

INTELLIGENT CHAT BOT FOR BANKING SYSTEM

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ABSTRACT

Natural Language Processing (NLP) has revolutionized the way humans interact with machines, making it possible for computers to respond to human language. In this project, we aim to develop a sophisticated chat bot for the banking system, leveraging NLP techniques which Helps customers and the financial institution communicate easily and naturally. The primary objective of the Chatbot is to enhance customer experience, reduce response time, and provide round-the-clock support. The design of the chat bot will incorporate multiple functionalities, including balance inquiries, transaction history, fund transfers and frequently asked questions. Chatbots offer various valuable uses for the banking industry, improving customer service, efficiency, and overall banking experience. By using chatbot technology, banks can streamline their operations, enhance customer satisfaction, and stay a head in the competitive financial landscape, all while maintaining a personalized and convenient banking experience for their customers.

INTRODUCTION

Banking is a major part of our day to day life. Building up savings, drawing salaries, paying utility bills, borrowing loans all involve transactions with the Bank. All the businesses relying on the banking sector since they handle their financial transactions such as day to day deposits/ withdrawals, investments, business expansions plan to name a few. But if we have any banking related queries, we have to visit the bank or contact customer care. This consumes a considerable amount of time and effort from both parties, especially for the bank. Huge amount of phone calls regarding customer inquiries are attended by the bank staff daily regarding Loans, Fixed Deposits, Exchange rates, Leasing, Pawning etc. lack of staff and heavy workload per employee sometimes result in unattended customer inquiries and delays in assisting the customer. Therefore, it will be more convenient if customers have a proper way of communicating with the bank via online process and get the feedback within a short period of time.

BANKING CHATBOT using NLP and Machine Learning is a project aimed at developing a chatbot system for banks that can assist customers with their inquiries, account information, and transactions. This system will utilize Natural Language Processing (NLP) and Machine Learning (ML) algorithms to provide an intelligent and personalized customer experience. Developing a chatbot system that meets these requirements presents several challenges. The system must be able to accurately understand and interpret customer inquiries, which can vary in complexity and language. The system must also be able to handle a high volume of customer inquiries simultaneously, ensuring that wait times are minimized. Additionally, the system must be able to recognize and personalize responses based on customer history and preferences to provide a more tailored experience. Here we create a customer front-end application which further enhances the customer experience. This hypothesis is supported by previously published literature that highlights the potential benefits of chatbot systems in enhancing customer service in various industries, including banking. To reduce the burden on human customer service representatives and provide customers with immediate assistance at any time. The base paper of this project is a literature survey of previously published works that have explored the use of Chatbot systems in customer service. The base paper highlights the potential benefits of using NLP and ML algorithms in developing chatbot systems that can handle complex customer inquiries and provide accurate responses in natural language.

LITERATURE SURVEY

Several theories have been implemented in order to analyze the adoption of different IT systems. According to Hanafizadeh and Khedmatgozar (2012), the most influential theoretical models applied in i-banking adoption studies, are the Diffusion of innovation theory (DIT), the Technology acceptance model (TAM), the Decomposed theory of planned behavior (DTPB), the Extended technology acceptance model (TAM2) and the Unified theory of user acceptance of technology (UTAUT), the latter becoming dominant in the literature in recent years. Shaikh and Karjaluo (2015) analyzed and synthesized existing studies of m-banking adoption and concluded that the most frequently used adoption models were TAM, followed by DIT and UTAUT, while several studies applied a combination of different technology acceptance models (e.g. TAM and DIT).

Title-Review on implementation techniques of chatbot:

The methodology employed for this paper is a critical review of chatbots and their current development strategies. The study primarily relies on the analysis of existing literature in the field of chatbots and AI, including academic research papers, industry reports, and online publications. The review is focused on exploring the functionalities and limitations of chatbots, the available development frameworks, and the underlying technologies that support their implementation. The study reveals that chatbots are intelligent systems developed using AI and NLP algorithms that interface with users and answer inquiries. They are widely used by organizations, government associations, and non-profit organizations, and are deployed by financial institutions, online retail stores, and startups. The review highlights the challenges and limitations of chatbot development, including the handiness and flexibility of real dialogues. Also, popular intelligent personal assistants such as Amazon's Alexa, Microsoft's Cortana, and Google's Google Assistant are identified in the study. The capabilities of these automated assistants are lacking and today's chatbots use rule-based methods, intuitive machine learning algorithms or retrieval techniques that do not produce satisfactory results.

