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Impact of Artificial Intelligence on Banking Sector in India

C. Mallesha[1], Peri Sai Santhosh[2]
[1]*Assistant Professor,* [2]*Student, School of Business Management, Anurag Group of Institutions,Venkatapur (V), Ghatkesar (M), Medchal (Dist.), Hyderabad-500088, Telangana State.*

Abstract: ***We are living in the surge of the internet and many technological trends, And in those technological trends one which is Artificial Intelligence. Research into artificial intelligence has become the prime area with which we know where actually the Artificial intelligence technology can be used in various sectors of the businesses. The Artificial Intelligence is the single biggest technology revolution which is disrupting throughout the banking and finance industry and implications of the rise of the Artificial Intelligence on the banking industry.***
Keywords: Artificial Intelligence (A.I), Machine learning, Cognitive computing, Natural language processing.

I. INRODUCTION TO ARTIFICIAL INTELLIGENCE

Artificial Intelligence is the blend of the three technologies which includes Natural language processing, Machine learning and Cognitive computing. The concept of the artificial intelligence is to simulate the intelligence of the humans into artificial machines with the help of sophisticated machine learning and natural language processing algorithms. In simple terms, a computer system which that can perceive the world around it, analyze and understand the information it receives, take actions based on that understanding and improve its own performance by learning from the information that has been perceived.

A. Need And Importance Of The Study

The main aim of this study is to determine and analyze the impact of the artificial intelligence in banking sector of India. This study presents a comprehensive application of artificial intelligence techniques in banking sector improving the effectiveness and efficiency of the systems and banking network. The study will also portray the opportunities and challenges with the usage of the artificial intelligence in the banking sector and also explains the areas where AI can be applied.

B. Review Of Literature

Amer AwadAlzaidi (2017). Department of Information Systems, University of Jeddah, Research on Artificial intelligence is a cutting-edge technology that has been forefront in technological revolution worldwide. Artificial intelligence systems have potential in transforming all operations of banking industry is seen as (AI) and is received with enthusiasm due to its capability of taking human-like decisions and avoiding human like errors. Artificial intelligence has been adopted in some sectors more widely than others. Banking sector is amongst the few sectors that had shown moderate level of acceptance and adoption of this technology.

Dr. Simran Jewandah (2017), Associate professor, Chandigarh University. How Artificial Intelligence Is Changing The Banking Sector –There is a growing need to use Artificial Intelligence (AI) and the Indian banking Sector is gradually shifting itself towards using AI. This can be due to the fact that banking is still a manpower-led sector, with operations that require human involvement. Yet the Indian Banking sector understands the need to cut down cost and the expenditure on redundant tasks. The Indian banking sector is exploring the ways by which it can harness the power of AI to improve the processes and enhance the Customer Service in the long run. The paper seeks to explore the areas where the AI is being used in the Banking Sector; the adoption has been gradual, when compared to other sectors.

Devendra Mangani (2017), Sr. Consultant, Bizofit. Article wrote an analysis on influence of artificial intelligence applications in banking sector. Having 12+ years of experience in strategy, business planning, B2B IT sales and raising capital for startups and companies in IT sector. Experience in managing multiple stakeholders and worked with global teams in previous companies including investment bank. He is guest faculty at management colleges and does workshops on design thinking. Devendra brings in strong understanding of research reports and consulting for building research capabilities of Bizofit. He is an IIT Bombay graduate and MBA from Queen's University in Canada.

Tim Sloane (2018), VP, Payments Innovation at Mercator Advisory Group. An overview usage of artificial intelligence in banking. Many different solutions where Artificial Intelligence can enhance banking, but makes it appear these solutions are already widely deployed. While each solution is currently in-market by at least one large bank this is a far cry from broadly deployed. Mercator surveyed large banks and found different cases where Artificial Intelligence solutions deployed in 13 different departments.

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C. Research Gap And Problem Statement

The above review of literature was about how artificial intelligence is being used in banking sector in the Middle East countries and various articles based on artificial intelligence can be applied in the real time banking processes.

None of the studies are focused on the impact of the artificial intelligence in the banking sector of India and its pros and cons by applying artificial intelligence in banking processes.

