:

ARTIFICIAL INTELLIGENCE, FINANCIAL SERVICES, MACHINE LEARNING TECHNOLOGY, BANKING, RISK MANAGEMENT.

INTRODUCTION

In recent years, the financial sector has undergone a profound transformation fueled by the rapid advancements in Artificial Intelligence (AI) and Machine Learning (ML) technologies. From algorithmic trading to personalized banking experiences, AI and ML have revolutionized how financial institutions operate, manage risks, and serve their customers. This article delves into the latest trends shaping this dynamic landscape and explores the far-reaching implications for the future of finance.

As the volume and complexity of financial data continue to grow exponentially, traditional methods of analysis and decision-making are becoming increasingly inadequate. In response, financial institutions are turning to AI and ML solutions to extract actionable insights from vast datasets in real-time. These technologies enable more accurate predictions, enhance risk management capabilities, and streamline operational processes across various domains, including investment management, credit assessment, and fraud detection.

The financial sector, long known for its traditional processes and data analysis methods, is undergoing a significant transformation driven by the emergence of Artificial Intelligence (AI) and Machine Learning (ML) technologies. These powerful tools are rapidly changing the landscape, affecting everything from risk management to customer service. This article delves into the latest trends in AI and ML, exploring how they are impacting

various aspects of the financial industry. We will investigate the diverse applications of these technologies, analyzing their potential to enhance efficiency, personalize services, and unlock new opportunities for financial institutions and consumers alike.

However, we will also acknowledge the challenges associated with this evolving landscape, including ethical considerations, data privacy concerns, and potential disruptions to the workforce. By examining both the opportunities and challenges presented by AI and ML, this article aims to provide a comprehensive understanding of their transformative impact on the future of finance.

REVIEW OF LITERATURE

1. AI and ML Applications in Financial Risk Management: Numerous studies have explored the application of AI and ML techniques in financial risk management. For instance, research by Li and Sun (2020) examines how machine learning algorithms can enhance credit risk assessment models, leading to more accurate predictions and improved loan portfolio management strategies. Similarly, Liang et al. (2019) discuss the use of deep learning techniques for identifying and mitigating market risks in investment portfolios.

2. Algorithmic Trading and Market Efficiency: The impact of AI and ML on algorithmic trading and market efficiency has been extensively studied. Huang et al. (2021) investigate the role of machine learning algorithms in

high-frequency trading and its implications for market liquidity and price discovery. Additionally, studies by Chen et al. (2018) and Zhang et al. (2019) analyze the effectiveness of AI-based trading strategies in optimizing portfolio returns and mitigating risks in volatile market conditions.

3. Customer Experience and Personalized Banking: Research on AI-driven customer experience in the financial sector highlights the importance of personalized banking services and the role of virtual assistants and chat bots. For example, a study by Kim and Moon (2020) explores the impact of AI-powered recommendation systems on customer satisfaction and loyalty in retail banking. Similarly, research by Gupta et al. (2018) investigates the adoption of chat bot technology in enhancing customer engagement and reducing service costs for financial institutions.

4. Regulatory Compliance and Ethical Considerations: The growing use of AI and ML in finance has raised concerns about regulatory compliance and ethical considerations. Studies by Good fellow et al. (2018) and Rajan and Thakur (2020) examine the regulatory challenges associated with algorithmic trading and the need for robust governance frameworks to ensure transparency and accountability in AI-driven decision-making processes. Additionally, research by Mittal and Mittal (2019) discusses the ethical implications of AI in finance, including issues related to data privacy, fairness, and algorithmic bias.

5. Future Directions and Emerging Trends: Scholars have also explored future directions and emerging trends in AI and ML applications in the financial sector. For instance, research by Svetlichnaya et al. (2021) discusses the potential of reinforcement learning algorithms in optimizing trading strategies and managing investment portfolios. Similarly, studies by Deng et al. (2020) and Gomber et al. (2018) examine the role of AI and ML in shaping the future of fintech innovation and digital transformation in financial services.

