Implementation Artificial Intelligence with Natural Language Processing Method to Improve Performance of Digital Product Sales Service

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Abstract. Improving the performance of digital product sales services is the main focus of the company's attention in the face of increasingly fierce competition in the online market. In order to optimize these services, Artificial Intelligence (AI) technology with the Natural Language Processing (NLP) method is an attractive option. This research aims to find out how the application of AI with Natural Language Processing (NLP) can contribute to improving the performance of digital product sales services. The methods used in this research include collecting data on customer interactions via WhatsApp that have implemented artificial intelligence with the Natural Language Processing (NLP) method. The data is then analyzed using Natural Language Processing (NLP) techniques to understand the needs, preferences, and problems faced by customers. Natural Language Processing (NLP) assists the chatbot in correcting incoming questions if they do not match the database on the question. Differences that can be helped by Natural Language Processing (NLP) if there is inappropriate capitalization, excessive conjunctions. The results show that the application of AI with Natural Language Processing (NLP), can enable companies to be more responsive to customer needs and improve overall customer satisfaction. With in-depth analysis of customers' natural language data, companies can provide more relevant services and empower sales teams to provide faster and more accurate responses. This can be seen from the quality of service results which have a point of 4.1, this value indicates a good response from customers so that the system is considered to have improved sales services by buyers.

Keywords: Artificial Intelligence, Natural Language Processing, Performance, Digital Product, Sales Service.

1. Introduction

In the growing digital era, digital product sales services have become one of the key aspects that influence the success of companies in winning market competition[1]. In Indonesia, WhatsApp is one of the most widely used platforms by online merchants for their digital sales.[2] According to a survey

conducted by the Central Bureau of Statistics (BPS) in 2021 showed that around 64% of digital businesses utilize the internet for marketing, which includes the use of social media such as WhatsApp.[3]This shows that WhatsApp plays an important role in Indonesia's digital marketing and online sales strategy, in line with the high adoption rate of the platform by internet users in the country.With increasing internet penetration and shifting consumer behaviour to online platforms, companies are required to provide superior and responsive customer experiences[4]. However, with the large volume and increasing complexity of data, the challenge of managing sales service is becoming increasingly complicated, one of which is the number of questions from customers whose writing sometimes does not exactly match what is recorded in the set of questions provided by the chatbot.[5] In the face of this challenge, Artificial Intelligence (AI) technology has emerged as a promising solution, with its ability to automate data-driven analysis and decision-making processes.[6] One prominent AI method is Natural Language Processing (NLP), which allows systems to understand and process human language in a human-like manner.[7]

The application of AI with NLP methods in the context of digital product sales services promises great potential to improve the efficiency, speed, and quality of services provided to customers.[8] By deeply analysing the natural language data generated by customers through various digital platforms, companies can gain valuable insights into the needs, preferences, and problems faced by customers.[9] Research on this chatbot for response time to answer questions of less than 5 words is 0.01 seconds and for more than 5 words is 0.02 seconds with a data set of 1000 lines. [10]This chatbot application is able to answer questions asked by users, according to the knowledge that has been given before.[11] The response given by the chatbot depends on the keywords inputted, the chatbot will reply to the keywords with the most similar pattern from the textual database.[12]

The use of artificial intelligence technology has made chatbots more advanced, including processing natural language and machine learning so as to provide accurate results when interacting with bots.[13] The chatbot developed uses natural language processing so that the system can understand user queries in the form of natural language.[14] Chatbot is able to communicate with website visitors and Chatbot can be optimised in communication. [15]

Through this approach, companies can design more personalised, relevant, and responsive service strategies, which in turn can increase customer satisfaction, strengthen customer-company relationships, and generate significant sales growth.[16] Therefore, research on the application of AI with NLP methods in improving the performance of digital product sales services has high relevance and urgency in the current business context.[17] In this context, this study aims to investigate the contribution and potential of this technology in improving product sales service in the digital era.[18]