D. Scope Of The Study

This study is focused on the analyzing the impact of the artificial intelligence in the banking sector of India, further it can be analyzed, whether it had similar impact on banking sector of different regions across the globe and global market. This study focused on advantages, disadvantages and opportunities associated with use of artificial intelligence in banking sector, but it does not include risks associated with it and challenges faced during its implementation as well as operations.

E. Objectives of The Study

1) To study the framework of Artificial Intelligence used by the banks.
2) To study the role of Artificial Intelligence in Indian Banking Sector.
3) To study the advantages, disadvantages and challenges of Artificial Intelligence in Indian banking sector.

F. Research Methodology

1) *Sources of Data:* The research is based on a contemporary topic that is artificial intelligence and how it is impacted on the banking sector. This research is a qualitative method of data collection and analysis seems relevant and the data collected has been collected from authentic and reliable sources. The research focuses on Artificial Intelligence being used by banks, and its application in the Banking Sector and how it impacts the overall banking sector in India. The research was to know importance of using Artificial Intelligence especially in the Banks to reduce the dependency on the human element and to improve the productivity and efficiency, also to understand what the possible implications of the use of artificial intelligence can be.
2) *Period of the Study:* The period of the study is considered for 10 consecutive years.

G. Limitations Of The Study

1) The study is about the usage of artificial intelligence.
2) This study pertains to Indian banking sector.
3) Study is about how artificial intelligence impacts the banking sector in India.
4) Focused on the areas where artificial intelligence can be applied.

II. INTRODUCTION TO ARTIFICIAL INTELLIGENCE FRAMEWORK

Banking artificial intelligence is the technology that makes interpretation and decisions that used to require direct human involvement. Artificial intelligence combines amounts of data with fast and iterative processing and intelligent algorithms, allowing artificial intelligence to learn automatically from the patterns. There are subfields to build the artificial intelligence technology framework. The major subfields are as follows,

A. Machine learning is the one which automates the analytical model building. It uses methods from the neural networks, statistics, and operations research to find the hidden insights in the data without revealing explicitly how it is programmed to find out from where it is being processed.
B. Neural network is a type of network which is made up of small units (like neurons) into a complex network that processes information by responding to the external inputs, relaying with the each unit. This process requires multiple iterations to find the exact meaning for the external request from the undefined data.
C. Cognitive computing is the subfield of the artificial intelligence that strives for the natural human like interactions with the machines. The main aim is to simulate human intelligence with the help of the sophisticated algorithms.
D. Natural language processing (NLP) is the ability of computers to analyze, understand and generate human language, including speech. The next stage of NLP is natural language interaction, which allows humans to communicate with computers using normal, everyday language to perform tasks.

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III. ARTIFICIAL INTELLIGENCE FRAMEWORK USED BY BANKS

Every industry has a high demand for AI capabilities and one which industry is the Banking industry. Artificial Intelligence enhances the speed, precision and effectiveness of human efforts. In financial institutions, AI techniques can be used to identify which transactions are likely to be fraudulent, adopt fast and accurate credit scoring, as well as automate manually intense data management tasks. Changing regulatory compliance requirements and shifting customer demands mean a bank's survival flexibility on its ability to search the relevant insight from all available data. In fact, the efficient and effective use of data is critical to addressing many issues today's banks face, combating fraud and financial crimes, managing credit and regulatory risk, enhancing the customer experience and generating sufficient capital. A partnership between humans and machines each augmenting the other holds the most promise for successfully achieving compliance and meeting customer needs.

In various ways the technology has impacted in various sectors of the businesses, and one which is banking industry. The framework of the Artificial intelligence used by the banks will enhance the effectiveness of the banking processes. The sophisticated algorithms of artificial intelligence used by the banking industry will make the banking to take the right decisions. The compliance in the banking sector will be concrete which results in effectiveness and efficiency in the banking processes.

