

CHATBOT APPLICATION BY USING API DIALOGFLOW TO SHOW SCHEDULE OF MISA AT CATHOLIC CHURCH BASED ON ANDROID

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ABSTRACT

This study aims to find out how effective the delivery of information on mass schedules to Catholics. This research method uses a qualitative method with a descriptive approach, namely describing the data processing of the mass schedule, church data and pastor data on the application to be built. The data collection techniques used are observation, interviews and library studies related to the application being built, and the design method used is the waterfall method using UML (Unified Modeling Language) diagram as a software method and also implemented with the Java programming language. The problem that occurs is the delivery or media used in conveying information on the mass schedule to the Catholics, namely by putting up announcement sheets that are displayed on the information boards that are still less effective. The results of the questionnaire distributed to several respondents can be taken a solution to solve these problems, namely to build a mobile application in the form of a chatbot application with the implementation of Google technology, Dialogflow API, which can interact with people using everyday language. This chatbot application can provide information to Catholics about the mass schedule located in the church of the Diocese of Bandung.

Keyword : *Chatbot, Dialogflow API, Android, Misa Schedule, Catholic Church*

1. INTRODUCTION

Misa is from Latin, missa. The word Misa is a term that is very popular in the ears of Catholics for the celebration of the Eucharist in the Catholic church. The word Mass can also be used in other liturgical celebrations, prayers, elements of the sacrament of repentance, readings or daily worship. Then the word Mass can be interpreted by the dissolution of the congregation or people who have finished in a meeting or celebration of the liturgy or eucharist [1]. In each Catholic church or called parish that each mass schedule is different, either on a daily mass schedule or weekly mass schedule, this is adjusted to the number of Catholics around the parish or the Catholic church and the number of pastors on duty in the parish. The daily and weekly mass schedules are determined by each of them to the Pastoral and Pastors

who are in service in the parish. In the delivery of information about the mass schedule to Catholics, it is still not effective, because the media used to disseminate information is only by posting a piece of announcement paper on the bulletin board, so not all Catholics know if there is a change in the mass schedule or on a large mass schedule such as Easter and Christmas celebrations. By building an Android-based mobile application, by distributing questionnaires to Catholics it can be concluded that for now many use Android-based smartphones. With this consideration an application will be built as a solution to overcome these problems. To process the stages used for the problems that occur, the descriptive research methodology is considered the most appropriate, because this study aims to make the phenomenon that is happening can be clearly illustrated. With the method of collecting data with literature studies by studying the sources of literature and references to books, journals and other research results. Interview where this stage conducts question and answer directly with parties related to the research conducted. The research that became a reference in solving this problem is the chatbot application for information on tourism objects in Bandung using the NLP (Natural Language Processing) method. Where applications are built using everyday language or natural language (Natural

Language) for communication media between fellow [2].

2. THEORY BASIS

2.1 Chatbot

Chatbot is a computer program that is programmed to be able to interact between humans and computers using everyday language. Examples of congestion such as Help Bot on Yahoo! Messenger and ALICE (Artificial Linguistic Internet Computer Entity) developed by Dr. Richard S. Wallace. Chatbot is a QA system or question answering system, which gives a computer the ability to interpret natural languages to have conversations with humans or users, conversations that occur like two humans are in dialogue [3].

2.2 Dialogflow API

Dialogflow API is a Google technology that can interact humans with computers based on voice and text conversations that are supported by artificial intelligence (Artificial Intelligence). Dialogflow API is the property of Google technology to develop interactions between humans or users with computers using human language or with everyday language. The Dialogflow API provides a platform that allows developers to design and implement conversation interfaces that can be embedded with external applications such as bots [4].

2.3 Natural Language Processing (NLP)

Natural Language Processing (NLP) is a form of representation of a message that is communicated between humans or users. One form of representation is in the form of sound or speech (spoken language), but often applied to text or writing in the form of questions from users. In language can be distinguished namely natural language and artificial language. Natural language is a language that is often used in everyday life, and artificial language is a language specifically created to meet certain needs such as programming languages [3].

