

Designing a Mobile Chatbot For Elementary School Vocabulary

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Abstract— English is one of the languages used throughout the world and has also been established as an international language. So the interest in learning English must start early. Children who are raised in elementary school must have been introduced to English. This paper aims to develop an educational-based chatbot and provide an evaluation of its use as a medium for learning English vocabulary for grade elementary school children using the Machine Learning method. With the dataset is the vocabulary obtained from a second grade elementary school book. The results showed that the development of chatbots could motivate elementary school children to learn English vocabulary more often.

Keywords— chatbot, english, elementaryschool.

I. INTRODUCTION

As time goes by, people strive to become superior human beings. One way is to master a variety of languages (secondary language). In this connection, English is one of the international languages that is used in almost all parts of the world in communicating between one person to another. Currently English has also been established as an international language so that English is used between countries in communication. Therefore, we are encouraged to be able to master English. This is supported by the existence of a curriculum in English subjects found in school teaching starting from elementary school. In addition, we can also find dictionaries and textbooks to support learning English, both in writing and online.

According to Banu, Rasheedha et al, English is a universal language throughout the world [1]. When using English related to English that has been approved by the global world . However, in its application, the speaker experienced problems such as verb usage, content problems, sentence structure used, process (the desire to write), problems using conditional sentences, lack of vocabulary, past use and difficulty spelling punctuation. In his research said the main reasons for this problem are less skilled teachers, poverty in the education system and assessment system, school environment, writing attitude, class strength, less qualified teachers. There are several factors that affect the performance of students in speaking English fluently. They are afraid of making mistakes while talking. They also hesitate to use English because they do not have adequate and appropriate vocabulary. Another factor is that they are shy and nervous. They feel afraid to speak English in front of others because they lack confidence in their own ability to speak English.

Meanwhile, according to a survey conducted by EF

(Education First) through a report on the results of the EF English Proficiency Index (EPI) or EF EPI in 2018, it was stated that Indonesia ranked 51 out of 88 countries in the world, with a score dropping to 51.58 from 52.14 in 2017. This score places Indonesia 13th out of 21 countries in Asia and is below the average value of English proficiency in the Asian region itself (53.94). Indonesia's ranking has maintained a low skill level since 2017 and is still below the ranks of other ASEAN countries, such as Singapore with (68.63) at the Very High Skill Level, the Philippines (61.84) and Malaysia (58.32) at the High Skill Level . Even Indonesia, is below Vietnam (53.12) which is in the Intermediate Skill Level.

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Seeing this, the English learning system in Indonesia must continue to be improved. To support teachers, we need a system that can help children overcome their difficulties in learning English. Along with this, a Artificial Intelligence (AI) system has been developed called chatbot. Chatbot is an automated conversation agent that interacts with users who use natural human language. Chatbot is illustrated as a human in the form of a system, so researchers continue to

develop chatbots to be more similar to talking to humans. So, chatbot is an application where we provide input (input) and will produce an answer (output) which is in harmony with the given input. Input given in the form of words which will then be processed by chatbot and then will produce output answers from what has been given (input) before.

This paper aims to build a Chatbot application system as an educational medium combined with English vocabulary material for second grade elementary school children. By developing this chatbot system, it is hoped that it will help motivate children to learn English more easily and interestingly. Chatbot was developed using the Natural Language Processing method which makes it seem like talking to fellow humans, so that children are more confident in learning English vocabulary. The vocabulary in Indonesian will be input into the chatbot system and then the word will be forwarded to the database in the chatbot then processed and in the end will provide answers in the form of words in English that have been inputted by the user who has previously entered the word to search for its meaning in English. Chatbot application that is designed will be made with English vocabulary quiz material and with mobile-based.

II. RELATED WORK

In research of Wang, Yi Fei, Stephen Petrina. (2013), they find great advantages in chatbot technology because chatbots provide opportunities to learn challenging languages with a personal learning system [3]. Language learners can adapt the conversation to their own learning system. They can find answers to each question, repeat sentences without pressure, or skip sentences that don't make sense to them or that are difficult to understand.

