

Design and Development of Chatbot Using Dialog Flow in Surya Sembada PDAM Surabaya City

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ABSTRACT

Surya Sembada City Surabaya Water Supply Company is a company that provides clean water production. In its service, many complaints are obtained from customers. During this time complaints are carried out manually, of course, less effective. With the development of information technology, the chatbot was born. Chatbot acts as an automated conversation agent. Making this chatbot using the Dialog flow platform with a database stored in the cloud. The design starts with the collection of data obtained from the customer service, followed by making use case diagrams, system architecture, interface design, and chatbot design. The results of this project will be in the form of a chatbot for PDAM Surya Sembada, Surabaya City, which is integrated with Telegram to help optimize company services.

Keywords: *Chatbot, dialog flow, customer service*

1. INTRODUCTION

At the Surya Sembada Municipal Water Supply Company (PDAM) in Surabaya, the path through which customers submit questions or complaints is still conveyed manually through customer service or call centers. Of course, it is less effective to serve customers, so we need a system automation technology. One of the technologies is artificial intelligence. The main part of artificial intelligence is the knowledge base (knowledge base), which is an understanding or understanding of the subject area obtained through learning and experience [1]. One of the programs in artificial intelligence that is designed to be able to communicate directly with humans as users is a chatbot. A chat can be interpreted as a conversation. The bot is a program that contains several data, if given input it will provide answers.

The chatbot can answer questions by reading the text typed by the user through the keyboard [2]. The Chatbot acts as a conversation agent that can replace the role of customer service. The ability of computers to store large amounts of data without forgetting even one of the information they store is combined with the practicality of asking direct information sources compared to finding information on their own and learning capabilities they have can create a reliable customer service. Based on the

background outlined above, the authors formulated the issues to be discussed in this report including how to design conversational flow for chatbots in PDAM Surya Sembada, Surabaya City and how to integrate chatbots with Telegram.

This research was made to facilitate the performance of PDAM Surya Sembada Surabaya's customer service to answer general questions from customers by designing chatbots that will be integrated into the PDAM Surya Sembada, Surabaya City social media platforms such as Telegram. To that end, companies must implement Customer Relationship Management (CRM) to serve customers as well as possible so that customers feel satisfied and valued by the company. As Arif Budi P. [3] said, with CRM, companies will get detailed information about customers. The information is in the form of customer personal data, criticism, suggestions and what is needed by the customer, so the company can provide responses, services, and changes following what the customer wants.

The previous research was conducted by Ahmad Iswandi [4], in which in his writings the writer made a chatbot order management using dialog flow which was integrated with Facebook Messenger. And other papers written by Dimas Pratama Jati and Muhammad Rifqi Ma'arif [5] the authors of their research focus on the use

of API and LINE platforms to build customer service chatbots. After conducting a review of the previous research the writer concluded that all the studies have the same concept that is to make chatbot a helper of human work. As for the research that the author is doing now has a differentiator from previous studies, where the authors implement customer service chatbot with Dialog flow integrated with Telegram in PDAM Surya Sembada City of Surabaya which has never been done in previous studies.

2. METHOD

A research methodology is a discussion of the theoretical concepts of various methods, advantages, and disadvantages, which in scientific work is followed by the selection of the methods used [6]. The research methodology that the author uses in this study is:

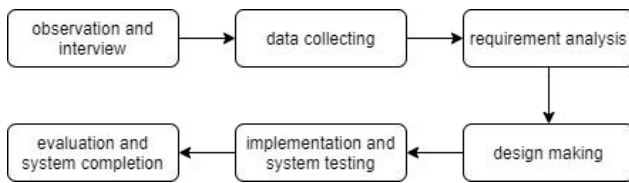


Figure 1 Block diagram of research

Figure 1 is a block diagram that explains how the stages of research that have been done by the author when researching PDAM Surya Sembada City of Surabaya.

- a. Data collection technique
- b. Data collection techniques are ways that can be used by researchers to collect data [7].
- c. The data collection techniques used by the author are as follows:

2.1. Direct Research (Field Research)

Conduct a direct review to obtain the data needed in research. This research was conducted on the activities of all research objects, including:

- a. Observation
Observation is a systematic, direct observation of the symptoms to be examined [8]. With the method of observation, the authors make direct observations about the activities and conditions of the company where the research was conducted, namely PDAM Surya Sembada Surabaya City.
- b. Interview
An interview is a question and answer activity between two or more people directly [8]. In this study, the authors conducted a question and answer directly with the parties concerned about the issues discussed, namely regarding the procedures for implementing complaints on

customer service PDAM Surya Sembada Surabaya.

c. Documentation

Documentation is the collection of data which is done by examining the documents contained in the company [9]. The author collects data obtained from the Public Relations Department of PDAM Surya Sembada City of Surabaya in the form of archives of complaints history data through the official WhatsApp channel.