Title-Enterprise Crowd Computing for Human Aided Chatbots:

The methodology used in this paper involved a literature review of existing research on chatbots, their limitations, and the concept of Human Aided Chatbots. The paper also discusses the potential benefits and drawbacks of Human Aided Chatbots and how enterprise mesh computing can help overcome the challenges they face. The authors introduce ECrowd, a platform designed for consolidating training data for rational systems, as a potential solution. The paper highlights the limitations of fully automated chatbots and how Human Aided Chatbots can help overcome these limitations by leveraging human intelligence. The authors also discuss the potential benefits of using enterprise crowd computing to assist Human Aided Chatbots, such as scalability and low-latency. However, the paper also acknowledges the

potential challenges and concerns related to privacy and security when using chatbots operated by the humans.

Title-"Nudge Your Workforce: A Study on the Effectiveness of Task Notification Strategies in Enterprise Mobile Crowd sourcing":

A survey of IBM Benelux's 93 staff members was carried out to determine the factors that might influence engagement with mobile business crowd sourcing. To study the effectiveness of different notification strategies for specific tasks, the results of the survey has been used to develop an experiment. The impact of factors such as time and the context for notification on staff participation and retention was assessed in this study. The study found that break times were the most suitable for crowd work. Employees were more likely to participate in crowd sourcing tasks during their breaks, as compared to other times of the day. In addition, the study showed that "aggressive disclosure strategies" had been shown to be a deterrent for participation, while simple but periodic nudges were significantly more likely to help retain contributions of proponents. The study also identified several other factors that affected engagement in mobile enterprise crowd sourcing, including perceived usefulness of the task, intrinsic motivation, and job autonomy.

PROPOSEDSYSTEM

Recent technological developments have transformed the way consumers and financial institutions interact with each other. The rise of artificial intelligence (AI) based technology is to this transformation, banks have begun to implement. AI-based applications. The main aim is to analyze user's queries and understand user's message. The system is designed for banks use where users can ask any bank related questions like Transaction summary, account details etc. Based on our literature review, we found that existing chatbot systems in the banking industry have some limitations, such as limited ability to understand natural language queries and provide accurate responses, lack of personalization, and inability to handle complex requests. The proposed algorithm will rectify these drawbacks by utilizing state-of-the-art NLP and Machine Learning techniques such as Support Vector Machine (SVM) and Navie Baye's (NB) Classifier to understand and appropriately and quickly answer to natural language inquiries. Then we will be creating a front-end application for a more effective customer bank interface. This is a very eye-catching feature of our project, where in the time complexity is reduced and better experience is provided to the customer. The system architecture is shown below.

