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Identification Of Chatbot Usage In Online Store Services Using Natural Language Processing Methods

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Abstract. Chatbot is one of the implementations of artificial intelligence in helping human tasks. The way the chatbot itself works is to answer questions directly according to the database that has been created. Chatbot helps online store owners answer questions from the same customers so that there is efficiency in terms of employee salaries. 40 questions that are often asked by customers to the online store admin. In its use, chatbot is one of the implementations of machine learning, where the function of machine learning itself is to improve the ability of machines to learn new information from data and develop the ability of machines to solve problems. Machine learning requires instruction from training data or input to teach machines how to solve problems, answer questions, and draw conclusions from the results of data processing. Furthermore, it is processed using Natural Language Processing (NLP). Natural Language Processing (NLP) is a branch of artificial intelligence that is able to study communication between humans and computers through natural language. The processing stages are identifying the intent, processing the input and displaying the results according to the input. Followed by testing the accuracy level. Then conduct testing using 40 question and answer data. Then obtained 36 answers that are appropriate and 4 answers that are not appropriate with the percentage of accuracy of the answers generated from the chatbot is 90 percent. The results of this test can answer the questions asked by customers. This chatbot can make it easier for customers to get information with a very good level of accuracy.

Keywords: Chattbot, Natural Languange Processing, Artificial Intellegent, Online Store, Service, Machine Learning.

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1. Introduction

Online stores are one of the shifting trends after internet technology became increasingly popular. The shopping community does not need to leave the place, they can choose the items to be purchased through online stores through the marketplace by looking at the photos displayed along with the description of the goods written, Because of this, it has led to an increasing number of online stores in Indonesia, and made online store owners unable to take a lot of profit because if their goods are too expensive buyers will choose to shop at other online stores[1]. Therefore, the owner will try to minimize the costs incurred, one of which is the cost of employee salaries.

Online stores do not require face-to-face meetings with buyers but the meeting is done online using the chat feature. Chatbot is a solution needed by online shop entrepreneurs in order to reduce employee salary costs, especially admin.[2] Chatbot can eliminate the role of admin by replying to questions from customers automatically, so that customers can still be served without having to be done by humans[3].

The development of information technology has brought significant impacts in various aspects of life, including the business world.[4] In the context of e-commerce or online stores, the interaction between customers and sales platforms is crucial to creating a satisfying and efficient experience. In an effort to meet these demands, the application of artificial intelligence technology, particularly chatbots, has become an increasingly popular trend.[5]

A chatbot is a computer system designed to perform human-machine interaction through natural language. [6]Basically, chatbots aim to provide instant responses to user questions or requests without involving human intervention. In the context of online stores, the use of chatbots is not only considered an innovative element, but also a strategy that can improve the efficiency and quality of customer service. One of the growing methods to improve chatbot performance is Natural Language Processing (NLP). NLP is a branch of artificial intelligence that allows machines to understand, interpret, and respond to human language in a manner similar to human-to-human communication. By applying NLP methods to chatbots, it is expected to improve the chatbot's ability to understand and respond to various natural language expressions used by users.[7]

Research on this chatbot gets an accuracy of 90.9 %, while the responsiveness time to answer questions of less than 5 words is 0.01 seconds and 0.02 seconds for more than 5 words.[8] for more than 5 words is 0.02 seconds with a data set of 1000 lines. data set of 1000 lines. This chatbot application is able to answer the questions asked by user, according to the knowledge that has been given previously. The response given by the chatbot depends on the keywords inputted, chatbot will reply to keywords with the most similar pattern from the textual database from the textual database.[9]

Chatbot technology is one form of application with Natural Language Processing (NLP), NLP itself is one of the fields of science. Artificial Intelligence that studying communication between humans and computers through natural language[10]. This application application is known as an automatic conversation agent that running on computer programming or some kind of Artificial Intelligence (AI) interaction between users and machine with the intervention of Natural Language Processing.[11] Chatbots can potentially be called the most promising form of of human-machine interaction that is the most promising and advanced.[12] NLP has many purposes that can assist human communication, such as translation machine and assisting human machine communication, such as with conversational agents and others. A chatbot is a technology whose main purpose is to interact with human users by processing natural language input and generating relative output through a machine-driven rule-driven machine or artificial intelligence engine. Natural language processing uses the stages of tokenizing, filtering, and analysis as well as applying the knuth morris prrat algorithm.[13]

This research aims to identify the use of chatbots in online store services with an NLP approach. Through a deeper understanding of the implementation of this technology, it is expected to reveal the potential for improving service quality, operational efficiency, and customer experience in the context of online stores. Thus, this research not only contributes to the literature on chatbot applications in e-commerce, but also provides practical insights for businesses in utilizing this technology to improve competitiveness and customer satisfaction[14].

2. Methods

The framework in research is an interconnected stage with a systematic arrangement to solve a problem. systematically to solve a problem. [15]At This research framework is carried out in stages to make it easier to solve problems related to related to Chatbot Identification in Improving Online Services Using the Natural Language Processing Method. Work framework in stages of research can be seen in Figure 1[16].