2.2. Literature Study (Library Research)

Is to go to the library and look for books that fit the problem raised, the information obtained is used to solve problems related to the implementation of customer complaints. In this research activity, the writer uses one of the frameworks for making a chatbot, namely Dialog flow. The following is an explanation of the workflow Dialog flow that I use in this study [10]:

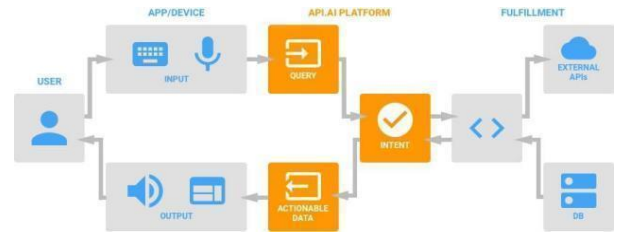


Figure 2 Workflow dialog flow

Figure 2 is an explanation of the chatbot request process from users with Dialog flow. Dialog flow is a platform for developing chatbots based on natural language conversations. Important concepts such as intents and context are used to model chatbot behavior.

2.2.1. Dialog flow component

Dialog flow consists of several components including Agents, Intents, Entities, and Contexts. The following is an explanation of each component. Agent The agent is best described as an NLP (Natural Language Processing) module. They can be used by applications, products, or services to turn natural user requests into actionable data. This transformation occurs when user input matches one of the objectives in the agent.

- a. Intent
The intent is a mapping between what users say and what actions the software must take. The Intent interface has the following sections:
 - i. Phrase Training
 - ii. Action
 - iii. Response
 - iv. Context
- b. Entities
Entities are advanced features that are used to

extract parameter values from natural language input. Every important data that you want to get from a user request, will have the appropriate entities. Entities used in a particular agent will depend on the parameter values that are expected to be returned as a result of the agent function.

c. Contexts

Contexts represent the current context of the user's request. This is useful for distinguishing phrases that might be unclear or have different meanings depending on user preferences, geographical location, current page in the application, or conversation topic.

2.2.1. System architecture

The design of this system architecture itself is a stage that is passed for making chatbot will use services that are already available such as using a text messaging platform from Telegram. Figure 3 below is a system architecture that has been made.



Figure 3 System architecture

3. RESULTS AND DISCUSSION

The following are the steps to create a chatbot with Dialog flow. By signing in and going to the console. After that create a new agent, as in Figure 4.

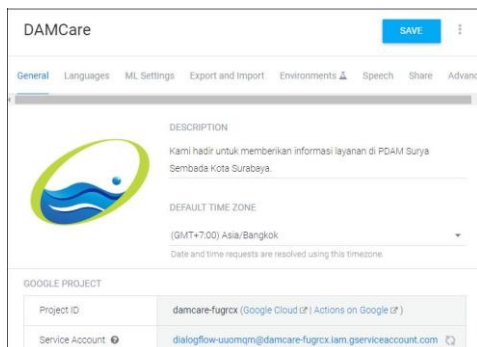


Figure 4 Making agents;

Next group the types of questions that will be learned by chatbots by making intents, as in Figure 5.

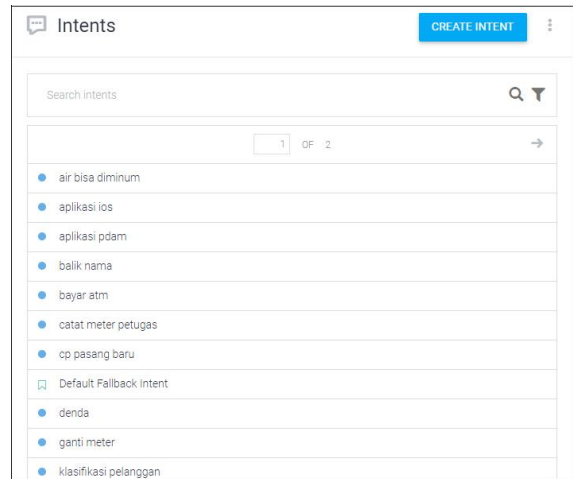


Figure 5 Making intents

After that, train chatbot with word synonyms or synonyms to make it easier for the system to not write several similar questions several times in intense using the entities feature, as in Figure 6.

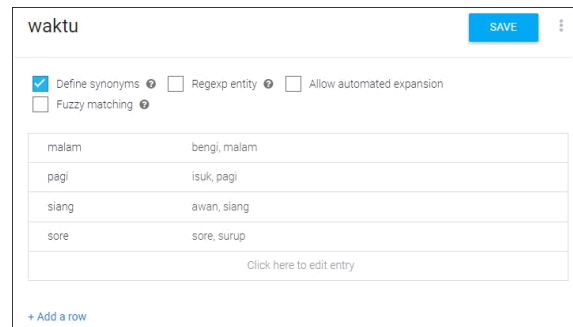


Figure 6 Making entities

3.1. Chatbot implementation on Telegram

First, register the bot with @Botfather. Select the search menu and type "Botfather" or "@Botfather", as shown in Figure 7.



