

WILL ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING REPLACE HUMANS IN FINANCE?

Abstract

This study looks at how machine learning and artificial intelligence can be used in today's financial sector, as well as what new trends and difficulties are emerging. The big debate in today's society is whether or not artificial intelligence can replace financial services. In this study, we looked at how machine learning and artificial intelligence can aid in the financial market, and the manner in which machine learning can provide us with reliable predictions. Machine learning and artificial intelligence are the future of finance. It will help the organizations to boost the profitability by reducing the cost by using AI and Machine learning.

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I. INTRODUCTION

AI and machine learning are not new to anyone. As we all know, the application of artificial intelligence and machine learning is growing by the day. Let us look at CHATGPT as an example. People use CHATGPT for simple questions, and CHATGPT can address people's difficulties by providing a proper description.

Machine learning and artificial intelligence are becoming increasingly significant in financial services. Many financial service applications rely on artificial intelligence and machine learning. Financial services, banking, and insurance are three of the most important industries benefiting from machine learning and artificial intelligence. Machine learning techniques assist individuals in comprehending enormous amounts of data and identifying essential patterns within them. This data is then utilized to improve company processes, make more educated decisions, and aid in prediction jobs. It is used by financial services firms to improve pricing, reduce risks caused by human error, automate repetitive processes, and better understand client behavior.

There are three divisions within the chapter: The paper's first section explored the advantages of machine learning and artificial intelligence in finance as well as the newest advances in this field. The second section of the paper covered the challenges of using machine learning and artificial intelligence in the finance sector as well as the limitations of artificial intelligence. The final section of the study answers the question, "Will artificial intelligence replace finance people?" What will the future of finance look like with machine learning and artificial intelligence?

Literature review is being done to understand the topic in depth. The review is as follows:

1. The first edition was published on December 15, 2020, and the second version was published on January 24, 2023. Daniel Hoang and Kevin Wiegratz conducted research on the latest applications and prospects of machine learning technologies in finance. They gave study on two categories of machine learning which are supervised and supervised learning they also has givenhis sample of finance research papers that apply machine learning. The overall study is based on the applications machine learning in finance.
2. A study on emerging new advancements and challenges in machine learning in finance was undertaken by Jaydip Sen, Rajdeep Sen, and Abhishek Dutta. They have gave study on different applications of machine learning in finance and how these applications are useful in finance, they also gave study on how these applications are able to reduce the risk in financial market and new challenges in financial modelling. The overall study is based on how the machine learning and artificial intelligence are creating their place in financial services.
3. Saqib Aziz, Michael Dowling, Helmi Hammami and Anke Piepenbrink published a research paper on machine learning finance – A topic modelling approach. This study is based on the topic modelling approach with different topics, they have explained 14 different topic modelling approaches through diagram for example, Topic modeling through Latent Dirichlet Allocation. The main of this paper is actual mapping of the machine learning in finance literature.
4. John W. Goodell, Satish Kumar, Debidutta Pattnaik, Weng Marc Lim, focused on identifying foundations, themes, and research clusters from bibliometric analysis. By

using co-citation and bibliometric-coupling analyses they have inferred the knowledge and thematic structure of AI and ML research in finance for 1986–April 2021.

5. Yoser Godhoum has a research paper on Artificial intelligence Trends and Ethics: Issues and alternatives for Investors according to this research paper the structure of the financial system should be structured in a way that it is easy to adopt the new trends of the artificial intelligence. They have talked about the positive and negative impact of artificial intelligence on the financial sector. They also gave what ethical issues we have to face because of the artificial intelligence.

II. EMERGING TRENDS IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN FINANCE DOMAIN

The AI and Machine Learning are transforming the financial industry across the board. Financial industries may manage massive amounts of data by utilising various applications. There are several apps used by the financial sector, including the following:

1. **Fraud Detection:** Fraud detection is an essential application in the financial sector, and it is typically employed by banks. The banking sector can utilise machine learning algorithms to detect fraud in any financial organisation. Natural Language Processing is an application that can assess the financial language used in various papers. This programme helps us to reduce fraud activities. And as a result of these apps, financial companies' security and privacy have improved.
2. **Managing Risks:** Risk management can be described as the predetermination of the uncertainties that are involved in the specific work. For example, if a trader wants to buy the shares of a specific firm, he must first determine where that company stands in the market so that he can invest his money in specific shares. Artificial intelligence improves accuracy and predictability, allowing financial firms to reduce risk. According on previous data, artificial intelligence can help forecast the future and reduce risk.
3. **Prediction of Credit Risk:** Credit risk is the most significant risk for financial institutions. For giving loans, financial institutions must search for the customer's history as a result banks and other financial institutions can lend funds to their needy customers. Machine learning and artificial intelligence can assist financial institutions in reducing credit risk by analysing historical data, identifying patterns, and predicting the likelihood of defaults using algorithms such as credit plus developed by Decimal Point Analytics. They can improve their loan approval process by adopting these models.
4. **Market News in Real Time:** Financial institutions or traders must be kept up to date in order to make sound financial decisions. They must be kept up to speed with daily news, social media posts, and other applications that provide current market information. Artificial intelligence can assist people in managing large amounts of data and in obtaining reliable market information. Eco pulse, for example. It is your go-to source for macroeconomic statistics, treasury auctions, and significant central bank speeches from around the world.
5. **Strategic Portfolio Management Involves:** Machine learning and artificial intelligence are playing key roles in strategic portfolio management in the financial services business.

Machine learning and artificial intelligence assist the investor or trader in analysing massive amounts of data and making decisions based on that data. It also assists traders in spotting market trends, correlations, and potential threats, allowing financial professionals to better allocate assets, diversify, and manage risks. Artificial intelligence and machine learning assist investors in improving their portfolios.

6. **Algorithmic Trading:** Algorithm trading is the execution of stock trading in one or more phases of the trading process. The algorithmic trading method is based on studying previous data and estimating the future value of equities. It also does real-time fundamental analysis and high-volume trading decisions.
7. **Stock Market Forecasting:** Predicting the future price of stocks on the stock market. Algorithmic trading and high frequency trading are two methods of trading that use machine learning technologies. In algorithmic trading, tools such as regression, classifier, and support vector machine assist the institution in predicting the future of a specific asset. Stock market forecasting can be accomplished using both short- and long-term memory methods.
8. **Robo Counsellor:** A virtual financial counsellor created by artificial intelligence is known as a Robo advisor. It is a programme that assists investors in making investing decisions. Robo advisors provide financial and investing advice to their clients while also assisting them with risk management. Because there is no human intervention, there is less chance of error. There are benefits and drawbacks to using a Robo adviser; nonetheless, users must exercise caution while hiring a Robo advisor.
9. **Sustainable Investing:** Investors can evaluate a company's sustainability and ethical performance more precisely and effectively with the help of artificial intelligence algorithms. By using artificial intelligence-driven ESG analysis, you may gain a deeper understanding of a company's performance and make investing decisions that are consistent with your values.

III. BENEFITS OF MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE IN FINANCIAL SERVICES

Artificial intelligence and machine learning have a significant impact on the financial services industry and are transforming how those industries operate. Artificial intelligence and machine learning are advantageous to the financial services sector as well as to consumers. Forbes estimates that 54% of financial service organisations use artificial intelligence in their operations. Consider Capital One. Financial institutions have new chances thanks to artificial intelligence, which also helps them make more money. Artificial intelligence and machine learning have numerous advantages for the financial sector, including the following;

1. **Automation:** Artificial intelligence enables automation, which boosts productivity and lowers operating expenses for businesses. According to data, artificial intelligence enables organisations to reduce operation costs by up to 70%, which aids in cost-cutting. Automation speeds up business operations; formerly, manual labour-intensive financial services required a lot of time.