IV. INTRODUCTION OF ARTIFICIAL INTELLIGENCE TO INDIAN BANKING SECTOR

Artificial Intelligence is one the fastest adopting technology in the banking sector. In India the adoption of the artificial intelligence will enhance the economic growth and improvement in the reliability on the banking services. Banks play a very important role in the development of the financial life of the modern society. Banks helps their customers to track their expenditures over savings to earn interest for a safe future. The banking industry plays such a major role in the development of world's economy it is very important that each and every financial transaction done through the banks must be properly documented. To do this, the banks primarily use computers, where they have a detailed record in their databases. Some of the various channels that banks use for their operations are through ATM's, mails, telephone banking, online banking and mobile banking. It is mind boggling to know that the entire banking system is so well connected that each and every transaction can be tracked and any exchange of information can be done from any part of the world just by connecting to these networks. This smooth operation of the banking world that is done through computers and networks is possible only because banks use Artificial intelligence.

Artificial Intelligence will empower the banks to completely the redefine the processes they perform. It includes operations, financial instruments, and services. The most important process is customer experience.

V. ROLE OF ARTIFICIAL INTELLIGENCE IN BANKING

The most essential part of this industry is Artificial Intelligence in banking. It has a profound impact when the machine learning in banking industry can interact with humans by making decisions and in a convincing way encourage customers. The main aim of having Artificial Intelligence in the banking industry is to get insight into the customers preferences, to ensure that the customers are happy with the services provided by the banks and help the customers understand their expectations from the banks**.** Most of the banks have started embracing AI and related technologies worldwide. As per the survey by National Business Research Institute, over 32% financial institutions use AI by the means of voice recognition and predictive analysis. Banks are using AI technology for enhancing the customer experience by giving it a personalized touch. Most of the millennia's rely heavily on mobile banking, which means that AI-powered banking mobile apps can attract them. Such apps can readily meet the user's expectations with personal, contextual, and predictive services. These are intelligent apps that can track the user's behaviors and give those personalized tips and insights on savings and expenses. Artificial Intelligence has immense potential in banking sector. It brings automation and simplifies the processes. Some of the processes where artificial intelligence is applied are,

1) *Process Optimization And Cost Reduction***:** The main thing which banks focuses is profitability, Banks heavily rely on the capital optimization, and in order to make it artificial intelligence is applied. So that algorithms will work on the huge data to make statistical analysis and mathematical calculations and bring out the outcomes which are required by the banks accordingly in order to make decisions.
2) *Lending Plans And Credit Scoring:* The banks runs its organizations through lending the money to the customers who are in need. Behind the lending of the money through bank to a party involves various parameters to be considered, one of which is credit scoring. The credit scoring is the numerical quantity which determines whether the money should be loaned to a customer or not. Through artificial intelligence calculating the credit scoring has become efficient. It has huge potential to synthesize and analyzes the data with in short span of time. Credit scoring involves each and every transaction of a customer to be considered which involves huge data transactions are needed to be considered.

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3) *Fraud Detection In Banking:* In banking fraud may include forging of checks or may be using of the stolen credit cards or may be authentication of the passwords. In order to have to control and overlook those knee-jerk situations for the banking sector AI has proven extremely applicable to security and fraud detection use cases. Machine learning algorithms can analyze thousands of data points in real time and flag suspicious or plain-right fraudulent transactions, stopping many fraudulent claims in the process. The immediate course of action will be able to take by the banks in order to stop the suspicious transactions. Fraud detection with artificial intelligence will helps the banks to increase the customer reliability.

A. *Advantages Of Artificial Intelligence In Indian Banking Sector*

Though the artificial intelligence is in its nascent stage in banking and finance sectors of India, The impact of artificial intelligence will have a bigger footprint in the coming years and there are many advantages by applying the artificial techniques for banking sector.