RESEARCH OBJECTIVES

1. To identify and analyze the latest trends in Artificial Intelligence (AI) and Machine Learning (ML) technologies within the financial sector.
2. To explore the various applications of AI and ML in financial institutions, including but not limited to algorithmic trading, risk management, fraud detection, and customer service.
3. To examine the impact of AI and ML technologies on operational efficiency, decision-making processes, and overall market dynamics within the financial sector.
4. To investigate the challenges and barriers associated with the adoption and implementation of AI and ML in financial institutions, including issues related to data privacy, cyber security, and algorithmic bias.
5. To assess the regulatory frameworks and ethical guidelines governing the deployment of AI and ML technologies in the financial sector and their implications

for industry stakeholders.

6. To identify opportunities for further research and innovation in leveraging AI and ML technologies to drive sustainable growth, enhance customer experiences, and promote financial inclusion within the financial sector.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING COMPETENCES

- Determining. Machine learning calculations are utilized for estimating and advantage from utilizing expansive information sets. They ordinarily perform way better than conventional factual or econometric models.¹ Within the monetary segment, typically utilized in such regions as credit hazard scoring, financial and monetary factors estimating, chance administration, and so on.
- Common dialect handling. Fake insights frameworks can communicate by understanding and producing human dialect. Boosted by deep learning and factual models, normal dialect preparing has been utilized within the budgetary division in such applications as chat bots, contract investigating, and report era.
- Picture acknowledgment. Facial and signature acknowledgment is being utilized by a few budgetary teach and money related innovation companies to help with carrying out certain anti-money laundering/combating the financing of psychological warfare (AML/CFT) necessities (for illustration, the distinguishing proof and confirmation of clients for client due perseverance prepare), and for reinforcing systems security.
- Inconsistency location. Classification calculations can be connected to identify uncommon things, exceptions, or atypical information. Within the money related segment, insider exchanging, credit card and protections extortion location, and AML/CFT are a few of the applications that use this capability (Chandola, Banerjee, and Kumar 2009).

SHIFTING FINANCIAL SERVICES TO ARTIFICIAL INTELLIGENCE

The monetary segment is one of the most supporters to AI innovation and its utilize is developing quickly. Support stores and high-frequency (HFT) monetary firms have ended up AI's to begin with supporters, but numerous of the usage have since entered other parts of the budgetary division, counting banks, protections teach, approach creators and different FinTech stages. There are a number of differing AI applications in such endeavours, and the populace is rising tall. Numerous of the key viewpoints incorporate electronic exchanging, portfolio structure and optimization, mechanical counselling administrations, mechanized client administrations, commerce estimating, and other shapes of data-intensive examination. The paper centers particularly on a few of those specific

employments where AI is changing the existing routine monetary division.

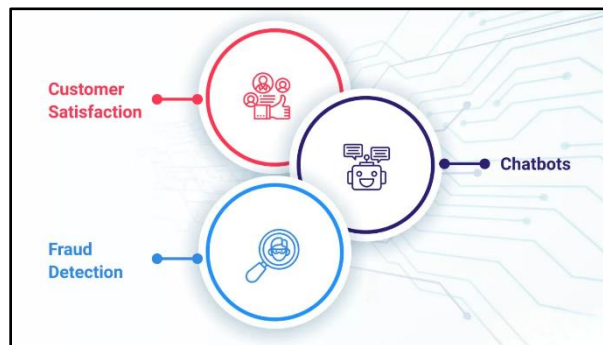


FIG 1: BENEFITS OF AI IN BANKING SECTOR

IMPACT ON ACTIVITY OF FINANCIAL SECTOR PARTICIPANTS

The appropriation of AI in fund is driven by the huge and developing accessibility of information inside money related administrations and the anticipated competitive advantage that AI/ML can give to budgetary administrations firms. The blast within the wealth of accessible information and analytics (huge information), coupled with more reasonable computing capacity (e.g. cloud computing) can be examined by ML models to distinguish signals and capture basic connections in data in a way that's past the capacity of people. The sending of AI/ML and enormous information by budgetary division companies is anticipated to progressively drive firms' competitive advantage, through both progressing the firms' productivity by diminishing costs, and improving the quality of money related administrations items requested by clients (US Treasury, 2020).

This figure looks at the potential affect that the utilize of AI and huge information may have in particular money related advertise exercises, counting resource administration and contributing, exchanging; loaning; and block chain applications in fund.

