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Artificial Intelligence in Finance: Opportunities and Challenges

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ABSTRACT

"Artificial intelligence" as its name suggests is a major advanced technology, given form and produced by the human being which gave the ability to the computers and robots to make the life of a human easier and convenient. Even after produced by the humans, which requires human intelligence and effort to put the data together, AI enables a machine to learn from its past experience and make adjustments to new changes.

Beginning its journey from the mid-century era, AI has shown its widespread importance in the recent years, covering a vast number of areas in its domain. Financial aspect is one among the wide range of selection who has taken quite an interest in developing the journey with AI. With the emergence of growing need of stability and consistency in financial sector, AI has shown its efficiency time by time. Starting with risk assessment, management of the financial risk in order to keep the investors at peace, making trade decisions easier along the way to detecting fraud, giving personal advises on investment decisions, every aspect is in clear light and easier access.

In the last few years, we have seen a tremendous increase in the number of mobile banking facility for which AI and ML have helped by taking some measures to prevent cyberattacks. The repetitive work process has reduced drastically and the customer service provided throughout day and night has eased the strain of the customers to a greatextent. This paper work is going to focus on some of these major factors and the growing importance of AI in the arena of finance.

Keywords: AI, Machine learning, Financial risk, Investment decision, Banking

Introduction:

Artificial intelligence is a branch of computer science, which makes a computer system that can mimic human intelligence at a more precise and concrete manner. The concept is comprised of two words named, "Artificial" which means a thing made and developed by human and "intelligence", which means, to think and interpret. In combined manner, it can be said as a human-made machine with highly integrated data structure. It is not a new concept for the researchers nor is the technology but the increasing impact it has on the day-to-day functioning in any segment that we can think about, is a matter of discussion here. The evolution of Artificial neurons has started from the year 1943 and gradually developed when one of the greatest mathematicians as well as computer scientist named Alan Turing gave a new concept by introducing Turing machine which was capable of implementing algorithm logic in order to solve complex problems and with the help of ML, now human can have solution to a huge number of complex data which are reliable to a great extent.

In the year 1956, the Dartmouth Summer Project gave a new insight on the profound benefits that the acceptance of AI can provide to human beings. With time, there were inventions of robots like; Unimate, Eliza, Shaky and many other robots were developed which helped mankind tremendously. As we are going to focus on the financial aspect in this article some of the prominent robots which have shown remarkable change in this domain are SensaFraud, made by symphony Ayasdi one of the best companies to adopt AI in order to stop financial crises in the era where with the increase in the use of new technologies, the level of cyber-crime has also manifested. Blue Prism is used for trade finance, Bny Mellon for trade settlement, Enablesoft for report automation and there are many more which can never be counted with bare hands. The discussion will be on the helping hand provided by AI to the financial sector and the level of importance it holds.

- IDC predicts worldwide revenues for artificial intelligence (AI) software, hardware and services will reach $156.5B in 2020, increasing 12.3% over 2019.
- The global AI fintech market is predicted to reach $22.6B in 2025, achieving a Compound Annual Growth Rate (CAGR) of 23.37% between 2020 and 2025 according to Mordor Intelligence.
- Fintech is forecast to achieve a compound annual growth rate (CAGR) of 25% through 2022, reaching a market value of $309B. The broader financial services market expected to reach $26.5T by 2022, achieving a 6% CAGR.
- 70% of all financial services firms are using machine learning to predict cash flow events, fine-tune credit scores and detect fraud, according to a recent survey by Deloitte Insights.

- 54% of Financial Services organizations with 5,000+ employees have adopted AI, according to the latest Economist Intelligence Unit adoption study.