2.3 Components of Android Applications

Android is an operating system for smartphones and tablets. An operating system that can be illustrated as a bridge between devices (devices) and users, so they can interact with their devices and run applications that are available on the device. In the world of personal computers, operating systems that are widely used are Windows, MAC, and Linux[5].

2.4 Android

Programming using the Java programming language, is a programming language used for writing programming languages in building an android application. Java codes will be compiled with all the files that are needed which will be where the process is packaged by a tool called APT tools so that it will generate files with the extension of the package on the android package. The apk file that is called is an application that can later be installed on a mobile android device [6].

2.5 Bahasa Pemrograman Java

Java is a fairly well-known programming language. As a programming language, Java can be used to write a program. As is known, the program is a collection of instructions proposed for computers. Through the program, the computer can be arranged to carry out certain tasks according to what is determined by the programmer (programmer). Java language was developed at Sun Microsystems and began to be released to the wider community in 1995. Examples of object-oriented programming languages include C ++ and Java. Java can facilitate the construction of a large scale application [7]. The further development of the Java language is as a language to compete with the idea of Microsoft in Distributed (Objects) Application on a DNA project

(Distributed interNet Application), Sun, which is assisted by foreign companies competing with other Microsoft has issued J2EE (Java Platform 2nd Enterprise Edition). Java is intended as English for a Java Applet development, Java Script, Java Servlet, Java Server Pages (JSP), specifically for the N-tier architecture developed for applications spread across enterprise scale [8].

2.6 Database

A database is a structure that is generally divided into two things, namely a flat database and a relational database. Relational databases are easier to understand than flat database because relational databases have a simple and easy form of data operations. MySQL itself is a relational database. Databases that have a relational structure have tables for storing data. Each table consists of columns and rows and a column to define what type of information should be stored [9].

2.6 Unified Modeling Language (UML)

UML (Unified Modeling Language) is a graphic language for documenting, specifying and building software systems. UML is object oriented, implements many levels of abstraction, does not depend on the development process, does not depend on language and technology, guides several notations in various methodologies, together with the parties, is supported by tools integrated through XML (XMI). The UML standard is managed by the OMB (Object Management Group).

UML is a modeling language for specifying, visualizing, building and documenting artifacts from the system [8].

To visualize, specify, build and document static aspects of the system. The structure diagram in UML consists of:

1. Class Diagram shows a set of classes, interfaces and collaboration and connection. Class diagrams are shown for static views of the system.
2. Use Case Diagram shows a set of objects and their connection. This diagram shows static pieces from the instant that are in the class diagram. This diagram is to show a particular prototype or case that might occur.
3. Sequence Diagrams show interactions that occur between objects. This diagram is a dynamic view of the system. This diagram emphasizes the basis of the timeline of the messages that occur.
4. Activity Diagram shows the flow of activity in the system. This diagram is a dynamic view of the system. This diagram is important for modeling system functions and emphasizing control flow between objects [8].

3. RESEARCH METHODS

The methodology used in this research is descriptive. Descriptive method is a research method that aims to get a clear picture of things that need and need to be understood and interpret objects that are in accordance with facts that are systematic, factual and accurate. The research method can be seen in figure 1 below :

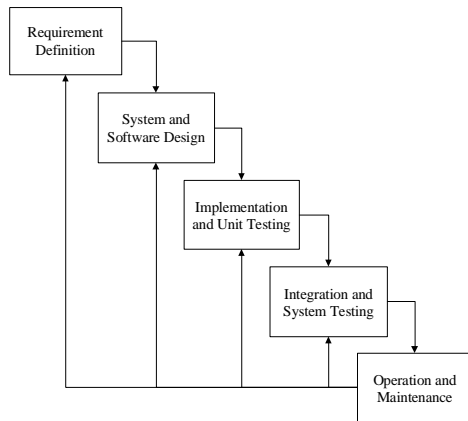


Figure 1 The Ian Sommerville Waterfall Model [10]

The method of data collection in this study is the first by using a literature study which is a method of collecting data with sources from libraries such as reference books, other research results and related journals. And the second is by conducting interviews, where at this time collecting data by conducting direct question and answer with related parties regarding the coverage provided.