2. **Chatbots:** Chatbots are being used by the banking industry to simulate actual staff using artificial intelligence. Omni channel messaging, audio assistance, live client chat, and more client engagement are provided. Because chatbots are powered by artificial intelligence, they draw on historical data from the past and base their responses on previous interactions with customers. Additionally, this technology has the capacity to reduce errors.
3. **Personalized Banking:** Chatbots powered by artificial intelligence are being used by personalised banking to cut the expense of call centres. In addition, personalised banking offers consumers a personal financial advisor who helps them reach their financial objectives by keeping tabs on their regular costs, earnings, and spending patterns. Customers can access a personalised banking app from Bank of America, Chase, and Wells Fargo.
4. **Minimize Human Errors:** In a financial institution; human mistake is not an option because it might have a negative impact on the company's bottom line. Machine learning can assist the organisation in processing data accurately and eliminating human error.
5. **Free of Bias:** Humans are prone to passing judgement or thinking in accordance with their perceptions while making decisions, and as every person's view is unique, this has an impact on the decision-making process. Machine learning is more reasonable in data selection and decision-making in the banking business since precise conclusions are crucial for the organisation and should be free from prejudice. Organisations are able to make transparent, non-biased judgements with the use of machine learning.
6. **Derivative Pricing:** The prices of derivatives are now based on many assumptions and expectations that aren't applicable in the real world when utilising the old technique. Artificial intelligence offers quick and precise methods for pricing derivatives that accurately assess the strike price, maturity period, and option time. With the use of hedging technologies, artificial intelligence and machine learning enable the financial institution to issue derivatives with little risk and motivate investors to increase their investments.
7. **Loan and Insurance Underwritings:** When we apply for a loan or an insurance policy, we must sign a series of forms. Before making a loan, underwriting determines the risk connected with the person. Underwriting insurance businesses must obtain data from third parties and assess the data, which takes a long time. Firms can use abstractive summarization and transformers to convert unstructured data into structured data with the help of artificial intelligence. There are numerous things that we can automate using NLP and NLU that take less time than manual processes.
8. **Real Estate Flipping :** Real estate flipping is the practise of purchasing properties and reselling them for a profit. Artificial intelligence can help you identify and finance the correct property. Artificial intelligence may assist you in finding the greatest deals, forecasting market trends, and even assisting in property maintenance, as well as making more educated decisions regarding your real estate investment.

IV. CHALLENGES

- 1. Data Privacy and Security:** Because the financial sector deals with extremely sensitive client information, protecting it from breaches or unauthorised access is critical. The artificial intelligence system is heavily reliant on data. To preserve confidence and protect consumer confidentiality, the institution must implement comprehensive security measures while adhering to strict privacy regulations.
- 2. AI Algorithm Transparency and Interpretability:** As AI systems become more complicated, comprehending how they arrived at decisions becomes increasingly challenging. This lack of transparency raises concerns about their accountability and potential biases. Financial institutions must invest in explainable AI and create techniques for providing clear rationale for AI decisions.
- 3. Finding the Correct Balance between Automation and Human Oversight:** While artificial intelligence and machine learning can automate many jobs, relying entirely on them might introduce new risks for financial institutions. Human supervision is required to monitor and validate the outcomes.
- 4. Algorithmic Fairness:** The financial institution or financial sector makes sure that its AI system doesn't act unfairly against people on the basis of factors like ethnicity, gender, or socioeconomic background. Financial institutions must carefully examine and eliminate any biases that may be present in the data used to train artificial intelligence algorithms, as well as monitor and assess the results of these systems, in order to assure equity.
- 5. Avoiding Unethical Consideration:** Avoiding unethical consideration is an ethical challenge for artificial intelligence systems. As artificial intelligence becomes increasingly common in banking, there is a risk that a few dominating actors would amass tremendous power and influence. Financial institutions should strive for a competitive environment that fosters innovation and allows all participants equal access.

V. LIMITATIONS

Lack of common sense: The Artificial Intelligence system lacks the ability to apply common sense to new and varied situations. They can only forecast and make decisions based on the data they have been trained on, limiting their ability to adapt their expertise to new scenarios. This lack of common sense can make Artificial Intelligence systems prone to error, especially when dealing with novel situations.

- 1. Perpetuate and Magnify Biases:** Artificial intelligence systems can perpetuate and even amplify biases introduced in data by a variety of techniques such as human mistake, sample bias, or social and historical factors.
- 2. Lack of Human Intellect:** While artificial intelligence excels at well-defined tasks with enormous amounts of data, it falls short of human intelligence's flawless understanding and adaptability. Currently, AI systems struggle with context understanding and abstract thinking, which are crucial to human cognition. Despite the fact that artificial intelligence can process large amounts of data, it frequently falls short when confronted with

ambiguity, creativity, and complex decision making. Rather than replacing humans, artificial intelligence's true potential lies in enhancing human capabilities and fostering symbolic partnership through automation of repetitive tasks and data analysis.

- 3. Data Scarcity Problem:** The data starvation problem refers to artificial intelligence's reliance on enormous amounts of data. Training AI models necessitates a large amount of data, which can be costly, time intensive, and limiting in some applications. Developing strong AI systems with restricted data availability continues to be a key problem, particularly in specialised fields where labelled data is scarce.

