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Web Based Banking Module for Query Submission

[1]Yash Kudale, [2]Deepak Bohara, [3]Abhishek Patil, [4]Pranav Sawant, [5]Prof. Pragati Kinage

[1]B.E. (Computer Engineering) ICEM
[2]B.E. (Computer Engineering) ICEM
[3]B.E. (Computer Engineering) ICEM
[4]B.E. (Computer Engineering) ICEM
[5]Asst. Prof. (Computer Engineering) ICEM

ABSTRACT—

The study of artificial machine intelligence is a tremendously complex subject. It entails building tools with the ability to simulate knowledge. Before providing an alternative vision for how some of the most firmly held views of the day can change, this essay examines some of the most recent AI behaviours and trends. System-Chatbots, often known as chatter bots, are created based on fundamental A.I. (Artificial Intelli- gence) structuring and working for this. The study demonstrates how AI is always evolving. Although little is known about artificial intelligence at the moment, this study provides a fresh concept that examines machine intelligence and demonstrates the potential of intelligent systems. The latest disruptive force that has altered how customers connect is the growth of chatbots in the finance industry. Artificial intelligence has transformed the way that banks communicate with their consumers in the banking sector by enabling chatbots. Any nation's development depends heavily on the banking industry. It also investigates the chatbot's current usability to determine whether it can satisfy customer's fluctuating needs

***Index Terms*—Technology acceptance model, Artificial Intel- ligence, Chatbot, Self-service, Banking, Partial Least Squares- Structural Equation Modeling (PLS-SEM).**

I. INTRODUCTION

Research indicates that by the year 2020, the use of chatbots in banking will have tripled.Only 4% of banks had chatbots in their banking operations at the beginning of the year; by the end, that number had risen to 13%.Artificial intelligence and machine learning are now a crucial component of practically every sector because to technological breakthroughs.One of the most widespread applications of AI is in customer ser- vice, particularly when chatbots are used in the banking and finance industries.For the banking sector to remain competi- tive, chatbots are now essential.Today's tech-savvy customers desire access to every solution online in the age of remote everything.In banking, chatbots have completely changed the game.The minimum industry requirements for query resolution times and customer support have been set at 4 minutes per inquiry.

II. LITERATURE SURVEY

This paper explores the factors that influence consumers' intention to use chatbot technology in the banking industry, using a sample of 287 respondents. The results indicate that perceived utility and compatibility are important factors for adoption, while awareness of the service impacts perceived ease of use, perceived privacy risk, and indirectly affects usage intention through perceived usefulness. Perceived ease of use and perceived privacy risk do not significantly affect usage intention. [1]

This paper presents the development of a customer service chatbot that uses NLP to provide appropriate responses to user queries. The chatbot is built using PyTorch and NLTK, employing a feed-forward neural network model with input, hidden, and output layers. The chatbot is designed for a coffee shop and can perform actions such as taking orders and suggesting drinks. It is customizable and does not require high computational power for training or deployment. [2]

This research paper details the development of a chatbot that mimics a virtual assistant, capable of understanding and responding to user queries in natural language. The chatbot is designed to replicate customer service experiences and is trained on a dataset prepared from FAQs on banks' websites. The paper includes the chatbot's architecture, development methodology, and a comparison of seven classification algo- rithms for input

classification. The chatbot has the potential to enhance customer service in banks, help desks, telephone answering systems, and customer care centers. [3]

This paper discusses the development of a chatbot for BTPN using natural language processing to understand user queries about their product, Jenius. The chatbot replaces FAQs on their website and uses cosine similarity and sentence structure checking to compare query results with a knowledge base. The chatbot's accuracy was tested with 10 users and found to have a suitability of 84%. [4]

This research paper provides an overview of Artificial Intelligence (AI) and its evolution, focusing on its potential impact in the banking sector. It defines AI as the science and engineering of making intelligent machines capable of human- like tasks. The paper highlights the significant interest and investment in AI, with projections of global revenue from the AI market reaching up to 97.9 billion U.S. dollars by 2023. The potential of AI in the banking sector and its widespread adoption in the near future are discussed. [5]

This research study explores the effectiveness of AI-based chatbots in customer service in the financial sector. The study finds that chatbots positively impact bank net income for services related to existing products, while new product- oriented services are better suited for customer service. It also suggests that small banking transactions processed through chatbots can positively impact profits. The study provides evidence of the potential of AI-based chatbot systems in improving financial soundness and suggests policy alternatives for reducing resistance to technology adoption.. [6]

This research paper proposes the use of chatbots as an alternative interface for software applications, particularly for a college inquiry chatbot. The chatbot uses AI and NLP to provide a stateful service and improve user experience by efficiently handling user queries related to various college activities. [7]

