



Role of Artificial Intelligence in Bank Payment Applications

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Abstract

The banking industry has become the major adopter of artificial intelligence (AI) technology. The penetration of AI technology in this industry has especially increased with the advent of Internet or online banking and self-service branch networks. Natural language processing (NLP) and machine learning systems are being used to automatically and reliably respond to customer queries, monitor saving and spending trends, and make disbursements on behalf of customers among other use cases. Automation of repetitive processes and tasks could save costs, minimize human error, and allow staff to focus their energy on more value-adding operations.

Objective: The main aim of the study is to find the role of Artificial Intelligence in the bank payment applications.

Methodology: The descriptive research study is carried out with a well-structured questionnaire containing 5-point Likert scale. The sampling technique used is simple random sampling in Chennai city with 110 respondents. The statistical tools used are Factor analysis and cluster analysis.

Key findings: The three main components show the integrity in performing the Payment process through the AI based applications that help in the Processing of transactions and further the results are given in descriptive form

Implication/Significance: The major implication is that the use of all these technologies should be more precisely available for the digital users in their regional languages in order to avail the full benefit out of it. The increase in the technology and all these services will drive away the usage of the digital payment in an drastic manner.

Keywords: Artificial Intelligence, Banking, Chat bot, Machine Learning, and Technology.

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Introduction

Banks are also increasingly leveraging big data analytics systems powered by AI and machine learning to offer quicker and personalized customer services and experiences. With customers being the major driver of any service industry, AI may be used to gain a greater understanding of the needs and behaviours of customers. Consequently, banks leverage the increased understanding of consumers in order to personalize their products and services. Other than customer-facing banking applications, big data analytics systems may be used to enable banking executives and managers to make more informed decisions concerning various internal business processes, operations, investments, risks, resource utilization, and so on. Other compelling use cases of big data analytics and machine learning include facilitating the detection of fraudulent transactions, improving internal policy and legal or regulatory compliance, offering secure transactions, and predicting future outcomes. Therefore, AI technology is adequately mature to be deployed in the banking sector. Banks are harnessing it to streamline business processes, optimize service efficiency, enhance customer experiences, build strong customer relationships, foster business growth and competitiveness, and quickly respond to internal and external changes. However, banks' adoption of AI systems comes with a number of challenges. Generally, AI-based systems are widely recognized as a real threat to societies. Massive implementation of AI systems in the banking sector implies increased automation of various tasks. Consequently, employees who stand to be affected by task reassignments and employment termination may react with hostility and resign. Alternatively, affected employees could become dissatisfied and inefficient. Moreover, advances in neural networks and deep learning tools have made AI-based systems to be better than human decision-makers. Nevertheless, AI systems often do not demonstrate how they generate their conclusions. Consequently, banking executives and managers may be exposed to costly biases in their decision making. Moreover, people with the right AI competence would need to be hired to tackle potentially hidden biases in the course of data analysis and decision-making processes. Moreover, extensive automation of customer facing processes and subsequent reduction of customer contact could erode the emotional "human touch". Consequently, customer trust, satisfaction and loyalty may be badly ruined. In addition, customer loyalty could be adversely affected because of potential digital divide. The socio-economically deprived customers may not embrace AI-based systems and associated banking services. Therefore; banks have to ensure that the needs, perceptions, motivations, and limitations of various groups of customers are adequately considered prior to the implementation of AI-based systems.

Literature Review

The rudimentary applications AI include bring smarter chat-bots for customer service, personalizing services for individuals, and even placing an AI robot for self-service at banks. The rudimentary applications AI include bring smarter chat-bots for customer service, personalizing services for individuals, and even placing an AI robot for self-service at banks. The rudimentary applications AI include bring smarter chat-bots for customer service, personalizing services for individuals, and even placing an AI robot for self-service at banks. Beyond these basic applications, banks can implement the technology for bringing in more efficiency to their back-office and even reduce fraud and security risks. The rudimentary applications AI include bring smarter chat-bots for customer service, personalizing services for individuals, and even placing an AI robot for self-service at banks

Puri Lakshkaushik (2022) the rudimentary applications AI include bring smarter chat-bots for customer service, personalizing services for individuals, and even placing an AI robot for self-service at banks. Beyond these basic applications, banks can implement the technology for bringing in more efficiency to their back-office and even reduce fraud and security risks. Chatbots, personalized customer service, handle risk management, compliance, fraud detection, AML (Asset Liability Management) pattern detection, process automation, cost reduction, voice assisted banking, algorithmic trading, predictive analysis and wealth management for clients.

Ahmad Ghandour (2021) the key banking industry stakeholders have to formulate appropriate strategies aimed at overcoming existing and prospect AI challenges. Among the AI challenges that should be prioritized we include the following: job loss and user acceptance concerns, privacy breaches, creativity and adaptability loss, restrictive implementation and operational requirements, digital divide, availability of vast quality data, AI-business strategy alignment, and loss of emotional “human touch”.