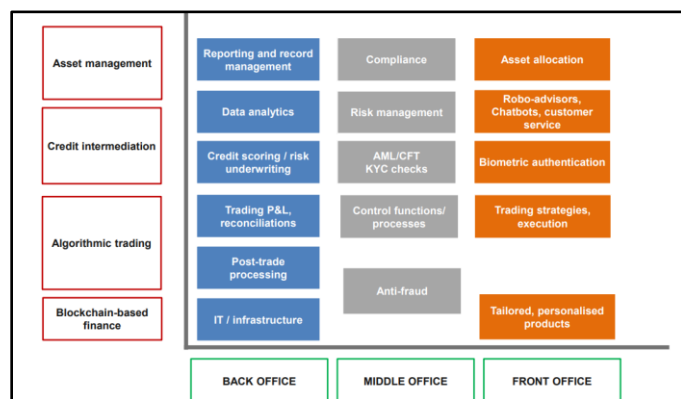


FIG 2: EXAMPLES OF AI APPLICATIONS IN SOME FINANCIAL MARKET ACTIVITIES

ALGORITHMIC TRADING

Algorithmic Exchanging (AT), too known as the Programmed Exchanging Framework, has been one of the greatest members within the worldwide capital markets.

AT follows back to the 1970s, when computerized money related frameworks have been actualized on American capital markets (Begum et al., 2012). Cartea et al (2015) portrays AT as applying budgetary rules to such an progressed framework, but at that point employments them for exchanging purposes. Right now, AT has put in put a complex AI calculation that's competent of acting inconceivably rapidly and is subsequently able of exchanging much speedier than people. HFT and machines account for 50-70 per cent of all exchanges on monetary markets and 60 per cent of prospects exchanges. Individuals more often than not anticipate that this figure will be indeed higher within the US and somewhat lower at nearly 40% in creating nations like India. These frameworks are important because they have the capacity to carry out exchanges at the leading conceivable cost.

In their nearness, a computer regularly includes a essentially diminished chance of making botches than a human being. In expansion, they have the potential to bargain with information loads at once and to track different markets at the same time. At long last, intercessions don't have an effect on exchange or are likely to play down undue choices (Kuroda, 2017). Ideally, in arrange to be able to utilize AT and HFT, it is fundamental to have the slightest potential timing contrasts and a tall degree of mechanization and solidification capacity inside the stock showcase. HTF exchange is made up of multinational exchanging companies spread over different treasury bonds, such as values, corporate bonds, ETFs, and prospects. Hedge funds, corporate managing an account educate and companies are all recognized for the utilize of the HTF.

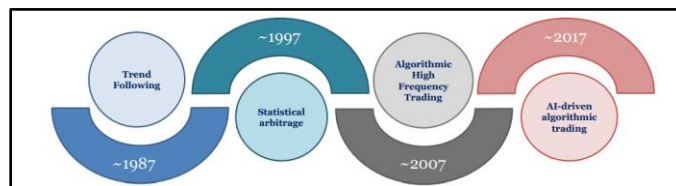


FIG 3: HISTORICAL EVOLUTION OF TRADING AND AI

The utilize of AI in exchanging has gone through distinctive stages of advancement and comparing complexity, including a layer to conventional algorithmic exchanging at each step of the method. First-generation calculations comprised of purchase or offer orders with straightforward parameters, taken after by calculations permitting for energetic estimating. Second-generation calculations conveyed procedures to break up expansive orders and decrease potential advertise affect, making a difference get way better costs (so-called 'execution algos'). Current methodologies based on profound neural networks are designed to supply the finest arrange arrangement and execution fashion that can minimize advertise affect (JPMorgan, 2019). Profound neural systems mirror the human brain through a set of calculations outlined to perceive designs, and are less subordinate on human mediation to operate and learn (IBM, 2020). The utilize of such procedures can be

advantageous for showcase creators in upgrading the administration of their stock and decrease the fetched of their adjust sheet. As the improvement of AI progresses, AI calculations advance into robotized, computer modified calculations that learn from the information input utilized and depend less on human mediation.

