A Chatbot that uses Artificial Intelligence to Automatically Respond to Whatsapp Messages

R. Regin

Assistant Professor, Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, India

S. Suman Rajest

Professor, Dhaanish Ahmed College of Engineering, Chennai, Tamil Nadu, India

Abstract: The recent advancement trend of the technology had motivated the need for the study to explore the readiness of the employees in the workplace in accepting the new technology engagement. With this, the current study will focus on investigating the readiness of the employees towards the social interaction with the technology in the workplace in Malaysia. The previous study had suggested that there is indication of the social interaction among employees to have positive relationship against the acceptance of the technology at workplace which provide the indication that the employees are not ready for the shift into the digitalization era of working environment. The quantitative analysis method had been taken into the account for the methodology of the research where the quantitative analysis will focus on the output based on the 150 questionnaires distribution among the Malaysian employees based on the convenience sampling. The outcome of the result through the quantitative analysis had observe the lack of evidence to prove the presence of the significant in the relationship between the social interaction of the employee towards the acceptance of the technology in the workplace. This had been providing the evidence to show that the Malaysian employees had been not affected by the social interaction factor when comes to the transitioning towards the engagement of new technology in the workplace provide the indication that the Malaysian employees are likely to be ready for the shift into the transitioning and shift into the use of technology in the workplace.

Keywords: Chatbot; Incoming Messages; Technology; Generating Messages; Database; Python Programming Language; Artificial Intelligence.

Introduction

In today's world, technology has become an inseparable aspect of human life. It has woven itself into the very fabric of our daily activities, making life more convenient and efficient. Whether it is through communication, transportation, healthcare, or education, technology is utilized in almost every sphere of life. As a result, there is hardly a day that passes without people relying on some form of technology to complete their tasks. The growing dependence on technology has only led to its rapid evolution [1-4]. One key area of technological growth is the development of chatbots, which have been introduced into various facets of human interaction. Chatbots are essentially software applications designed to simulate human conversations. They are created to facilitate communication by reducing the need for direct human involvement, allowing for faster and more efficient interaction between users. This has made chatbots particularly valuable in the business sector, where they are increasingly used to automate customer service and other

processes that would otherwise require human resources. Recognizing the potential of this technology, we have developed a WhatsApp chatbot that can automatically generate and respond to messages on the WhatsApp platform [5-11].

A WhatsApp chatbot is a computer program designed to interact with WhatsApp users by sending automated responses to their inquiries. These chatbots are designed using programming languages such as Python, which is known for its simplicity, flexibility, and effectiveness in handling large sets of data [12]. There are already several pre-built WhatsApp chatbots available in the market, such as the WhatsApp Business API, Twilio API for WhatsApp, and Chatbot API for WhatsApp. However, our chatbot has been developed with a larger database and the capacity to respond to a wider range of messages simultaneously [13-17]. The core functionality of a WhatsApp chatbot is to automate repetitive tasks, provide necessary information to users, and assist customers with inquiries without requiring any human intervention. This automation makes WhatsApp chatbots highly valuable in several areas, such as customer service, e-commerce, entertainment, and education [18].

The WhatsApp platform, being one of the most popular messaging apps globally, provides the ideal environment for deploying chatbots. WhatsApp chatbots can be programmed to respond to specific keywords or phrases, making them useful for handling a variety of tasks and queries [19-23]. These bots can handle a range of functions, from responding to customer service inquiries to assisting in e-commerce transactions, processing orders, and even engaging users with entertainment content. The ability of these bots to understand and respond to user inputs makes them a highly efficient tool for businesses seeking to streamline their operations and improve user engagement [24-29].

To effectively build a WhatsApp chatbot, it is crucial to understand the problem at hand. In many cases, businesses and organizations face challenges in responding to incoming messages in a timely manner. The growing volume of user inquiries can overwhelm human agents, leading to delays in response times and a decrease in customer satisfaction [30-35]. The solution lies in developing a WhatsApp chatbot that can handle multiple incoming messages simultaneously, responding quickly and accurately. However, one limitation of many existing chatbots is that they are unable to respond to messages that are not pre-programmed in their database. This is where our chatbot distinguishes itself. By utilizing a larger and more comprehensive database, our chatbot can respond to a broader range of messages and queries, significantly improving its efficiency and responsiveness. The primary goal of this project is to create a WhatsApp chatbot using Python programming that can automatically generate new messages based on incoming queries [36-41]. This chatbot will be capable of handling a wide array of tasks, making it an invaluable tool for businesses and organizations looking to improve their customer service and operational efficiency. The chatbot will be programmed to identify and respond to specific keywords and phrases, ensuring that it can provide relevant information to users. By automating these responses, the chatbot reduces the need for human intervention, freeing up resources that can be allocated to other areas of the business [42-49].

