

HDFC EVA CHATBOT: A CASE STUDY ON ITS POTENTIAL TO REPLACE HUMAN CUSTOMER SUPPORT

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Abstract

Chatbots have been widely adopted by various sectors, and the banking sector is one of them. In the banking sector, efforts are continuously being made to improve chatbots. This study aims to examine the effectiveness, limitations, and capabilities of chatbots, and to observe whether chatbots can fully answer all the questions that human representatives can. An exploratory research method has been employed in this study. The methodology involves asking the chatbot 20 different types of questions, including general queries, basic information, and some complex questions. The results show that while the chatbot can answer general questions, it struggles with complex ones and is unable to provide responses like other chatbots such as ChatGPT, Meta AI, or Gemini, which can offer more precise answers to specific questions. This indicates that there is still significant room for improvement. The biggest improvement needed in banking chatbots is ensuring that the response is relevant and tailored to the user's question, so that the user's time can be saved. Despite these limitations, the HDFC EVA chatbot has proven to be beneficial for customers in several aspects of banking service.

Keywords: Chatbots , Artificial Intelligence ,Eva , Hdfc Bank

INTRODUCTION

Artificial Intelligence:- A computer system or program that can performs tasks in a manner similar to human intelligence is called artificial intelligence (AI). In banking sector Artificial Intelligence is being used in form of chatbots, voice assistant, robots, whatsapp banking etc.

Chatbot: A chatbot is a computer program that simulates human conversation with an end user. Not all chatbots are equipped with artificial intelligence (AI), but modern chatbots increasingly use conversational AI techniques such as natural language processing (NLP) to understand user questions and automate responses to them(Ibm website)¹⁸

Chatbots use Natural Language Processing (NLP) to understand customer queries or questions and respond in a manner similar to a human executive example of popular chatbots are chatgpt, meta ai, gemini.

In the Indian banking sector, some prominent chatbots include:-

SBI's SIA

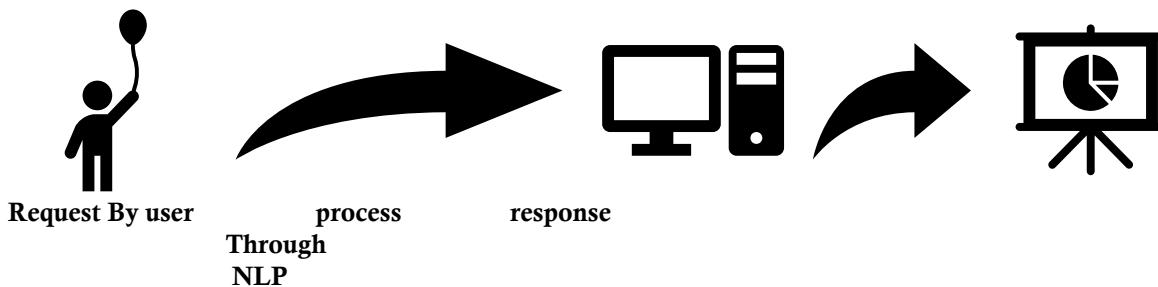
HDFC's EVA

ICICI's IPAL

AXIS AHA

KOTAK
BANK's KIYA

How does chatbot work?



Chatbots are very useful for banking customer as they are 24*7available for customers's queries, they are cost effective, instant reply,easy access to information etc.

Hdfc bank's EVA(Electronic virtual assistant) :- EVA is india's first ai based banking chatbot¹⁹ that can answer millions of customers queries/questions.HDFC bank collaborated with senseforth and launched EVA in march 2017on their website. EVA provides information to its customer about loan,credit card,balance enquiries, account opening ,interest rates ,debit card activation process etc.

OBJECTIVES OF THE STUDY

1. To Evaluate the Accuracy of Responses from HDFC Bank's EVA Chatbot.
2. To investigate whether the Eva chatbot can Replace Human Representatives.

RESEARCH QUESTION

- Does the Eva chatbot provide accurate responses?
- Are the Eva chatbot's responses 100% relevant to customer queries?
- Can Eva chatbot answer complex questions in addition to general inquiries?
- Can Eva chatbot replace a human representative?

IMPORTANCE OF THE STUDY

If the current technical capabilities of chatbots are properly analyzed and improved, this can greatly enhance the customer experience. Therefore, this study is essential to highlight the strengths and limitations of the Eva chatbot.