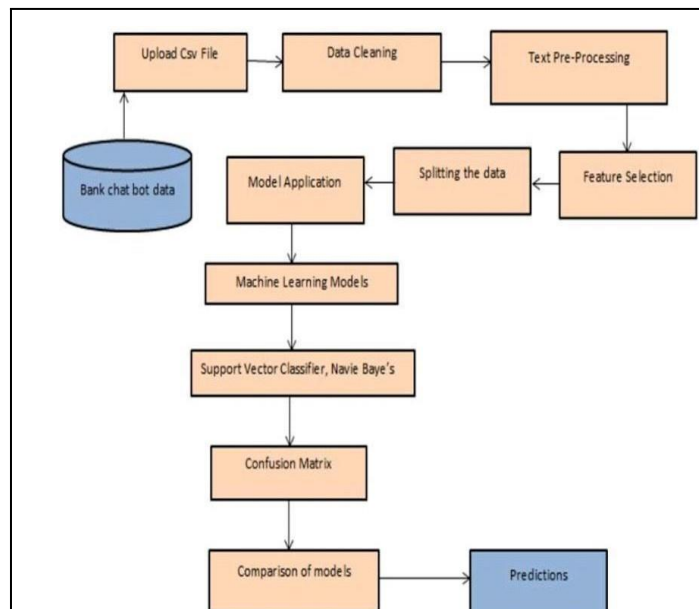


Fig.1:system architecture

This is the architecture of our system. In this, user gives the input in the form of voice or text. If the input is in the form of voice, then it will be converted in the form of text by using voice to text converter. The input is then passed to the query interpreter of chat bot. The query interpreter will interpret the input using Intelligence System and send request to the web server; server will collect data from respective repositories which are maintained by the admin. The output from query interpreter matches with repositories and generate the answer as per pattern matching. At last, web server will send the result back to the chatbot. The result can be in the form of text. Finally, the user can get the required result. Banking Chatbot will develop using the RASA framework. Architecture will describe the process under the framework and methodology that was used to implement the chatbot.

Banking chatbots allow banks to communicate with customers more efficiently and effectively than traditional methods. Customers can ask questions, get answers, and conduct transactions without the need to be served by a human agent. This benefits banks and customers because it saves time while ensuring that all questions are answered correctly. As a result, customer satisfaction is uncompromised, but the bank saves a lot of time and money on service. Banking chatbots provide 24/7 support. This is especially helpful when a customer needs help during non-banking hours. For example, if a customer forgets their password on a Sunday and needs assistance to access their account, they can do so with immediate help from a banking chatbot.

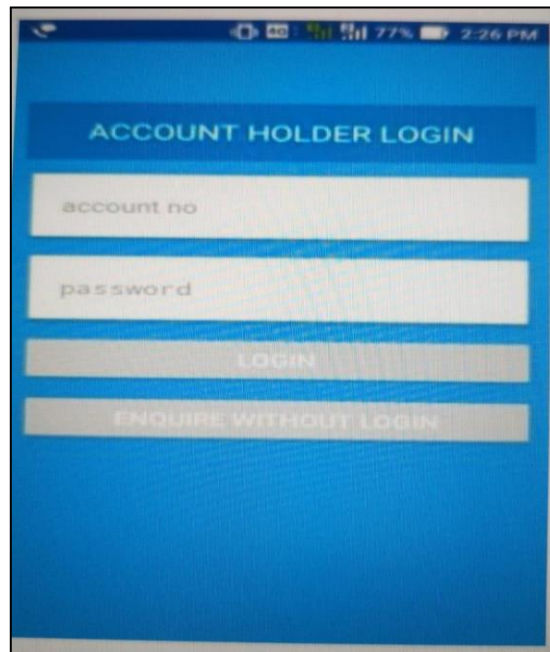
Banking chatbots can help banks reduce their employees' time on administrative tasks and mundane query resolution. This frees up time for bank personnel to focus on more sophisticated and impactful tasks. It's especially beneficial for customer service representatives who often spend a large chunk of their day answering phone calls, emails, and customer texts. Banking chatbots can process transactions in seconds instead of hours or days, allowing customers to complete their business faster. Quick resolution is something that most customers love. Especially effective for large financial institutions that are notoriously known for long snaking queues. Banking chatbots can help banks personalize their customer experience by incorporating information about each customer's preferences and history into the conversation. It makes the customers feel special and is a relief considering the typical situations.

Banking chatbot can make bank personnel more productive by allowing them the freedom to focus on more complex problems instead of being stuck with basic customer queries. Younger generation prefer instant messaging and it is faster than waiting in a queue to get assisted by a staff member. Chatbot maintain consistency in answering user queries and this ensures value to customer conversation. Consistent answers will always improve customer experience with the bank.

RESULTS

Final expectation of the research is to develop an advanced Artificial Intelligent banking assistant that is capable of answering account related customer queries. And the trained model is able to connect with different interfaces like slack and web interface. Having multiple channels to reach a banking assistant is convenient to draw customer attention with different social states. Most importantly, the final product of AI banking assistant is capable of handling account related user queries, out of scope queries and when necessary, situations occur, the AI assistant is trained to fallback gracefully.

