Examining Artificial Intelligence in the Finance Industry

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Abstract: *Artificial Intelligence, which consists of algorithm language and machine learning, is a significant technological advancement. Automobiles, healthcare, gaming, robotics, finance, surveillance, entertainment, space exploration, agriculture, e-commerce, social media, and many others are among the many industries in which it is well-known. Its objective is to create an autonomous and intelligent system. With a concise introduction, our study examines the applications of artificial intelligence in the financial sectors. The study describes obstacles and their effects in the financial sector, including pros and cons. Additionally, the study elucidates the future ramifications of artificial intelligence on the financial sector while offering few recommendations.*

Keywords: Machine learning, Predictive analytics

I. INTRODUCTION

Background of Artificial Intelligence (AI):

In numerous domains, artificial intelligence is currently fashionable. Artificial Intelligence, which consists of algorithm language and machine learning, is a significant technological advancement. Artificial Intelligence can be defined as the capacity of machines to reason intelligently, i.e. determine the best course of action, typically with the intention of accomplishing a specific objective.
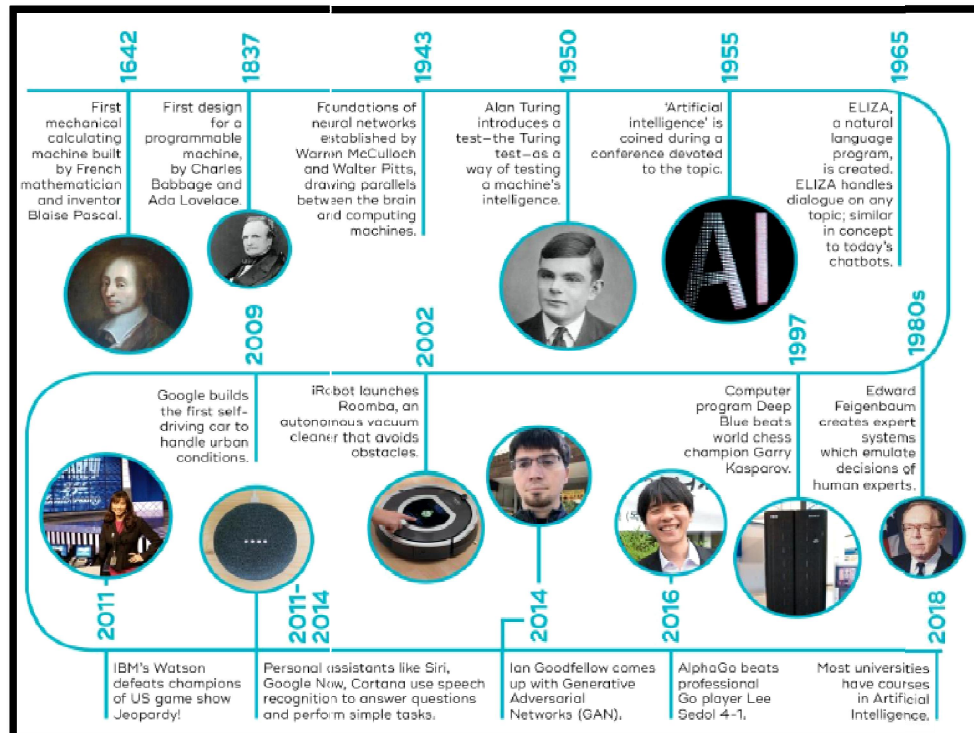
Definition: John McCarthy (1955) provided the definition of artificial intelligence as "the ability to program a machine to exhibit behaviors that would be considered intelligent if exhibited by a human." ML is a subfield of AL concerned with the construction of models, primarily statistical models that generate analytical outcomes. AI is of considerable importance in the finance sector when it comes to future forecasting, such as investments in the stock market. To optimize profits, investors employ a variety of investment analysis techniques and data mining techniques on vast quantities of stock data. Due to the fact that both market and non-market factors have a substantial impact on the stock market, machine learning is an integral component of the "black box" model prediction that improves market forecasting accuracy. In a similar vein, machine learning applications employ regression algorithms and time series models to address the performance measure issue by constructing a predictive model that has the potential to enhance the precision of financial data analysis and forecasting. A concise history of AI is provided below:

Objectives
- To examine, with a concise introduction, the applications of artificial intelligence in the financial sector.
- Examine the difficulties and effects of AI in the financial sector, including pros and cons.
- Conduct an analysis of the Future Prospectus of AI in India and provide suggestions

Scope:
The research investigates the application of artificial intelligence in various financial sectors, including banking, investment, insurance, and real estate.