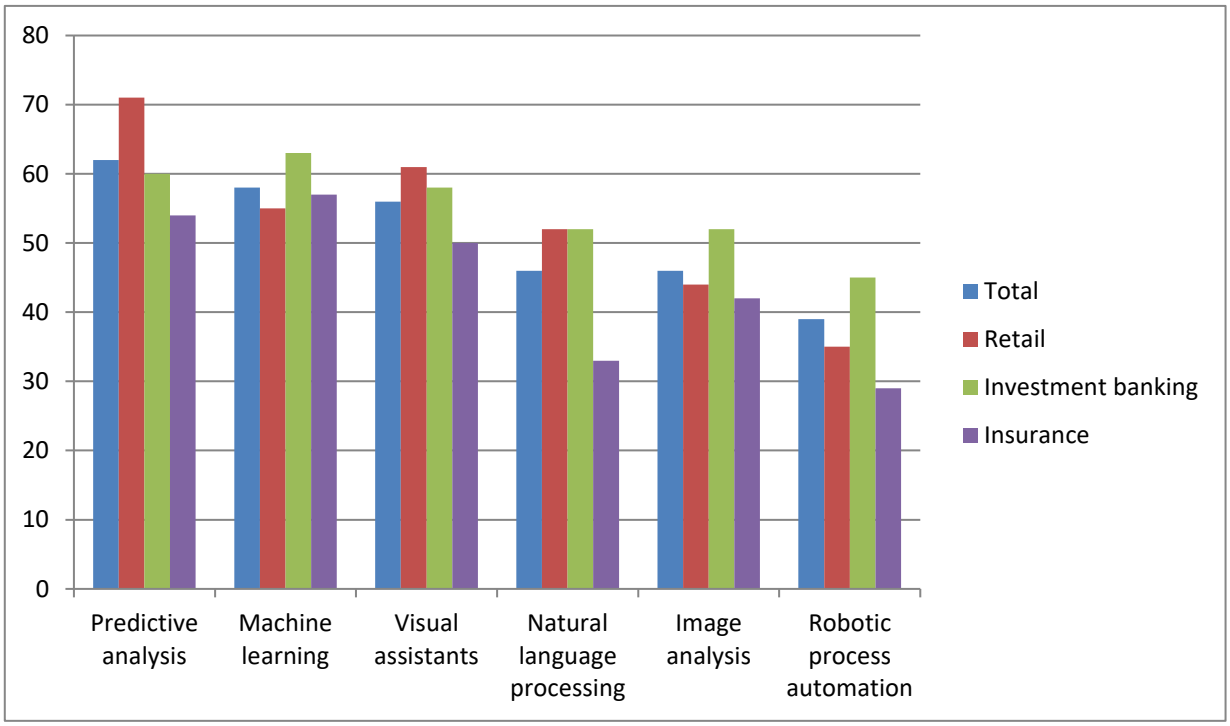
Table-1

AI most in use

What AI applications are used by your organization at present? (% of respondent)

AI most in use						
	Predictive analysis	**Machine learning**	**Visual assistants**	**Natural language processing**	**Image analysis**	**Robotic process automation**
Total	62	58	56	46	46	39
Retail	71	55	61	52	44	35
Investment banking	60	63	58	52	52	45
Insurance	54	57	50	33	42	29

Figure-1



Source: Economist Intelligence Unit Study, The Road Ahead: Artificial Intelligence And The Future Of Financial Services; 2020

Theoretical Framework:

As we know, the use of AI has been increasing at a rapid rate and extending its roots into financial sectors too where it is helping the organisations to analyse the behaviours of users and is doing it continuously so that it becomes very helpful for the banking and financial sectors to detect anomalies in advance. Anti-money laundering has been minimized to a great extent by using AI as an aid. Machine learning is being used in various places such as for online recommender systems, Google search algorithms, Email spam filters, Facebook Auto friend tagging suggestions, etc. Effective forecasting of cash flows can be made using ML, which makes it easier for the investors as well as the banks to get the appropriate information about their investment decisions too. Likewise, we can see various other programs which use AI in order to achieve the desired output. The Banking and Financial Services Sector has covered a deep transformation over the last decade in terms of safety and security of the personal as well as inter-personal aspect. The use of cloud computing and digitization and ML has ensured heightened customer experience combined with optimization of both cost and time for both side of the user. Artificial Intelligence plays a vital role in allowing the banking industry to provide personalized services to customers by understanding their needs and staying ahead of their expectations by providing services using chatbots, voice assistant and online transaction facilities with minimum hurdles. There are both sides the good as well as the bad, to this new emerging field but, mostly all the BFSI sectors are feeling the increasing needs to adapt AI in their day-to-day business.