2. Methods

The framework in research is interconnected stages with a systematic arrangement to solve a problem.[19] In this research framework, stages are carried out to facilitate problem solving related to Chatbot Identification in Improving Online Services Using the Natural Language Processing Method.[20] The framework in the research stages can be seen in Figure 1.
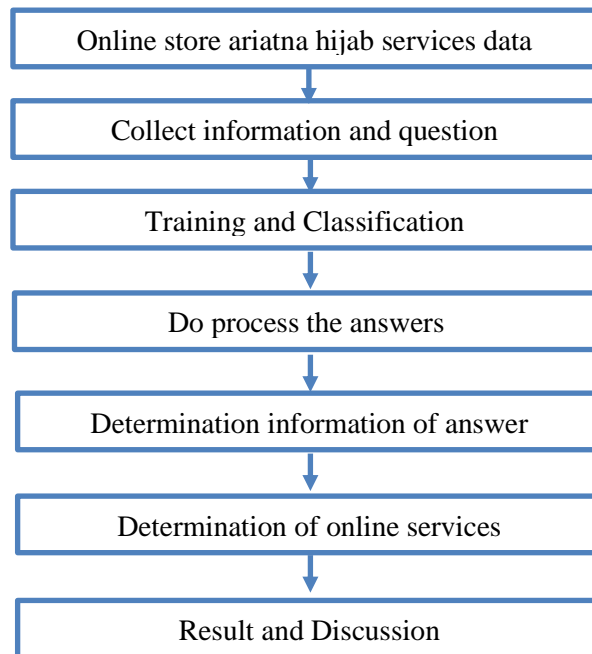
Figure 1. Framework chatbot

1. Collect information on ariatna hijab shop services

    The system framework above shows that the first to collect information for the sales process includes the process of interviewing customers and resellers, studying similar literature related to similar research and collecting questionnaire results for customers regarding online store services.

2. Training and Classification

    Training and classification are done so that the system is able to know the keywords of each question stored in the system, so that the answers will still come out according to the questions recorded in the chatbot database.

3. The process of issuing answers by the chatbot

    In the natural language processing method there are 3 stages, namely case folding, tokenizing and filtering. Let's take an example of the question "ada Promo gak kak ?"

    a. Case folding is a process that Natural Language Processing uses to convert capital letters into lowercase letters.

    b. Tokenizing, a process in Natural Language Processing to separate the sentence in question into a word
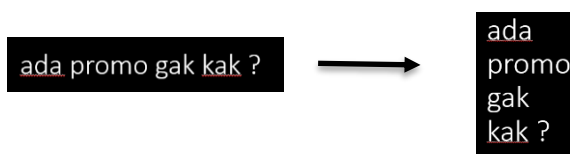
    c. Filtering, is the process of removing conjunctions so that it becomes a complete sentence. In this question there is the word "gak" where the word is one of the connecting words. So it must be removed.
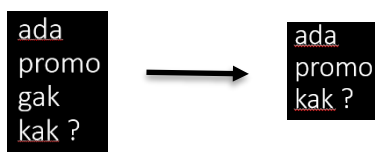
In the explanation above, it can be seen that in the sentence there is a conjunction word "gak", then the question asked by the buyer and the database prepared by the seller are considered suitable because the conjunction word gak is removed at the filtering stage so that the answer still comes out according to the database.

4 Determination Of Online Product Sales Service Quality

Determination of service quality will be taken from the results of questionnaires distributed to ariatna hijab customers. Customers will be asked questions about services while buying at the ariatna hijab online store. After that, beta testing will be carried out with a score of 1 - 4, the parameter value of 1 is a bad value and 4 is very good.