Methodology:
The study is descriptive in nature and is founded upon secondary data. The information gathered from an assortment of journals, reports, and articles.

Limitations:
Further research could be conducted on a vast array of applications of artificial intelligence, including but not limited to the finance sector, automotive, healthcare, gaming, robotics, surveillance, entertainment, space exploration, agriculture, e-commerce, and social media.

II. REVIEW OF LITERATURE

The thesis "Artificial Intelligence in Finance: Understanding how automation and machine learning are transforming the financial industry" by Kunwar M. (2019) investigates the impact of artificial intelligence in the contemporary world, with a particular focus on the finance sector. The research findings indicate that as the value chain in financial services progresses, an increasing amount of technological capabilities will be present to facilitate tasks such as investing, analytics, and processing. Xie, M. (2019) authored Development of Artificial Intelligence and Effects on Financial System, which examined the application and progression of AI and machine learning within the financial system, in addition to their ramifications on macroeconomics and microeconomics. On the grounds that artificial intelligence has brought attention to financial risk management, a number of recommendations and strategies for the prudent application of AI in this domain were presented. "Artificial intelligence applications in corporate finance" was the topic of Wallon's (2019) thesis, which examined the current and near-term prospects of AI in the corporate finance sector. It presented a perspective on this topic by utilizing data gathered from scholarly articles, reports, and specialists, as well as an ongoing survey that incorporated both qualitative and quantitative analysis. It provides an impeccable perspective on the present state of situational analysis and the anticipated developments of artificial intelligence in the realm of corporate finance, specifically. According to the 2019 article "Artificial Intelligence, Finance, And the Law" by Tom C.W. Lin, an examination of these risks and limitations—the ways in which misunderstandings and artificial intelligence can hinder and harm society, finance, and the legal system—is presented. This article emphasizes the dangers and blunders associated with artificial intelligence in the financial sector, data bias, virtual threats, and systemic risks. Furthermore, it gives rise to more extensive concerns regarding the imminent ramifications of financial artificial intelligence on competition, society, and financial cyber security. The scholarly article "Artificial Intelligence In

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Finance" by Patel, K. (2018) investigates human cognitive processes. AI is also concerned with the representation of these processes through the use of devices. Currently, AI dominates numerous industries, including the financial sector.

Application of Artificial Intelligence in Finance

- Regulatory compliance – detection and prevention fraud: As the prevalence of e-commerce and online transactions continues to rise, so too does the likelihood of fraudulent activities. AI is predicated on an anti-fraud system that identifies, reports, and obstructs fraudulent transactions. Financial and banking institutions have Fraud Detection Software that employs machine learning algorithms to identify fraudulent transactions and reduce the number of false declines, as well as predictive analytics to identify patterns without the need for human analysts' knowledge.

- Prediction of Stock Market and Trading system: A number of complications may impede the trading system. By conducting a more rapid analysis of data, AI systems not only identify the root cause of failures but also provide the corresponding solution. A computer system has undergone training to predict optimal trading times for shares in order to minimize losses and maximize returns amidst periods of uncertainty. Its purpose is to assist investors, institutions, and companies in making prompt decisions.

- Increasing security: In artificial intelligence, machine learning algorithms require a fraction of a second to detect fraudulent transactions in real-time, not after the fact. Numerous organizations are attempting to integrate artificial intelligence into their operations in order to bolster the security of online transactions and associated services.

- Risk Management: Many organizations led to the subprime mortgage crisis due to a lack of risk management. Traditional software applications focused only on the selected loan application and financial reports. But new machine learning technology focused on every fact related to the current market trend to prevent financial crime and financial crisis prediction by its credit-scoring tasks in real life environment. It also helps to minimize underwriting risks. In the field of loan, health, mortgage, or life insurance, it can help handle every risk. It also fits perfectly with the underwriting tasks that are so common in finance and insurance.