Geetha (2021) Banks and other financial institution can mine the financial transaction data generated by the proliferation of digital payments and banking to better monitor, predict and respond to consumer behaviour. The study concluded that the customers more commitment from representatives to the banking and financial services by giving development innovative preparing to improve the AI procedures in the workplace.

Dr.C.Vijai (2019) in his article explained that “how Artificial intelligence is changing business processes and customer-facing services in the banking sector in India. It is also being used to meet regulatory compliance, detect fraud, and assess individual creditworthiness. The application of AI has the potential to create more efficient business processes, offer personalized services, and assist in larger goals such as financial inclusion.”

Margaret A. Boden (2019) concluded in her research paper that some creative ideas have already been generated by AI-programs, though usually by merely exploratory (or combinational) procedures. Transformational AI-originality is only just beginning. The two major bottlenecks are domain-expertise, which is required for mapping the conceptual space that is to be explored and/or transformed; and Valuation of the results, which is especially necessary-and especially difficult-for transformational programs

Research Gap

Literature review reveals that many numbers of studies have been carried out to study the artificial intelligence and the key indicators. Researchers have also analysed the factors relating to the Artificial Intelligence among various sectors. Many research studies have focused on the AI and its uses in various fields. There were very limited research studies based on the consumer’s aspect towards the impact and role of Artificial Intelligence.

Objective of the Study

The main aim of the study is to find the role of Artificial Intelligence in the bank payment applications that enable the convenience and ease for the customers.

Research Methodology

Table-1 Research methodology	
Research Design	Descriptive
Sampling Technique	Simple Random Sampling
Sampling area	Chennai city
Sample Size	110
Research Instrument used	Self-designed structured printed questionnaire with scored using a five - Point Likert scale
Data collection tools	Primary data- Questionnaire Secondary data- Journals.
Period of Study	June- August 2023
Statistical Techniques	Factor Analysis, Cluster Analysis, Frequency Statistics, Reliability Analysis
Source: Compiled by Authors	

Results and Discussion

Reliability Analysis

Table-2 Reliability Statistics	
Cronbach's Alpha	N of Items
0.946	20
Source: Primary Data Analysis	

Interpretation:

Table 2 shows the data reliability which is studied using the Cronbach's alpha and the alpha score is 94.6% i.e. is approximated to 95% which is at an acceptable level.

Table-3 Demographic Profile		
Age		
Age in Years	Frequency	Percent
18-25 years	53	48.2
26-35 years	29	26.4
36-45 years	25	22.7
46-55 years	1	0.9
Above 55 years	2	1.8
Total	110	100.0
Gender		
Male	43	39.1
Female	67	60.9
Total	110	100.0
Educational Qualification		
Under Graduate	55	50.0

Post Graduate	28	25.5
Professional Course	11	10.0
Doctorate	11	10.0
Others	5	4.5
Total	110	100.0
Occupation		
Salaried	42	38.2
Business	34	30.9
Student	14	12.7
Home maker	1	.9
Others	19	17.3
Total	110	100.0
Annual Income		
Less than 200000	14	12.7
200001-300000	76	69.1
300001-400000	12	10.9
400001-500000	8	7.3
Total	110	100.0
Source: Primary Data Analysis		

Interpretation:

The above table shows the demographic profile of the respondents. The majority of the respondents are from the age group of 18-25 years. 26.4% of the respondents are from the age group of 26-35 years, 22.7% of the respondents are from the age group of 36-45 years, 0.9% of the respondents are from the age group of 46-55 years and the rest of the respondents were from the age group of above 55 years. The gender of the respondents clearly explains about the majority of the respondents were female and the 39.1% of the respondents were male respondents. Majority of the respondents were under graduates, 25.5% of the respondents were post graduates, 10% of the respondents were professionals, and the other 10% of the respondents were doctorates and the other 5% of the respondents were in other categories. The occupation of the respondents clearly explains that 42% of them are salaried, 30.9% of the respondents are business people, 12.7% of the respondents are students and 0.9% of the respondents are home makers. 69.1% of the respondents are from the income group of Rs.200001- Rs. 300000. 12.7% of the respondents are from the income group of less than Rs. 200000. 10.9% of the respondents are from income group of income group of 300000-400000. Remaining respondents were from the income group of Rs.400000-Rs.500000.

Factor Analysis

Table-4 KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.907
Bartlett's Test of Sphericity	Approx. Chi-Square	1428.180
	Df	190
	Sig.	.000
Source: Primary Data Analysis		

Interpretation:

The above table shows the KMO score of 90.7% is highly acceptable one and therefore the factors with fewer score can be dropped till the overall KMO rose above 91% and the acceptable factors were selected for the study.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.968	49.841	49.841	9.968	49.841	49.841	5.271	26.354	26.354
2	1.446	7.231	57.072	1.446	7.231	57.072	4.022	20.112	46.466
3	1.215	6.076	63.147	1.215	6.076	63.147	3.336	16.681	63.147

Extraction Method: Principal Component Analysis.