The domain of this project falls under artificial intelligence, a branch of computer science that focuses on simulating human intelligence in machines. Artificial intelligence (AI) enables machines to learn from experience, adjust to new inputs, and perform tasks that typically require human intelligence. In this project, AI will be used to develop a chatbot capable of processing large amounts of data and responding to user queries in real-time [50-55]. Python, one of the most popular programming languages used in AI development, will serve as the foundation for this project. Python is well-suited for AI applications due to its ease of use, extensive libraries, and ability to handle complex data sets. By leveraging AI, the chatbot will be able to learn from its interactions with users, improving its responses over time. One of the key aspects of artificial intelligence is the use of algorithms to solve problems and perform specific tasks. In this project, various AI algorithms will be employed to ensure that the chatbot is capable of understanding user inputs and generating appropriate responses [56-61]. These algorithms will be programmed

to analyze incoming messages, identify key terms, and determine the most relevant response based on the context of the query. The chatbot will be trained using a large dataset of pre-programmed responses, allowing it to handle a wide variety of tasks. Over time, the chatbot's performance will improve as it interacts with users and learns from their inputs [62-66].

The application of WhatsApp chatbots is vast and can be tailored to suit a range of industries and use cases. In the business world, chatbots are commonly used to automate customer service functions, ensuring that users receive timely responses to their inquiries. By automating routine tasks, businesses can improve their operational efficiency, reduce costs, and enhance the overall user experience [67-71]. For example, e-commerce companies can use chatbots to handle order inquiries, track shipments, and provide product recommendations to customers. This level of automation not only improves customer satisfaction but also allows businesses to scale their operations without increasing their workforce. Chatbots can also be applied in the education sector, where they can be used to respond to student inquiries and provide information about courses, schedules, and assignments. Educational institutions can deploy chatbots on their websites or messaging platforms to ensure that students receive timely responses to their questions. This can greatly enhance the student experience by reducing wait times and ensuring that they have access to the information they need. Additionally, chatbots can be programmed to assist with administrative tasks, such as processing applications, scheduling appointments, and managing student records [72-79].

In commercial marketing, chatbots can play a key role in engaging with customers and promoting products or services. By automating the process of responding to customer inquiries, chatbots can help businesses maintain a consistent level of communication with their audience. This can be particularly useful during promotional campaigns, where businesses may receive a high volume of inquiries. Chatbots can be programmed to provide information about discounts, special offers, and new product launches, helping businesses generate leads and drive sales. Furthermore, chatbots can be integrated with customer relationship management (CRM) systems to track user interactions and provide personalized recommendations based on previous interactions [80-88].

In, the development of a WhatsApp chatbot using Python programming presents a valuable solution for businesses and organizations looking to improve their communication efficiency and enhance user engagement. By automating the process of responding to incoming messages, the chatbot reduces the need for human intervention and ensures that users receive timely and accurate responses to their inquiries [89]. The application of artificial intelligence in this project enables the chatbot to learn from its interactions with users, improving its performance over time. As the use of chatbots continues to grow across various industries, their ability to automate tasks and streamline operations will make them an indispensable tool for businesses seeking to remain competitive in today's technology-driven world. The versatility of WhatsApp chatbots allows them to be applied in a wide range of contexts, from customer service and e-commerce to education and marketing, making them a valuable asset for any organization looking to improve its operational efficiency and enhance the overall user experience.