And the stages in the design of applications that will be built can be seen in Figure 2. In this flow image has also been included in the steps taken. Where in designing the application to be built has the application installed so that the application development is directed. The following are the steps :



Gambar 2 Application Design Stages

4. HASIL DAN PEMBAHASAN

The main purpose of this research is the results of solving problems obtained. Also discussions relating to various analyzes carried out, modeling, design and implementation of the system built. Then the steps taken along with the results of testing from this study will be presented briefly.

The first is problem analysis, problem analyzes obtained by evaluating the applications that will be built later. The problems obtained will be the background of the Chatbot Application Using Dialogflow API for Mass Schedule Information in this Android-based Catholic Church. And here are the problems of the analysis that has been carried out, the media used in conveying information on the mass schedule to Catholics is still less effective. For analysis of hardware requirements, it is important because the process of analyzing the use of hardware that can run on the application to be built. And for the

hardware specifications needed can be seen in table 1 as follows.

Table 1 Mobile System Hardware Specifications

No.	Hardware	Minimun Requirement
1	Processor	800 MHz
2	Memory	512 MB
3	Screen	4 inch
4	Other Devices	Internet Connection

Analysis of software requirements, is also important in building applications. Software is also an instruction to hardware so that the application can interact between the two. To specification the requirements of the software used can be seen in table 2 below:

Tabel 2 Software Requirements Specifications

Software	Specifications
IDE (<i>Intergrated Development Environment</i>)	Android Studio
Android SDK (<i>Software Development Kit</i>)	Versi 4.4 (API 19)
JDK (<i>Java Development Kit</i>)	Versi 7
Sistem Operasi	Windows 7
Web Browser	Windows 10

Analysis of functional requirements which include Use Case Diagrams, Activity Diagrams, Class Diagrams, Activity Diagrams, and Sequence Diagrams. This is also a description of the process of activities that will be applied to the application, what are the needs needed for the system to run well. 1.

Use Case Diagram

To identify the use case of the system to be built, it can be seen in Figure 3 below:

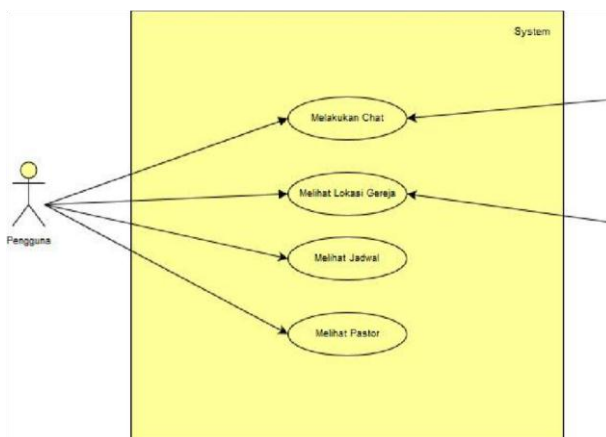


Figure 3 Use Case Diagram

And in table 3 below is a presentation of the use case identification of the system to be built, can be seen as follows :

Table 3 Identify Use Case Diagrams

Use Case		
No	Use Case	Deskripsi
UC-01	Chat	Functions that are useful for chatting with bots
UC-02	Viewing Church Locations	Functionality that is useful for viewing church locations based on user's position
UC-03	Looking at the schedule	Functional Schedule that is useful for viewing the schedule of Masses and Pastors on duty
UC-04	Looking at Pastors	Functionality that is useful for viewing Pastors in each church or parish

2. Activity Diagram

A diagram that aims to describe business processes and workflows. And here is one example of the activity diagram chatting on the application that was built, can be seen in Figure 4 below :

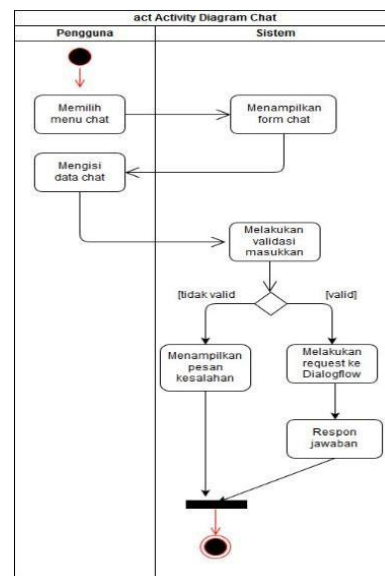


Figure 4 Activity Chat Diagram

3. Sequence Diagram

Sequence diagrams do chat or communication shows a series of messages sent by user objects to

other objects in the process of chatting. Chat sequences can be seen in Figure 5.