Source: Primary Data Analysis

Interpretation:

In the above table it is observed that the 20 variables are reduced to 3 predominant factors, with cumulative variance 63.147%. These 3 factors individually possess the variance as stated below: Preventive Factors (49.841) Safety Factors (7.231) Facilitating Factors (6.076).

Component Matrix

Factors	Components	Component		
		1	2	3
Preventive Factors	Real Time Processing	.895		
	Fraud Detection and Prevention	.834		
	Visual Image Recognition	.792		
	Assist in financial planning and recommendation	.788		
	Prevents anti money laundering	.777		
	Predictive Modeling	.773		
Safety Factors	Authenticated Transactions		.703	
	Enhancing Approval Process		.639	
	Improved Compliance		.634	

	Valuable insights from record speed derived		.625	
	Automated Decision making		.623	
	Cyber security		.618	
Facilitating Factors	Virtual assistant to monitor transactions			.609
	Expedite Document Management with OCR			.596
	Optimize client conversations			.591
	Personalised Reminders for bill payment			.559
	Customer service engagement Using Chat bot			.546
	Reminder for suspicious activity			.534
	Enhanced Security Measures			.523
	Speed Up Transactions			.515
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 7 iterations.				
Source: Primary Data Analysis				

Interpretation:

The table shows that two components were extracted from the component analysis. Component 1 which is labelled as preventive factors comprises of factors like Real Time Processing, Fraud Detection and Prevention, Visual Image Recognition, Assist in financial planning and recommendation, Prevents anti money laundering, Predictive Modeling, where real time processing has the highest score of 0.895.

Component 2 which is labelled as safety factors comprises Authenticated Transactions, Enhancing Approval Process, Improved Compliance, Valuable insights from record speed derived, Automated Decision making, Cyber security where authenticated transactions has the highest score of 0.703.

Component 3 which is labelled as facilitating factors comprises of Virtual assistant to monitor transactions, Expedite Document Management with OCR, optimize client conversations, Personalised Reminders for bill payment, Customer service engagement Using Chat bot, Reminder for suspicious activity, Enhanced Security Measures, Speed Up Transactions where virtual assistant to monitor transactions has the highest score of 0.609.

Cluster Analysis

Table-7 Final Cluster Center		
	Cluster	
	1	2
Speed Up Transactions	1	2
Fraud Detection and Prevention	2	2
Enhancing Approval Process	2	3
Real Time Processing	2	3
Authenticated Transactions	2	3
Personalised Reminders for bill payment	2	3
Prevents anti money laundering	2	3
Reminder for suspicious activity	2	3
Optimize client conversations	2	3
Expedite Document Management with OCR	2	3
Improved Compliance	2	3
Automated Decision making	2	3
Enhanced Security Measures	2	3
Customer service engagement Using Chabot	2	3
Virtual assistant to monitor transactions	2	3
Assist in financial planning and recommendation	2	3
Cyber security	2	3
Valuable insights from record speed derived	2	3
Visual Image Recognition	2	3
Predictive Modeling	2	3
Source: Primary Data Analysis		

Interpretation:

The factor component identified through factor analysis which comprises 20 factors which plays a high role in the bank payment applications was clubbed into 2 factors which describe the clusters by their variables.

Table-8 Number of Cases in each Cluster		
Cluster	Highest Influencing Role	83.000
	Lowest Influencing Role	27.000
Valid		110.000
Source: Primary Data Analysis		

Interpretation:

The number of cases in each cluster illustrates the split of cases into clusters. Large number of cases was assigned to the first cluster in which the highest influencing role in the bank payment applications. The first cluster is named as highest influencing role and the second cluster named as lowest influencing role of AI in bank payment applications. There are 83 respondents in highest influencing role in the bank payment applications and 27 respondents in the lowest influencing role of AI in the bank payment applications.

Findings from the Study

Demographic profile: The majority respondents for the study was female from the age group of 18-25 years have completed their Under-graduate and are salaried with the earnings of Rs.200001- 300000.

Factor Analysis: Three components were extracted from the factor analysis. The first factor labeled as preventive factors with real time processing as the most influencing component, the second factor labeled as safety factors with authenticated transactions as the most influencing component and the third factor labeled as facilitating factors with virtual assistant to monitor transactions as the most influencing component.

Cluster Analysis: The factors are further analyzed with the K- means cluster analysis. There are 83 respondents who report highly influencing role, 27 respondents who report low influencing role towards the role of AI in payment applications.

Concluding Observation and Suggestions

The security of mobile payments relies heavily on the robustness of authentication and registration controls configured within the design AI in the use of individual mobile payment services. Strong customer authentication is a procedure based on the use of two or more of the following elements categorised as knowledge, ownership and inherence: (i) something that only the user knows (ii) something that only the user possesses. These two must be kept in a careful way in order to prevent from the risks and challenges pertaining to the payment applications using the Artificial Intelligence.

Scope for Future Research

The researcher has highlighted some of the key points relating to artificial intelligence in the payment applications. The future researchers can focus on many other factors like the reasons for using the AI and also the challenges faced by the experts in implementing it and the rectification of the challenges from the part of the concern or from the banks.

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