The rising tide of Artificial Intelligence in Finance

Shivam Singla

R&D, Informatica Business Solutions Pvt. Ltd. ,Bangalore, India

ABSTRACT: Artificial intelligence is revolutionising the global service economy by building smart and intelligent machines to accomplish jobs that would otherwise require human intelligence. It now controls a wide range of industries, including the Finance sector.

KEYWORDS: Artificial intelligence, Finance, Machine learning

I. INTRODUCTION

Artificial Intelligence (AI) is burgeoning popularity in today's industry. Artificial Intelligence adoption in the economy has accelerated dramatically during the previous decade[2]. The Finance Sector is one of the productions where Artificial Intelligence has been extensively used. Since the 1980s and 1990s, numerous aspects of AI's impact on financial markets have been explored and published in documents and other publications (e.g.,[3]). Today's AI-powered robot-advisers are intended to provide automated, algorithm-based financial planning services with little or no human intervention. Financial institutions, too, use artificial intelligence in a variety of novel ways. Furthermore, according to one of the studies, the economies of 20 countries will have doubled by 2035, and productivity will be at an all-time high[1].

II. AI IN TODAY'S FINANCE MARKET

According to Mordor Intelligence [4,8], AI in fintech had a market value of $7.91 billion in and is anticipated to increase at a CAGR of 23.17 percent to $26.67 billion by 2026. According to Mani Nagasundaram, head of solutions for global finance services at HCL Technologies, COVID-19 has triggered banks and monetary establishments to reply to customers at an excellent quicker and across the clock[5]. Artificial intelligence may free up staff, increase security, and ensure that a company moves in the proper technologically sophisticated, innovative direction[6]. According to Forbes, 70% of financial companies use machine learning to predict cash flow, update credit ratings and detect fraud [7]. Further advancements in automated trading techniques and algorithms, as well as smarter fraud prevention, better risk management, faster customer service such as chatbot and agent call routing, and relatively new applications for stronger ongoing compliance with financial regulations, as well as industry is expected to contribute to Expected growth [8].

III. USES OF AI IN FINANCE

1) Financial Management

In Lieu of months, quarters or year delays, AI can extract real-time data and log credentials for a day or a few minutes. This is a huge win for a vulnerable society that is undergoing dynamic change as a result of pandemics and rapid advances in technology[9]. Studies of more than 500 case studies show that AI often spans an organization's entire value chain, improving business processes, making them more efficient and cheaper, and making enterprises more responsive [10].

2) Fraud Detection

Online fraud is very prevalent, as e-commerce is becoming more popular and virtually impossible to prevent. Currently, the damage caused by fraudulent transactions in the United States is 13 times the actual amount of fraudulent transactions. Artificial Intelligence is now useful. Machine algorithms may now detect fraudulent transactions without the knowledge of human analysts by evaluating data points, ameliorating the accuracy of real-time approvals and reduce false rejections. Many businesses are currently investigating AI-based fraud prevention. MasterCard's recently released Decision Intelligence Technology is one such example[1].

3) Financial Technology

As the platform on which commerce is conducted, the financial system serves as the industry's backbone. The emergence of fintech firms

is altering the financial environment, as companies use new technologies to provide a variety of financial services [11]. The vast majority of FinTech breakthroughs benefit entrepreneurs, financial clients, and society. FinTech applications have distinct benefits and determinants depending on the financial sector[12]. The growth of several fintech firms and neobanks could be attributed to the millennial generation's high education, technological awareness, and scepticism of large corporations[13].Customers` reviews concerning Robo-advisors, collectively with subjective interpersonal norms and mass media, are the number one elements of acceptance, in line with a studies of consumer adoption withinside the US, UK and Portugal. Users with a better stage of acquaintance with robots are marginally extra motivated with the aid of using perceived application and attitude, even as customers with a lesser stage of familiarity are lots extra motivated with the aid of using subjective norms[14]. According to a survey performed in India, wealth tech companies withinside the us of a nevertheless want to elevate investor awareness, train them, and set up trust[15]. Since social marketers were slower to just accept technological developments, fintech corporations are step by step transferring the enterprise consciousness from social innovations (like microfinance) to technological breakthroughs[16,9].

4) Financial price setting and advisory services

Financial advice and pricing is another important area where programs are progressively being used. The current advancement of programs from rules-based to machine learning has increased the autonomy of computer-based pricing. When gas stations experience constant price fluctuations, online marketplaces such as Amazon, Barnes ,eBay and Noble lock prices (eg., [19]). [20] conducted an empirical study to investigate whether AI pricing algorithms from different companies could collate "autonomously" even if they did not interact. An antitrust policy, which can only be legally opposed to explicit collusion, would be effectively violated by this collusion. Machine learning methods of pricing create highly complex probabilistic dynamic systems whose analytics seem beyond our existing capabilities [9].