In India, many people use banks only for depositing money and taking loans because they do not have a platform through which they can access information or ask questions anytime and anywhere. The development of chatbots can solve this problem. With the advancement of chatbots, customers can obtain information related to various banking products, investment services, brokerage services, and other services offered by banks.

REVIEW OF LITERATURE

Singh, N. P., & Singh, D. (2019):- The authors sheds light on the evolution of chatbots, starting from the development of the first chatbot, ELIZA, in 1966 to the present-day chatbots that have been introduced. The article discusses how chatbots work, their features, and limitations. paper also examines the accuracy of chatbots used by Indian banks, finding that Alexa outperforms Indian chatbots in both performance and accuracy.

Galdinus, M. A., Vinoth, S., & Gopalakrishna, C. (2023): The author highlights the chatbot-based services provided by various Indian banks, and also mention their features. He studied that chatbots such as SBI – SIA, HDFC – EVA, ICICI – iPal, Kotak Mahindra – Keya, Axis Bank – Axis Aha, and Yes Bank – Yes Robot have been implemented by these banks since 2017-18.

Huang, K., Chen, X., Yang, Y., Ponnappalli, J., & Huang, G. (2023):-This study emphasizes ChatGPT's significant contribution to the banking and financial industry. how ChatGPT may improve fraud detection, expedite operating procedures, and customize financial services. The chapter also discusses privacy and security issues, including methods to guarantee data confidentiality, lessen hostile attacks, and permit ongoing observation

Rajendran, S. (2024):- The author analyzed HDFC Bank's chatbot service and suggested that the quality of the chatbot service be improved, as well as enhancing security and privacy measures.

Kalyani, S., & Gupta, N. (2023):-the study highlights the successful applications of AI and ML in the banking sector and identifies areas for further use. It also evaluates the scalability of these technologies to address challenges in the evolving banking landscape. Lastly, the study offers guidance for future research in this field.

Umamaheswari, S., & Valarmathi, A. (2023):- The paper describes the chatbot services of SBI, Kotak Mahindra Bank, Andhra Bank, Axis Bank, HDFC Bank, and ICICI Bank. Paper is based on primary data

Narula, G., & Narula, R. (2021):- The paper's main goal was to analyze banking customers' awareness of chatbots. The author found that customers do not feel completely assured that chatbots will replace customer service representatives.

Gupta, A., & Sharma, D. (2019):- The authors observe in their paper that the use of chatbots in banking is continuously increasing. The paper indicates that there is a positive correlation between a positive attitude towards chatbots and factors such as utility, accessibility, and perceived threats.

Abdul-Kader, S. A., & Woods, J. C. (2015):- This paper's literature review examines various studies focused on Chatbot design techniques over the past decade. It presents a survey of nine selected studies, detailing the contributions of each. Additionally, a comparison of the design techniques across these studies is provided.

Ghandour, A. (2021):- author concludes that Chatbots and virtual assistants are being utilized for market trend analysis, portfolio management, digital payments, and resolving customer issues, as well as reducing crowding in branches.

Mulyono, J. A., & Sfenrianto, S. (2022):- The authors analyzed in his paper that during the COVID-19 period, chatbot services benefited customers, but the motive behind these services was not focused on customer satisfaction or customer orientation. He emphasized that developers need to pay attention to the accuracy of chatbot responses, response time, and the relevance of responses to customers.

Eren, B. A. (2021):- he found that Perceived performance, perceived trust and corporate reputation significantly affect customer satisfaction with chatbot use. He stated that For banks, chatbots are an effective method for managing sales and customer services because of their fast and effective communication features. Banks may improve customer satisfaction resulting from chatbot use by enhancing their product and service performance.

Alt, M. A., Vizeli, I., & Săplăcan, Z. (2021):- they stated that The literature on technology adoption in banking is extensive, but chatbot technology remains underexplored. This study addresses that gap by identifying key factors influencing customers' intention to use banking chatbots, using an adapted TAM model that incorporates compatibility, perceived privacy risk, and service awareness. Findings indicate that perceived usefulness and compatibility are significant predictors of usage intention, Yet, perceived ease of use and perceived privacy risk were not found to be significant determinants of behavioral intention.

