



Artificial Intelligence (AI) And Its Application On Banking Sector In India

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Abstract

Artificial Intelligence (AI) pertains to computer programs that can execute complicated tasks that were previously limited to human capabilities, like problem-solving, reasoning, and decision-making. Today, the word "AI" refers to a broad range of technologies that enable many of the products and services we use on a daily basis, such as chatbots that offer real-time customer care and applications that suggest TV series. Artificial intelligence strengthens banking and financial institution. Because AI helps banks to process large amount of data and combat fraudulent transactions. The purpose of the paper is to study the fundamental technologies in AI and areas and application where AI technology is being used by banks and to study the opportunities and challenges of Artificial Intelligence.

Keyword: Artificial Intelligence, Banking technology, Blockchain, chatbots, emerging economy

Introduction

In today's banking environment, digital innovations are no longer optional for financial institutions rather, they are becoming essential to help them deal with a more competitive market and shifting client expectations. The use of artificial intelligence in the financial sector is increasing rapidly in recent time. AI is being used in the banking sector to create efficiency and provide better services to customers. The banking industry is now more customer centric and technologically competent due to the integration of Artificial Intelligence in banking apps and services. AI based banking system are now helping banks reduce operating cost by improving their productivity and making decision based on information. In addition, in a few second, sophisticated algorithms can identify fake information. Banking institutions are investing in area such as big data platform and data applications that use updated architecture that eliminate the upfront capital investments typically required to develop, deploy, and scale AI solution

AI is strengthening competitiveness of banks through:

- **Improve customer experience:** Banks understand customers and their behavior better with the help of AI. This enables banks to customize financial products and services by combining personalized features and seamless communication to connect customers meaningfully and build strong relationship with their customers. The use of AI improves the customer experience of the bank.
- **Forecasting of future trends and achievements:** AI help banks to predict future result and trends. AI is able to predict future scenarios by analyzing the behavior with the help of past record which help bank to identify frauds and detect anti- money laundering pattern. AI with its key recommendation studies the past to predict future behavior which helps banks to successfully up-sell and cross-sell.
- **Automation of cognitive process:** Automating a collection of tasks that continuously learns from its past versions through machine learning is the core of cognitive process automation.

- **Authentic interactive user interfaces:** Chatbot identifies the context and emotions of the text chat and responds to it in the most appropriate ways. This cognitive machine learning enables banks to save time and improve efficiency.
- **Effective decision making:** AI is a cognitive system that think and respond like a human expert. Along with this, it also provides optimal solutions based the available data on real time. These systems retain a repository of expert data in its database termed as knowledge database. Bankers utilize this cognitive system to make strategic decision.
- **Robotic automation of process:** AI analyses and modify processes by applying Robotic Process Automation (RPA). This makes it possible for about 80% of repetitive tasks to be automated, so that employees can focus on more important tasks that need human involvement.

Literature Review

Praveen Kumar Donepudi (2017). As per the study, machine learning and artificial intelligence technologies are taking over the banking sector. Artificial intelligence and machine learning is an effective way for the sector to meet the demand of its customers for a smarter, more convenient and safer way to access their money, save, spend and invest

Tejindra Singh and Dr. Nitin Pathak (2020). According to the study, with the help of artificial intelligence technology, banking operation have become easy because in today's era bank is facing dilemma of whether to reduce costs or meet the expectations of customers. AI is capable of providing a necessary impetus in removing this dilemma. AI has played an important role in persuading the public to use digital channels that provide a user-friendly experience

Kishore Meghani (2020). According to the result of this study, Artificial Intelligence and Blockchain technology are making a big contribution to the Indian banking sector. The application of AI is leading the banking sector and also helping in meeting the demand of the customers faster and easier. It also being used to meet regulatory compliance, detect fraud and additional personal loan eligibility.

Dr. S. Umamaheswari and Dr. A. Valarmathi, (2023). As per the findings of the paper, AI is gradually permeating the banking sector to improve financial services. People are more inclined to use digital means to stay in communication with their bank accounts and conduct transactions during a period of social separation and quarantine. Given these advantages, it is almost a given that most employees of banks and other businesses would use AI to enhance customer service and maintain their competitiveness.

