

# ROLE OF AI-INDUCED CHATBOT IN ENHANCING CUSTOMER RELATIONSHIP MANAGEMENT IN THE BANKING INDUSTRY

Meganathan Kumar Satheesh, Nagaraj Samala and Raul Villamarin Rodriguez

*School of Business, Woxsen University, India*

## Abstract

*Customers are less satisfied with the prompt services provided by the banks. They also feel that guidance to use the bank's products and services is not adequately explained. When they ask for information or report any issues, the process is not easy. On the other hand, handling millions of customers with limited bank employees is a tedious process. The bank employees are also exhausted to answer to the same repetitive questions for a long time. The customers are comfortable with the answers, and the bank employees are also tired of the same routine of giving the same answers to different customers. This unpleasant situation will weaken the relationship between the banks and the customers. This paper will discuss how AI-induced chatbots improve customer interaction and how chatbots play an essential role in customer relationship management in the banking industry. The AI-induced chatbot certainly enhances the customer relationship with the banks.*

## Keywords:

*Artificial Intelligence, Banking, Chatbot, Customer Experience, Customer Relationship Management*

## 1. INTRODUCTION

Among the various advanced innovations for the industrial revolution, Artificial Intelligence (AI) was first reported in the Summer Project report prepared by John McCarthy's Dartmouth in 1956. This state-of-the-art technology that performs activities requires human thinking and facilitates many services, namely, AI-based face recognition, AI-induced voice recognition, Natural language processing, and robotic processes [1].

Natural language processing (NLP), which also has another name called computer linguistics, was focused by the research community in 1980 to develop an algorithm for data that was readily available in plenty. Initially, this language process was introduced to deal with large amounts of data with the help of the statistical model. Then machine learning has become widely used for the term big data [2].

Three critical components take place in the architecture of the dialogue system, the first natural language understanding system that is responsible for decoding the message sent by the user and transmitting it into the other system for further processing. Second, the dialogue managing system that is used to track the context from which the output is extracted and third, natural language generating, shows the final output into natural language [4]. Machine learning techniques are used nowadays to deal with the system that understands the linguistic structure of the human dialogue with respect to semantic and syntactic information [2].

The service industry is different from the manufacturing industry because it copes with products that are not tangible [12] and cannot be stored. New technology makes the service industries efficient and effectual [18], which leads to better customer experience. Customer-oriented service is essential to

gratify the customers, which delivers more options and guidance to the customers for better customer experience. Service industries have the responsibility to render the services that fulfill the expectation of the services. Customer service is a critical factor in making a profit in the service industry. It demands billions of dollars per year spent by the companies to alter the existing perception in the customers' minds. Employees dealing with customer service have been facing repetitive queries, and they cannot answer beyond the office hours, paving the way for automatic customer services [13].

## 2. LITERATURE REVIEW

### 2.1 BANKING INDUSTRY

The banking industry has been facing more competition across the globe [7], making the banking industry create new services that are preferred by the customers for expanding the banking business [8]. Various reasons affect the profitability of the banks, such as merging and acquisition, incorporation of new technology in the industry, and globalization, making the banking environment more competitive to get the potential customer in the market [9]. Nevertheless, the banks have to make high margin profits to run the business and give returns to the investors [9], making the bank adapt state-of-the-art technologies. The development of electronic banking is one of the examples of technology adaptation. Due to the competition, the customers have a variety of choices to pick the desired banking services that give satisfies the customer with high-quality services at a low cost [7]. There are many difficulties in the banking industry concerning customer service: improper management of the database, lack of updated technology products, and others. Incorporating technology in the banking process will uplift customer service and enhance customer experience [9].

### 2.2 CUSTOMER RELATIONSHIP MANAGEMENT

Customer is a central part of every firm, which indicates that customer should be given more focus than ever before [9]. Research conducted in social psychology and marketing shows that the customer maintains different relations with the banks [7]. As mentioned earlier, customers should be given more attention by banks because of the contribution from the customers evaluates the business triumph. Customer relationship management is a process that deals with the needs and demands of the customer by collecting the information about the customers to analyze consumer behavior [8] that can be perceived well if the customer actions are observed [10]. Customer relationship management helps not only to improve the relationship between the firm and customers but also to brand equity [20].

Maintaining the existing customer, alluring the new customers, persuading the customer to make strong cooperation

with the banking products, and communicating the customers about the banks' latest launching products are the critical reasons for the banking institution to improve the existing customer service. By interacting with the customer, the banks can gather the details about the customer, observe the customer response, and evaluate the customers' perception about the bank. Details thus collected will be comprehensively helpful for marketing activities, mainly, relationship marketing, enriching the competitive advantage against the most competitive banks [8]. Businesses can also collect the data from the customer interactions to provide modified service as per the customer needs, which is fruitful to gratify the customers and strengthen customer loyalty [19].

### 2.3 CHATBOT

Chatbot, also known as "Artificial conversational entity" is a kind of computer program that imitates conversation performed by human beings in text and speech by using artificial intelligence methods. The three AI methods are natural language processing and image processing, video processing, and audio analyzing method [3]. It allows the users to chat with intelligent communication systems that identify the input information from the user [5] and deliver the output based on the query made by the user [3]. There are various types of chatbots available, namely, social chatbots, task-oriented chatbots, and others used for different purposes in the various industries.