Methodology

The methodology behind the development of this WhatsApp chatbot begins with designing a system capable of taking inputs and automatically responding to incoming messages. Building a functional and user-friendly chatbot for WhatsApp requires several key steps, starting with thorough planning, followed by development and integration. The chatbot was designed using artificial intelligence and coded in Python, leveraging the flexibility and simplicity of the programming language to create a responsive and efficient system. Creating such a chatbot involves defining clear objectives at the outset, which helps guide the development process. These objectives focus on what the chatbot should achieve, including automating responses, improving communication efficiency, and enhancing user engagement.

After setting clear objectives, selecting the right platform is crucial for ensuring the smooth functioning of the chatbot. In this case, the platform integrates Python with WhatsApp to enable seamless communication. Designing the conversation flow is the next step in the process. The chatbot's flow is structured to ensure that user interactions are intuitive and that the chatbot can respond to a variety of user inputs. Developing the chatbot logic comes next, where the underlying algorithms and processes are created to manage the chatbot's responses. This involves programming the chatbot to recognize specific keywords or phrases and respond accordingly. The chatbot logic is designed to handle multiple inputs simultaneously, allowing the chatbot to respond to a wide range of queries with minimal delay.

Once the chatbot logic is in place, the next step involves integrating it with WhatsApp. This is done by connecting the chatbot to WhatsApp's messaging platform, enabling it to communicate with users in real-time. After successful integration, the chatbot undergoes thorough testing. Testing is essential to ensure that the chatbot functions correctly, responding to user queries as intended. Any issues or bugs identified during the testing phase are addressed to ensure smooth performance. The chatbot is tested under different conditions to simulate real-world use cases, ensuring that it can handle various types of user inputs without malfunctioning.

Once testing is complete and the performance of the chatbot is satisfactory, it is deployed into a production environment. This step involves making the chatbot live, where it can begin interacting with users on the WhatsApp platform. Deploying the chatbot involves ensuring that all systems are functioning correctly and that the chatbot is ready to handle incoming messages in real-time. However, the work does not end with deployment. One of the key aspects of this model is continuous monitoring and maintenance. The performance of the WhatsApp chatbot is monitored regularly to ensure that it is functioning as expected. User interactions are analyzed to identify patterns, feedback is gathered to understand user satisfaction, and analytics are reviewed to determine how well the chatbot is meeting its objectives.

Monitoring also involves identifying areas where the chatbot can be improved. As users interact with the chatbot over time, new challenges may arise that require updates to the system. For instance, the chatbot may need to be programmed to recognize new keywords or phrases, or additional functionality may be required to enhance its utility. Regular updates are made to ensure that the chatbot remains effective and relevant. Maintenance is an ongoing process, and the chatbot is updated as necessary to ensure that it continues to meet user expectations. This process ensures that the chatbot remains aligned with the needs of the users and the goals of the organization.

Another important aspect of building and deploying a WhatsApp chatbot is compliance with WhatsApp's guidelines, terms of service, and privacy policies. It is essential to adhere to these regulations to avoid any violations that could lead to the chatbot being banned or restricted from the platform. In addition to complying with WhatsApp's policies, the chatbot must also comply with relevant data protection and privacy regulations, such as the General Data Protection Regulation (GDPR). This is especially important when handling user data, as failure to comply with these regulations can result in legal consequences and reputational damage. Ensuring that the chatbot complies with all necessary regulations is an integral part of the deployment process, safeguarding the integrity and security of the system.

Literature Review

The purpose of their endeavour, which is covered in this essay, was to provide the college with an API and chatbot feature While completing their undergraduate degree. This initiative has utilised a variety of AI and ML techniques. The primary purpose of this bot's implementation was to guide website visitors to their college. It made use of a variety of instruments to demonstrate natural language processing techniques. They created a web-based automaton whose primary function was to answer all user questions. After greeting the user and bidding them well, the chatbot would prompt them to log in by typing their messages into the device. In

the UI, the user can find various buttons that correlate to the various categories of their engineering college. The bot would then ask the user if their inquiries had been answered. If the user cannot find suitable answers to their questions, they can elaborately clarify their questions to continue the conversation. The user was presented with the best possible response after applying various machine-learning methods to this problem. The creators of this project included a special area in the chatbot where users could provide insightful reviews of the chatbot, which helped the creators identify any flaws in their bot [90].