As per the words of González-Carrasco et al., 2019,Data analysis allows information lying at diverse places in non-structured formats to be regrouped and analyzed using AI and machine learning. This procedure could help banks improve their customer relationship management, prevent fraud detection and meet accounting or legal reporting requirements. Similarly, McCrea, 2019 has said that, the Internet of Things (IoT), machine learning, and AI are helping supply chain management by regrouping data at diverse places and increasing the efficiency of supply chain finance. This can be considered as a win-win model for stakeholders as, Artificial Intelligence and cloud-based technologies allow banks and financial institutions to develop tech-savvy marketing strategies which enable them to make their customers happy and cross-sell or up sell the products to the right customers. BFSI is using AI with cloud computing to onboard and assess customers faster and cater to their expectations extensively with the increase in time. Also, the quick risk analysis helps them to expedite decision making and approvals leading to faster workflows.

Applications of AI in finance:

As per the recent report of the Reserve Bank of India responding to an RTI petition related to bank fraud has shown that the banking and financial services (BFS) sector can be greatly benefited by using AI. According to the official data, banks in India reported fraud worth ₹4.92 trillion as of March 2021. With a confounding increase in deceitful practices by malicious actors, the BFS industry is in desperate need of better monitoring and management tools in order to protect the interest of the customers. Some of the sectors which has used AI for the better management of the domain are discussed as below.

1. Anti-money-laundering screening

The process of showing illegally obtained money and making it appear to have come from a legitimate source, or money laundering, has increased over the past few years. This technology is used to identify suspicious activity linked to money laundering continues to evolve and become more accurate day-by-day. Machine learning (ML) coupled with deep learning are helping government systems and large financial institutions monitor for potentially fraudulent activities. 3i Infotech Limited, a global Information Technology company, launched AMLOCK Analytics, its advanced anti-money laundering (AML) solution powered by Artificial Intelligence (AI) and Machine Language (ML), which enables banks and financial institutions to identify complex and hidden AML patterns. It helps organizations to meet their most critical challenge of managing high false positives and provides a holistic view of investigating an alert. AMLOCK Analytics uses various statistical methods and machine learning algorithms to derive analyses and predictions based on institution-specific historical data.

One of the important features of 3i Infotech's AMLOCK Analytics is the reduction of false positives using risk profiling, through predictive analytics that identifies potential risk and thereby enhances decision making. Ravikanth Sama, Global Head- AML Practice, 3i Infotech said, AMLOCK Analytics merges both the traditional rule-based system and the power of analytics to bring better efficiency & risk focus. It can be hosted both on-premise and on cloud infrastructure.

AMLOCK is 3i Infotech's flagship AML solution that is multi-segmented and used by banks, insurance companies, Non-Banking Financial Companies (NBFCs) and mobile wallet companies to proactively detect and manage potential money laundering activities.

2. Risk Assessment

Since the very basis of AI is learning from past data; it is natural that AI should succeed in the Financial Services domain, where bookkeeping and records are just like second nature to the business. AI and ML are taking the place of a human analyst at a rapid rate as inaccuracies which are involved in human selection may cost the organisation in millions. AI is built upon machine learning which learns over time so that there will be less possibility of mistake and analysing vast volume of data; AI has established automation in the areas which require, intelligent analytical and clear-thinking.