This research paper provides an overview of the current state of dialogue systems, including different categories and approaches used to build them. The paper discusses the advancements in natural language processing (NLP) and ar- tificial intelligence (AI) and the strengths and weaknesses of different techniques. The paper also suggests the need for standardization in dialogue system building for future research in this area. [8]

This research paper discusses Artificial Machine Intelli- gence and its latest patterns and activities, with a focus on chatbots as a basic AI structure. The paper explores the rise of chatbots in the finance sector, specifically in the banking industry, and their impact on customer interactions. It also assesses the usability of chatbots in fulfilling customers' changing needs, offering alternative theories of change for popular postulates. The paper highlights the evolving nature of AI and its potential for machine intelligence. [9]

This research paper discusses the use of AI-based chatbots in the finance and banking sector to improve customer service. It proposes an interactive Chatbot called 'Chatbot as Islamic Finance Expert' (CaIFE) that utilizes machine learning to accumulate knowledge related to Islamic finance and banking. The paper highlights the potential of chatbots in providing real-time solutions to customer queries and complaints, and presents a case study of CaIFE, outlining its characteristics and limitations. The research underscores the significance of chatbots in enhancing customer experience in the finance and banking industry, particularly in providing efficient 24/7 customer service. [10]

This research paper focuses on chatbots, which are software programs designed to facilitate natural language conversations between users and computers. Chatbots engage in discussions with users and provide responses as if they were interacting with a human being. The application of chatbots in the context of college admission processes is explored, highlighting how they can provide fast replies and accessible information to students or parents from anywhere with an internet connection. The implementation of chatbots can reduce the workload of the admission department by automating responses to commonly asked queries, thereby enhancing the overall efficiency of the admission process. [11]

This research study focuses on digital privacy concerns re- lated to chatbots in the context of digital banking services. The study finds that privacy concerns have a negative relationship with user self-disclosure, and exposure to a preferred banking brand results in lower user self-disclosure and brand trust. The study recommends companies to focus on building trust through education, communication, and product development. The research provides insights into the importance of privacy and brand trust in chatbot adoption in financial services marketing. [12]

This paper reviews the use of artificial intelligence (AI) in the banking industry to improve customer experience. It covers various AI applications such as credit score checking, system failure prediction, fraud detection, and customer loyalty evaluation. The paper emphasizes that AI can reduce employee workload and enhance customer experience through mobile banking, chatbots, and augmented reality. The benefits of AI in various banking processes are also discussed. Overall, the paper highlights the positive effects of AI on the banking experience for both customers and employees. [13]

This research paper focuses on an intelligent chatbot devel- oped for banking-related queries. It uses artificial intelligence to process voice or written input and generate customized re- sponses. The system automates human thinking and problem- solving processes for better performance and utilizes a third- party expert system to improve its capabilities. The paper emphasizes the efficiency and effectiveness of chatbots in customer interactions in the banking domain. [14]

This study investigates customer satisfaction with chatbot services provided by Indonesian banks during the COVID-19 pandemic. Factors such as system quality, information quality, service quality, trust, perceived value, situational factor, and personal factor were evaluated in relation to the intention to use and customer satisfaction with banking chatbots. Data was collected from 100 respondents using the snowball sampling technique. Results indicate that system quality, service quality, and information quality significantly and positively affect cus- tomer satisfaction, and information quality and personal factor positively affect the intention to use banking chatbots. The findings suggest recommendations for the banking industry to improve customer satisfaction and intention to use banking chatbot services. [15]

III. OBJECTIVES

The primary objectives of a web-based banking module for query submission are to enhance customer convenience by providing a user-friendly platform for submitting queries, im- prove operational efficiency by automating query submission and resolution processes, enhance the customer experience by providing prompt and accurate responses, achieve cost savings by reducing operational costs, and ensure security and compliance by implementing robust security measures and complying with regulatory requirements. By achieving these objectives, the web-based module can contribute to a more efficient, customer-centric, and secure banking experience for customers and banks alike.

IV. EXISTING SYSTEM

The existing system of banking chatbots primarily relies on rule-based approaches, where predefined responses are programmed based on fixed keywords or patterns. These chatbots are typically designed to respond to specific questions or commands using a predetermined set of rules, without the ability to understand the nuances of natural language or engage in dynamic conversations. These rule-based chatbots are limited in their capabilities and have several limitations. Firstly, they lack the ability to understand the context of a user's query, resulting in inaccurate or irrelevant responses. For example, if a user asks a question in a slightly different way or uses synonyms, the chatbot may fail to understand and provide the correct response. Secondly, these chatbots often have limited functionality, only able to respond to a predefined set of queries or commands, and are unable to handle more complex or personalized queries from users.