The drawback of this project is that its usage is restricted to college users. Since it can only be used within the college, other people outside have difficulties interacting or cannot interact with the chatbot. The authors discuss a Python-based robot in this paper. With the aid of different classification techniques, such as pattern matches and processing of natural words. Shreyashkar Sharma has just produced a very straightforward WhatsApp chatbot for this initiative. The advantages and disadvantages of using chatbots were discussed in this undertaking [91].

This study clarified how chatbots can be linked with the aid of a database and how each user requires reliable responses. A database can be used to complete the entire procedure. Natural language processing was used to convert human-understandable words into data. According to Shreyashkar Sharma, NLP efficiently retrieves the best response to a user's question. The drawback of this project is that the replies to the user are not very precise. Since the replies are not very accurate, the users have difficulty understanding the exact replies from the chatbot, which makes it difficult for them to interact with the chatbot easily [92].

In this paper, artificial intelligence and machine learning are used to create a Student Bot for academic information. They concluded that the proposed Student Bot would allow users to enter the request related to their institution and branch and receive an immediate response [93].

The proposed system must create a database where relevant data will be kept and a web application console where the operator can access it. The implementation was evaluated, maintained the level of performance, and did well. The drawback to this project is that it is only restricted to usage. Hence, this project has limits; not all users can interact with the chatbot. This essay discusses the creation of an AI chatbot for the Android operating system. They thought a Chatbot might also be an informal boss where a bug is intended to mimic an informed conversation. It can produce operators in various formats, such as a speech, transcript, emotions, etc. Numerous exposed source platforms continue to operate with this goal in mind [94-97].

Extensible language, which is used to simulate a conversational agent, is where computing terminology originates.

In this work, we employ "program-o," an AIML decoder targeted at the set of responses to operators. The drawback of this project is that it cannot be used for messaging. Since the chatbot can only respond to the user's speech, transcript, etc, the user cannot express themselves using messages in this chatbot. This article describes the creation of "Python-BOT," a chatbot that uses artificial intelligence to teach Python programming. Additionally, he was informed that the use of artificial intelligence in the educational sector is continuously expanding. The Chatbot machinery, familiarised support education, and form duties are some new requests made to Education [98-100].

The method for increasing platform understanding for novice computer users represents a long-term drawback in computing education. The Communications Security Establishment has not yet acquired a chatbot to support the instruction of software creation. The Python-Bot Chatbot helps new computer programmers understand Python's simple Syntactical constructions and syntax were anticipated in this article. The drawback of this project is that the users are restricted only to schooling zones. Due to this, users outside of the schooling zones cannot access and interact with the chatbot; only people within the limits of schooling zones can access this chatbot for their use [101].

This paper's primary conclusion is that the chatbot application can respond to the question asked by the computer operator based on the knowledge provided based on the results of the Waterfall method tests performed on it. WhatsApp is a chatbot that can be used to communicate with. The developed chatbot program may provide details on college admissions and student registration. No chatbot is available to support the teaching of software programming at the establishment. The Python-Bot Chatbot, which helps new computer programmers understand Python's simple syntactical constructions and syntax, was anticipated in this article. The drawback of this chatbot is that it can only interact with users online. Users cannot interact with other users or interact in offline mode, which restricts most users from accessing chatbots in offline mode. The limits to this chatbot are completely online, and the user cannot do much once they lose the connectivity to their online network [102-105].

According to this study, WhatsApp chatbots, also known as intelligent assistants, are a component of companies that are rapidly evolving. Many different chatbot-building platforms and chatbot types are available for various businesses, including e-commerce, retail, banking, leisure, travel, and healthcare. However, with this approach, we would like to develop a new user-centric chatbot, allowing each user and business to handle a sizeable clientele simultaneously. Through electronic messaging apps, chatbots can communicate with a much larger population and are more useful than humans. Soon, they will develop into a useful information-gathering instrument. The drawback to this project is that this chatbot is not accessible to all the fields. This shows that it is only applicable to certain specific fields. Because of this, the number of users is limited, and those who don't fall under the range of these fields cannot access it [106-109].