In hone, the more progressed shapes of AI nowadays are for the most part utilized to recognize signals from 'low educational value' occurrences in flow-based trading, which comprise of less self-evident occasions, harder to recognize and extricate esteem from. Instead of offer assistance with speed of execution, AI is really used to extricate flag from commotion in information and changes over this data into choice almost exchanges. Less progressed calculations are generally utilized for 'high enlightening events', which comprise of news of money related occasions that are more self-evident for all members to choose up and where execution speed is of the essence.

At present, AT and HFT stages are competent of doing commerce in milliseconds. For case, the charts underneath outline the tick-by-tick cost swings of E-mini-S&P 500 subsidiaries (ES) and SPDR S&P 500 ETFs at isolated time intervals. By zooming within the figures, a huge cost crevice between the two stocks is recognized. They see totally related at to begin with locate. The more one zooms within the charts, the higher the cost distinction for securities. In this situation alone, what shows up to be in a perfect world connected closes up being profitable from the point of view of greatly quick AT mechanical technology (Treleaven & Batrinca, 2017). Such spreads could appear thin, but algorithmic exchanging stages are competent of creating huge sums of such little ventures on an everyday premise, with the plausibility of making enormous benefits.

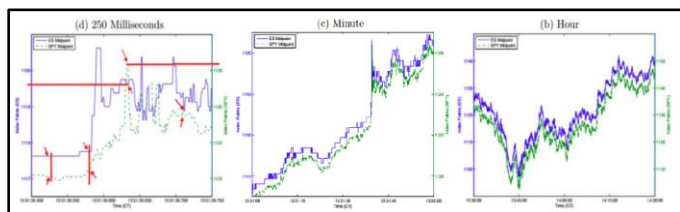


FIG 4: GRAPH DEMONSTRATING ALGORITHMIC TRADING AT DISTINCT TIME FREQUENCIES

FRAUD DETECTION AND COMPLIANCE

The cash related with compliance in most fund industry is generally tall to maintain a strategic distance from related punishments. For this reason, banks are now presenting AI innovation to form such exchanges more effective and solid. In expansion, McAfee reports that cyber-crimes right now taken a toll the monetary sector around \$600 billion every year, in spite of the fact that personality extortion has been the foremost predominant. A number of financial firms are as of now executing AI to distinguish extortion. Each one of them could be a MasterCard (Ahmed & Siddique, 2013).

The AI program, called "Decision Insights," employments

accessible information to recognize patterns in past MasterCard utilization in arrange to form a "default transaction," and after that MasterCard contrasts and scores any modern clients' exchanges versus their bland exchanges. Another deterrent to the distinguishing proof and requirement of extortion is to play down exchanges as well enthusiastically (Wilson & Daugherty, 2018). The Lance Methodology Consider (2015) demonstrated that inaccurately rejected exchanges constitute a major challenge for money related administrations.

CHATBOTS AND ROBOTIC ADVISORY SERVICES

A Chatbot is able of reacting to clients immediately and shows up to be able to supply 24-hour back 7 days a week, and 64 per cent of individuals are idealistic almost talking to a Chatbot since they are both more secure and more productive than talking to a individual. Such Chatbot systems are competent of overseeing the number of clients with a tall level of client bolster at a moo fetched. The Chatbot is centered on NLP and ML calculations planned to supply a customized discussion system (Lu et al., 2018). Robotic admonitory are calculations planned to distinguish the leading bundle for a client based on the client's chance inclinations and target. Right now, the benefits of utilizing Chatbots have made it an industry hone for budgetary educate with a wide client base, such as banks (Rouhiainen, 2018). Nowadays, the mechanical admonitory application, the Clerkie - combination of a chatbot with a mechanical counselling application that oversees the funds of all clients utilizing your smartphone (Donepudi, 2018b). Credits from distinctive banks can be utilized, and the AI motor is able to assess the income and consumption of clients in arrange to anticipate how much they ought to contribute and spare. This has the advantage of openness or rebuilding of administrative budgetary rebellious, cost effectiveness in which differentiated, low-priced asset allocations and behavioural inclinations are required.