Risk Assessment Software & Hazard Identification by EHS Insight is used to identify various hazards, assess associated risks, and track controls. By identifying hazards and assessing their risks, organizations can increase productivity, avoid injuries, and avoid costly incidents. An effective risk assessment technique informs proposed actions by focusing attention and resources on the greatest risks at hand. HIRA solution provides robust reporting to easily analyse such risks and gives appropriate solutions to control them. It quickly sees the current status of all assessments and control-implementation of projects, never let risk assessments grow old and out of date, defines periodic reviews and ensures that, the risk owner re-evaluates the risk in a timely fashion, enabling opportunities to implement state of the art technology as new controls whenever that is applicable.

3. Automating processes using OCR techniques

Powerful optical character recognition (OCR) engines are being deployed within the banking sector in order to recognize written letters and characters and reproduce them digitally for later use. This allows the bank to digitise the documents, automate invoices and purchase orders, and lowers the chances of human error. It can be used by the banks to scan paper applications, handle the financial statements, recognize and alert about new text arrangements, and accurately digitise the personal information on bank cards used at ATMs so that it can be verified by a security system.

Businesses in the BFS sector those who thrive on data-driven methods and AI are transforming the way human interact with money. The future lies in AI and ML. Embracing digitisation and AI will bring the power of advanced data analytics to combat fraudulent transactions and improve compliance and trust among the customers, whose numbers are increasing at a faster pace.

Docsumo, which is an intelligent document processing software, targets data extraction and financial document processing with the use of artificial intelligence. This is a holistic solution that takes care of the enterprise-level documents processing automation needs of a company. Docsumo comes loaded with pre-trained APIs for popular financial document types like; IRS tax forms, Acord forms, identity verification documents, invoices, and logistics documents. The automated documents processing is done with accuracy as high as 99% with turnaround time of less than 30 seconds.

Nanonets helps in extracting selected data from unstructured financial documents and populate them onto digital forms using artificial intelligence. Its AI works well with unseen and semi-structured data. The artificial intelligence infused in the software learns more with each document processed and delivers more accurate results each time.

4. Financial Advisory Services

A more personalized portfolio analysis report can be made using AI to analyse a digital version of a portfolio to provide a summary using diverse visuals. It becomes easier for the clients to understand their financial strength. It also uses predictive forecasting to make predictions about long-term price movements and potential investment opportunity evaluations.A robotic-advisor collects information about a client's financial situation, processes relevant financial data, makes appropriate investment decisions and monitors their performance throughout the investment cycle.

Wells Fargo's Intuitive Investor is an eye-catching example of the automated investment management technology. The user provides their investment goals and recommendations, and the app generates a portfolio within seconds. It handles daily tasks like rebalancing, monitoring, and updating the data in order to increase the wealth management with automation.

One of the most functional chatbots like Giosg are built with Natural Language Processing (NLP) which contains the capabilities to recognize user messages and provide them with complex answers, which makes them ready for using AI for asset management and financial planning purposes.

5. Credit scoring

One of the crucial applications of machine learning in the financial industry is credit scoring. Many financial institutions, be it large banks or smaller fintech companies, are in the business of lending money. And to do so, they need to assess the creditworthiness of an individual or a company accurately. It might also benefit people who do not hold an extensive credit history, allowing them to prove their trustworthiness and ability to repay the loan regardless.

Before the adaptation of AI in this domain, such decisions were made by analysts after conducting an interview with an individual and gathering the relevant data points. However, artificial intelligence allows for a faster and more accurate assessment of a potential borrower, using more complex methods in comparison to the scoring systems of the past.

Lendingkart Finance is a non-deposit taking NBFC which provides working capital loans and business loans to SMEs all over India. Lendingkart has formed technology tools based on big data analytics which aids lenders to estimate borrowers' creditworthiness and provides other related servicesto transform the small business byproviding insight to lend them money and making it convenient for SMEs to access credit easily. The company utilises analytical tools, analysing thousands of data points from various sources to automatically calculate the creditworthiness rapidly and accurately, aiming to disburse loans with minimal paperwork within only 72 hours.