This essay discusses the "Python Chatbot Development." The model's authors also concluded in the paper that it seeks to use less labour and respond to user queries as quickly as possible. Initially, customers would email the website administrator with questions, and it would take a few days for the administrator to respond [110]. Chatbots immediately satisfy the user's request or query with the help of pertinent responses, eliminating this delay. To respond to user requests more quickly, some websites for banks, academic institutions, and business sectors have created chatbots. The drawback to this chatbot is that the chatbot had a delay in response time, which caused the users to have to wait a certain amount of time to get the response back from the chatbot. The inputs given to the chatbots are processed late, and the response time is slow, making it difficult for the user to receive the responses faster [111].

The paper discusses the following: "Future Chatbots, supported by machine-learning technology, can remember prior discussions and draw lessons from them to respond to new ones. Speaking with the various larva users and multiple users would be difficult. In the future, we can build an AIML and LSA-based robot. With the help of this technology, a customer may interact with a chatbot more normally [112]. Using AIML and dynamic patterns and templates for general customer queries can improve the conversation and show that the correct answer is provided more frequently than with LSA. The drawback to this project is that the chatbot cannot interact with multiple users at a time. Due to this, the number of users the chatbot can interact with is very limited, and few users can interact with the chatbot simultaneously. To decrease the amount of time and paperwork required by the administration, this paper explains how to respond to student's questions about admissions by interacting with a chatbot [113].

Their perception of their interactions with others makes it less necessary for the administration to respond to each person's questions individually. The chatbot algorithm, a Python library that produces an automatic response to a user's input, is used in the development of this project [114]. The robot answers administrator-provided questions. Users can inquire about the admissions process, eligibility requirements, course information, and college query procedures. Users don't always need to go to college to get answers. This robot's drawback to this project is that it can only respond if the database matches. This chatbot can only respond to the messages

already stored in the database. If there is anything out of the database, the chatbot cannot read and respond to it. The database of this chatbot is very limited [115].

Project Description

The existing system runs based on the following mechanism; here's an overview of an existing system of a WhatsApp chatbot:

Users interact with the chatbot by sending messages to a designated phone number or WhatsApp account associated with the chatbot.

The chatbot integrates with WhatsApp using the WhatsApp Business API, which allows for programmatic interaction with WhatsApp. This requires setting up a WhatsApp Business Account and obtaining the necessary API credentials.

The chatbot receives messages from users and processes them to understand user intent and extract relevant information. This may involve using natural language processing (NLP) techniques to analyse and interpret the messages.

The chatbot maintains a conversation flow with the user, responding to messages based on predefined rules or using machine learning algorithms to generate responses. The chatbot may also store and retrieve user-specific information to provide personalised responses.

The chatbot may have error-handling mechanisms to detect and handle incorrect or ambiguous user inputs. It may provide error messages and prompts to guide users in providing valid input.

Proposed System

Even though WhatsApp is one of the most popular apps in today's generation, staying in touch with bosses, coworkers, or even our close family members can be challenging. The WhatsApp Chatbot automatically generates messages based on user input. We have built a WhatsApp chatbot trained to respond to incoming messages, emojis, gifs, and stickers faster and respond to a larger number of contacts as we have increased the size of the database. Thus, making it more user-friendly for people, this newly created chatbot will be able to function well for 20 contacts at once. The speed of communication is affected by the Chatbot server. To solve this problem, a Chatbot was developed to generate messages automatically [116-121]. The chatbot reads incoming messages; if the message doesn't match, a chatbot will read incoming messages again. Utilizing Python, this chatbot was created. Stickers, emojis, and gifs are not supported in the Chatbot simulation program, so those messages cannot be read once sent to the server. The inclusion of a random message feature will advance this study.

Results and Discussions

This experiment aims to create a user-friendly WhatsApp chatbot designed to respond to incoming messages faster and fulfill users' needs, especially during busy times. WhatsApp is one of the most commonly used communication apps in today's generation, and many people rely on it to stay connected with colleagues, bosses, or family members. However, it can be challenging for individuals to maintain constant communication, especially when they are busy or managing multiple conversations simultaneously. To address this issue, a chatbot was developed to automatically generate and respond to messages [122-124]. This chatbot includes features that extend its functionality beyond simple text responses, making it a more interactive and efficient tool for users. Specifically, our chatbot has an extended database that allows it to reply using emojis, stickers, and gifs, offering more versatile communication options. Furthermore, it is capable of managing up to 20 simultaneous conversations, making it highly effective for users who need to interact with multiple contacts at once.