3. Result and Discussion

This research produces a new way to make purchases from virtual stores using the WhatsApp platform, using the help of artificial intelligence with the chatbot feature. Chatbot helps sellers and buyers. Buyers are facilitated in terms of getting information about the items they want to buy in real time, so that information about the items they want to buy is immediately obtained at that time. Sellers are facilitated by providing answers automatically without the need for an admin who stands by on the cellphone layer, so that spending on employee salaries can be reduced by utilizing artificial intelligence as an admin to reply to messages to buyers. This can provide insight to online merchants that the implementation of chattbot with the Natural Languange Processing (NLP) method is one way to increase their sales. Buyers can easily make choices in buying their goods because the expected information can be answered directly, so that buyers do not hesitate to immediately carry out the buying process.
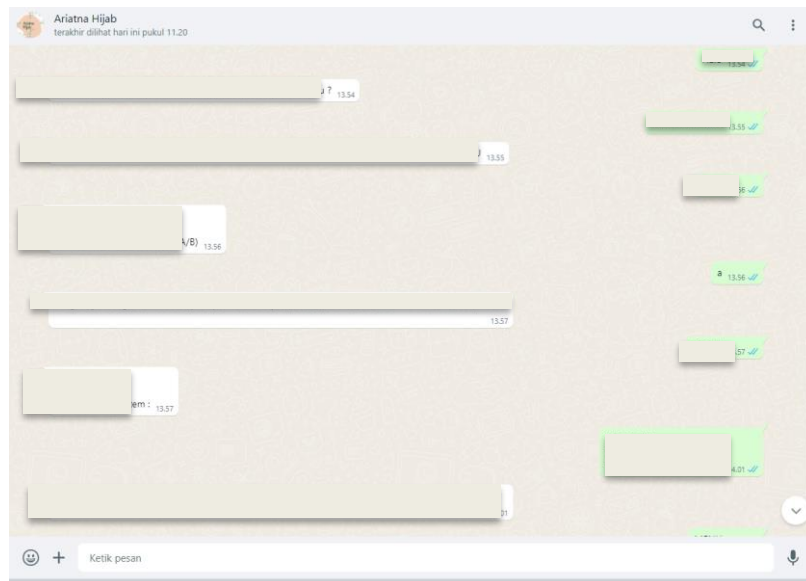

Figure 2. Interface chatbot

The use of artificial intelligence is used for communication between buyers and sellers directly without a third party in realtime, but there is a problem if the question sent by the buyer is not the same as the database stored. The Natural language Processing method helps answer according to the answer in the database even though the question sent by the buyer is not exactly the same as the existing database. The following is an attachment of the results of the conversation between the seller and the buyer using a chatbot on WhatsApp.
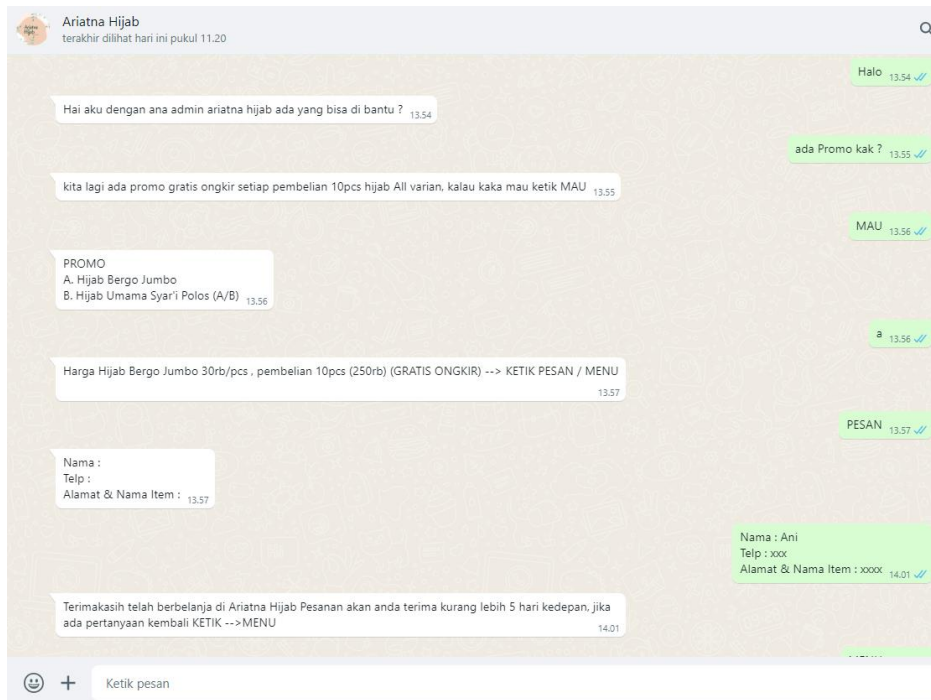
Figure 3. A Conversation Using The Chatbot Feature Between Seller and Buyer.
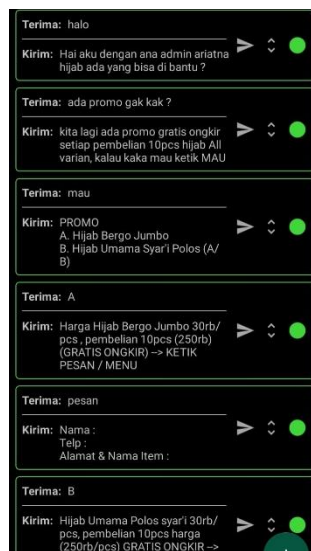