5) Banking Sector

In banking, AI has become the weapon of choice in the fight to not only reinvent transactions, but also to mine and provide ever-growing amounts of data [17]. According to [18], AI is also being used in investment banking and related services (eg stock forecasting and credit ratings) without customer intervention, but AI intervention in commercial banks

is still limited in important functions such as lending, deposit management and payment processing. Voice banking , Smart wallets, underwriting, personalized banking, data-driven artificial intelligence applications for credit selection, customer support and other services have all benefited the banking business. Figure 1 shows how key branches of the banking industry are using AI. Additionally, by 2022, AI is projected to have the largest impact on the banking and financial sectors. It will almost certainly have a positive impact on competitiveness as well. The same is true in Figure 2[1].
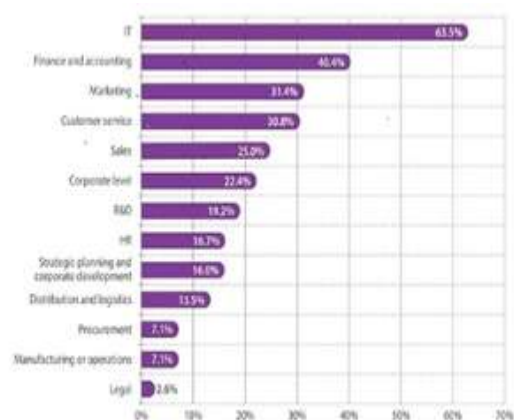

Fig.1. Proportion of companies using AI today in each business service
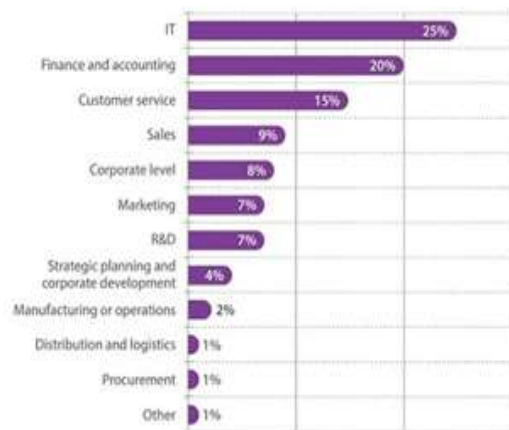

Fig.2. By 2022, Business Services where AI will have the greatest advantageous impact on competitiveness

6) Increasing security

Many companies are experimenting with to integrate artificial intelligence to enhance the security of online transactions and related services. This is achievable if you have a computer gateway that can reliably predict unauthorized access. [1].

7) Spending Pattern Prediction

`   Many organizations and financial services are using AI to determine customer spending. This is useful to prevent fraud or theft if card is stolen or account is hacked[1].

8) Stock Broker system

        Computer systems were taught to predict when to buy or sell stocks in order to maximize profits and minimize losses during uncertainty and collapse [1].

IV.   METHADOLOGY

        Various researchers suggest that different AI strategies are important. Figure 3 provides a summary of complex method systems and their usages in the various financial sectors covered in the literature reviewed in this article. An article [21] discusses the importance of neural networks, deep learning and machine learning in various financial applications.Another study [22] looks at how machine learning can assist in detecting credit card fraud. This shows that there are four popular fraud detection approaches. Although machine learning can be used to refine rules by deriving them directly from information, how other AI methodologies can be used to solve the identical problems is shown by table 1.
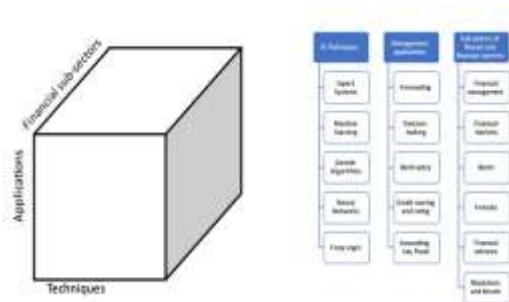

Fig.3. Three persuasions of AI techniques applied to finance

Method	Description
Decision Tree/Expert systems	Knowledge-based systems are based on human-readable symbolic representations of knowledge (KBS). In the field of fraud detection, expert systems are the most well-known artificial intelligence technologies. Decision trees(DT), case-based reasoning (CBR) and Rules are examples of symbolic methods of AI
	(CBR).
Supervised neural networks	Helps in Creating a model by deliberating a function of training data input and associated output. This methodology is exercised to categorise classes (genuine, fraud). In fraud detection, supervised neural networks and variants are widely employed.
Bayesian network	Helps in Creating a probabilistic model by surmising conditional dependencies from data.
Evolutionary techniques	Used as a search strategy to obtain the optimal collection of functions that can segregate fraud by applying a catechistic approach that satirizes the elements of biological natural selection. This encompasses artificial immune system (AIS) models that are stimulated by aspects of the biological immune system.