Kulkarni, C. S., Bhavsar, A. U., Pingale, S. R., & Kumbhar, S. S. (2017):- Recent literature highlights the rise of chatbots in banking as efficient solutions for addressing customer queries, mitigating the limitations of human customer service. By utilizing natural language processing and various classification algorithms, chatbots enhance user interaction and service quality. Studies emphasize the importance of well-curated datasets, such as FAQs from bank websites, in optimizing chatbot performance.

Kalla, D., Smith, N., Samaah, F., & Kuraku, S. (2023):- The author has studied how ChatGPT is being used across various sectors such as academia, jobs, research, etc. The author has also highlighted some of the advantages and limitations of ChatGPT, along with pointing out some of its alternatives.

RESEARCH GAP

Extensive studies have been conducted on the various services provided by chatbots, as well as on their utility and customer satisfaction. However, Limited research has been conducted on whether a chatbot is capable of providing immediate responses to all inquiries, similar to a human representative. Accuracy of responses provided by chatbots, the relevance of these responses to customer queries, and response times, This presents a notable research gap

Chatbots can easily provide answers to simple questions, but it is unclear whether they can respond effectively to complex inquiries.

RESEARCH METHODOLOGY

Research design:- An exploratory research method was used in which the responses provided by the chatbot were explored.

Data collection:- A total of 20 questions were asked through direct interaction with HDFC Bank's Eva chatbot, and screenshots of its responses were taken as proof.

Data analysis:-The total of 20 responses were analyzed through a pie chart. All responses were displayed in a table based on their respective ratings.

Limitation of method:- 20 different questions were asked by the researcher directly to the Eva chatbot. No other respondents were included in this study.

Ethical consideration:- The questions were asked by the researcher directly to the Eva chatbot. No screenshots of any other HDFC Bank customer's information are included in this study.

Questions Asked to HDFC Eva Chatbot and Its Responses (Screenshots Included)

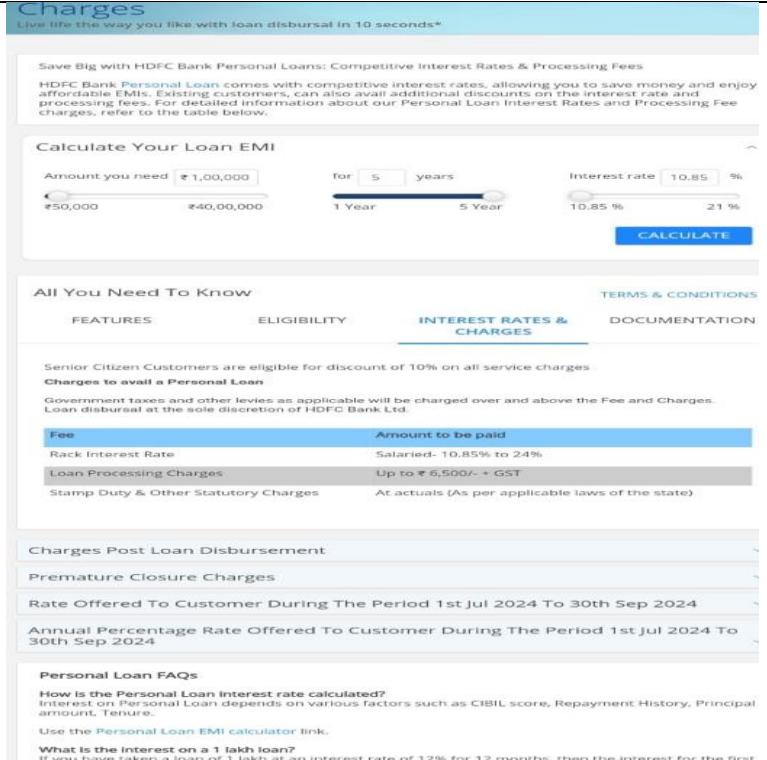
Sr. no	Question asked	Response Relevance Rating 1. Perfectly Related, 2. Highly Relevant, 3. Partially Relevant, Requires Extra Effort 4. Mostly Unrelated, 5. Completely Unrelated,	Screenshot of Reply
1	What are the home loan interest rates?	Mostly Unrelated,	<p>HDFC offers specially designed home loans for Agriculturists, Planters, Horticulturists, and Dairy Farmers.</p> <p>See More ▾</p> <p>Charges</p> <p>Apply</p> <p>Eligibility</p>
2	What are the car loan interest rates?	Partially Relevant, Requires Extra Effort	<p>Please click here to view the interest rates for New Car Loan.</p> <p>Apply Charges Limit</p> <p>Related Questions...</p> <p>Interest Rates for Loan against Car.</p> <p>Interest Rates for Pre-owned Car Loans.</p>

