ChatBot-based Bus Ticket Booking Prototype Using WhatsApp

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Abstract: Customer relationship management (CRM) is the most critical part of any business's operations. To deploy CRM at PO Harapan Jaya, a ticket ordering system is required to make things easy for customers. Researchers constructed a chatbot prototype using the WhatsApp app with the goal of making it easier and more efficient for PO Harapan Jaya customers to buy bus tickets. The eXtreme Programming (XP) approach is a strategy for creating a ticket booking chatbot prototype using WhatsApp. In developing the WhatsApp chatbot prototype for this research, a CRM system is proposed that can collect and manage information entered by customers, ticket purchase history, and produce proof of ticket reservations via WhatsApp chat, which will then be shown to the PO Harapan Jaya admin to obtain bus tickets ordered by customers. Researchers conducted a black box test on the prototype. This study intends to demonstrate how deploying chatbots in the WhatsApp application may speed up the bus ticket purchase process, increase customer service quality, and assist PO Harapan Jaya in optimizing CRM tactics. Based on the extensive programming processes, including planning, design, coding, and testing, it is possible to determine that the final WhatsApp chatbot will work properly and may be used by users to buy PO Harapan Jaya bus tickets. Customers may book tickets, examine departure schedules, and contact the PO Harapan Jaya admin if they have any issues when ordering tickets.

Keywords: Bus Ticket; Chatbot; CRM; Extreme Programming; WhatsApp.

INTRODUCTION

The fast advancement of technology is enhancing humans' daily activities by guaranteeing efficiency, safety, and convenience (Dah et al., 2024). With the advent of the internet and technology, it has become an essential component in many facets of human existence. Institutions and agencies need new innovations in developing strategies to maintain business continuity and survive all existing threats (Pranata et al., 2019). CRM is increasingly vital in the operations of every corporate organization. CRM business strategy (Yuniarti & Abdillah, 2022) entails integrating internal and external processes and operations to improve value, please customers, and create win-win scenarios by adopting different actions for each customer with the goal of preventing them from switching to rivals (Carissa et al., 2014). The latest trend in customer relations automation is carried out using assistants, namely chatbots.

Chatbot is a computer software that uses artificial intelligence to communicate with users via text or speech in discrete languages. Chatbots are a technology used by organizations to address customer demands (Bouhia et al., 2022). which can simulate conversations in natural language (S. C. P & Afrianto, 2015).

WhatsApp is the world's most popular instant messaging program, with 2 billion active users globally. Jan Koum and Brian Acton founded this application in 2009, and Facebook purchased it in 2014. WhatsApp is a cross-platform mobile messaging program that leverages Internet data plans to enable users to rapidly and conveniently share messages and information. Anyone may use WhatsApp to communicate (Wilantara & Maharani, 2022). WhatsApp's users may communicate online, share files, music, location information, trade photographs and videos, conduct long-distance calls, and even video calls (Ningsih et al., 2022). WhatsApp has also been transformed into a social media (Abdillah, 2022b) that connects individuals in a more personal way.

PO Harapan Jaya is a well-known autobus business with a long history of providing intercity transportation services. PO Harapan Jaya additionally uses online systems, cell phones, and visits directly for information media and bus ticket booking. However, this ordering method is seen as less successful because it incurs money, and many individuals still do not grasp how to utilize the internet. As a result, businesses must enhance customer experience by establishing a CRM system and a WhatsApp chatbot that can assist in providing services and ticket bookings that are simple to comprehend and use for the general public.

Based on the challenges described above, the purpose of this project is to design and build a CRM chatbot prototype that can be used to buy PO Harapan Jaya bus tickets via WhatsApp.