They discovered the potential use of chatbots can simulate communication like humans. Language learning implies appropriate cultural learning. Understanding culture is the key to discussing the use of language in context. Lucy Chatbot does not contain this feature. Language learners who can communicate with native speakers need cultural knowledge about the target language.

In the research conducted by PHAM, Xuan Lam et al. (2018) a mobile application system for learning English has been developed, but it still needs to be developed using chatbot in it [4]. In the chatbot application that has been developed, they create a conversation menu, quizzes and also subject matter. Overall, the interaction between humans and chatbots is a potential technological advance and can be applied in learning foreign languages.

Based on data collected in their study, positive responses were found between users and chatbots. Although chatbots are considered difficult to use, they must be identified and studied first in their use. However, the features in this chatbot still receive positive feedback from users.

In Song's research, Donggil et. Al (2017), This research supports to discuss and develop agent systems for online course interactions, implementing, and supporting them [5]. As a new form of conversation agent learning or intelligent tutor system in an online learning environment, this study discusses an effective system where students can interact in an activity through conversations with agents. Related systems proposed in this study contribute to using the chatbot system in education, especially in distance education. The main findings from this study indicate the instant, related content, and quality of interaction between students and software agents for online courses with higher education. Most importantly, the results of the implementation in this study indicate quality interactions through evaluations that can be carried out. This might support students involved in online courses using chatbots.

In Research of Ruan Sherry et al (2019), they present BookBuddy, a foreign language chatbot system that can be scaled as an automated tutoring system that can be made interactive with lessons for children based on reading material [6]. The results of the study show that children are very involved in talking to the system and prefer to speak English with our chatbots who are like human partners. Our work is the first step which is to create a system on a scale to improve English speaking skills for children. They found that there are many interesting future directions to explore in their initial results. First, it is important to consider both the level of participation and the benefits of the tutoring system. Although they find that in this case, children are very related users, they do not evaluate changes that occur after using the system. Secondly, the small sample size in their study.

In the research of Molnar, Gyorgy et al (2018), the authors believe that the education field is an application field that is very important for the implementation of chatbots [7]. At present, students receive an important part of their information about online study, curriculum and assignments. Therefore the chat program provides significant assistance in the learning and learning process, for example, NerdyBot.

But there are a number of areas where, in the author's opinion, chatbots cannot be used in education. In such contexts, they are more likely to reveal additional information that is more useful for students than solving content problems. Finally, chatbots can not only simplify the work of teacher administration and increase trust; if, for example, they are not efficient enough or do not understand user requests, they can also cause confusion that comes from inappropriate communication

III. METHODOLOGY

In its implementation, chatbot is created using the chatterbot library. Chatterbot uses functions with logic adapters and storage adapters. The logic adapter determines the logic of how ChatterBot selects responses

to given input statements. When the user enters an input, the chatbot will choose an output that matches the given input.