1) Artificial Intelligence automates repetitive learning and discover through the data. But artificial intelligence is different from hardware-driven, robotic automation. Instead of automating manual tasks, AI performs frequent, high-volume, computerized tasks reliably and without collapsing. For this type of automation, human intervention is still essential to set up the system and ask the right questions.
2) In most cases, artificial intelligence will not be sold as an individual application. Rather, products already in use will be improved with artificial intelligence capabilities, much like Alexa was added as a feature to a new generation of Amazon products. Automation, conversational platforms, bots and smart machines can be combined with large amounts of data to improve many technologies at home and in the workplace, from security intelligence to investment analysis.
3) Artificial intelligence adapts through progressive learning algorithms to let the data do the programming. AI finds structure and regularities in data so that the algorithm acquires a skill. The algorithm becomes a categorize or a predictor. So, just as the algorithm can teach itself how to play chess, it can teach itself what product to recommend next online. And the models adapt when given new data. Back propagation is an AI technique that allows the model to adjust, through training and added data, when the answer still needs to be improved.
4) Artificial Intelligence analyzes more and deeper data using neural networks that have many hidden layers. Building a fraud detection system with five hidden layers was almost impossible a few years ago. All that has changed with incredible computer power and big data. You need lots of data to train deep learning models because they learn directly from the data. The more data you can feed them, the more accurate they become.
5) Artificial Intelligence systems can be used to develop a framework to help ensure that regulatory requirements and rules are met and followed. Through machine learning, these systems can be programmed with regulations and rules so as to serve as a watchdog to help spot transactions that fail to adhere to set regulatory practices and procedures. This helps ensure real-time automated transaction monitoring to ensure proper compliance with established rules and regulations.
6) The application of Artificial Intelligence, providers of financial services are enabled to efficiently provide their services while also saving resources like time, money and human effort. By using Artificial intelligence systems to perform functions like customer service and data processing, resources like money and human labor can be saved or diverted to other sections of the company. This helps with lowering company running costs and improving all-round efficiency.

B. *Disadvantages Of Artificial Intelligence In Banking Sector*

In order to drive the Indian banking sector through technological transformation and digitalization there needs to be up gradation of the existing services of banking. Due to applying these technologies driven services there will some disadvantages at the introduction of these new paradigms shifts. Though its seems to have negative impact at beginner stage but for a long period of time these hardships will be accustomed and will strive to implement more and more technologies in order to stay updated from traditional practices of financial services. Artificial intelligence is also expected to massively disrupt banks and traditional financial services. Some of its disadvantages are listed below,

1) Production and maintenance of artificial intelligence demand huge costs since they are very complex machines. AI also consists of advanced software programs which require regular updates to meet the needs of the changing environment. In the case of critical failures, the procedure to restart the system and recover lost codes may require huge time and cost.
2) Though, The Artificial Intelligence can learn and improve, it still can’t make judgment calls. Humans can take individual circumstances and judgment calls into account when making decisions, something that AI might never be able to do. Replacing adaptive human behavior with AI may cause irrational behavior within ecosystems of humans and things.

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3) Replacement of the workforce with machines can lead to wide-reaching unemployment. Moreover, if the use of AI becomes rampant, people will be highly dependent on the machines and lose their creative power. Unemployment is a socially undesirable issue. Individuals with nothing to do can lead to the devastating use of their minds.

4) Artificial intelligence cannot be improved with experience. With time, it can lead to wear and tear. It stores a lot of data but the way it can be accessed and used is very different from human intelligence. Machines are unable to alter their responses to changing environments. We are constantly bombarded by the question of whether it is really exciting to replace humans with machines. In the world of artificial intelligence, there is nothing like working with a whole heart or passionately. Care or concerns are not present in the machine intelligence dictionary. There is no sense of belonging or togetherness or a human touch. They fail to distinguish between a hardworking individual and an inefficient individual.

VI. CHALLENGES OF ARTIFICIAL INTELLIGENCE IN BANKING SECTOR OF INDIA

A wide implementation of a high-end technology like AI in India is not going to be without challenges. From the lack of a credible and quality data to India's diverse language set, experts believe a number of challenges exist for the Indian banking sector using AI. Artificial intelligence is going to change every industry, but we have to understand its limits.

A. The principle limitation of AI is that it learns from the data. There is no other way in which knowledge can be incorporated. That means any inaccuracies in the data will be reflected in the results. And any additional layers of prediction or analysis have to be added separately.

B. Today's Artificial Intelligence systems are trained to do a clearly defined task. The system that plays poker cannot play solitaire or chess. The system that detects fraud cannot drive a car or give you legal advice. In fact, an AI system that detects health care fraud cannot accurately detect tax fraud or warranty claims fraud.

C. In other words, these systems are very specialized. They are focused on a single task and are far from behaving like humans. Likewise, self-learning systems are not autonomous systems. The imagined AI technologies that you see in movies and TV are still science fiction. But computers that can probe complex data to learn and perfect specific tasks are becoming quite common.

D. Artificial Intelligence based applications to date have been driven largely by the private sector and have been focused primarily in consumer goods. The emergent scale and implications of the technology make it imperative for policymakers in government to take notice.