- Credit Card and Loan Decisions: When credit card and loan decisions are made, AI evaluates the profile automatically, which significantly reduces the time and effort required and renders the entire process transparent and equitable.

- Protect Client by Spending Pattern Prediction: Currently, the entirety of the nation relies on online transactions. AI is beneficial for detecting client expenditure in the event that their card/mobile device is stolen or their account is compromised, thereby preventing fraud or larceny. It authenticates the user and enables the transaction to proceed.

- Personalized Banking: In banking, AI is crucial for completing all transactions online, including deposits and payments, so that customers do not have to hurry to the bank. In addition, manage the preponderance of client complaints and furnish clients with an effective self-service interface. In the consumer markets, AI-powered virtual assistants such as Alexa, Google Assistant, Echo, and others are already gaining ground. It provides genuine guidance to potential clients in order to ensure they obtain precise information and prompt resolutions to their issues.

- Process Automation: Process automation is essential for increasing efficiency and reducing operational expenses, as it completes its function in a matter of minutes. AI lessens the cost of repetitive tasks performed by humans by more than fifty percent. Process automation accurately interpreted documentation and identified issues requiring human intervention through the use of chatboxes, call center automation, workflow automation, and other similar services.

- Security to World financial data – Cyberattacks and Trojans, which are malware and viruses, are the greatest threats of the modern era. Securing the world's financial data with machine learning security solutions is possible due to the combination of big data capabilities and intelligent pattern analysis, which gives security technology an advantage over conventional and non-AI tools.

- Marketing: Additionally, AI demonstrates its importance in the finance sector by effortlessly generating predictive marketing analytics based on past behavior. It facilitates precise sales forecasting through the examination of consumer expectations. It is possible to effectively monitor web activity and analyze cell phone application usage in order to identify trends and patterns.

Challenges of Artificial Intelligence

As know AI is used in every field but have some challenges are there:

- Difficult to understand – The vernacular of machine learning is not simple to comprehend. It results in a certain degree of risk and optimizes the degree of governance. To reduce complexities, banks must provide users with a comprehensive understanding of the models and facts underlying them so they can avoid making poor business decisions.
- Based on data availability and quality - It is widely recognized that AI technology is founded upon massive amounts of data. Only when an adequate quantity and high-quality of data are published does it furnish dependable information. Prevalent sources are not immune to biases that may be concealed in the data. The reconciliation of data from beginning to end is already a challenge in the financial sector, and data references are frequently marred by quality concerns. A data-quality program is an essential requirement for the implementation of any artificial intelligence initiative on a large scale. Failure to do so results in perilous losses for the users.
- Responsibility – Another main challenge in AI is if something goes wrong who will be liable for responsibility and accountability. The fact that there is no explanation as to why the algorithm provided a positive or negative answer to a specific question can be disturbing for a banker's rational mind. So it becomes necessary to keep a human supervisor to validate the machine's decisions for critical activities such as releasing/blocking payments or validating trades, partially defeating the purpose of using a machine in the first place.
- Fast changing technology: In an era of accelerated technological advancement, it is imperative for every financial institution to transition abstract AI concepts from theory to practice in order to incorporate them into routine operations. Appropriate AI technology has the capability to mechanize manual processes that require significant human effort, provide the performance required to leverage cutting-edge technologies, integrate with operational systems, and be AI Reliability – For purposes of security AI reliability is contingent on the quality of its data and the extent of its control over the system. For a dependable system that can endure the measure of time, the method of measure Driven Development, which emphasizes verification and evaluation in order to develop the necessary algorithm, is essential. This approach is gradual but consistent.
- Lack of emotional intelligence: While AI demonstrates intelligence in identifying fraudulent activities and resolving specific problems, it is deficient in emotional intelligence. Chatboxes, for example, are intelligent but lack empathy. They execute the actions specified in the program's launch.
- Regulatory barriers – For financial services to function effectively within the highly regulated industry, transparency in AI is vital. A domain expert who can provide an explanation of the data's reasoning and primary context is required. The ability of machine learning models to articulate their reasoning will significantly assist in overcoming regulatory obstacles and gaining user acceptance.
- Tracking measure of success: AI forecasts, which are predicated on future prospects, cannot guarantee with absolute certainty whether an investment will generate a profit or a loss. It is difficult to monitor achievement indicators such as the positive impact ML has had on human behavior, cost reduction, and increased efficiency. The challenges faced by financial institutions will also evolve as AI advances.