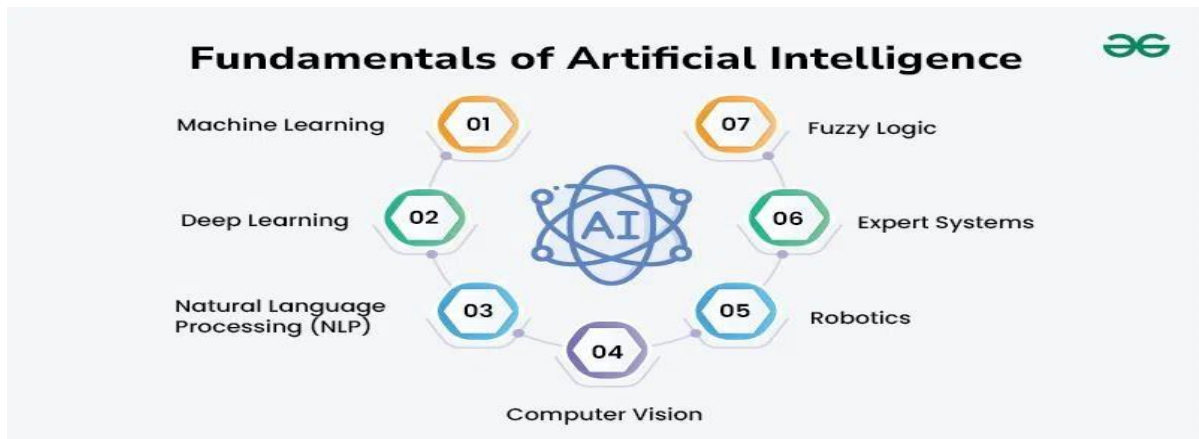
Preeti Panwar and Samar Sherma, (2024). The study highlights the opportunities and challenges of AI on banking industry in India. As per the study AI improve the efficiency of banking operation and enhance the customer relation. But at same time, banks have to face many challenges due to this application. To overcome the challenges, banks should improve IT governance and upgrade their IT infrastructure.

Objective of the Study

1. To study the fundamental technology in Artificial Intelligence.
2. To study the areas and applications where AI technology is being used by banks
3. To study the opportunities and challenges regarding use of AI in banking sector

Methodology

This study is descriptive in nature. The information is collected from secondary sources such as peer reviewed journals and, magazine, newspaper, official websites of bank, books.



(Sources: <https://www.geeksforgeeks.org/artificial-intelligence-101/>)

Machine Learning

Machine learning is a system of data analysis. It is the branch of Artificial Intelligence which focused on developing algorithms that enable the computer system to analyze, interpret and learn from data. With the help of machine learning, the system can identify data patterns and take decision with minimum human interference. Machine Learning has wide application in different fields like, in Finance sector, Machine Learning algorithm detect fraudulent transactions and forecast stock market trends.

Deep Learning

Deep Learning is a subset of machine learning that uses multi-layered neural networks. Deep learning trains computer system to perform human-like tasks, such as recognizing speech, identifying images, and making predictions.

Natural Language Processing (NLP)

A subfield of artificial intelligence called natural language processing enables computers to comprehend, interpret, and modify human language. Natural Language processing enables human to interact and work together with machine they naturally use on a daily basis. NLP offer many benefits like, Automation of repetitive tasks, enhanced data analysis and insights, improve search and content creation.

Computer Vision

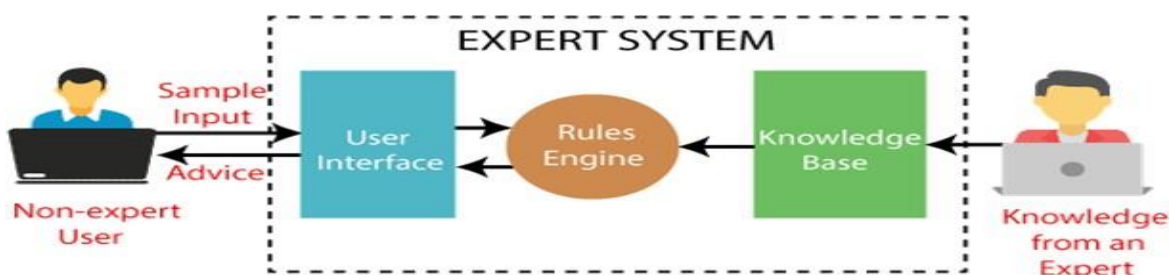
Computer Vision is a branch of artificial intelligence, enables computers to perceive and comprehend the visual world in a way that are similar to that of human. It uses machine learning models to recognize and categorize items in digital photos and videos, then allows computers to respond to their observations. Image classification, feature matching, edge detection, pattern detection, object detection, facial recognition, and image segmentation are among the several forms of computer vision.

Robotics

In robotics, artificial intelligence (AI) enables robots to make judgments based on sensor data, learn from mistakes, and adapt to new situations. Natural language processing, computer vision, machine learning, and other AI methods may be used in this procedure. Machine learning algorithms can be utilized by robots to examine data, identify trends, and gradually enhance their performance. This is especially helpful for jobs where the surroundings are changing or uncertain.

Expert Systems

A computer software that can solve complicated issues and make decisions similarly to a human expert is called an expert system. In response to user inquiries, it uses reasoning and inference procedures to retrieve knowledge from its knowledge store.