3	How do i change my net banking password?	Perfectly Related	<p>Procedure to reset your Netbanking password:</p> <p>HDFC Bank Account Holders</p> <ul style="list-style-type: none"> • Click on the 'Forgot Password' link • Select the option "Regenerate IPIN using One Time password (OTP)" • Enter your Customer Id and click on "Go" • An OTP would be sent to the selected Mobile No. Please re-initiate the transaction, incase you have not received the same • Please input the One Time Password which was sent to your Mobile Number / Email Id • Choose a new password and then reconfirm the new password • We request you to use the new password for your future log in <p>Non HDFC Bank Account Holders</p>
4	How do I transfer money using net banking ?	Perfectly Related	<p>To transfer money using NetBanking:</p> <p>A. Customers Not Migrated To New NetBanking:</p> <ul style="list-style-type: none"> • Login to NetBanking • Click on Fund Transfer tab • Click on NEFT/RTGS/IMPS to transfer funds <p>B. Customers Migrated To New NetBanking:</p> <ul style="list-style-type: none"> • Log in to NetBanking • Go to Pay ---> Money Transfer <p>Please click on the links given below to watch a demo.</p> <ul style="list-style-type: none"> • NEFT • RTGS • IMPS
5	How repo rate affects interest rates?	Completely Unrelated,	<p>HDFC bank offers attractive interest rates on various deposit and savings schemes.</p> <p>Please click here to view the detailed Interest Rates.</p> <p>Related Questions...</p> <p>Q What is the current rate of interest?</p> <p>Q What are the interest rates for transferring a plot to</p>

6	Do you offer loan to farmers?	Partially Relevant, Requires Extra Effort	<p>HDFC offers specially designed home loans for Agriculturists, Planters, Horticulturists, and Dairy Farmers.</p> <p>See More ▾</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid #ccc; padding: 5px; text-align: center;">Charges</div> <div style="background-color: #0072BD; color: white; border: 1px solid #0072BD; padding: 5px; text-align: center; width: 150px;">Apply</div> <div style="border: 1px solid #ccc; padding: 5px; text-align: center;">Eligibility</div> </div>
7	What is the benefit of credit card?	Perfectly Related	<p>Here's the list of key Credit Card benefits:</p> <ul style="list-style-type: none"> • A Credit Card is one of the simplest ways to pay for anything • You can also set it up to automatically make recurring payments such as your phone, electricity or gas bills. • A Credit Card comes with a grace period between purchase and payment (could be up to 50 days) during which the bank does not charge any interest. • Every time you pay using an HDFC Bank Credit Card, you earn Rewards. <p>To know more, please click here.</p>
8	Fee and charges of credit card?	Completely Unrelated,	<p>Late Payment charges will be applicable if Minimum Amount Due is not paid by the payment due date.</p> <p>See More ▾</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid #ccc; padding: 5px; text-align: center;">Finance Charge</div> <div style="border: 1px solid #ccc; padding: 5px; text-align: center;">GST Charges</div> <div style="border: 1px solid #ccc; padding: 5px; text-align: center;">Membership Fee</div> </div>
9	How do I get a new debit card?	Highly Relevant	<p>HDFC Bank Customers can login to NetBanking to apply for a Debit Card or upgrade a Debit Card.</p> <p>Non HDFC Bank Customers click on the link below to apply for a Savings Account in order to avail a Debit Card.</p> <p>Apply Now</p>