LITERATURE REVIEW

CRM is essentially a management system that focuses on managing customer relationships as a business continuity. CRM is focused on identifying the value customers provide, not just what the company sells. Consumers can make decisions about their purchases based on this, so it is important to consider. Companies are expected to use CRM to establish positive relationships and communication with consumers, as well as offer product sales and support production. Apart from offering competitive prices and high quality products, we also strive to satisfy consumer desires (Asraini, 2019). Based on this, good CRM can be carried out using WhatsApp communication facilities which have a wide reach so that customers and business owners can communicate well wherever and whenever. Good communication will make the business run smoothly and will provide benefits for the business owner and satisfaction for customers.

WhatsApp is a Facebook messenger that may be used both online and on mobile devices (Abdillah, 2022a). WhatsApp is a very promising platform for chatbot development because it has a large user base, simple interface, and features such as notifications and group chats. Users generally say they choose this application because it is free, free and equipped with various facilities (Pranajaya & Wicaksono, 2018). Apart from that, WhatsApp also provides an API that is easy to use and can communicate, thereby enabling integration with CRM systems. This is in line with the opinion of (Wilantara & Maharani, 2022) who stated "Anyone can communicate via WhatsApp because it uses a non-face-to-face communication tool". From the views of these experts, WhatsApp is a platform that has great potential for chatbot development because it has a large user base, is easy to use, and has interface features that are easy for its users to use. However, it is also necessary to pay attention to aspects such as data security and user privacy in developing chatbots on WhatsApp.

Bus tickets are a very important product for bus companies because they are the main source of income. The bus ticket ordering system is a process carried out by consumers with the bus company (PO) before making a trip (Zuhri & Putra, 2022). The use of technology in purchasing bus tickets can simplify and speed up the ticket purchasing process. The use of online platforms and mobile applications can make it easier for prospective passengers to buy tickets and choose seats according to their wishes. Through the WhatsApp chatbot, ordering tickets will be very easy and profitable for consumers and bus companies who purchase tickets using the WhatsApp chatbot, of course with well-integrated Customer Relationship Management (CRM).

In previous research conducted by (Fitriani et al., 2015) "creating an Android-based bus ticket booking application where in the booking application the customer makes a ticket order, displays the seat plan and number of seats, as well as displays information on the departure schedule and ticket price". In this research, it was an Android-based application that required customers to install the application on their Android smartphone. Based on this, the researcher wants to conduct research to create a chatbot for ordering bus tickets using the WhatsApp application because the WhatsApp application is an application that has a large number of users which can be used as a basis for conducting this research. So it is hoped that the aim of this research can be achieved, namely that PO Harapan Jaya customers can easily use it.

METHOD

This research falls within the applied research category, which focuses on the creation and implementation of a technical solution. Applied research (Bairagi & Munot, 2019) seeks to answer a specific problem encountered by industry or society. The research approach follows the extreme programming (XP) method. XP is a method for developing software quickly. Through stages (Fig. 1) consisting of Planning, Design, Coding, and Testing" (Pressman & Maxim, 2020).

The research location is PO Harapan Jaya Palembang or often called the Pak Kumis counter which is located at Jl. kemas H. Ateh No. 45, Sukodadi, Kec. Sukarami, Palembang City, South Sumatra 30961. Research data is obtained through various techniques or methods. In research to collect data, data can be obtained from observation or interviews, as well as questionnaires and document research, which are one of the available methods. The data sources can be primary and secondary data sources. Primary data sources are information submitted directly to data collectors. Primary data is obtained from research participant interviews, field