Fuzzy Logic

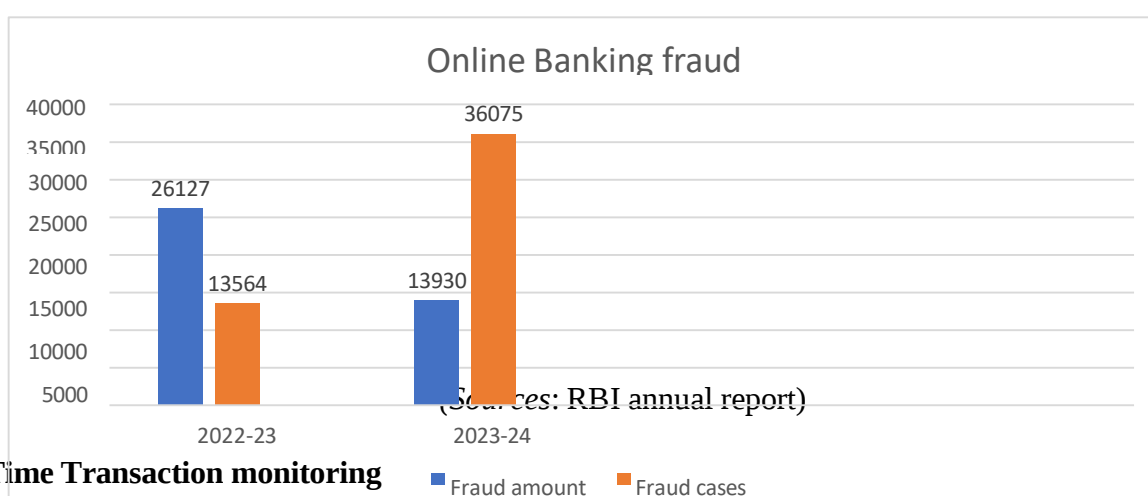
Many logical values, which represent the truth values of a variable or issue between 0 and 1, are contained

in fuzzy logic. In 1965, Lofti Zadeh presented this idea, which was based on fuzzy set theory. This idea offers possibilities that computers cannot deliver, but that are comparable to the variety of possibilities that people can create.

Areas and applications where AI technology is being used by banks

Fraud Detection

Banks and other financial institutions can identify suspicious activity and prevent losses by using AI algorithms that can evaluate huge amounts of data in real time. The RBI to introduce real time AI driven system to investigate cyber fraud. The system will use AI to gather and analyze data on possible fraud, identify high risk platform and inform users during transaction to minimize cyber-crime risk. The Reserve Bank of India Innovation Hub has already introduced MuleHunter AI an artificial intelligence and machine learning model to help banks detect mule accounts used by fraudsters and also alert users and protect them from fraud.



Real-Time Transaction monitoring

For security in transactions, AI algorithms is capable of real-time pattern recognition and detections of fraudulent activities. It examines transaction data to identify patterns of fraudulent activities, such as if several transactions occur repeatedly in different locations, it may be a sign of an attempt to use a stolen credit card. Similarly, AI algorithm looks at spending patterns, analyze temporal aspects of transactions, assesses factors such as time, frequency, location to indicate suspicious activities.

Chatbots and Virtual Assistants

Chatbots is the best application of AI in banking. Chatbots continuously learning about customers usage pattern. It helps them understand the requirement of user efficiently. Chatbots can quickly provide details about transactions histories and balances of customers. Banks with a huge customer base are looking at chatbot as a smart, self-service, 24/7 customer service channel that can handle a large number of customer inquiries and evolving banking needs of customers without placing too much pressure on their customer service agents.

Top 8 banking Chatbots and Virtual Assistants

Banks	Chatbots
State Bank of India	SBI Intelligent Assistant (SIA)
HDFC Bank	HDFC Bank's EVA
ICICI Bank	ICICI BANK's iPal
Yes Bank	YES ROBOT
IndusInd Bank	IndusAssist
Kotak Mahindra Bank	Kotak Bank's Keya
Axis Bank	Axis Aha
Andhra Bank	Andhra Bank's ABHi

(Sources: https://roboticsbiz.com/top-8-banking-chatbots-and-virtual-assistants-in-india/#google_vignette)

Debt Management

Bank and financial institute face several difficulties in managing and collecting debt, especially in light of growing of debt levels and unstable economic condition. By utilizing machine learning, behavioural science and advance analytics, AI driven solution provide innovative techniques to automate debt collection procedure.

Secured Transaction

Keeping its data and customer information safe is the biggest priority for the bank. AI technology is essential for improving security measures, because the use advance authentication techniques like voice and facial recognition, biometric and blockchain encryption. Leading FinTech companies like Adyen, Payoneer, Paypal, and Stripe are leading the way in incorporating AI-driven security solutions to protect against fraud and data breaches.

