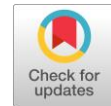


# Chatbot helpdesk design for digital customer service

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## ABSTRACT

A chatbot is a computer program based on AI (Artificial Intelligence), namely virtual robots that simulate conversations like humans. Customer service (CS) is one of the many parts of a company that will directly contact customers. Therefore CS is expected to be able to provide fast and appropriate responses to customer complaints and needs. Using AI technology, Chatbot can help or replace customer service duties because it can provide information and help customers' constraints precisely and quickly. A chatbot is currently widely used by middle and upper companies. H3I is a kind of Chatbot that serving all loyal customers and can be implemented in various messenger platforms such as WhatsApp, Line, and others. For gathering the information, the authors use interview, observation, literature study. Moreover, the Prototype model is used for the development of Chatbot. The result was made a Chatbot for WhatsApp that can be used for customer service.

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## 1. Introduction

Technology is the development of applications, tools, machines, materials, and processes that can help humans solve problems. Simultaneously, information results from a manipulation processing and organizing or structuring a group of data that has knowledge value for its users. The development of information technology is running so rapidly in various aspects. The more rapid the number of human jobs that technology helps to complete. With the help of work, technology, or activities can be carried out quickly and minimize errors. Technological developments that have become a hot topic on various occasions are artificial intelligence (AI). The use of AI as a technology that is considered increasingly advanced has also made all fields advance their fields. One area that plays a role is customer service[11].

Customer Service (CS) is one part of the company that holds a vital role in customer service. With the use of AI Technology, the services provided are directed towards services in the digital world. To always be ready to serve customers, time to respond to services is often a particular concern. If customer service is through face-to-face, customer service will immediately respond (real-time) to customer complaints or needs. To be able to create a digital response, chatbot development is needed. CS is an essential benchmark in building satisfaction with complaints or problems [10]. With AI, computers can complete specific tasks just like humans do. Like a chatbot. Chatbots are computer programs that allow us to have written conversations. Expert customer service consultant [2] said that artificial intelligence has successfully changed the business world drastically. The existence of chatbots equipped with successful AI technology has become a "viable customer service channel" [4]. Chatbots are built with artificial intelligence and can have a more natural sense of conversation so that even if they have a conversation with a virtual assistant, customers will feel that they are having a conversation with an average human.

Recently, Rahayu [8] suggests that chatbots have been used for practical tasks such as online assistance, personal services, or information acquisition, which can be seen from the program's function as a conversational agent. The Chatbot acts as a conversational agent that can be used as a helpdesk. (medium.com) A chatbot is a computer program designed to simulate conversations with human users, via the internet. In detail, a chatbot is a virtual assistant that communicates with people via text messages, pictures, or locations as a virtual companion that is integrated into websites, applications, or other platforms so that companies can be closer to customers. Helpdesk is a structure or program that handles all forms of complaints from various parties by providing services to provide information to users [7]. Currently, many companies have taken advantage of chatbots and assisted customer service tasks in serving customers. With chatbots, customers can get information about products, promos, services, and solutions to problems that customers are experiencing appropriately and quickly; besides, customers can also provide criticism and suggestions about the chatbot company [2].

Based on the research done, it can be concluded that the new Chatbot's success rate is 32.5% higher than the old Chatbot on average. The new Chatbot's SUS score is 32 superior to BigBot, 24.5 superior to ReMind, and 23.5 to RemindMe. However, it still lost as much as 6.5 with Reminders [6]. The average SUS score for new chatbots increased by 18.4 compared to the old chatbots. The scores illustrate that the user-centered design approach is suitable for analyzing products directly related to the user. In selecting the right interface, it can increase the user experience of a chatbot that uses the interface [1]. One of the companies that have utilized chatbot technology is H3I. This company is engaged in telecommunications. It has millions of customers spread across Indonesia, and even in the world [3]. With chatbots [3], customers do not need to spend much time going to the nearest H3I gallery or wait their turn to connect with customer service via telephone because customers can connect only by accessing chatbots on various available messenger platforms such as WhatsApp, Line, Facebook Messenger, and others. Kata.ai [3] is a platform for building an enterprise-scale Bot with ease. With the kata.ai platform's help, we can Chatbot using messenger platforms (Figure 1).