Figure 7 Looking for a Botfather

After that, press 'START' to start the interaction with @Botfather. Furthermore, @Botfather will be presented with a selection menu. Next send: / new bot and answer the questions from Botfather. The questions include the name of the bot, the username bot, for the username must

use the suffix "bot". If the username is available, then at that time you will also get a TOKEN which is the identifier of the bot itself. Take good note of TOKEN obtained from BotFather. This TOKEN is confidential, only the owner (creator) of the bot can find out if needed then can do a TOKEN revoke, to fix it. Then change the chatbot description and others like Figure 8.

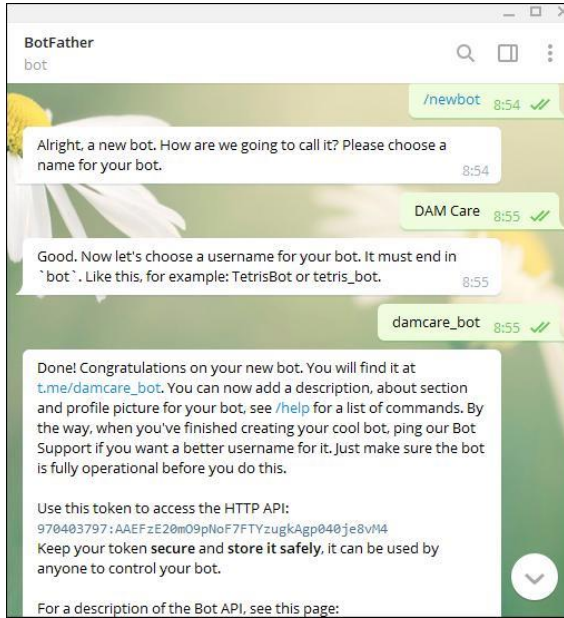


Figure 8 Registering a chatbot with the Botfather

The next step is to integrate the chatbot with Dialog flow. The way to do this is to copy the TOKEN that BotFather has given to the 'Integrations' feature and select the telegram and then paste the TOKEN in the column provided, as shown in Figure 9. For the results of telegram integration with dialog flow shown in Figure 10.

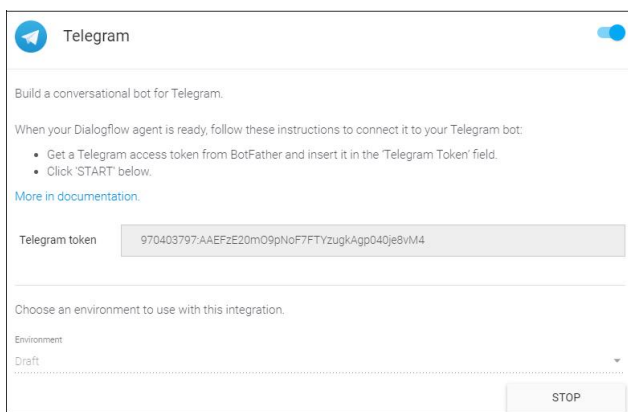


Figure 9 Entering the chatbot token

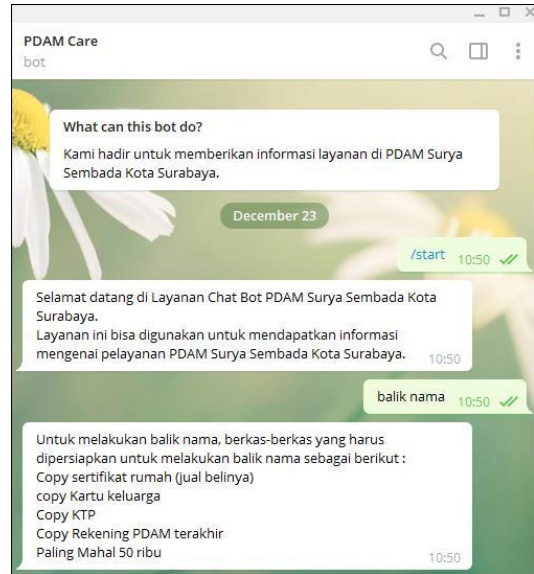


Figure 10 The results of the chatbot implementation

4. CONCLUSION

Based on the testing that has been done, several conclusions can be drawn, including:

1. Based on the results of the needs analysis, PDAM Surya Sembada, Surabaya City needs a program (chatbot) that can be used to support customer complaints and can simplify work on the customer service department.
2. This chatbot program was built to serve complaints and questions given by customers.
3. A chatbot is integrated with Telegram to facilitate the use of chatbot services by users.

Based on the results of research conducted by the author has several suggestions for similar research going forward:

1. A chatbot that is built is static. In the future, it will be developed dynamically so that it is connected to the company's internal database
2. Adding machine learning in the chatbot, so chatbot training is not done manually but rather automatically.

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