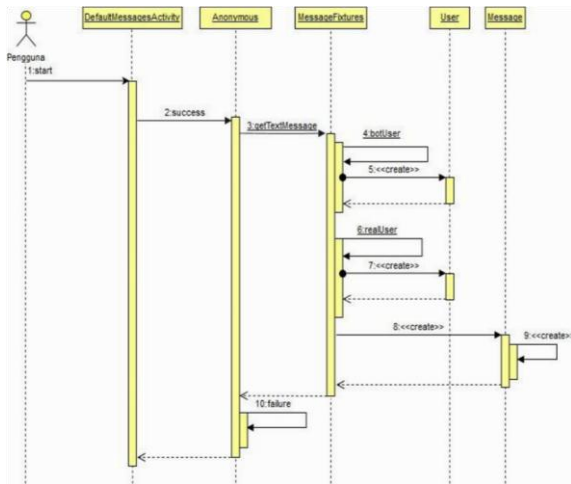


Figure 5 Chat Sequence Diagram

Relationship Scheme, where this is a series of relationships between two tables and / or more in a database system. For the relation scheme that is built on the software can be seen in Figure 5 as follows :

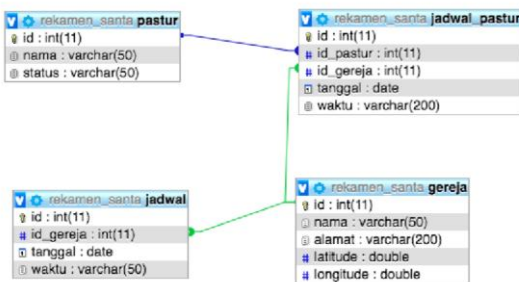


Figure 6 Relationship Scheme

Analysis of the system architecture of the application built, and can be seen in Figure 10 below :

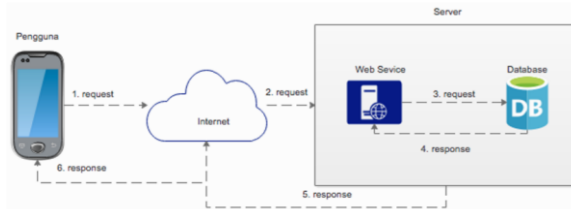


Figure 7 Mobile Platform System Architecture

The interface design of the application that will be built and will be taken one example from the design of the home page display interface wherein there is a forecast menu from the application and all content that is in the application, the design of the home interface can be seen in figure 11 below.

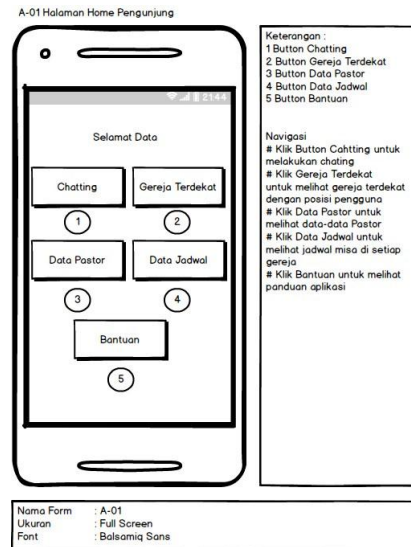


Figure 8 Design of the Main Home Interface

Application implementation, which aims to explain the manual to users who will use and utilize this application. Can also give input to developers who build applications to make improvements aimed at making the application better. In the implementation of the application there are several things that must be considered, among others:

1. Software Implementation, namely software that will run from the application system that was built.
2. Hardware Implementation, namely hardware or hardware that will be used to run from the application system that was built.
3. Data Implementation, namely design based on databases made previously. Implemented using software, namely MySQL.
4. Interface Implementation, which contains details of the displays that exist in the built-in application software which consists of antamuka names or files that represent it.