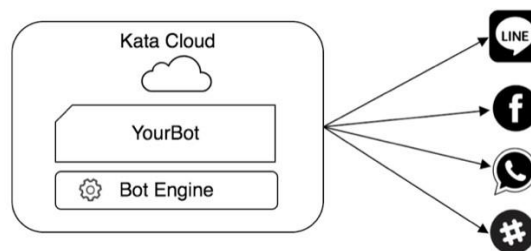


Fig. 1. Kata.ai Messenger Platform

In Kata Bot Platform [3], the processing of user message is divided into three pipelined steps there are; Intent Recognition Converting raw message into structured information (in the form of intent and attributes), State Mapping Determining the state of the Bot and the context variables and Choosing Action Generate response by executing defined action. It can improve company performance by providing the best service to customers, where they get information and fast solutions to all service problems. WhatsApp is one of the most messenger apps used by more than 2 billion people in over 180 countries. This research focuses on creating a helpdesk chatbot design using WhatsApp used for digital customer service based on the explanation given.

## 2. Method

In Figure 2, it is explained that research is carried out through the stages of data collection and system development, which will be detailed in the following description:

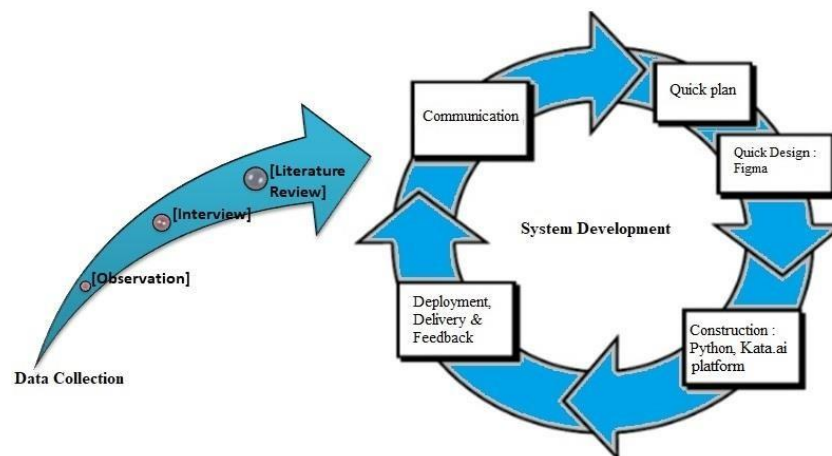


Fig. 2. Methodology

## 2.1. Data Collection Method

### 2.1.1. Observation

Make observations or observations of customer service that are usually done by customer service.

### 2.1.2. Data Collection

Researchers collect data on questions and complaints that are often raised by customers as well as data on answers to these questions and complaints

### 2.1.3. Interview

Researchers interviewed several customer service providers about service procedures or procedures that had been done so far.

### 2.1.4. Literature Review

Researchers refer to several journals and related reading sources to support this research.

## 2.2. System Development Method

The development model used is a prototype model, defined as a tool that provided the maker and the potential user. Provided how the system functions in its complete form, and the process for producing a prototype is called prototyping. [9]. Technical matters that are not understood by the user are connected to the prototype model to specify user requirements to the software developer.

Prototyping is creating a simple software model that allows users to have a basic overview of the program and perform initial testing. Prototyping is one of the widely used software development methods. The stages of the prototype model are as follows:

- Collection of needs: researchers collected the data needed to design a chatbot to work optimally in serving customers.
- Build a prototype: the prototype is built using Figma as an illustration of the Chatbot.
- Evaluation of the prototype: users evaluate prototypes built based on needs.
- Encoding the system: coding using the python programming language and also a coding platform in building a chatbot
- Test the system: the Chatbot is tested by customer service in detail from the beginning to the end of a case conversation.
- System evaluation: evaluate to see applications according to initial specifications. If it is correct, go to step 7. If it is not correct, then it will be corrected
- Use of the system: if the Chatbot is built successfully, it will be published to be used by customers.