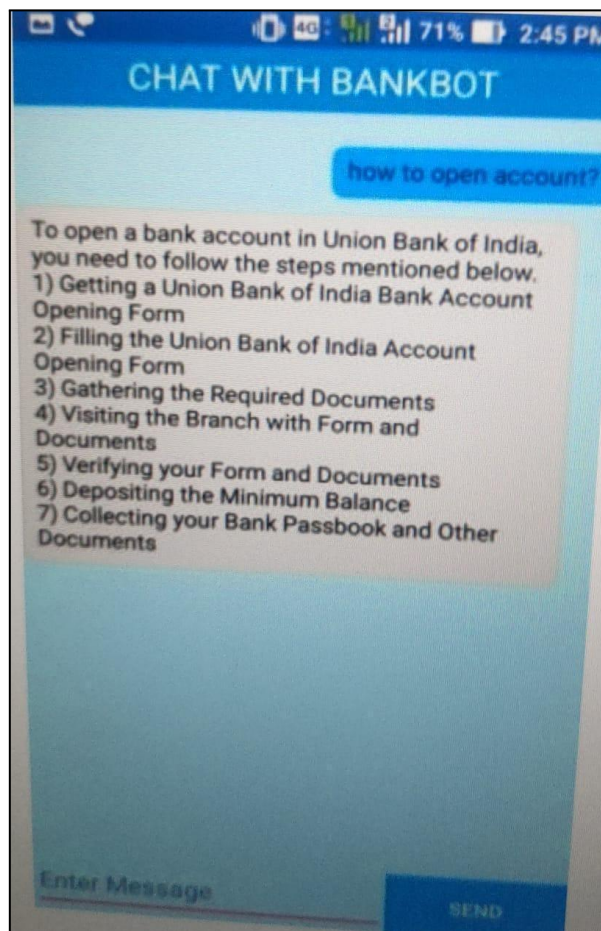
CUSTOMER LOGIN:



This is android app login screen for customer. Customer login with their valid account number and password. For enquiry purpose new customer enter in the system without

CHATWITH INTELLIGENT BANK BOT:

This chat activity screen use for chat with bank bots system. Customer enter query what he want related bank. And then he click on the send button, if the answer is present in the database then he will get the answer.



CONCLUSION

As we can see, chatbots and other types of AI assistants are of great use in any industry that has to provide high-quality customer support. One such industry is the finance or banking area, and it is rapidly integrating these technologies into its workflow. Banking is all about money and reputation, and AI Chatbots offer numerous benefits for both. If you need a custom-made high-quality AI solution for your bank or any other financial organization, we are ready to help. Contact us, and our specialists will develop a Chatbot that would bring you significant savings, as well as better customer experience. By providing users with convenient, 24/7 access to essential banking services, such as checking their account balance and blocking lost or stolen cards, it streamlines routine tasks and fosters a higher level of customer satisfaction. The chatbot's adaptability and scalability position it for future growth, allowing for the integration of additional services, improved security measures, and alignment with emerging fintech trends. As the banking industry continues to embrace digital transformation, chatbot is well-positioned to remain a valuable asset, not only improving the banking experience but also contributing to the institution's long-term success in an increasingly tech-driven world. In conclusion, the Bank Chatbot using NLP and Machine Learning is a promising solution for the banking industry to improve customer service and automate various banking processes. The performance of the system can be further improved by using advanced machine learning algorithms such as Naive Bayes having 90.6% accuracy which has shown better accuracy than SVM is having the accuracy of 76.2%. With the advancement of technology, it can be expected that the chatbot system will become fully integrated into banks operations, providing more efficient and personalized services to customers. Using stream lit we have created the application for the Chatbot forest abolishing a more effective interface between the bank and the customer. Banking Chatbots are providing excellent customer service and improving how customers interact with banks and other financial institutions. In fact, chatbots are revolutionising the way banks offer their services to customers. Banks now put great effort into customer service since it has become a massive driver of customer satisfaction. It is necessary to rank ahead in the competition by providing outstanding products and services, brand recognition, trust, cost, and innovation.

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