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observations, or direct observation. Secondary data previously existed and was collected from publications, official documents, statistical figures, literature, etc. (Sugiyono, 2018).
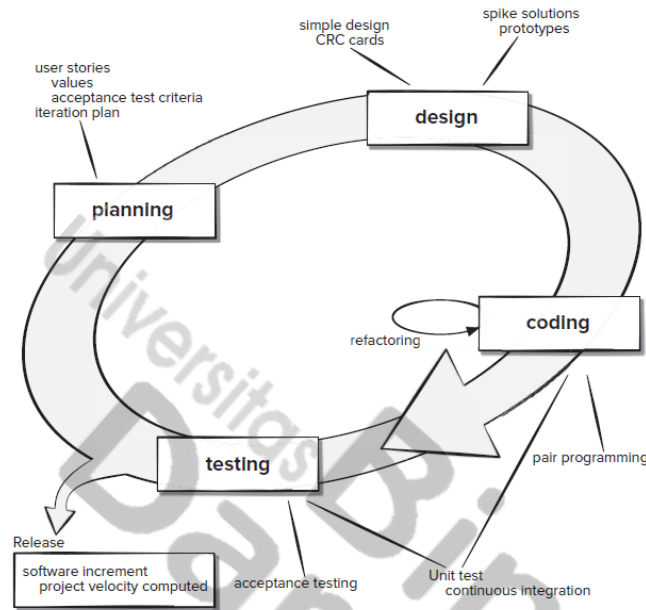

Fig. 1 Extreme Programming (Pressman & Maxim, 2020)

The stages of the Extreme Programing (XP) method consist of "planning" by understanding the business being carried out, determining the results (output), parts and functions of the application to be created. Design is carried out by designing a simple application according to needs using a CRC (Class Responsibility Collaboration) card. The use of CRC in this phase is to map (create) the classes used in use case diagrams, class diagrams and object diagrams. The coding involved in developing applications using XP is pair programming (two or more programmers are involved in creating the program). Testing is testing the functionality of the application being created to see whether errors occur and whether the application being built is in accordance with the business processes being carried out." Based on these stages, a chatbot prototype for ordering PO Harapan Jaya bus tickets using the WhatsApp application will be developed in this research.

In this research, the tool used is the Desktop Whatsapp Auto (DEWA) application which can be integrated into the Whatsapp application. The DEWA application (Figure 2) has an auto reply feature to create automatic messages regarding ticket orders and also a form feature that can create forms for ticket orders which contain data filled in by customers automatically. Furthermore, the WhatsApp message can be proof of the ticket order that the customer has ordered. Apart from the DEWA Application, this research also involved: WhatsApp Massangger Application, Microsoft Office 2010, Maria DB, Node JS, OleDB, MySQL Front, and Chrome Browser.
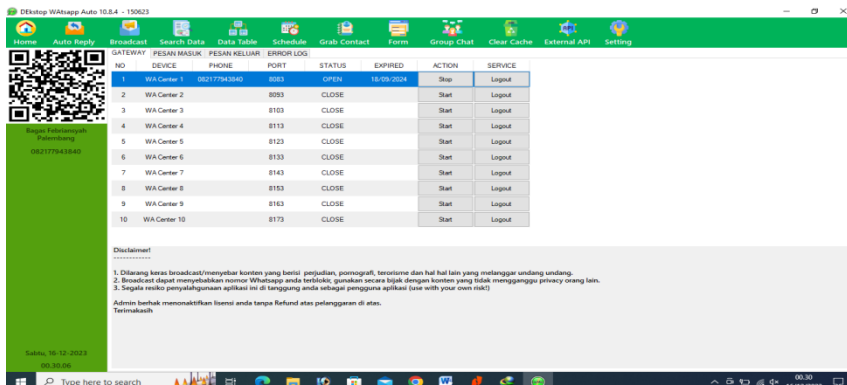

Fig. 2 The Main Display of DEWA Application

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RESULT

The results section of this article provides a complete description of a revolutionary chatbot-based bus ticket purchasing prototype that runs on the WhatsApp messenger application. This breakthrough service allows users to seamlessly book bus tickets using WhatsApp, leveraging the platform's large user base and instant messaging features. This interface simplifies the ordering process by providing real-time information and ensuring secure transactions. This article emphasizes the strategic and customer-centric character of this partnership, indicating the potential for future advances in digital customer service.