### 3. Results and Discussion

Based on the results of interviews and observations conducted by researchers regarding services provided before the Chatbot can be concluded as follows:

- Customers who have questions or complaints must contact the H3I call center and bear the call costs incurred.
- Customers must wait for their turn when all call centers are serving other customers.
- Customer service serves customers based on standard time; if the time limit provided exceeds the usual time, the customer will be disconnected from the related customer service.
- The customer received no conversation history.
- Customers need more costs to connect to customer service.
- If the problem is related to the physical card, the customer must come to the nearest gallery with an ID card.

With this Chatbot design, it is hoped that it will help customer service tasks and serve customers wherever and whenever they need customer service. Therefore, to clarify the Chatbot role, an analysis will explain what processes are being carried out and depicted through diagrams. The diagram modeling is made with [5] draw.io, a website specially created to illustrate diagrams online. All the features on the site can be accessed via a browser. Draw.io makes it easy to create diagrams without limitation on the number of diagrams integrated with Google Drive. The Chatbot interacts with users through the available channels. The H3I Chatbot is made using the Python programming language and the Kata.ai platform, with an interface overview in Figure 3.

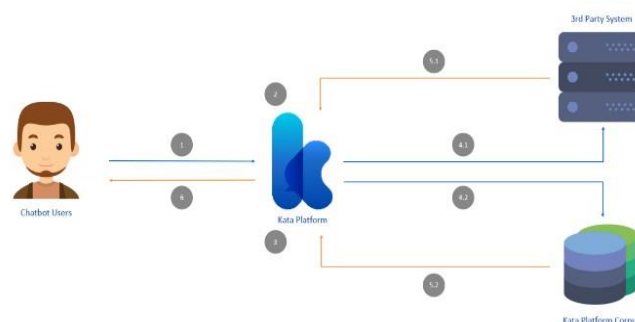


Fig. 3. Digital Platform

Figure 3 shows that Chatbots can be implemented on various messenger platforms such as WhatsApp messenger and connected to the kata.ai platform. It contains all code, data, AI, NL methods, and other components that build the Chatbot; besides that, Chatbot is also connected to the API, knowledge center, CMS, middleware, and other channels a role in giving chatbots intelligence. In general, the activities carried out on the Chatbot are shown in Figure 4. Chatbot activity (Figure 4) analysis details such as users must have a messenger application such as FB; they can then access the Chatbot on the messenger. Start a conversation, the Chatbot will respond to the user quickly. Users can ask or find out based on their needs about H3I via Chatbot. Like most applications, the Chatbot is also organized into several menus.

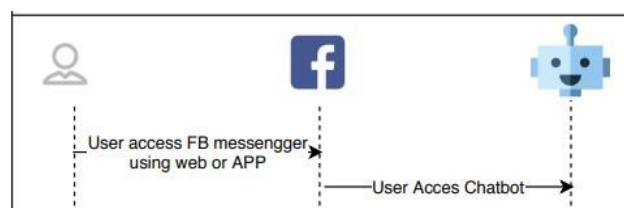


Fig. 4. Chatbot Activity

Figure 5 illustrates that Chatbot on H3I, four main menus, can help serve all customers' activities.

- Info menu: contains information on services, products, and promos provided by H3I
- Account: contains account information belonging to the customer.
- Tips & Tricks: assist customers in overcoming problems that are often experienced by most customers
- Assistance: if the customer is not satisfied with the Chatbot's services, the customer can connect directly via the Chatbot.