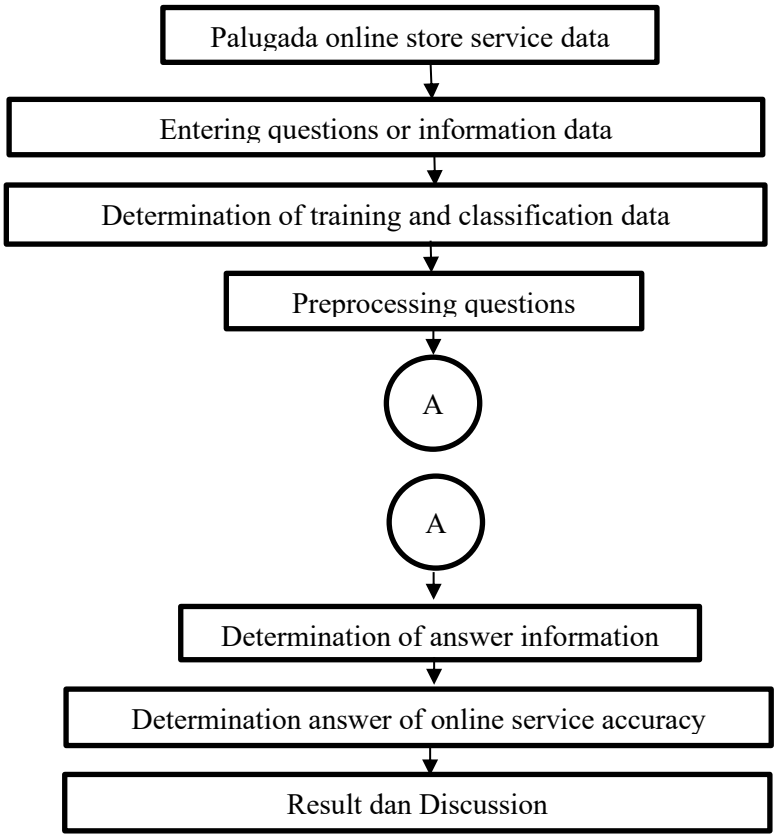

Figure 1. Framework research

2.1 Palugada online store service information data

collection sales information used by the author in this study are:
a. Interviews were conducted with customers and resellers of the palugada online store.
b. Literature studies are carried out by searching for journal references.
c. Questionnaires addressed to customers and resellers of palugada online stores.

2.2 Entering questions or information data
Questions about palugada online shop services are collected along with the answers using the program that has been created. For text-based chatbots, you can type questions or information into the chat or text interface, so that the chatbot will generate a response based on their understanding of your question or information.[17]

2.3 Determination of training and classification data
Training and Classification is done so that the chatbot has the knowledge to understand natural human language, this stage is used when there is one word or keyword that is suspected to be similar, an answer will appear according to customer expectations.[2]

2.4 Preprocessing questions
The preprocessing of these questions is done using algorithms in order to produce appropriate answers in the database. Syntax Analysis in NLP is divided into 3 (three).[8]

a. Case Folding:
   To simplify processing, case folding is often performed to convert all letters in the text to lowercase or uppercase. This helps overcome the issue of case distinction which may not be relevant.
b. Tokenization:
   Tokenization is the process of converting text into smaller pieces, called tokens. Tokenization is an important step in text processing in Natural Language Processing (NLP) by dividing text or sentences into smaller units called tokens. Tokens can be words, phrases, or characters.
c. Filtering or Stopword Removal:
   Filtering or stopword removal is a common step in text pre-processing in Natural Language Processing (NLP). Stopwords are common words that appear frequently in text and tend not to contribute significantly to the meaning of a sentence or document. Stopwords (common words like "the", "and", "is") are often removed to increase the focus on more informative words.

2.5 Determination of answer information.

Chatbot is intended as a tool to answer questions automatically, so before the question is answered, the question and answer must be determined first. Determination of answers in this online store service is collected first, as seen in Figure 2, so that if there is a chatbot question will answer according to the answers that have been provided.

Figure 2. Determination of answer

2.6 Determination answer of online service accuracy.

Determining accuracy based on questions on a chatbot refers to evaluating the performance of the chatbot in answering questions asked by users.[18] Accuracy is a metric that measures the extent to which the answer provided by the chatbot is as expected or desired.[19]