This prototype was created using the extreme programming (XP) application development methodology and the WhatsApp Auto Desktop application (DEWA). Using these methods and applications, a chatbot is produced as a bus ticket-ordering service assistant. The appearance of the chatbot on the WhatsApp application is shown in Figure 3. Users can type 'Pesan' which the chatbot then replies with a greeting and a list of menu options. Users can select menus by typing numbers from the menu list. The menu contains route and departure information, ticket reservations and assistance services. Selecting a menu by typing a number is then sent according to the menu you want to select.
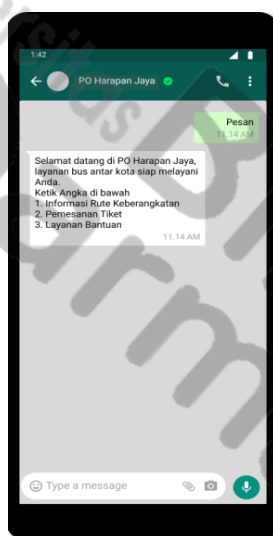

Fig. 3 Main Menu Display

The first menu ("Informasi Rute Keberangkatan") can be displayed by typing '1', then the departure schedule displayed on the chatbot screen contains routes that can be viewed according to the needs of PO Harapan Jaya customers. In the departure information menu, after the customer selects this menu, the city of origin that can be selected and also the destination city (Table 1) that can be selected will appear to find out the ticket price and departure time on the day the customer sees the schedule (Fig. 4).

Table 1. PO Harapan Jaya Destinations

No	Destination City	Cost
1	Boyolali	Rp. 555.000
2	Jombang	Rp. 670.000
3	Kendal	Rp. 555.000
4	Madiun	Rp. 605.000
5	Magetan	Rp. 605.000
6	Nganjuk	Rp. 605.000
7	Ngawi	Rp. 605.000
8	Salatiga	Rp. 555.000
9	Semarang	Rp. 555.000
10	Solo	Rp. 555.000
11	Sragen	Rp. 555.000
12	Surabaya	Rp. 670.000
13	Tanggerang	Rp. 555.000

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There is a choice of thirteen destination cities, namely: 1) Boyolali, 2) Jombang, 3) Kendal, 4) Madiun, 5) Magetan, 6) Nganjuk, 7) Ngawi, 8) Salatiga, 9) Semarang, 10) Solo, 11) Sragen, 12) Surabaya, and 13) Tanggerang. For example, select destination number '9' (Semarang), departure information will be displayed: 1) Origin, 2) Destination, 3) Price, and 4) Departure time.
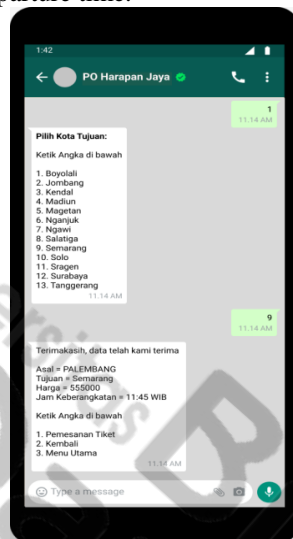

Fig. 4 Departure Route Information Display

The departure schedule display can be seen in Figure 4. To check the output departure schedule, customers select the city of origin and destination city. The chatbot will display a message containing the ticket price and departure time. Apart from that, the message also contains the next menu, namely ticket reservations to order tickets directly, the back menu to return to the departure route information menu and the main menu to enter the main menu which can be viewed. Selecting a menu by typing a number is then sent according to the menu you want to select.

In the ticket ordering menu, the chatbot that has been selected by the customer will fill in the information needed to order tickets. To make an order the user may type '1' (Ticket Order). The ticket ordering menu display can be seen in Figure 5.

Fig. 5 Ticket Ordering Display

After selecting the preferred route, the customer then fills in the number of seats, departure date, ordering name and telephone number (Figure 6). Then the chat reply will automatically contain the data that has been selected and sent by the customer. The automatic chat also displays a menu for filling in passenger data with menu options of 1 seat for one passenger data, 2 seats for two passengers, 3 seats for 3 passengers, and 4 seats for four passengers. There is also a cancel menu to cancel the order and a return menu to re-enter the ticket order. Selecting a menu by typing a number is then sent according to the menu you want to select.