VI. WILL ARTIFICIAL INTELLIGENCE REPLACE HUMANS IN FINANCE?

This is a thought-provoking question as AI has made significant strides in recent years. Thanks to breakthroughs in machine learning natural language processing and computer vision. Artificial intelligence (AI) is becoming increasingly capable of performing complex tasks leading some to believe that they eventually outperform humans in various domains, however it is important to know that artificial intelligence is far from achieving true general intelligence and its current capabilities are largely focused on specific tasks with advancements in machine learning algorithms. Artificial intelligence has excelled in areas such as image and speech recognition, natural language understanding and data analysis. Artificial intelligence still struggles with certain complex tests that humans excel at. Artificial intelligence systems often lack contextual understanding, common sense reasoning and the ability to handle unpredictable situations while they can process vast amounts of data and make predictions based on patterns.

Although you won't necessarily find yourself competing against robots in the job market, artificial intelligence will play a significant role in the lives of finance professionals in the years to come. Instead, these professionals must find a way to survive in a world of rapidly evolving technology. The finance professional has to adapt to new skills like how to use different AI-driven tools. Artificial intelligence won't replace humans in finance since finance is a very large complex industry with many parts and pieces. Some jobs in the finance profession will be taken over by artificial intelligence such as accounting clerks and bookkeepers, financial analysts, loan officers, stock traders, customer service representatives but these jobs cannot be completely replaced by artificial intelligence. Artificial intelligence cannot completely replace human empathy, judgements, creative thinking, strategic planning and relationship building. By doing some things or adopting some skills humans will not be replaced by artificial intelligence such as developing skills that cannot be easily automated, by staying up to date with technology, by building relationships.

If working in finance meant only crunching numbers, then perhaps technology will replace you. But it is not at all the case. You offer much more to the table than that. JUSTICE PAUL MCDONALD

VII. FUTURE OF FINANCE WITH ARTIFICIAL INTELLIGENCE

With today's rapid technological advancements, Artificial Intelligence has emerged as a strong weapon in our quest for vision by processing enormous amounts of data, recognising patterns, and learning from historical trends. AI systems are increasingly being utilised to

forecast outcomes in a variety of fields. We will develop systems and robots that are smarter than ourselves, and by 2045, computers will have the same level of intelligence as humans. This stage in evolution is referred to by some scientists as the Singularity. Big data computer programmes or artificial intelligence can analyse enormous amounts of data, identify trends, and utilise the knowledge to develop answers to the world's most pressing problems such as hunger, sickness, climate change, and overpopulation. Staying ahead of competitors is critical in the fast-paced world of banking. From the initial days of online banking to the rise of algorithmic trading, we have witnessed incredible technological advancements throughout the years. However, artificial intelligence is sweeping the finance business. Transforming the way transactions are carried out, investments are managed, and risks are assessed.

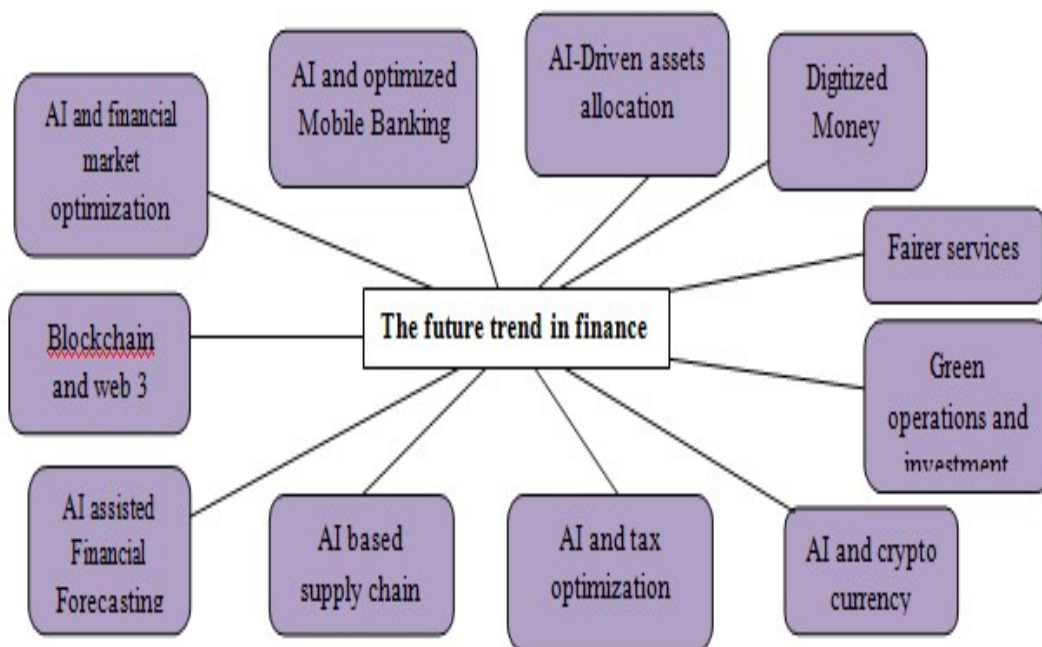


Figure1: The Future Trend in Finance Sector
(Source- Compiled by Authors)