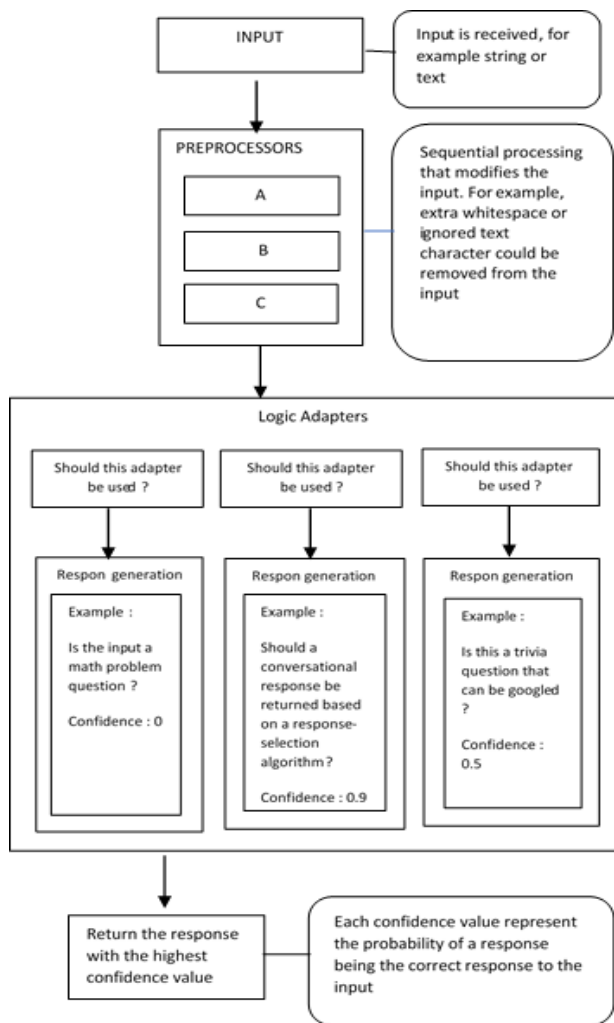


Figure 1. Chatbot Method

First, we do the input process. The input can be in the form of words or sentence texts. Then in preprocessors (simple functions that change input statements received before statements are processed by Logic Adapters), the input will be filtered such as excessive space, unicode, punctuation. After that it is processed in a function called Logic Adapters, by selecting responses based on their level of confidence.

To aid in the selection of responses, several methods are built into ChatterBot to select responses from the available options that will return the response statement that has the greatest level called confidence value. The confidence value and the selected response statement must be returned as output. The confidence value represents the ranking of how accurately the adapter logic expects the selected response. This confidence value is used to choose the best response from several logic adapters. The confidence value must be a number between 0 and 1 where 0 is the lowest confidence level and 1 is the highest. In the end, it returns

the output that corresponds to the highest level of confidence, where each confidence value represents the likelihood of the response being the most correct response to the input. In this case the input that will be entered by the children will be processed and produce a response that matches the input so as to produce the right answer. Then in the storage adapter, it is possible to chatbot to remember the database and also the input received, then it is accommodated in a storage. Chatbot will create a new storage (if it has not been formed before) and will remember the input received previously.

Chatbot is made using the python programming language using the framework flask and the chatterbot module. Chatbot will be integrated into Android mobile so that it can be accessed by mobile phones.

Meanwhile, to build mobile applications using react native. And finally the mobile application will be integrated with the chatbot that has been built. In the application, users can choose the menu provided. The menu consists of material, quizzes and chatbots. In this material, vocabulary material will be taught, for example material consisting of animals. In the quiz, questions will be given in the form of multiple choice. With these menus, it is hoped that children can choose what they want to learn.

The framework used in this study is to use a flask with the chatterbot module. In the chatterbot module, there is a word processing with code *trainer = ChatterBotCorpusTrainer (bot)* where this code will do word processing by taking a dataset, in this case called corpus, is a collection of vocabulary that has been created.

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conversations:
- - Apa itu angry
  - Angry itu adalah marah
- - Kamu tau angry
  - Hmm, aku rasa angry itu artinya marah
- - Angry
  - Angry adalah marah
- - Bahasa indonesianya angry
  - Bahasa indonesianya angry adalah marah
- - Artinya angry
  - Angry artinya itu marah
- - Apa itu big
  - big itu adalah besar
- - Kamu tau big
  - Hmm, aku rasa big itu artinya besar
- - big
  - big adalah besar
    