The existing systems for WhatsApp chatbots lack some of the key features that our proposed system introduces. In current systems, the response capabilities are limited, as they can only handle up to 10 contacts at a time, and the responses are restricted to text-only communication. These systems are not designed to incorporate the use of emojis, stickers, or gifs, which are

commonly used forms of communication in today's messaging culture. Additionally, the response times in existing systems are slower, which can hinder efficient communication, particularly when users are engaging with multiple contacts simultaneously. These limitations in the existing systems prompted the development of our enhanced WhatsApp chatbot.

The proposed system offers significant improvements over the existing solutions. Our chatbot extends the contact capacity from 10 to 20 simultaneous conversations, providing a more scalable solution for users with high communication demands. Additionally, the inclusion of emojis, stickers, and gifs in the response options enhances the interactivity of the chatbot and aligns with the way many people naturally communicate on messaging platforms. These additions not only make the chatbot more versatile but also make it more engaging for users who prefer using media-rich communication methods. By integrating these new features, we have created a more user-friendly chatbot that can cater to a wider range of communication preferences and needs. The faster response time of the proposed system also ensures that users can manage multiple conversations without delays, improving overall efficiency and satisfaction.

In terms of technical advancements, the increased capacity for handling up to 20 contacts at once is a significant enhancement. The system's database has been optimized to manage multiple conversations simultaneously without compromising performance. The faster response time is a result of improvements in the underlying algorithms, which ensure that messages are processed and delivered quickly. This is particularly beneficial for users who need to communicate with multiple contacts in real-time, such as business professionals or individuals managing group conversations. The improved speed and responsiveness of the chatbot allow for smoother interactions and reduce the likelihood of communication bottlenecks.

While the enhanced functionality of the chatbot represents a substantial improvement, concerns may arise regarding the transparency of data handling. As with any system that involves the exchange of personal messages and data, it is crucial to address potential privacy concerns. Users must be assured that their data is handled securely and transparently, in compliance with relevant privacy regulations such as the General Data Protection Regulation (GDPR). Ensuring that the chatbot provides clear communication regarding how user data is collected, stored, and used is essential to building trust with users. By implementing strong data protection measures and adhering to ethical standards, the system can mitigate potential privacy concerns and foster a greater sense of security among users.

In summary, the proposed WhatsApp chatbot introduces several key enhancements that significantly improve its functionality compared to existing systems. The ability to manage up to 20 contacts simultaneously, combined with the inclusion of emojis, stickers, and gifs, makes the chatbot more versatile and engaging. These features, along with faster response times, create a more efficient and user-friendly experience for individuals who rely on WhatsApp for their daily communication needs. By addressing concerns related to data privacy and transparency, the chatbot can also build trust with users, ensuring that their interactions with the system are secure and compliant with relevant privacy regulations. The improvements in scalability, personalization, and user experience make this WhatsApp chatbot an innovative and valuable tool for enhancing communication in both personal and professional contexts. The integration of modern communication methods and a commitment to user privacy positions this chatbot as a forward-thinking solution that meets the evolving needs of today's messaging users.

Conclusion

In conclusion, a WhatsApp chatbot offers a valuable solution for businesses and organizations seeking to enhance customer service efficiency and personalization. By utilizing natural language processing (NLP) and artificial intelligence (AI), chatbots can understand and respond to user inquiries instantly and around the clock, without requiring human intervention. This capability not only improves customer satisfaction by providing quicker responses but also reduces operational costs for businesses by minimizing the need for additional staffing.

Furthermore, WhatsApp chatbots can be seamlessly integrated with other systems, such as customer relationship management (CRM) software and e-commerce platforms, allowing for a more tailored and efficient customer service experience. These integrations help businesses offer personalized interactions that are both relevant and responsive to individual customer needs. Implementing a WhatsApp chatbot can, therefore, be a strategic investment for companies looking to streamline their operations while enhancing customer engagement and satisfaction. In our case, the developed chatbot responds to incoming messages at a faster rate, including handling a variety of media such as gifs, emojis, and stickers, further enriching the user experience. This functionality makes it a highly versatile tool, capable of adapting to diverse user interactions and improving overall communication efficiency.

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