There will be no formal phrases like bookkeeping or journal entries in the future of finance as a result of artificial intelligence. There are three primary technologies that are reshaping the future of finance: artificial intelligence, block chain, and hyper automation, which are altering corporate finance. In the future, the financial function cost will be reduced by 40%, allowing the organisation to profit more. Because banks have several mobile applications that provide financial advice to their customers, artificial intelligence will eventually replace human financial advisors. Artificial intelligence will eventually replace financial auditors. The first artificial intelligence revolution in finance started with auditing, because auditing financial professionals must shift transactions and manage large amounts of data. In the future, artificial intelligence will assist organisations in cost reduction, decision making, data analytics, cloud computing, and other areas. The future of finance with artificial intelligence is bright, with plenty of potential and difficulties. This perspective is reflected in

the Bank of England study, which expects a growth in AI utilisation to fulfil future operational demands in the new normal of a Covid-19 world.

Top 10 Companies Who are Changing the Future of Finance with Artificial Intelligence

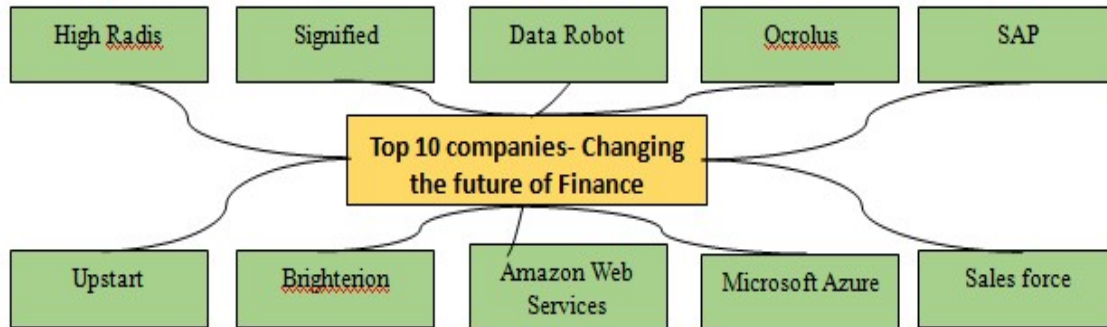


Figure 2: Top 10 Companies – Changing the Future of Finance
(Source- Compiled by Authors)

By utilising artificial intelligence and machine learning, machine learning algorithms, natural language processing, automating tasks, and improving customer experience, these companies are reshaping the future of banking.

Artificial intelligence algorithms trained on financial data and market movements will be able to assist investors in making informed decisions in the future. Instead of connecting to the cloud and utilising its resources, we will be able to upload your consciousness to the cloud or virtual reality. Looking ahead, the future of AI in finance is quite bright, with advancements in areas such as predictive analysis, fraud detection, and personalised financial planning expected. AI technology will continue to supplement human talents as it matures, allowing professionals to focus on complicated problem solving and strategic decision making. Adopting AI in banking brings up new dimensions and opportunities. The future looks bright and we are excited to witness the transformative impact of AI on the finance world.

VIII. CONCLUSION

It can be concluded that by using the power of data analysis and machine learning, artificial intelligence has the potential to revolutionise our capacity for projecting the future. In finance, artificial intelligence can foresee outcomes. However, we must proceed with caution when making AI predictions and address the ethical concerns that arise. By combining human judgement, critical thinking, and responsible AI practises, while preserving fairness, transparency, and social advancement, we can use AI to navigate an unpredictable financial future. Artificial intelligence has made great advances, but it is critical to temper expectations and recognise its current limitations. AI has become a game changer in the finance business, providing unprecedented opportunities while also posing novel obstacles. By leveraging the power of AI financial institutions could increase productivity, lower risk, and offer their clients better services. By utilising AI, financial institutions may increase productivity, lower risk, and provide their customers improved services. To develop a

responsible and trustworthy AI-driven Financial Ecosystem, it is critical to address ethical problems, secure data security, and maintain human oversight.

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