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Fig. 6 Passenger Data Display

In the seat selection command, customers can select the desired seat number (Figure 7). If the customer selects the select your seat number menu, the chatbot will display the seat number that the customer can choose and if the selected seat cannot be selected then the seat is already occupied. Customers also fill in the name of the orderer so that later the admin can see that the seat number chosen by the customer is not confused with other customers. The reply chatbot also contains a menu to select a seat number (if there is more than one, please select another seat), this menu can be selected by the customer if ordering more than one passenger. The next menu is payment for customers to make payments. The last menu on the reply chatbot is cancel if the customer wants to cancel their order. Selecting a menu by typing a number is then sent according to the menu you want to select.
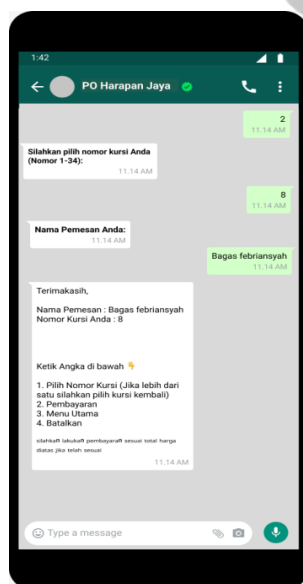

Fig. 7 Seat Selection Display

In the payment menu, the output produced is a message related to payment information (Figure 8). In the payment menu selected by the customer, an automatic message will appear for the customer to select the available payment method. Upload valid proof of payment that has been made in nominal terms according to the total price that has been previously notified according to the order. The sender's name will later be confirmed by the PO Harapan Jaya Palembang admin that the proof of transfer is correct. Payment can be made using digital payment (Abdillah et al., 2023), for example, using the Dana Application. After filling in the data, the chatbot will automatically reply to a message containing the data that has been filled in by the customer and also include

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the order number which the customer will later show to the PO Harapan Jaya Palembang admin at the counter to confirm that they have made a ticket order and printed the bus ticket.
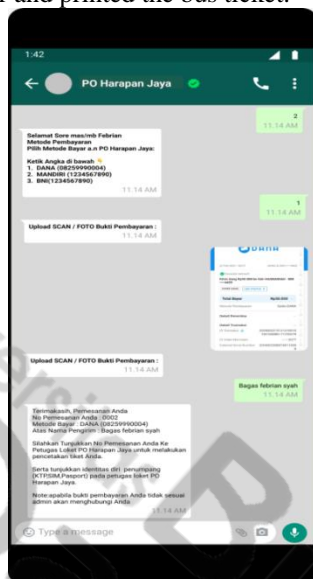

Fig. 8 Payment Display

The next assistance service menu that customers can choose contains the PO Harapan Jaya information menu. To order tickets and menus, contact us to be able to contact the PO Harapan Jaya admin directly. The help service menu display can be seen in Figure 9.
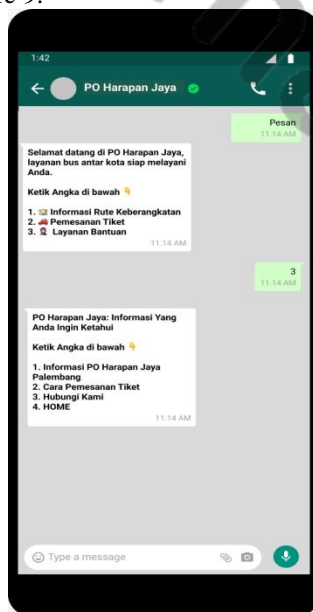

Fig. 9 Help Service Menu

In the help service menu, if selected by the customer, a menu will appear containing information about PO Harapan Jaya Palembang which contains information about PO Harapan Jaya if selected by the customer. Ticket ordering menu for customers to know how to order tickets. The contact us menu, if selected, will immediately connect to the WhatsApp admin directly. The last menu is Home, which if selected will return to the main menu. Selecting a menu by typing a number is then sent according to the menu you want to select.