Another drawback of rule-based chatbots is their lack of adaptability. As banking operations and customer queries evolve over time, these chatbots require frequent updates and maintenance to keep up with new queries or scenarios, which can be time-consuming and resource-intensive. Furthermore, these chatbots may not provide a seamless user experience, as they can feel robotic and impersonal, leading to customer frus- tration and dissatisfaction. In conclusion, the existing system of banking chatbots without AI and NLP has limitations in terms of their ability to understand natural language, provide accurate responses, handle complex queries, and deliver a per- sonalized user experience. As customer expectations continue to rise, there is a growing need for more advanced chatbot systems that leverage AI and NLP technologies to overcome these limitations and provide a more intelligent and interactive banking experience for customers.

V. IMPLEMENTATION

1) Preparing Data Set: The data set was created by com- piling commonly asked questions and corresponding an- swers that are typically addressed by bank employees at customer care centers or inquiry desks. We gathered this information from various bank websites and obtained frequently asked questions (FAQs) as our data source. Web scraping tools were utilized to collect this data.

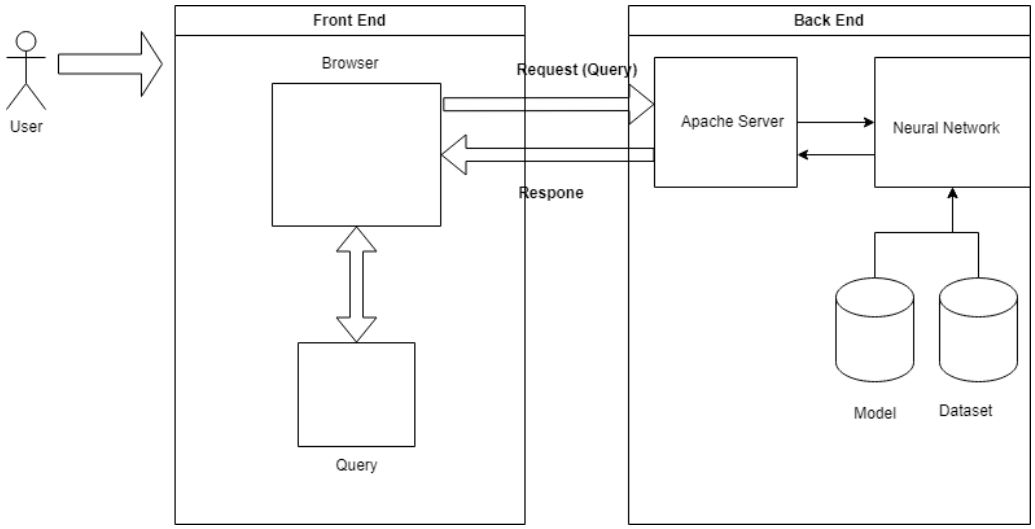

Fig. 1. Architecture of chatbot

2) Pre-Processing: In order to enable the machine to under- stand English statements as user input, we utilized the Natural Language Processing (NLP) and specifically, the NLTK library. As the use of the same word in different forms can cause ambiguity and increase processing time, we implemented pre-processing which involved tokenization and lemmatization steps.

3) Vectorization and Classification: We utilized the Bag Of Words (BOG) concept to transform our text data into a vectorized format, which is a method for preparing text for input to our machine learning algorithm. This involved developing a vocabulary from all the documents and then counting the number of times each word appears in each respective document. However, as the dataset grows larger, finding similarity between a user's query and the questions from a large dataset and returning an answer becomes more time-consuming. To improve efficiency and reduce response time, we imple- mented classification and used the Scikit-learn library, which is a tool for data mining and machine learning in Python. Through a literature survey and initial training, we selected a subset of classifiers to determine the best- performing one as the final classifier for the chatbot.

4) Developong the model: During this phase, we integrated Natural Language Processing, Vectorization, and Classi- fication algorithms to create a model that we saved for future use. Now, when a new query is entered into the system, we retrieve the saved model, test the query on the model, and obtain its class. This approach eliminates the need to train the model for every new query, thereby significantly reducing processing time.

CONCLUSION

In conclusion, the development of a web-based banking module for query submission has the potential to greatly en- hance banking operations by offering customers a user-friendly platform for submitting queries related to their accounts and transactions. This can result in improved customer experience, increased operational efficiency, and enhanced competitiveness for banks. However, challenges such as ensuring robust secu- rity measures, addressing technical glitches, and navigating regulatory requirements need to be carefully considered for successful implementation. Further research and development are needed to fully realize the benefits of web-based banking modules in the real-world banking environment.

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