10	Can I prepay my personal loan?	Perfectly Related	<p>You can choose to prepay your personal loan anytime after 12 months of taking the loan and after you have paid 12 EMIs along with applicable foreclosure charges.</p> <p>Please note, loans can be foreclosed by issuing a Demand draft / cheque at the branch.</p> <p>Kindly note that cash beyond Rs. 49000/- will not be accepted for loan repayment against part prepayment/ full payment / matured loan closure payment. Any payment above Rs. 49000/- should be made vide Account payee Cheque / Pay order /Demand draft.</p>
11	Please give me the detail about the various hdfc mutual fund schemes ?	Completely Unrelated	<p>Only select schemes of select AMC's are currently available for transactions done through NetBanking. The list of the schemes is available on the HDFC Bank's website.</p> <p>Related Questions...</p> <p>Q. Already have Mutual Funds.</p>
12	How can I invest in hdfc share?	Completely Unrelated	<p>Here is an answer that might be relevant to your question!</p> <p>-----</p> <p>How can I make stock market investments through HDFC?</p> <p>You earn well by working honestly and to the best of your abilities. A major goal behind your financial earnings is to secure your future finances. Make your #FuturePerfect at HDFCsec.com. Invest through our wide range of product offerings. Equip yourself with the most robust tools and all the right news and views at one place.</p> <p>visit the link below for more:</p> <p>Web link</p>
13	How can I change my debit card pin?	Perfectly Related	<p>NetBanking:</p> <p>B. Customers Not Migrated To NetBanking:</p> <ul style="list-style-type: none"> • Login to NetBanking • Go to Cards Tab > Debit card > Request > PIN Regeneration • Select the card number and click on continue • Select the Reason for Regeneration • You then have the option to get the OTP sent to your phone by choosing 'Yes' if the correct mobile number is displayed. Choosing 'No' will give you the option of having the new PIN sent to your home address. • If you have opted for OTP please read the terms and conditions given below in the NetBanking page. You will need to visit an HDFC Bank ATM to complete the process • Click on Confirm after you have made your decision.
14	Why is interest	Completely Unrelated	

	charged higher in first year of emi?		<p>Were you looking for any one of the following?</p> <p>Interest Rate for Credit Card EMI.</p> <p>Why is EMI due when payment has been already made?</p> <p>Interest Rate for Debit Card EMI.</p> <p>8:41 PM</p>
15	Various fixed deposit interest rates schemes in hdfc banks ?	Partially Relevant, Requires Extra Effort	<p>crore.</p> <p>Related Questions...</p> <p>Q Does HDFC Bank offer any special rate of interest on Fixed Deposits for Senior Citizens?</p> <p>Q What are the types of Fixed Deposits?</p> <p>8:59 PM</p>
16	What is the process of opening a bank account online in hdfc?	Perfectly Related	<p>NetBanking:</p> <p>B. Customers Not Migrated To NetBanking:</p> <ul style="list-style-type: none"> • Login to NetBanking • Go to Cards Tab > Debit card > Request > PIN Regeneration • Select the card number and click on continue • Select the Reason for Regeneration • You then have the option to get the OTP sent to your phone by choosing 'Yes' if the correct mobile number is displayed. Choosing 'No' will give you the option of having the new PIN sent to your home address. • If you have opted for OTP please read the terms and conditions given below in the NetBanking page. You will need to visit an HDFC Bank ATM to complete the process • Click on Confirm after you have made your decision. <p>C. Customers Migrated To NetBanking:</p> <ul style="list-style-type: none"> • Login to NetBanking • Go to Cards page • Select the Debit Card and click on Set PIN • An OTP will be sent to you with which you can visit your nearest HDFC Bank ATM to set your Debit Card PIN • You can also request for the PIN to be