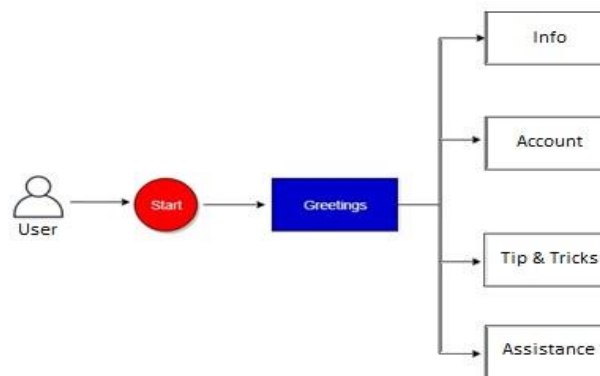


Fig. 5. Flow Diagram

The details of the process that can be done via Chatbot are illustrated in Figure 6. Details of analysis described as users say greetings like "Hi," the Chatbot will immediately respond and display a menu. Users can select one of the available menus. The Chatbot will answer all questions based on the knowledge that has been accommodated in the knowledge center and the data connection via the available API.

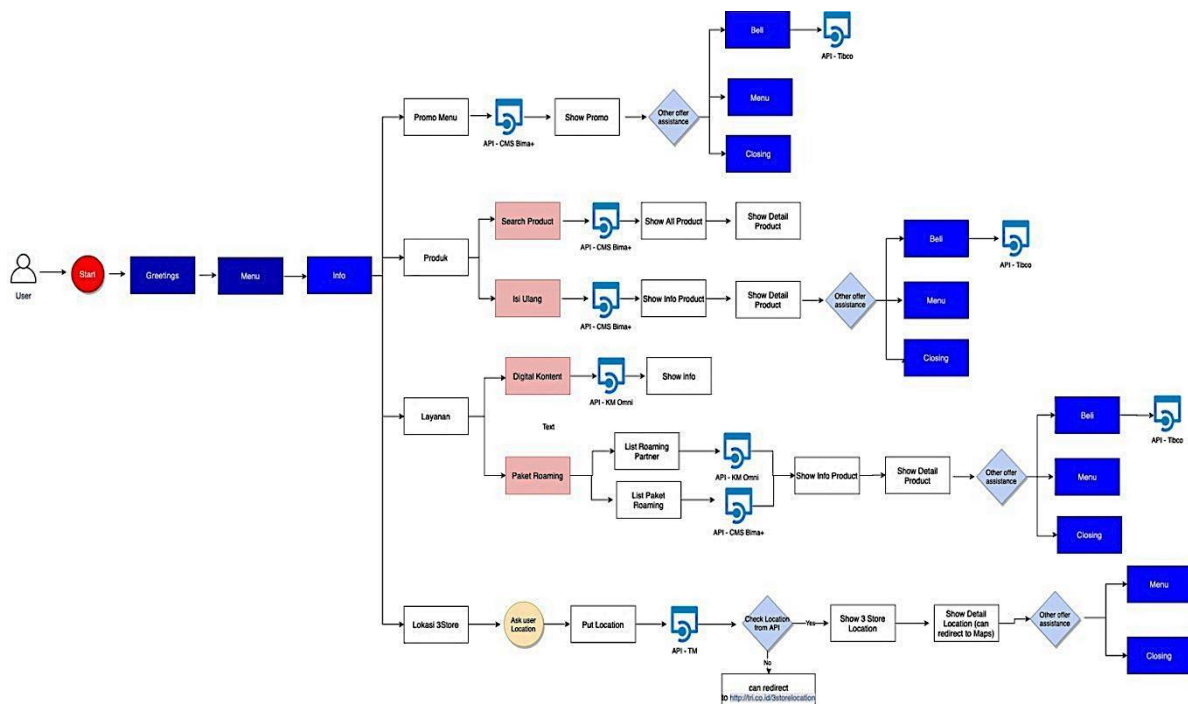


Fig. 6. Details of Flow Activity

Chabot H3I is designed with the Python programming language and the Kata.ai platform that can create intelligent virtual assistants that can serve customers well. With AI solutions that can reach customers in all messaging applications, a chatbot concept connects and resolves questions or problems in just seconds as long as the customer is connected to the internet. After the design process is carried out, the development and implementation process continues. Implementation is the stage of arranging the system so that it is ready for use or operation. The implementation aims to confirm the design modules so that users can provide input to the system developer. The chatbot system's implementation is different from other implementations because the Chatbot is only in the form of text and images and does not need a frontend because the chatbot front end design follows the messaging platform Chatbot is implemented. The main component of chatbot development is the platform and also the Bot. Bot (shown in Figure 7) is a dialogue agent capable of receiving messages and returning responses. This Bot can be connected to various channels such as Facebook Messenger, LINE, Slack, or even Apps.