Figure 4. Database of questions and answers that will be issued to the chatbot

In Figure 3 and Figure 4, it can be seen that there are several questions asked by buyers that do not match the database including "Hello" with "hello", "ada promo gak kak ?" with "ada Promo kak ?", "mau" with "MAU", but the answers displayed on the chatbot match the database. This is because this research uses natural language processing methods.

The next discussion is in terms of the quality of the services provided by the seller so that transactions make it easier for buyers to carry out the buying process, one of which is in terms of finding information. Analysis of the quality of buying and selling services using WhatsApp will be carried out by conducting a survey where questions are asked about buying and selling services between buyers and sellers using chatbots, where aspects that will be asked include the ease with which buyers can access the seller's WhatsApp. The suitability of the answers provided by the chatbot with the buyer's expectations and the time required by the chatbot in answering the buyer's questions. The following is a table of the results of the questionnaire asked to 30 buyers from ariatna hijab using chatbot on whatsapp.

Table 1. Survey Testing Quality Service.Chatbot From Whatsapp.

No	Question	5	4	3	2	1	Total	Result
1.	Are you comfortable shopping online using whatsapp?	5	24	1	0	0	124	4,123
2.	Do the answers you receive match your expectations?	3	24	2	1	0	139	4,654
3.	Do you receive answers in a very short time?	5	20	3	2	0	118	3,933
4.	Do you prefer online shopping features over offline?	8	20	2	0	0	126	4,2
5.	Do you need less than 30 minutes to shop at our store?	6	22	1	1	0	123	4,1
6.	Do you get information more easily using chatbot on whatsapp ariatna hijab?	2	26	1	0	1	118	3,9333
7.	Do you prefer questions to be answered by chatbots compared to humans?	4	25	0	0	1	121	4,0333
Total Quality								29,2769
Average Quality Of Service								4,182423
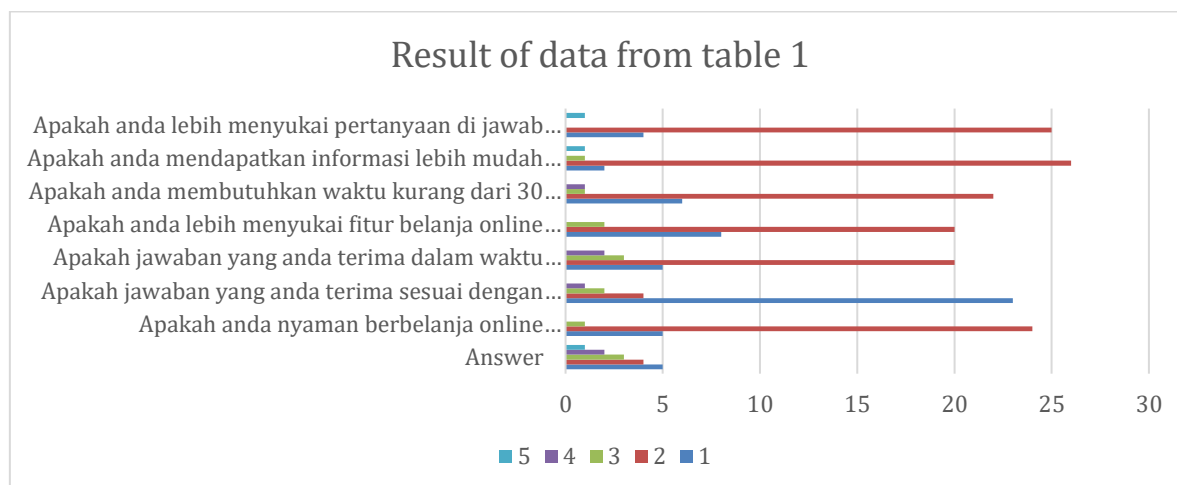
Figure 5. Graph of the results of the service questionnaire in table 1