Table 1. Four most common used methods for Payment card fraud detection ontology [22]

        We decided to focus on the strategies that appear most frequently in 191 newspapers. Most of the procedures listed in Table 1 are covered[9].

V.   CONCLUSION

        Artificial intelligence, particularly in the financial sector, has become a recognised subject with technical manuals outlining economic rules and their impact in the economic literature. The post-financial-crisis economic growth restrictions, as well as recent pandemic outbreaks, have posed significant obstacles for AI technologies. Recent survey results have raised hopes for increased efficiency, management services, risk reduction and answers to certain unsolved questions about negative repercussions on long-term growth and economic well-being.

VI.   FUTURE OF AI IN FINANCE

        It's no reverence that artificial intelligence has been the focus of attention in the financial sector,

especially since COVID 19 changed contact with humans. AI has a significant influence, with experts predicting that it would save the banking industry $1 trillion by 2030 by streamlining, connecting activities and processing data and information significantly faster than humans. According to [23], "artificial intelligence technologies are becoming increasingly important to the environment we live in, and banks must implement these technologies at scale to be relevant". A comprehensive transformation circumscribing various layers of the organisation is required for success[6].

REFERENCES

[1]   Artificial Intelligence in Finance, IJSART - Volume 4 Issue 4 – APRIL 2018 ,ISSN [ONLINE]: 2395-1052 J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[2]   Agrawal et al., 2019; Furman and Seamans, 2019; Brynjolfsson et al., 2021

[3]   Pau, 1986, Shap, 1987, Pau and Tan, 1996

[4]   Artificial Intelligence in Finance,Leon Yen,2021

[5]   https://artificialintelligence-news.com/2020/12/15/from-experimentation-to-implementation-how-ai-is-proving-its-worth-in-financial-service

[6]   https://onlinedegrees.sandiego.edu/artificial-intelligence-finance/#:~:text=Artificial%20intelligence%20can%20free%20up,credit%20scores%20and%20detect%20fraud

[7]   https://www.forbes.com//sites/louiscolumbus/2020/10/31/the-state-of-ai-adoption-in-financial-service/?sh=926cb532aac9

[8]   https://www.datamation.com/artificial-intelligence/artificial-intelligence-in-finance/

[9]   Artificial intelligence methadologies in finance and financial markets: A survey of the literature,Carlo Milana, **Article** in Strategic Change · May 2021

[10] Influence of Artificial Intelligence (AI) on Firm Performance: The Business Value of AI-based Transformation Projects,Wamba-Taguimdje et al., 2020

[11] FinTech evolution: Strategic value management issues in a fast changing industry,Ashta & Biot-Paquerot, 2018

[12] Fundamental analysis and technical analysis integrated system for stock filtration,Hua et al., 2019

[13] Principles of econometrics, Hill, 2018

[14] Artificial Intelligence in FinTech: understanding robo-advisors adoption among customers, Belanche et al., 201

[15] Artificial intelligence and machine learning in finance: Identifying foundations, themes, and research clusters from bibliometric analysis, john W. Goodell, Volume 32, December 2021, 100577

[16] FinTech evolution: Strategic value management issues in a fast changing industry,Ashta, 2018

[17] Artificial Intelligence : The Weaponof choice in banks' fight for survival, Padmaavathy, 2018

[18] Applications of Artificial Intelligence in commercial banks – A research agenda for behavioral finance, Elsevier, Königstorfer et al. (2020)

[19] Performance Studies Floating Free of Theatre. Richard Schechner and the Rise of an Open Interdisciplinary Field,Schechner, 2017

[20] Innovation management techniques and development degree of innovation process in service organizations,alvano et al. (2020)

[21] Fintech Risk Management: A Research Challenge for Artificial Intelligence in Finance, Front. Artif. Intell., 27 November 2018

[22] How Artificial Intelligence and machine learning research impacts payment card fraud detection: A survey and industry benchmark,Ryman-Tubb et al., 2018

[23] McKinsey & Company, https://www.mckinsey.com/industries/financial-services/our-insights/ai-bank-of-the-future-can-banks-meet-the-ai-challenge