

# DEMYSTIFYING MACHINE LEARNING & ITS IMPACT ON FINANCIAL SERVICES

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**Abstract**—Machine Learning (ML) is nothing but an application of Artificial Intelligence. It provides systems with an ability to automatically learn and improve with experience without being explicitly programmed. Machine Learning and artificial intelligence are often used interchangeably, but the former is an advanced subset of the latter. Just because something is artificially intelligent doesn't necessarily mean it can learn.

Machine learning technology can adjust to a variety of situations and learn as it goes forward. It mainly focuses on the development of computer programs that can access data and use it to learn for themselves. Giants like Amazon, Google and many more tech platforms are using it to its utmost potential. Be it finding out specifications for a product to suit its current market to investing in global market, it can help us in making decisions with high level of accuracy.

Machine learning and artificial intelligence are set to alter the banking industry owing to the accessibility to enormous expanses of data and more reasonable computing power. Prime banks and financial services companies are positioning Artificial intelligence technology, with machine learning to restructure their procedures, optimize portfolios, provide legal advices and sanction loans amongst other things. Financial services providers have begun to use vast amounts of data to build frameworks for better decision making, tailor services, and improve risk management.

The success of machine learning project hinges more on structuring efficient infrastructure, collecting suitable datasets, and applying the right algorithms. ML technology has exhibited an important role in many stages of the financial ecosystem, from approving loans and carrying out credit scores, managing assets and evaluating risk to distinguishing fake legal documents from genuine documents. According to the McKinsey Global Institute, this could generate value of more than \$250 billion in the banking industry.

This research article explores ways in which machine learning is altering the financial services landscape. It also discusses the various applications of machine learning in finance specifically in India.

## Introduction

The potential of Machine Learning in recent times has surprised a lot of people. With new regulations coming in, the use of machine learning has become more legitimate. Despite the challenges, many financial companies have already benefitted from this technology. The sudden boom of start-ups had Machine Learning play a pivotal role. ML has reduced operational costs thanks to process automation, augmented revenues thanks to better productivity and improved user experiences & better compliance.

Companies such as Ola, Myntra or Lenskart have transformed the way businesses are conducted by providing customer-specific solutions and suggestions using machine learning applications. This doesn't only help customers to manage things efficiently but also helps corporates gain competitive advantage through cost efficient operation.

Developed countries have already started making use of Machine Learning in various public sectors as well. Healthcare being a great example where supervised ML methods can provide expert decision support in regions with few resources, while deep learning techniques can analyze satellite imagery to create novel economic indicators.

The establishment of Machine Learning has assisted a lot in the growth of Financial services industry. ML has provided the support, confidence and surety to financial service providers to give better and competent services to the clients. This has resulted in opening of several investment opportunities and has enabled non-financial background individuals to invest more confidently.

## Applications of Machine Learning in India

- HFT- Few industries have as much historic and organized data than the financial services industry, making it a seamless field for application of machine learning technologies. Investment banks were inventors of AI technologies, using machine learning since as early as the 1980s. Algorithmic Trading is one of the wonders of technology which has outdated the concept of manual trading by making the cycle of trading faster with the use of High-Frequency Trading. Algorithmic trading is a system that automates decision making or its execution based on the preconditions defined by the users and the strategist. This can be as easy or as complex as the user desires. It involves a process through which buying and selling of securities takes place. Algorithmic Trading is a very powerful tool, which requires the right kind of understanding for better output and assistance in multiplying the profit.

Around 50% of the trading volume is contributed by algorithmic trading. HFT is a subset of Algo Trading wherein the trades are of small quantity, a very high frequency and the positions are squared up rapidly.

Indian financial industry has adopted the use of HFT. In the current scenario of heightened volatility, HFT has seen a surge as traders are eyeing quick profitable trades for every short market movement. In FY19, trades worth more than Rs 18000 crore were executed. This is eight times the turnover generated by HFT firms in FY18. In 2019, Jet Airways has seen Rs 5,168 crore worth of HFT trades, while DHFL saw Rs 3,506 crore worth of HFT trades.

Fraud Detection – The growth of digital payments has also led to the emergence of complex frauds that have become a major concern for financial institutions. Fraud losses incurred by Indian banks in FY-18 amounted to Rs.65.26 crore. Fraud is one of the foremost reasons financial institutions have opted for the use of Machine Learning in Finance. The capability of learning, scanning through vast data sets, detecting anomalies and flagging them instantly in machine learning is why it is ideally suited for fraudulent financial transactions. By recognizing patterns and using predictive analytics, machine learning algorithms can block fraudulent transactions with accuracy not even possible with stand-alone AI.

Indian Financial Industry is also adapting to the process of machine learning in fraud detection. ICICI Lombard has opted for the use of machine learning to detect frauds in segments such as healthcare and motor insurance. ICICI has also filed a petition regarding fraud detection in vehicle insurance claims.