Impact of Ai in Finance Sector

AI offers enormous advantages to a vast array of concerns. Each factor possesses both positive and negative consequences: Similarly, AI possesses the following:

IMPACT OF AI IN FINANCE SECTOR	
PROS	CONS
Efficient in handling a large volume of information	Complex in nature need high production and maintenance cost
More efficient in forecasting assist business relationship strong and do advisory work as well	High-end fintech technology is too costly so each organization could not afford the premium application of AI
Eliminate bias from metrics	Due to rapid technology changes many experts issue warnings about the dangerous nature of AI
Better informative charts and graphs help to make a safe decision	Lack of regulatory scrutiny may present a problem in the upcoming period
Provide 24/7 hours service as compare to human resources.	Possibility of misuse of data cause serious losses like delivered to wrong hand can cause serious threats to humankind.
Quickly perform the task related to finance like Insurance, Trading, accounting, etc. Financial users get transaction records online and offline which saves time, money, and effort.	Wide-reaching unemployment as replaces workforce with machines and computers. Also, block the human mind and increase dependency on the machine.
Fraud detection is a smart card-based system with the use of AI.	Lack of creativity mind

Future of AI in India with Some Recommendation
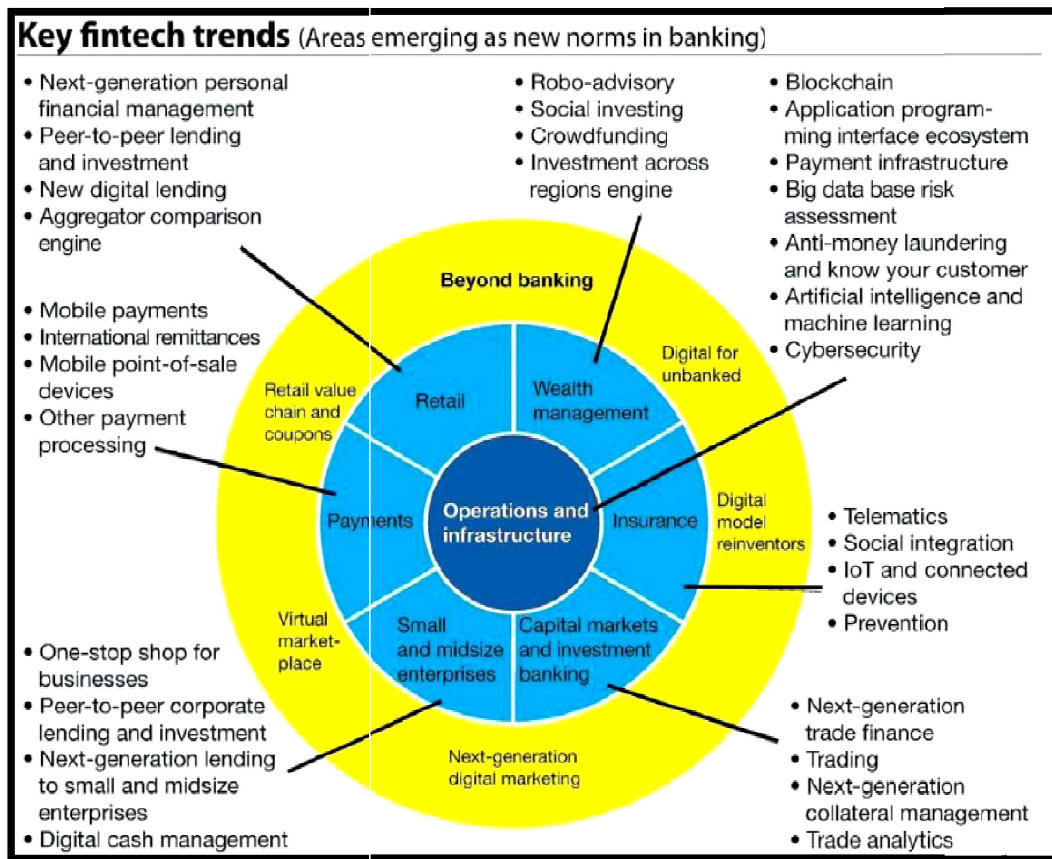
Source: Mckinsey