Founded in 2013 by Gaurav Hinduja and Sashank Rishyasringa, Capital Float is one of the leading Fintech lenders in India. Decision sciences rest at the core of its product offerings, and they extensively leverage AI capabilities. The start-up has custom-built affordable finance solutions and offers these through digital channels too. Borrowers can apply for loans from Capital Float by presenting their basic information. Some other companies using AI for credit scoring are; Crediwatch, Perfios, CreditVidya and there are many more in this emerging segment.

A new experience of careful credit decision making with the AI-powered can be felt with GiniMachine platform. This is a credit scoring software which helps in analyzing parameters that the traditional systems ignore or miss out to reach thin-file borrowers. With GiniMachine, one can forget about limits and build hundreds of scoring models by setting up unique parameters like; age, occupation, location, etc.

6. Personalized banking experience

The banking sector tries to harness the power of AI with the aim of providing a personalized banking experience for everyone. An example could be chatbots, which are increasingly difficult to distinguish from actual human consultants and by using advanced NLP techniques, they can understand the intent of the customer and try to point them in the right direction. For example, they can help the users check their current balance, schedule a transactionchange their password, etc. Additionally, such chatbots also have the ability to recognize the customer's emotions and adjust their response on the basis of those feelings, which makes it easier for handling the customers.

Challenges of AI in finance:

1. Data quality

A proverb in the data science says that, "garbage in, garbage out". It is very important to provide appropriate and due attention while feeding information in the ML at initial stage. While applying this to any data-related work, it is of paramount importance within the financial industry because even a single day's corrupted data or even just a few wrong observations fed into a trading algorithm can have dire consequences for the entire system, leading to bad trades and financial loss which cannot be mitigated easily.

2. Black Box

In many industries, data scientists are very eager to use the latest and greatest state-of-the-art techniques which perform tons of complex calculations under the hood and provide very accurate predictions. While in many cases this can be a reasonable thing to do, there is more to it in finance.

The financial industry is heavily regulated and many of the decisions made by algorithms must be fully understood by the institution. As we know, algorithms are becoming more powerful, pervasive, and sophisticated, the methods for monitoring and troubleshooting them lag behind adoption.

Organizations must consider the value of transparency and accountability in how decisions are made by algorithms and here ethics, fairness, and safety of the persons should also be given due importance.

3. Highly Expensive

Production and maintenance of AI has always demanded huge costs since they are very complex in nature. AI also contains advanced software programs which require regular updates to meet the dynamic needs of the changing environment. In the case of critical failures, the procedure to reinstate the system and recover lost codes may require enormous time and cost which can result in a hazard if not managed properly.

4. Risk of unemployment

According to a study conducted by McKinsey Global Institute, Intelligent agents and robots could replace 30% of the world's current human labour by the year 2030. The study further states that *"*automation will displace between 400 and 800 million jobs by 2030, requiring as many as 375 million people to switch job categories entirely*"*. So, it can't be ruled out that AIs will result in a less human intervention which may cause major disruption in the employment standards in future.

5. Dimensionality reduction

Financial institutions sit on a big heap of data, as a single transaction can have thousands of data points. That is also the reason why there is a very low signal-to-noise ratio in the industry, which makes the work of data scientists very challenging and interesting at the same time.

Conclusion:

In this article, we have described the areas within the financial industry in which a broad discussion is made on understanding AI and how it can provide a lot of value-added services for both the companies and their customers. We have also covered a few of the key challenges that need to be tackled while implementing AI and ML as core of BFS sector. Improvements are needed to be done in, both the AI and financial landscapes as changes are constant in these areas and we need to adapt to the progress that is made on a daily basis. One thing that can be said with certainty is that, we live at the tip of an AI-based revolution impacting businesses and individuals alike.

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