A fraud analytics company ‘Thirdwatch’ is also revolutionizing fraud detection through machine learning and AI. Their software scans and addresses suspicious behaviors by the seller or a high RTO (Revenue Turnover) percentage across platforms etc. in real time, preventing losses.

Machine Learning is also the key to tackle the concern of false positives, which is very common in the financial industry. Also known as false declines, this happens when the seller, corporate or the financial institution wrongly declines valid financial transactions requests.

- Loan / Insurance Underwriting – Financial Institutions have access to terabytes of data that the ML algorithms can be trained on. They are capable of automating tasks like matching the data records of consumers, looking for exceptions and uniformity of the payment, calculating whether the user is eligible for a loan or insurance.

Following Kerala Floods, there was a sudden surge in home insurance claims. Policy holders went on a two-way video chat to show extent of the damage to the surveyor. As a result, claims got processed in three days, compared to the span of two weeks prior leveraging AI/ML. Video conversations powered by AI and ML addressed the problem of many victims.

Insurance Companies are using ML platforms to help agents design the right policy for the consumers. Chatbots and ML powered apps are one of the few platforms that help the customers to choose an optimal policy. These platforms have the capability of making real conversations and guiding the customers through the process, benefits, terms and conditions of their chosen financial instrument. Risk Management – Financial Institutions are leaning on ML/AI to make accurate market forecasts as they’re immensely dependent on them. This can be used to spot data trends and better predict looming risks. Risk Management in the financial sector is improving at a noticeable rate. Most of the ML used for risk management uses a feature called Natural Language Processing or NLP. It finds and tracks relevant information, learning from successes and mistakes with each search.

Axis Bank has started the use of NLP (Natural Language Processing) which reads and extracts data from sentences and paragraphs or even entire pages written in natural English. The companies also provide real time information to the customers about heavy impact events and critical breaking news that can impact their portfolio.

- Chatbots – Chatbots can work for customer's convenience, handling their various accounts, directly checking their bank balance and expenses when asked to do so. Customers can do payments and automated transactions directly through a

Chatbot without downloading any Application. Chatbots are developed to facilitate two-way communication, replacing channels such as phone, email or text. The objective is to provide swift service and transactional support. These chatbots are fully capable of holding live conversations with customers and resolving their queries.

Many Financial Institutions in India such as ICICI, HDFC, SBI, Motilal Oswal, Paytm have already adopted the use of Chatbots for their services. Many of those chatbots have the capability of finding out the risk appetite of the customer. These chatbots have not only increased the efficiency of financial institutions but have also made their services better by providing personalized services to customers. After the introduction of Chatbots, the term Smart Banking was coined.

- Money Laundering – According to a recent United Nations report, the amount of money laundered globally in a year is about 2-5% of global GDP, amounting to \$800 billion - \$2 trillion. Money laundering is a quintessential 21<sup>st</sup> century crime, Global, hard to track. It has increased illegal trafficking, mostly human trafficking. AI/ML deductions of both financial institutions and law enforcement can help uncover these tracks of Financial crime.

**Machine Learning initiatives by various Indian Banks**

Financial Institution	Chatbot/Software	Function
State Bank of India (SBI) & its subsidiaries	SIA chatbot (solves 10,000 queries per second)	Solves enquiries on banking products and services.
	Chapdex	Scans cameras installed in the branch and captures facial expressions to determine whether the customer is satisfied or not.
HDFC Bank & its subsidiaries	Eva (Solved 100,000 queries from 17 countries)	Solves queries regarding its products and services. Has the potential to make bank transactions and making real time conversations.
ICICI bank & its subsidiaries	iPal (Solved 6 million queries with 90% accuracy rate)	Solves queries about product and services offered by ICICI.Can make fund transfers  Live conversations help people to discover new features.
	Robotic Software (100% accuracy)	Emulates human actions to automate and perform repetitive, high volume and time-consuming business tasks.
Axis Bank & its subsidiaries	AI & NLP (Natural Language Processing) application	Conversational Banking aids consumers with financial and non-financial transactions.
	AI for Back-end work	Over 125 processes and cognitive automation across 90 processes

Figure.1

Figure.1 exhibit how major bank are using diverse machine learning applications to help their customers get the best solution. SBI with a customer base of approximately 420 million is using chatbots to solve its customer’s queries. The bot has the capacity to solve ten thousand queries per second. SBI also uses a software called chapdex, which is an AI based solution made by the winning team of SBI’s hackathon. This software provides the bank with an ability to assess a customer’s reaction by scanning imageries from their corporate offices.

HDFC’s Eva (Electronic Virtual Assistant) has been trying to improve their accuracy rate. It has solved over 2.7 million queries with ease, interacted with over 530,000 unique users and has successfully helped in culmination of 1.2 million conversations. Eva has answered thousands of customers from 17 countries across the globe. It solves the trouble to search browse or call by providing solutions instantly and accurately.

ICICI has deployed software robotics for over 200 processes across various functions of the company, a kind of software which focuses on automation office work. This has successfully reduced the customer’s response time by 60% and reached the accuracy level of 100%, sharply improving the bank’s operational efficiency.