As a result, automated admonitory applications would spare up to 4.4% of costs every year compared to ordinary monetary exhortation. Cyber Security Cyber security and information assurance are imperative since they diminish the chance of losing profitable and secret information, which is why AI is required to address this powerlessness. AI has interminable scope in numerous businesses and markets. Similarly, the requirement of a stricter arrange security conspire with the assistance of AI might moreover offer assistance businesses secure from cyber-attacks and distinguish more up to date infections (Horowitz et al., 2018). In expansion, these models can advance appropriate security hones as well as dodge botches, making them a no-brainer to execute in a assortment of instances. In any case, it is additionally critical to stay mindful that AI Advances chips seem have noxious code and adware designed for a assortment of reasons of political concern (Donepudi, 2015). As a result, the sending of AI has made it conceivable to utilize diverse shapes of biometric verification for indeed more secure get to (Donepudi, 2018a).

A few of these AI applications incorporate unique mark scanners, sensors and palm pictures, and facial discovery. Without indeed executing these operations in comparison to the original watchword, the cyber-criminals' jump has expanded impressively. All of this underlines the require for consistency and accuracy within the progression of AI until advancement is executed on basic web stages.

ACCOUNTING AND AUDITING

Bookkeeping and inspecting are encountering a radical move due to propels in information mining and AI. Closely reflecting on the Profound Move 2015 consider of the World Gathering, 816 senior IT and communications officials taken part within the Innovation Tipping Focuses and Social Impacts study. They declared that 75 per cent of members acknowledged that a 30 per cent turning point for AI trade reviews would be come to by 2025 (Abedin et al., 2012). One of the most excellent angles of AI is that it is extraordinary to coordinate patterns, making innovation available to a wide run of businesses and huge ventures (Kokina & Davenport, 2017). Particularly, the Profound Move consider focuses out that more laborers would before long be supplanted by computer calculations and mechanical technology.

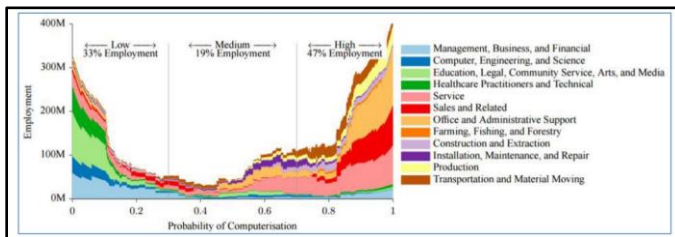


FIG 5: COMPUTERIZED OCCUPATIONAL DISTRIBUTION IN THE US

Reviewing is especially well suited to AI and commerce insights usage, because it has gotten to be exceptionally troublesome to consolidate expansive sums of both organized and unstructured information in arrange to pick up understanding of the budgetary and non-financial results of businesses. Moreover, as numerous of the reviewing exercises are organized and excess, the organization with AI will rearrange these operations. In more basic cases, AI may well be utilized to efficiently encode account inputs and to construct and improve extortion location components by creating an progressed ML code (Shabbir & Anwer, 2018). As distant as the review advertise is concerned, more advanced AI advances such as DL can be utilized to analyze both numerous information sources in arrange to compile reports or anticipate exact figures. The assortment of DL information that can be checked is exceptionally wide and can cover everything from social media messages, sound records, conference calls and emails. By presenting AI in bookkeeping and inspecting, exchanges can be checked more closely by permitting a more prominent volume of information to be reviewed.

ADOPTION OF AI IN FINANCIAL SECTOR

Pioneers and designers are right now confronting a

number of challenges in executing AI. App designers are battling to secure AI that's known to contribute and recognize utilization events. Leader's issues have moved from 'if' to 'how.' 'Pioneers are working to illuminate challenges in drawing in ability and settling societal resistance to AI. Monetary educate carry out a wide extend of operations, extending from collecting essential data to making educated choices or something else prompting approach creators. At display, money related structure conventions are intentionally outlined to use the collective mental capacity and comprehension of a number of people. Officials ought to be empowered to reorganize their forms in arrange to have full AI capability. Satisfactory arranging and approach are required to construct and keep up a energetic environment for AI to bolster the economy more broadly. The usage of digital technology may be a vital degree to guarantee that companies can compete effectively over distinctive businesses and areas.