Social chatbots are developed to have a trivial conversation like chit-chat conversation, which has been used in psychological treatment. Task-oriented chatbots are bifurcated into two types: generalist task-oriented chatbots and specialist task-oriented chatbots. The former is designed to answer and question the small conversations that can be used to set the alarm clock and give a phone call and short message services. The latter is designed for specific tasks that need domain knowledge to carry out tasks such as booking a flight ticket, ordering the food, and diagnosing the health issues [6].

Based on the architecture of the chatbots, the chatbots are divided into two categories, which are rule-based chatbots and data-driven based systems. The rule-based chatbots deliver dialogue as per the rules assigned to it. Extending the rules to the extreme will help perform the complex task, but it is tedious, sophisticated, and time-consuming. Thus, this kind of chatbot is used for general purposes. For instance, if the user gives input of the following, "Hey," "Hi," "Hello," "Good morning," "Good afternoon," "Good evening," etc. then the chatbot will reply, "Hello" based on the assigned rules. The first rule-based chatbot is developed to imitate the Rogerian psychotherapist, named 'Eliza.' Eliza works based on the principle of pattern and transformation rules. Every transformation rule corresponds to certain keywords that are given a ranking from specific to general, along with highly ranked keywords. For example, the user has stated, "You dislike me" to the rule-based chatbot. It will then match the pattern from the sentence by assigning 0 to the sentence to identify the elements. In this case, this sentence is modified as (0 you 0 me) whereby the word "dislike" is then given 0 to identify as the third element. This third element is used by the chatbot in reply, "Why do you think that I (the third element) dislike you?" After applying the third element, the final output will be, "Why do you think that I dislike you?". The 'Eliza'

chatbot, and the 'Parry' developed for more complex problems in psychotherapy where affecting variables are required such fear, anger, etc.

Data-driven chatbots are the latest one based on the text dataset, especially conversation, which learns to deliver answers from the documents' content, namely, man to man conversation, man to bot conversation, and other forms of human conversations. It is classified into two types as per the usage: information retrieval from database based chatbot and machine learning-based chatbots.

The information retrieval from the database based chatbots work like a search engine model, where the users send the inquiry, and the chatbot provides the answer. On the other hand, machine learning-based chatbots that stimulate conversation like a human being are categorized into two types based on the learning method: reinforcement learning and sequence to sequence learning. Reinforcement learning enables the chatbots to learn like humans by rewarding, either positive or negative, interacting with the environment to observe and learn. Furthermore, the sequence to sequence learning is used by various applications, namely, image caption, machine translation, text summarizing, question-answer system, and speech recognition, representing a logical pattern to use a recurrent neural network. This sequence to sequence-based chatbot comprises an encoder that takes the input from the user and then converts into a vector and a decoder that receives the vector to produce the output [6].

### 3. SCOPE OF AI-INDUCED CHATBOTS IN CUSTOMER RELATIONSHIP MANAGEMENT

The efforts of AI researchers bring forth robot mediated communication that imitates the human conversational language and improves the interpretation of bots [4]. With the advancement of machine learning algorithms, NLP, and speech recognition, a chatbot can be utilized in various platforms. Sony bank has provided the AI-induced chatbot, delivering new value to the customers, in the business environment. Though chatting with robots is hard for the customers, the request information will be obtained in less time. The selection of chatbots is vital because the different scenario needs a different kind of chatbots. Introduction of the chatbots has enhanced the customer experience by improving the present services, smoothing the process of dealing with a large number of customers in providing the information about the offers and benefits of the products like house loans, cards related details, etc. Then, existing customers have given an extended level of convenience from chatbots, such as the promotion of products with sample screening. Finally, the chatbots were streamlined to focus on handling the customers' frequently asked questions that need to be automated due to repeatedly asking the same questions [15]. The question may be the same, but the doubt is different for different customers. Each inquiry needs to be understood to guide the customers, which needs specific intelligence if a chatbot is used. Hence, Finplex robot agent platform is used to answers the query based on an automatic reaction system launched by Fujitsu financial services.

The Finplex robot agent has two elements: the conversation screening system that deals at the user end and the robot element that serves as the response engine. The conversation screening

system enables customers to customize the color and design, tailoring the user interface. In contrast, the robot element in the chatbot system is responsible for dialogue editing that facilitates the customers to select the service required and the thesaurus generation that uses AI to generate the appropriate text with the help of machine learning. The thesaurus generation uses the keywords from the input. For example, if the customer looks for a house loan, the user's input is "pair-home-loan." From the input, the robot agent will understand that a customer is a married person, and double earnings people look for a home loan. This understanding makes the AI-induced chatbot to deliver the output accordingly [15].

The AI-induced chatbots offers various services to the business, including automatic customer service. Applying the speech recognition and NLP, the AI-induced chatbot can address even the complex request from the user [16]. The customer's emotional state should be considered before reply to the customer because the strong relationship between the customers and banks is possible if they are connected emotionally. With the help of customer engagement-related solution-chordship, offered by Fujitsu, the AI-induced chatbot understands the emotional state of the customers from their input. It even delivers rueful statements to calm down the customers [17]. Customer Engagement has been effective in increasing sales, customer satisfaction and customer journey [21] [22]. Engagement is more effectively done using AI based analytics, especially in the banking sector [23].

#### 4. CONCLUSION

As the banking industry depends on the customers, it is better to incorporate state-of-the-art technology in all operations, particularly in customer-related services. Along with the competition within the banks, non-banking institutions have been pressuring the banking industry to stay up-to-date. The better customer experience will lead to improving the bond between the bank and the customers, which is a good sign for business. AI-induced chatbots have produced better conversations with the customers as per the recent studies. Hence, banking institutions should utilize this latest development to enhance customer service and customer loyalty.

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