DISCUSSIONS

Based on the findings of study and testing, the WhatsApp chatbot was designed to work properly and match the specifications. As a result, this addresses the problem of how to design a CRM chatbot prototype using WhatsApp for ticket ordering, specifically by employing the XP methodology, despite the fact that the

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manufacturing process has undergone numerous changes, because it must be tailored to the needs and abilities of researchers as well as the application used to create the program, which is still in development.

The WhatsApp chatbot prototype developed in this study complies with the research goals in that it allows users to buy PO Harapan Jaya bus tickets via WhatsApp. This chatbot allows clients to book tickets, view departure timetables, and contact with the PO Harapan Jaya admin to ask questions about ticket orders. The menu presented when booking tickets via WhatsApp chatbot contains the primary menu by entering chat with the word message, as well as the auto respond function, which generates output in the form of a message including a menu from which the consumer may pick. The menu provides route and departure information, ticket reservations, and help services. When you type a number to pick a menu, it is then transferred to the appropriate menu.

The departure route information option produces a message with the departure timetable for the available routes. Customers may select their city of origin and destination, and the message will be delivered to them based on their selection, along with the ticket price and departure time. Aside from that, this message has the following menus: ticket reservations to order tickets directly, back menu to return to the departure route information menu, and main menu to enter the main menu that may be seen. When you type a number to pick a menu, it is then transferred to the appropriate menu.

The output from the ticket ordering menu is a message providing the passenger's name, cellphone number, departure date, number of seats, route selected, and total ticket price calculated by multiplying the ticket price by the number of seats. The message also includes a menu for entering passenger data, with possibilities such as 1 seat for one passenger, 2 seats for two passengers, 3 seats for three passengers, and 4 seats for four passengers. There is also the option to cancel the order and return to the ticket order menu. When you type a number to pick a menu, it is then transferred to the appropriate menu. The ticket order output is generated when the customer fills out the ticket order form, which includes selecting a route, entering the number of seats, entering the passenger 's name, date of departure, and telephone number.

The support service menu generates a menu with information about PO Harapan Jaya, how to buy tickets, contact us, and home. When you type a number to pick a menu, it is then transferred to the appropriate menu. Customers can select meals based on their needs.

CONCLUSION

The stages in creating a ticket booking WhatsApp chatbot prototype have been implemented using the XP method, in which there are several stages, namely the planning, design, coding and testing stages. The steps that have been carried out have resulted in a chatbot that can be used by PO Harapan Jaya customers to order tickets according to their desired destination. Testing carried out can be said to mean that the program that has been created runs well so that it is suitable to be used. With the WhatsApp chatbot for ticket booking, customers do not need to go to the counter to order directly and can also find out the schedule and ticket prices at PO Harapan Jaya. Apart from that, with the admin chat feature provided, customers can also contact the PO Harapan Jaya counter staff to ask about ticket orders.

ACKNOWLEDGMENT

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[SinkrOn] Letter of Acceptance (LoA)

SinkrOn
JURNAL & PENELITIAN TEKNIK INFORMATIKA

Dear Author:

Leon Andretti Abdillah:

We have reached a decision regarding your submission to Sinkron : jurnal dan penelitian teknik informatika, "**ChatBot-based Bus Ticket Booking Prototype Using WhatsApp**".

Our decision is to: **Accept Submission and publish for volume 8 issue 3, july 2024**

Online manuscripts are available at the link https://jurnal.polgan.ac.id/index.php/sinkron/article/view/13812 in the period described above.

Thus this decision letter is made and is an **Official Letter of Acceptance (LoA)**.

If further discussion is needed, please contact the Editor on Whatsapp +6282251583783

Best regards,

Muhammad Khoiruddin Harahap
Editor in chief

Note: This email is official and we do **not provide LoA in PDF form**. Please Print as PDF this email if you need it.