It also has a chatbot named ‘iPal’, which functions in 3 categories. iPal chat serves customers with their queries as well as it offers financial services like micro transaction, such as bill payment, fund transfer, account view, recharge and more.

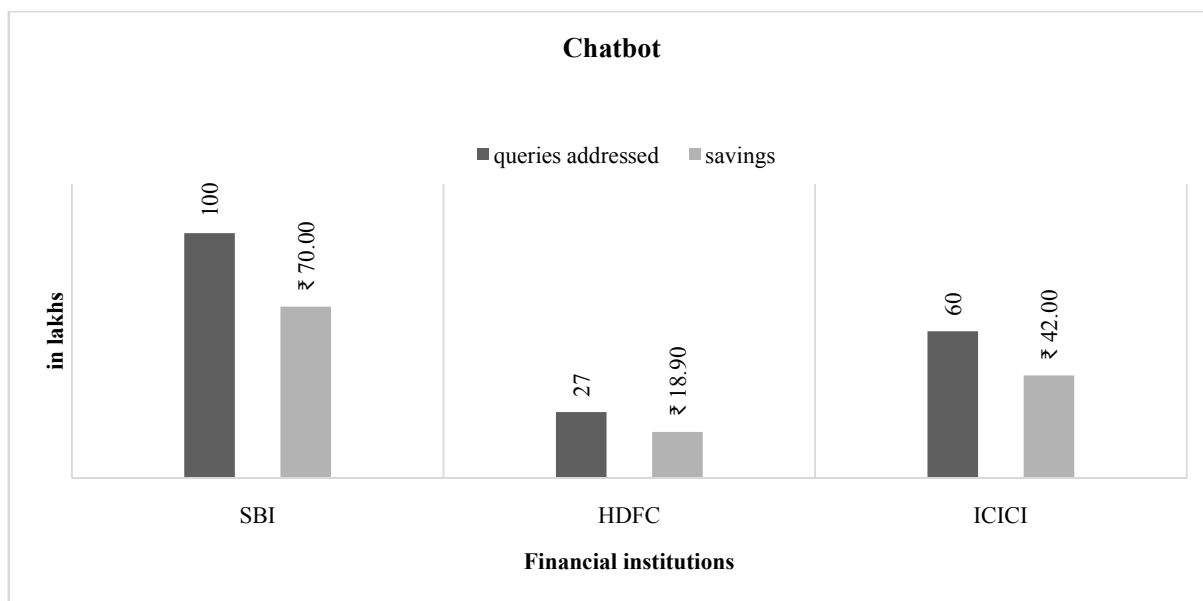


Figure.2

Figure.2 depicts the usage and savings through chatbots alone by the three largest Indian Banks (w.r.t asset).

SBI, HDFC and ICICI have saved ample amount of money just by solving queries through software by reducing their Turn Around Time. The proportion of queries solved to savings varies depending on how good is the algorithm that is being used & what is its accuracy rate.

### Limitations

Strong AI is a process which can be entirely equated to the human mind. Artificial Intelligence in every sense function like the human mind with the extraordinary capability to understand everything that can be understood by an impeccable human mind. The beliefs, cognitive states and perception which can be only found in humans are programmed in strong AI.

However, the difficulty lies in defining intelligence accurately. It is almost impossible or highly difficult to determine success or set boundaries to intelligence as far as strong AI is concerned. Hence weak AI is preferable, primarily because of its ability to accomplish assigned tasks with optimum efficiency. Weak AI does not fully encompass intelligence, rather it focuses on completing a task it is assigned to complete. Hence it can be broken down into smaller procedures.

Machine learning requires huge resources to function. It may demand added computing power. Machine learning requires enough time to let the algorithms learn & develop to fulfill their intended purpose with a considerable amount of accuracy and relevancy.

ML needs massive datasets to train on. These must be unbiased/wide-ranging and of good quality. In certain situations, they may need to gap for new data to be generated. Even if data is gathered, building a technology which learns on its own & finding investment ideas requires a lot of effort, time, money and resources.

Accurately interpreting the results generated by the algorithms is another challenging task. The algorithms require frequent changing of the variables or feeding the machine learning algorithm.

### Conclusion

Machine Learning has impacted the financial industry greatly. The hurdles faced previously, which were detrimental for many businesses have been solved by machine Learning. Whether its detection of fraud or evaluating documents, machine learning has smoothened processes & solved problems in a matter of minutes. Machine learning has proved effective in attracting large section of the population to financial services, which earlier found them cumbersome, expensive, and time-consuming. Companies have provided their customers with various means to invest. High Frequency Trading and Algo trading have made investing easier. Many people are adopting to these apps to create passive income. Financial Institutions are making use of chatbots and software to help customers; guide through processes while making a conversation, addressing issues regarding

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financial products and services making information transparent for billions of customers nationwide. India has not yet tapped the full potential of Machine Learning applications like PMS -Robo Advisors and Money Laundering prevention applications that can make the financial system transparent, efficient and financially sound.

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