Until the last is System Testing, testing the system functionally alpha and beta. The first for alpha testing uses the blackbox testing method that focuses on the functionalities of the software that was built. To find out if there is an error in the operation, software capabilities and management of the software. If the testing of system functionality is running as expected, it can be said that the application made is correct. And to see the scenario of alpha testing can be seen in table 4 as follows.

Table 4 Alpha Test Plans

Kelas Uji	Poin Pengujian	Jenis Pengujian
Chat	Data chat input	Black Box

	Validation of data chat	<i>Black Box</i>
Viewing Church Locations	Input parameters	<i>Black Box</i>
	Display church data	<i>Black Box</i>
View the Schedule of	Input parameters	<i>Black Box</i>
	Display schedule data	<i>Black Box</i>
See Pastor	Input parameters	<i>Black Box</i>
	Display pastor data	<i>Black Box</i>

Beta testing, testing conducted aims to determine the extent to which the application system quality is built. Beta testing is done to respondents who are called users of the application by conducting data collection using the questionnaire method. This questionnaire was given to ten respondents by giving four questions with an answer scale of 1 to 5.

Scale questionnaire answers and questions submitted to respondents as follows.

- TS : Disagree
- KS : Disagree
- CS : Simply Agree
- S : Agree
- SS : Strongly Agree

The questions asked, the following are the questions that are asked to the respondent:

1. When opening the application, visitors understand what must be done?
2. Users (visitors) have heard the term chatbot before? 3. When interacting with a chatbot, do you think that the one who answers your question is human too?
4. Interacting with chatbots is more interesting than ordinary web applications?
5. After using this chatbot application, can this application help visitors in terms of searching information about the mass schedule in the Catholic church in Bandung Diocese?
6. The information or answers provided by the chatbot are in accordance with what the visitor asked or intended?
7. Need updates to improve the system?

Based on the results of the questionnaire given to the respondent as a sample, the percentage can be calculated using the formula:

:

- Information :*
- Y : Percentage value*
- P : Total score*
- Q : Highest Score*

And here is the answer from the questionnaire given

$$Y = P/Q * 100\%$$

the score skor, can be seen in table 5 below :

Tabel 5 Questionnaire Answer Scores

Scale Answer	Description	Score
TS	Disagree	1
KS	Less Agree	2
CS	Simply Agree	3
S	Agree	4
SS	Strongly Agree	5

From the questionnaire that has been carried out, the following are the results of the questionnaire filled out by 26 respondents as samples. Can be seen in table 6 below:

Tabel 6 Table of Questionnaire Results

No.	Questions	T S	K S	C S	S	S S
1	When opening the application, visitors understand what must be done?	0	0	6	14	6
2	Users (visitors) have previously heard the term chatbot	0	2	6	12	6
3	When interacting with a chatbot, do you think that the one who answers your question is human too?	0	0	6	13	7
4	Interacting with chatbots is more interesting than normal palikasi web	0	0	4	12	10
5	After using this chatbot application, can this application help visitors in terms of searching information about the mass schedule	0	1	6	14	5

	at the Catholic Church in the Diocese of Bandung					
6	The information or answers provided by the chatbot are in accordance with what the visitor asked or intended	0	0	3	18	5
7	Need updates to improve the system?	0	0	5	8	13

Based on beta testing, the conclusions that can be taken is that the application that is built is easy to use, provides benefits and can help users in finding information about the mass schedule and location of the church in the Bandung Diocese with the features provided by this built application, according to the answers from the respondents' respondents to the questionnaire questions given.

5. CONCLUSION

After carrying out analyzes, design and planning, and also the implementation of software design that was built. But suggestions are needed and very important for future improvements to software development. The general conclusion can be summarized that the application has been able to provide solutions and help overcome the problems that arise and are discussed in the previous section. The results were obtained from the average respondent's answers to the 4 questions the questionnaire provided.

For chatbot applications for information on this mass schedule it is still far from perfection, and certainly still has disadvantages. Then development is needed and further improvements are made. Suggestions that must be considered such as the application can be more natural in answering questions from the congregation regarding the mass schedule, the location of the church spread in the Bandung Diocese as well as information on the priests who are in service in the churches in the Bandung Diocese.

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