The world is currently transitioning towards artificial intelligence technology. Some tech titans, including Google, Amazon, and Flipkart, have implemented AI to develop predictive models of consumer behavior. In the realm of education, the majority of universities have provided a variety of AI-related courses. Bitcoin has achieved widespread recognition by implementing artificial intelligence in the financial sector through the provision of automated advisory services. Already dominant in the insurance industry, AI for big data that generates personalized recommendations has supplanted personal financial assistance. Massive investments are made by corporations, firms, and investors using AI data, which prevents human error and saves them money. The banking, financial services, and insurance (BFSI) sectors are rapidly embracing fintech solutions that are powered by artificial intelligence.

Given the rapidity with which the finance industry has embraced AL, it is indisputable that these progressive steps will soon supplant human resources and offer users fast and effective solutions; this is the future of the finance industry, as illustrated in the diagram below.

There exists the potential for a substantial surge in the adoption of artificial intelligence within the Indian economy by the year 2035. Recently, the United States and China have been at the forefront of adopting AI technology. While India is lagging behind in this regard, it does offer a positive outlook by creating job opportunities for around 2 lakh AI experts and others across various sectors including education, healthcare, retail, and more. Appropriate expertise is considered the most important determinant of success in technology adoption. The commencement of the start-up initiative in 2018 coincided with a period of significant financial sector expansion. More than 400 enterprises have emerged recently specializing in AI and machine learning. Numerous Indian startup hubs, including Bangalore, Hyderabad, Mumbai, and New Delhi, are developing AI and providing superior customer service. One million dollars of the sum is spent by private industry participants in AI. The NITI Aayog established the strategic framework for the advancement of artificial intelligence in India in June 2018. There is a belief that Artificial Intelligence could contribute to the economic and social development of the nation. AI will soon be applied to traffic issues, road maintenance, tracking blacklisted individuals, biometrics, and more. LG companies announced in a report dated 17 May 2021 that they will invest over $100 million over the next three years to construct a vast high-performance computational infrastructure for the development of artificial intelligence. LG has developed a cutting-edge computing infrastructure capable of executing 95.7 quadrillion calculations every second. They anticipate AI systems to be beneficial in every aspect of production development and customer service. Additionally, they intend to apply AI solutions to the creation of vaccines for cancer treatment and eco-friendly plastics.

More than 32% of financial services providers, according to joint research by the National Business Research Institute and Narrative Science, employ AI technologies for voice recognition, government finance, audit, predictive analytics, and other purposes. The following are some industrialist experts' perspectives on AI:

According to payments platform CEO Rajeev Agarwal, artificial intelligence (AI) is still in its nascent phases of development and will necessitate a robust digital infrastructure, dependable data, and a proficient labor force in order to completely harness the potential of the technology. Likewise, cofounder and CTO of Shubh Loans Rahul Sekar stated, "In an environment characterized by rapid change, policies and procedures must be adaptable and customized to consumer attributes. "Without AI, it is impossible to deliver the next-generation customer experience,"

Both Manish Patel, cofounder of Mswipe, and Gaurav Chopra, Founder & CEO of India Lends, concur that Artificial Intelligence (AI) has the capacity to revolutionize the financial services industry by increasing its precision and effectiveness. AI can also emerge as a substantial factor in the future expansion of the Fintech sector.

II. RECOMMENDATIONS

AI is utilized in every industry and has the potential to reduce human employment opportunities; therefore, AI deep learning is required. The business will attain substantial success through the collaborative efforts of both its human and mechanical personnel.

Artificial intelligence must be implemented in sectors that demand experienced administrators.

Artificial intelligence necessitates particular skills; therefore, pupils must acquire exceptional instruction in machine learning and algorithm programming languages. It is imperative that universities and institutions support such courses.

Government assistance to promote AI so that we do not lag behind other nations technologically

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498

III. CONCLUSION

Professionals anticipated that AI would soon be an integral element of human existence. It fundamentally alters our perception of the world. It resolves numerous issues within minutes. There is a chance that AI will diminish human necessities; therefore, we must maintain equilibrium by adapting to the changes. It is essential to remember that while we created machines, they did not create us. We derive benefits from its appropriate application.

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499