AI is the essential set of approaches to be used for a particular trade case. Pioneers within the company ought to be mindful that the concentration of the workforce is expanding, not supplanting it. In expansion, the arrangement of information and expository culture is more critical than the AI capability. In case the discoveries and suggestions are not accomplished, not one or the other the prescient nor the clear instrument can be accomplished. ML requires you to advantage from the components of the accessible datasets. There appear to be a number of special cases at the staff level to assist all those included. The AI venture system will permit decision-making by administrators. In-house way of life new businesses can permit clients to create their possess methodologies to a complex challenge. At long last, budgetary teach must overhaul their IT working demonstrate in arrange to arrange for the unused standard.

Firms ought to create their innovation abilities, approaches and be more brilliantly around desires of their clients. The organization ought to center on cyber security some time recently it shows up to be critical. It is imperative for companies to ensure that they have sole rights to the abilities and capacities required to perform and win.

ARTIFICIAL INTELLIGENCE'S ROLE IN BANKING

The taking after may be a list of manufactured insights applications within the keeping money industry:

- **Personalized Fund Direction:** Manufactured insights in back makes a difference clients make fast and exact budgetary choices by presenting them with the foremost up-to-date advertise data. As a result, we will expect that AI can help clients with personalized monetary direction.
- **Advanced Wallets:** Advanced wallets have without a doubt pushed the digital money development to modern statures. Clients can purchase anything online by fair submitting their cellphone number or a one-time secret word (OTP), which may be a

interesting include of advanced wallets.

- Intelligently Voice Reaction Framework (IVRS): Clients are reached with an intelligently voice reaction framework (IVRS). The most reason of this application is to grant clients a extraordinary managing an account involvement by reacting to their inquiries accurately.

FUTURE OF ARTIFICIAL INTELLIGENCE IN BANKING & FINANCIAL INDUSTRIES

Advanced innovation is affecting nearly each industry, not fair changing businesses but too changing the way businesses work. Each industry is right now analyzing alternatives and actualizing procedures to succeed in this tech-driven world.

These days, each nation is moving ahead in terms of digitalization, and this can be the reason the number of clients is persistently developing within the managing an account sector. Now the address emerges is how the managing an account division can help increasingly clients without expanding workforce costs.

It is challenging for businesses to coordinate the one-of-a-kind requests of the clients. Clients nowadays have extremely high desires. These days, clients are carefully modern and anticipate businesses to supply them with a charming and comfortable client encounter, the same thing they moreover anticipate from the managing an account division.

To meet the desires of the customers, the managing an account division has extended its reach into retail, IT, and telecom areas to supply administrations like versatile managing an account, e-banking, and real-time cash exchange. These progressed highlights give clients to profit managing an account at their fingertips, but they come at a taken a toll to the keeping money industry.

The engagement of IT, telecom, and retail has expanded the likelihood of exchanging private data over virtual systems. In some cases, it causes cyber-attacks and extortion within the managing an account division. This kind of extortion not as it were influencing the bank in terms of stores but too influences the believe of the individuals.

Within the keeping money industry, the primary goal of counterfeit insights is to help consumers by prioritizing their choices. Fake Insights too makes a difference to guarantee that buyers are satisfied with the bank's administrations. AI or machine insights makes a difference the bank in understanding customer desires.

CONCLUSION

The most objective of this paper was to analyze the effect of AI on the digital society, especially within the budgetary division. It moreover looked for to portray the execution of AI, its limitations, its prospects and its effect on work and administrations. For this study, a record on the subjective audit of the method was utilized to accumulate data on the usage and effect of AI, as well as a proposition for the

appropriation of AI by the managing an account division. It is famous that the monetary segment may be exceptionally sharp to plan and embrace AI for speed, precision and execution. AI makes a noteworthy contribution to changing and changing the culture of work and effectiveness, and there's a gigantic potential. The new surge in AI-based applications points to be the biggest and most compelling innovative transition within the past.

Its general-purpose presence, which encourages the use of these newest technologies in numerous segments and occupations, independent of the sort of polished skill of representatives within the work environment, may be a source of far-reaching collective fear of work misfortunes and the misfortune of control over the lives of people. Each commerce can utilize AI innovation for money related and bookkeeping purposes. It is important for companies and society as an entire to memorize how to utilize and improve modern innovations. In arrange to remain competitive, firms will ought to consolidate AI, and labourers will ought to adjust their aptitudes in arrange to hold work.

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