E. Early lessons of AI success in the United States, China, South Korea, and elsewhere offer public and private funding models for AI research that India should consider. The sequential system of education and work is outdated in today‘s economic environment as the nature of jobs shifts rapidly and skills become valuable and obsolete in a matter of years.

F. A key challenge is the availability of the right data. Data is the lifeblood of AI, and any vulnerability arising from unverified information is a serious concern for businesses. Imagine for example, the risks that could arise from KYC compliance AI systems if the data sources are incorrect. Or consider the efficacy of a fraud detection AI system without the right kind of data. Structured mechanisms for collecting, validating, standardizing, correlating, archiving and distributing AI relevant data is crucial.

G. India has 150+ languages with various proportions of spoken population. Applications which use speech to text or text to speech rely on natural language processing (NLP) libraries and techniques. Banks can use the existing technologies to start with to support some major Indian languages, but in order to effectively reach out to wider population in India. Much more progress is required on Natural language processing area.

H. One of the important challenges that is faced by Industry and not just banks in India is unavailability of people with right data science skills. With only small number of good data scientists available to do AI work, the industry needs to work with universities in India to develop skilled data scientists as well as develop in-house training programs to train employees on data science skills. Also identification of right use cases for AI implementation with the help of domain experts and data scientists can help banks in successful implementation of AI technologies for banking functions.

The introduction of artificial intelligence in Indian banking sector will have major impact in positive way, if the above stated challenges are addressed in a way to turn them into opportunities and to make the whole banking and financial services more sophisticated and robust.

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VII. FINDINGS, SUGGESTIONS AND CONCLUSION

A. Findings

Throughout the study of how artificial intelligence has impacted the Indian banking sector and also various ways to apply A.I technology. The below are the some of the areas where artificial intelligence can be used.

1) Personalized financial services are the one which focuses on the personalized connect with the customer to provide the automated financial advices and also provide expertise in assistance for making financial decisions. It also analyzes the market volatility and recommends the suggestions for the user's to manage their portfolios and to achieve the financial goals.

2) Digital wallets are promoting as the future of real-world payment technologies, with major players like Google, Paytm, PhonePe and others, stepping towards to take initiatives in order to develop their own payment gateways. This decreases the dependence on physical form of the cash and thereby expanding the reach of money to greater levels.

3) Physical presence is slowly fading away as technology empowers customers to use banking services with voice commands and touch screens. The natural language technology can process queries to answer questions, find information, and connect users with various banking services. This reduces human error, systemizing the efficiency.

4) Customers issues related to banking sector will be resolved efficiently, as speech processing and natural language processing technologies will be upgraded. We are getting closer to the day, when computers could handle most customer service queries. This would make the end to waiting in line and hence resulting in effective customer service.

5) The artificial intelligence has its impact on banking sector in India. The major players of the banking sector are implementing the artificial intelligence technology in some of its processes in order to make banking more efficiently, thus banking sectors will have more time invest various other tasks to improve banking businesses and freeing from the tedious tasks. The implementation of the artificial intelligence across globe is increasing rapidly in various sectors.

B. Suggestions

The application of Artificial Intelligence in Indian banking sector is although in the nascent stage, but there are many opportunities while applying in the various banking services.

Driving the banking sector with the technology will enhance the banking processes in various ways like, preventing them from the cyber threats and maintaining the authenticity of the customer's information in order to access whenever it is needed.