Conversations in Figure 8 are interactions between users and bots, consisting of one incoming message and one or more responses. The system will never send messages to users by itself. Every message that comes to a user is triggered by an incoming message. To better understand this Chatbot design, researchers provide an overview of the chatbot prototype if implemented in WhatsApp.

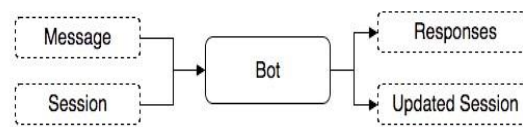


Fig. 7. Bot

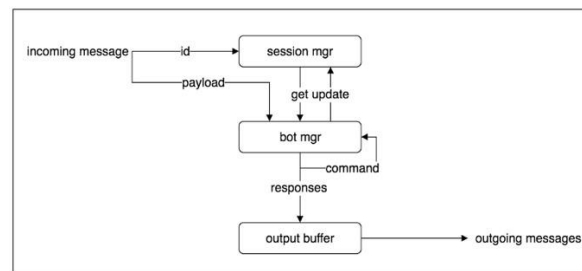


Fig. 8. Conversation

However, before that, the Chatbot had to be integrated into the platform. Figure 9 is an overview of the H3I Chatbot using WhatsApp.



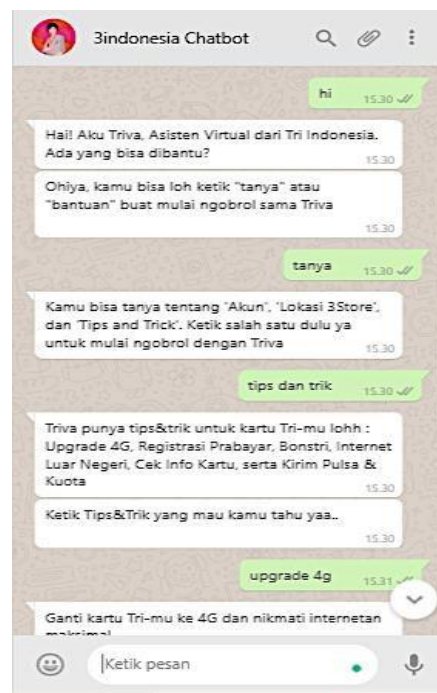


Fig. 9. Chatbot on WhatsApp using Bahasa

Before publication, the Chatbot must pass the test by the testing and customer service teams who usually serve customer service, can be seen in [Table 1](#) below:

Table 1. Testing Result

fig	Expected Result	Testing Result	Conclusion
The user starts a conversation with the Chatbot	The Chatbot responds quickly and precisely	Successful, The Chatbot will display a menu according to customer needs	Accepted
Users need information on promo products and services owned by H3I	The Chatbot provides answers to needs based on data from the API and knowledge center that has been implemented in the Chatbot	Successful, The Chatbot provides updated information to customers.	Accepted
Users need account information by providing the phone number, and OTP code sent	The Chatbot provides customer account information based on a verified number.	Successful	Accepted
OTP error or telephone number or other data	The Chatbot will not provide customer data if there is data that is not verified.	Successful	Accepted
Users need tips and tricks while using the H3I service	The Chatbot provides tips and tricks according to customer requests	Successful	Accepted

#### 4. Conclusion

From this research, it can be concluded that Chatbot is an AI solution for smart conversations that can serve all customers quickly and precisely. Chatbots help the role of customer service in serving customers. Customers can quickly get information and receive solutions to all service problems

experienced by customers. For future works, this design can be implemented as a stand on an application or add-on for services that focus on customer loyalty.

### Declarations

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