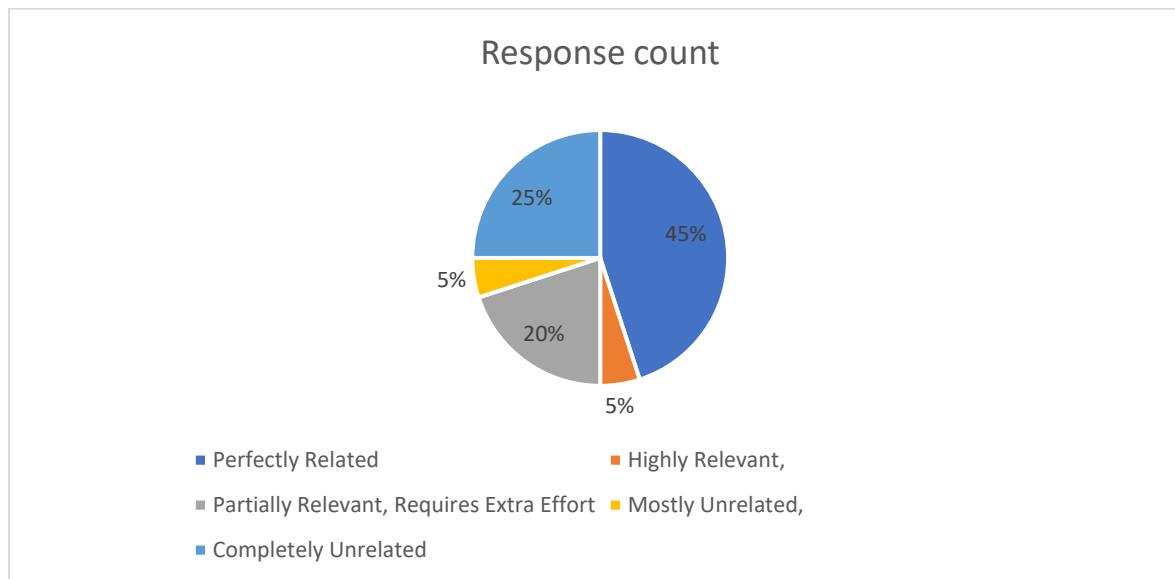
17	Fastage apply ?	Perfectly Related	<p>You can avail HDFC Bank FASTag just by applying online. Please click here.</p> <p>OR</p> <p>You can check with your nearest HDFC Bank branch for availing Over the Counter (OTC) FASTag facility.</p> <p>Related Questions...</p> <p>Q. What is NETC FASTag?</p> <p>Q. What are the benefits of using NETC FASTag?</p>	
18	How do I update mobile no in my account?	Perfectly Related	<p>Here are some easy options for you:</p> <p>Insta Services</p> <ul style="list-style-type: none"> • Click here for mobile number updation. <p>NetBanking:</p> <ul style="list-style-type: none"> • Login to NetBanking <p>See More ▾</p>	
19	Show my balance?	Perfectly Related	Your account balance is xxxx	
20	What is the interest rate for personal loan for salaried person?	Partially Relevant, Requires Extra Effort	 <p>The image shows a screenshot of the HDFC Bank Personal Loan calculator and information page. The calculator allows users to input the amount needed (₹1,00,000 to ₹40,00,000), tenure (1 Year to 5 Year), and interest rate (10.85% to 21%). The 'CALCULATE' button is visible. Below the calculator, there are tabs for 'FEATURES', 'ELIGIBILITY', 'INTEREST RATES & CHARGES' (which is currently selected), and 'DOCUMENTATION'. The 'INTEREST RATES & CHARGES' section provides details on fees, interest rates, and stamp duty. Other sections visible include 'Charges', 'All You Need To Know', 'Personal Loan FAQs', and 'Rate Offered To Customer During The Period 1st Jul 2024 To 30th Sep 2024'.</p>	

DATA ANALYSIS

Count of each rating

Response	count
Perfectly Related	09
Highly Relevant,	01

Partially Relevant, Requires Extra Effort	04
Mostly Unrelated,	01
Completely Unrelated	05



RESULT

As shown in the pie chart, a total of 20 questions were asked to the Eva chatbot. The responses provided by the chatbot were categorized into five categories: Perfectly Related, Highly Relevant, Partially Relevant (Requires Extra Effort), Mostly Unrelated, and Completely Unrelated. After this, the responses were classified based on these ratings. out of 20 , 9 responses were completely correct, while 1 response was obtained after clicking on the displayed link. For 4 questions, the bot provided answers after clicking on the displayed link or related questions. However, there were 5 questions for which the chatbot did not have an answer and could not understand the query. Additionally, 3 questions received responses that were not related to what was asked. Thus, 10 questions had correct answers, 8 did not receive answers, and 4 answers were obtained after a second attempt.

It appears that the chatbot was able to answer common questions, but for more specific or different questions, it could not provide the answers. Unlike popular bots like Meta AI, Gemini, and ChatGPT, which can provide answers based on the question itself, the Eva bot was limited and could only provide preloaded data or FAQ-type responses.

CONCLUSION

EVA chatbot is providing customers a variety of information. It can be concluded that the EVA chatbot still cannot answer all the questions that a customer would ask a human representative. While it can provide answers to common questions, it struggles with more human-to-human conversation queries. Unlike other chatbots like ChatGPT, Meta AI, and Gemini, which provide to-the-point responses, this bot does not seem to exhibit the same level of efficiency. There are many "click here" options and related question prompts that appear, indicating that there is significant room for improvement in the system.

SCOPE FOR THE FUTURE STUDY

The researcher asked questions directly to the Eva chatbot. In further studies, other users can be included, and a comparative study can be conducted with chatbots of other banks.

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