Predictive analytics

The banking industries can be affected by external global factors such as, instability in politics, emergencies, and currency fluctuations. AI offers analytical insights that gives an in-depth understanding of potential future events facilitating prompt decision making and proactive planning.

Personalized recommendation

AI play an important role in providing individualized financial advice and planning. It manages this by carefully reviewing individual financial information, including transaction history, earnings and expenditure, saving, investment trends.

Analysing customer behaviour

AI play a key role in the banking industry's analysis of consumer behaviour. It first gathers a lot of information such as account balance, transaction records, consumer demographic and online activities. After that, this data is combined into coherent database that offer an in-depth knowledge of every client's financial history. AI is excellent at identifying patterns and trends.

Authenticating risk management

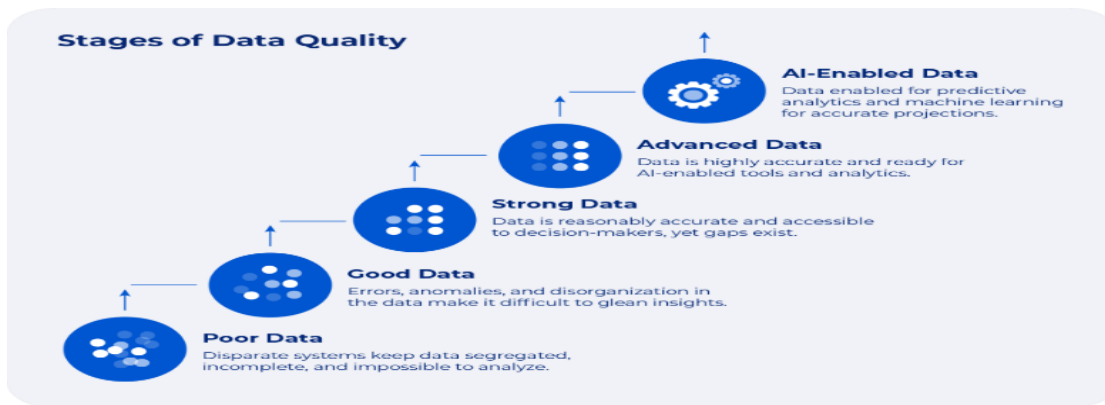
AI-powered risk management systems require minimal human oversight to track transactions, identify unusual activity, and produce compliance reports. This guarantees that financial institutions adhere to constantly changing requirements by lessening the workload for compliance teams and lowering the possibility of human error.

Opportunities and Challenges of Artificial Intelligence in Banking Sector

Every chance is accompanied by a challenge. This also applies to artificial intelligence in banks. There are numerous obstacles to overcome when using AI in banks.

Availability of credible and quality Data

A significant amount of data must be used to train AI algorithms. The AI model will produce predictions and conclusions that are increasingly accurate and dependable the more data it has access to.



(Sources: <https://www.scalefocus.com/blog/ai-in-the-banking-sector-risks-and-challenges>)

Many Languages

India has a large population that speaks more than 100 languages. Applications that use text-to-speech or speech-to-text depend on libraries and methods for natural language processing (NLP). Banks can initially handle a few main Indian languages using the current technologies.

Data Privacy

Data privacy is a core aspect of AI. If the bank uses AI it is a challenge for the bank to keep its data confidential. Digital Personal Data Protection Act (DPDPA) is passed in India. It is a data protection law, designed to protect the privacy of Indian people's personal data.

Lack of Skilled Manpower

Lack of skilled manpower is another big challenge of banks. To use AI algorithm effectively in banking sector, skilled manpower is required. They have complete knowledge about Artificial intelligence and how to AI in banking sector.

Legacy System: Overcoming the technological barrier

Legacy system is a big challenge for banks to adopt AI. It is a challenge for bank to integrate their old IT infrastructure with the AI model. Bank needs to make big investments in hardware and software as well as data management system.

Opportunities of AI on Banking

- Enhance efficiency in operation
- Smart decision-making
- Improve customer relationship
- Fraud detection and risk assessment
- Automation of process
- Digital financial inclusion

Conclusion

Adopting AI model has brought many benefits to banks and their customers. As it helps in making banking operation easy and efficient. Artificial intelligence helps the banks to identify fraudulent activities, customer usage pattern. It also helps in debt collection and helps in understanding future trends. Along with this, banks face many challenges due to uses of AI such as protecting the data, maintaining privacy, lack of skilled manpower and technological hurdles. AI chatbot is able to efficiently handle large amount of data and extract valuable information at unprecedented speeds. Natural Language Processing helps to analyze customer feedback for better product development. Overall, the AI operation is well placed to minimize risk and provide appropriate services to customers. It brings revolution in banking.

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