```

Figure 2. English Chatbot Dataset

This chatbot uses a dataset with an .yaml file extension. The dataset was obtained from an elementary school using second grade textbooks. In the book, at the end of the chapter there is a vocabulary that has been summarized into one table. The dataset used around a hundred english vocabulary for elementary school children.

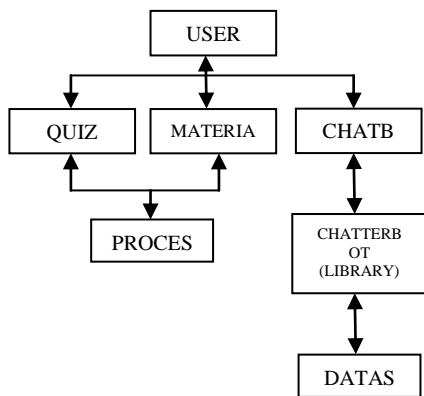


Figure 3. System Architecture

First, the application is run by the user. In this section, users can choose to run three different types of menus consisting of quizzes, materials and chatbots.



Figure 4. English Chatbot Menu

In the quiz menu, users can choose which chapters they want to learn. Quizzes are divided into chapters according to elementary school English language curriculum. When the user selects a chapter, the application will proceed and then a question will appear in the form of multiple choice.

In the material menu, it will also be divided into chapters. When the user selects a chapter, the application will process and display the vocabulary material in accordance with the curriculum of the elementary school English lessons.

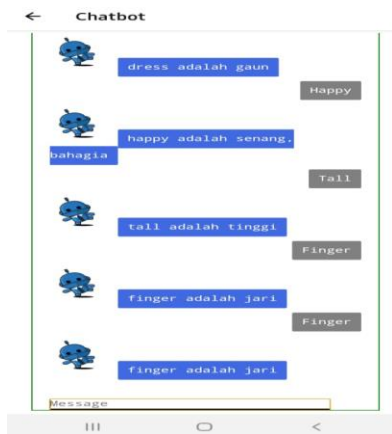


Figure 5. Chatbot Interfaces

In the chatbot menu, the user will see an chatbot interface with a moving robot animation. Then the user can type the word that they want to find meaning, for example when the user types the word angry, then chatbot will do the process in this study using the chatterbot library. Then chatterbot will process the database (corpus) that has been prepared.

IV. RESULTS AND DISCUSSION

The evaluation of this research is to build educational media applications for learning English vocabulary at the elementary school level by implementing chatbot, which can increasingly attract children's interest in learning English. Building a mobile application by creating a material menu as a medium for children can learn English vocabulary well. Also in the quiz menu, with multiple choice questions, users can learn well and find out how far they have mastered this English vocabulary. Based on this research, the results obtained are as follows. It saves time for the students as well as teaching and non-teaching staffs. And it is easily accessible and saving time and money also. The development of chatbots in mobile applications also makes it easier for children to learn because they are efficient. Children are also more confident by learning to use chatbots.

Researchers conducted a survey of six users consisting of five elementary school children and also one teacher who came from a private elementary school near the residence of researchers.

Table 1. Evaluation of Chatbot

Question	Response				
	Strongly Disagree	Disagree	Netral	Agree	Strongly Agree
Attractive App Display	0	0	0	3	3
Application Easy to use	0	0	0	4	2
The material provided is in accordance with the teachings of the school	0	0	0	0	6
Quiz given in accordance with the material	0	0	0	0	6
Chatbot attractive appearance	0	0	2	4	0
Easy to interact with Chatbot	0	0	1	5	0

Like the Chatbot system	0	0	0	3	3
Chatbot gives the searched words	0	0	0	2	4
Chatbot helped me learn about vocabulary	0	0	0	1	5

From the evaluation results show that in terms of application as much as 50% of respondents agree and 50% strongly agree that the application is interesting and easy to use. While in terms of the suitability of the material and the quiz according to the second grade English vocabulary curriculum, respondents stated 100% agreed. In terms of chatbot, from the display it was found that as many as 67% of respondents agreed that chatbot had an attractive appearance, 83% of respondents said it was easy to interact with chatbot. As many as 83% of respondents said they agreed with the chatbot system, 67% of respondents strongly agreed that chatbot could provide the words they were looking for, 83% of respondents strongly agreed that chatbots helped in learning, and 100% of respondents strongly agreed that chatbots motivated them to learn vocabulary English. So it can be concluded that with the chatbot can motivate children to learn English vocabulary.

V. CONCLUSION AND FUTURE SCOPE

For future work, through a system created, it must be made more attractive and easier to use. Especially for children who are more interested in good visualization. The data set that is created must also be more complicated so that the data set is needed in the chatbot, it can produce output or more precise answers. Then can also use other methods in building chatbot as a learning media that is getting better. The use of text to speech (TTS) and speech to text (STT) and the addition of animation to the output also adds to the user's attraction. In the end there are still many things that can be developed even better in future research.

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