No	Question	Answer
1	Kak, jual apa aja ?	Match
2	Barang, Asli atau KW ?	Match
3	Produknya produksi sendiri?	Match
4	Warna Jilbabnya apa aja ?	Match
5	Harga pas kak ?	Match
6	Ada Ukuran lain ?	Match
7	Apakah Ada garansi ?	Match
8	Bisa retur ?	Match
9	Apakah Gratis Ongkir	Match
10	Apakah ada cashback ?	Match
11	Kalau barang sobek bisa di tukar ?	Match
12	Pengirimannya berapa lama ?	Match
13	Barang saya sampai mana ?	Not match
14	Beli banyak dapat diskon ?	Match
15	Ready Stok ?	Match
16	Ada toko offlinenya ?	Match
17	Cara jadi reseller gimana ?	Match
18	Bahan Jilbabnya apa ?	Match
19	Sama Azahra kualitasnya sama ?	Match
20	Bagaimana jika produknya tidak sesuai dengan gambar ?	Not match
21	Kok mahal ?	Match
22	Bedanya sama Azahra apa ?	Match
23	Ada ukuran XXL untuk bajunya ?	Match
24	Jual baju cowok ?	Match
25	Harga partai minimal pembelian berapa ?	Match
26	Barangku sampai mana kak ?	Match
27	Bagaimana caranya pesan barang ?	Match
28	Lokasi pengiriman dari mana ?	Match
29	Berapa total semuanya ?	Match
30	Boleh aku datang ke toko langsung ?	Match
31	Baju ukuran big size ada ?	Match
32	Apakah ini real pict ?	Not match
33	Bahan baju manohara ini apa ?	Match
34	Ongkir ke surabaya berapa ?	Match
35	Gratis ongkir kak ?	Match
36	Bisa kirim hari ini?	Match
37	Cara cek stok gimana kak ?	Not match
38	Mau jadi reseller syaratnya apa ?	Match
39	Pembayaran COD bisa ?	Match
40	Ini yakin amanah kalau saya transfer dulu ?	Match

Figure 3. Determination answer of online service accuracy.

Accuracy : $\frac{\text{Match answer}}{\text{All answer}} \; x \; 100\%$

: $\frac{36}{40} \; x \; 100\%$

: 90%

Based on testing the accuracy of answers using chattbot, it has been tried by entering 40 questions on the palugada online store service, found 4 answers that do not match so that the accuracy of the chattbot is 90%.

3. Result and Discussion

At this stage the author identifies the chatbot created on WhatsApp to improve online services. The chatbot application is presented in the figure 4.[20]

Figure 4. Result of chatbot

The use of chattbot using the natural language processing method can help the owner in answering questions from customers. as shown in Figure 7, the questions "kak, jual apa aja ?" and "kak jual apa aja ?" the answer will be the same because it uses the natural language processing method to remove the "," sign in the question so that the answer that appears is the same.

3.1 Perform question preprocessing

a. Case Folding is a process in NLP to convert all words into lowercase letters.

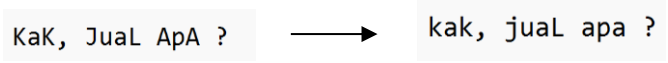

Figure 5. Case Folding Process

Case folding is one of the stages in text processing in Natural Language Processing (NLP). Case folding is used to convert all characters in the text into lowercase or uppercase letters, thus treating the text without considering the difference between uppercase and lowercase letters. This helps to reduce complexity in the next stage of analysis, as the same word with different uppercase or lowercase letters will be considered the same. In Figure 5, it can be seen that there is an uppercase

letter located at the end of the word so that after NLP is applied the uppercase letter that was originally located at the end of the word becomes lowercase. [20]

b. Tokenization which is a process in NLP to break down the input text in the form of questions into words.

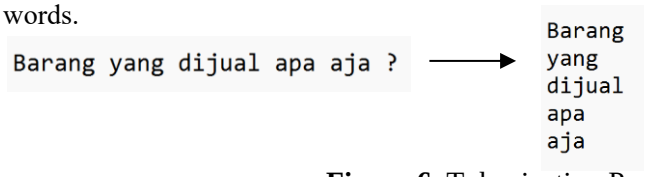

Figure 6. Tokenization Process

Tokenization is the process of dividing text or sentences into smaller parts, called tokens. Tokens can be words, phrases, or other subsections of the text. Tokenization helps transform text into a more structured representation, making analysis and modeling easier.[9] In Figure 6 the sentence "Barang yang dijual apa aja ?" in the Tokenization process will divide the text into tokens in the form of words or collections of words, namely: ["Barang", "yang", "dijual", "apa", "aja"].

c. Filtering, which is a process in NLP to eliminate conjunctions such as "dan"

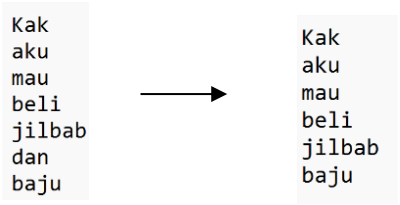

Figure 7. Filtering Process

Filtering in Natural Language Processing (NLP) is the process of removing or filtering certain elements of the text that are considered irrelevant or unwanted. [14]The process carried out at this filtering stage is Stopword Removal where the meaning of stopword removal is common words that often appear in text and tend not to provide significant information. In Figure 7 removes the stopword "and".

4. Conclusion

This research identifies the use of chatbots in online store services by applying Natural Language Processing (NLP) methods. Through this exploration, it can be concluded that the use of chatbots with NLP brings significant positive impacts on various operational aspects and service quality of online stores. The implementation of a chatbot improves operational efficiency by providing instant responses to customer queries and handling routine tasks automatically. This not only reduces the workload of the human customer support team but also speeds up the overall service process. The chatbot's ability to understand natural language using NLP methods provides more natural and relevant interactions with customers. Improvements in understanding synonyms, complex sentence structures, and context enrich the customer experience and result in more accurate responses.

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