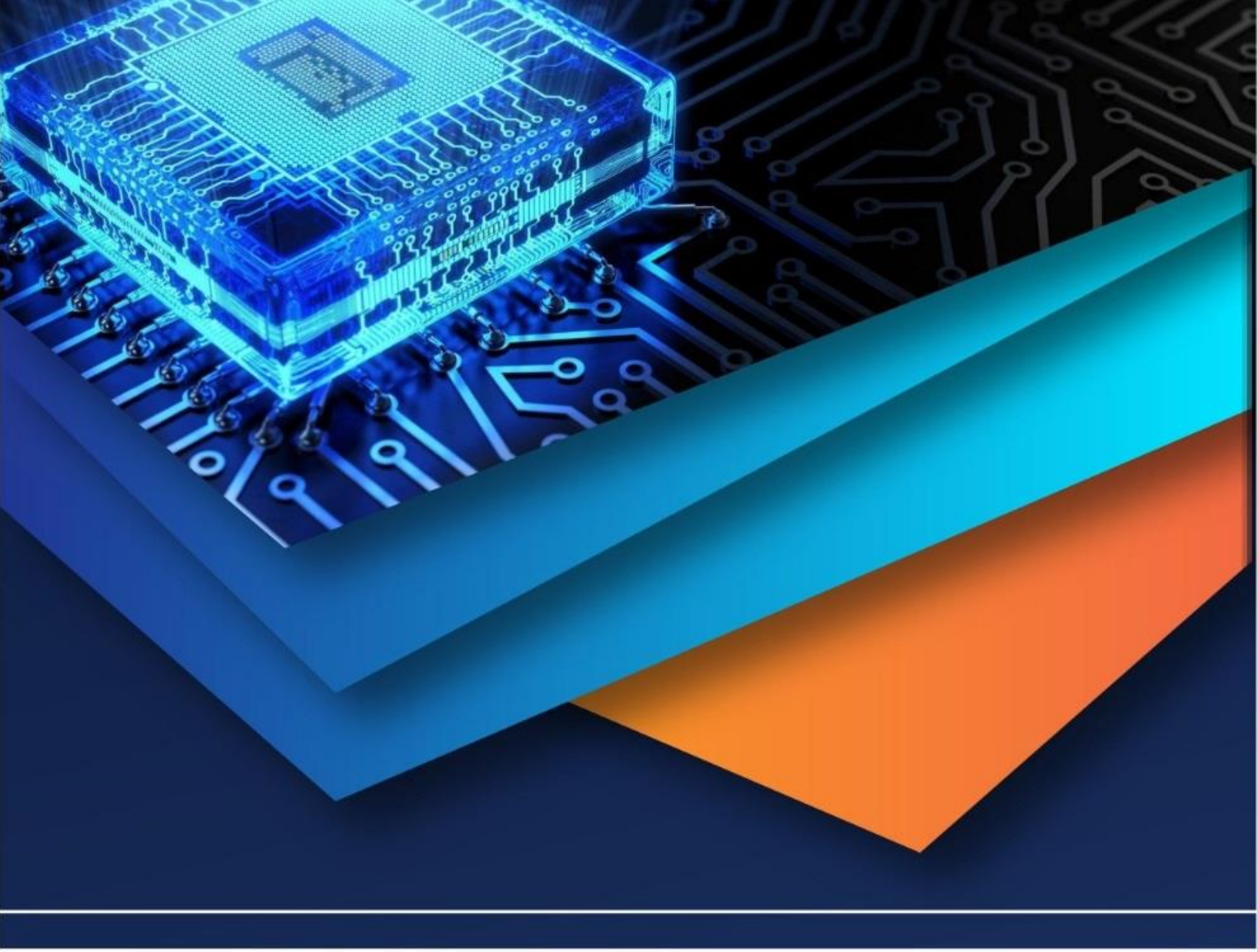
The future substantially will be driven by the various technologies in many sectors, in order to transform the traditional methods with the usage of the new technologies will increase the productivity in the banking sector. Initially the implementation of the technologies will be cost effective, but it can be compensated in process optimization and will increase the efficiency banking processes. In order to face the difficulties in future without adapting of the new technologies in banking sector, the best way is to adapt with these technologies and thus making those difficulties as opportunities in future which helps to grow as robust and reliable banking sector.

C. Conclusion

The Artificial Intelligence impact on the banking sector of India is although in its nascent stage. The digitalization and technological trends is rapidly increasing in all sectors especially in the banking sector. The artificial intelligence is replacing the traditional banking with adopting of new technologies like artificial intelligence, cloud computing and many more.

Artificial Intelligence is gaining popularity day by day and banks are exploring and implementing this technology in transforming the way customers are assisted. So, the future of Artificial Intelligence in banking sector is very bright and with the introduction of Artificial Intelligence, it makes it even easier for a customer to do transactions from any place and at any time without waiting in long queues for long time at the banks. Hence, the aim of Artificial Intelligence is to provide personalized and high-quality customer satisfaction along with efficient and time saving services.

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