The questionnaire was given to the buyer to find out the level of satisfaction from the chatbot service on WhatsApp provided by the seller. In the questionnaire, number 5 indicates a very good value. Number 4 shows good. Number 3 shows enough. Number 2 shows less. Number 1 shows very less. From the graph above, the average buyer gives a value of 4 to the services provided by the ariatna hijab shop with the help of a chatbot, so that satisfaction can be rated "good".

4. CONCLUSION

This research can show that there is a new method to bring sellers and buyers together virtually, namely using WhatsApp which is implemented with artificial intelligence, namely chatbots. The use of Chatbot makes it easier for buyers to get information in real time because there is no need to wait for the admin to answer because there is already a database provided by the seller to answer questions from buyers. The use of the Natural Languange Processing method makes it easier for the system to answer questions if they are not exactly the same as the database because the method makes questions through several stages including, Case Folding to change capital letters to lowercase letters, Tokenizing breaks sentences into several words, and Filtering removes connecting words in sentences. The progress of the buying and selling system using chatbot on whatsapp can be said to be a good system as evidenced by the value of the results on the questionnaire getting an average value of 4.1 in the final results of the questionnaire. The use of chatbots with the Natural Languange Processing (NLP) method is highly recommended in improving an online store because chatbots can be used as virtual assistants. Buyers can immediately carry out the process of purchasing goods because the information obtained is very clear and teal time, so there is no longer any doubt from the buyer.

5. References

[1] P. A. Alia, J. S. Prayogo, R. Kriswibowo, and A. T. Setyadi, "Implementation Open Artificial Intelligence ChattGPT Integrated With Whatsapp Bot," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401019, Jan. 2024, doi: 10.26877/ASSET.V6I1.17909.

[2] J. Becker *et al.*, "Artificial Intelligence-Based Detection of Pneumonia in Chest Radiographs," *Diagnostics*, vol. 12, no. 6, 2022, doi: 10.3390/diagnostics12061465.

[3] W. H. Curioso and M. J. Brunette, "Artificial intelligence and innovation to optimize the tuberculosis diagnostic process," *Rev Peru Med Exp Salud Publica*, vol. 37, no. 3, 2020, doi: 10.17843/rpmesp.2020.373.5585.

[4] M. D. Kurniawan and H. Haryanto, "GOMS-based User Experience for Cultural Tourism Application in Indonesia," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401016, Jan. 2024, doi: 10.26877/ASSET.V6I1.17862.

[5] M. Rafid, A. Luthfiarta, M. Naufal, M. Daffa, A. Fahreza, and M. Indrawan, "The Effect of LAB Color Space with NASNetMobile Fine-tuning on Model Performance for Crowd Detection," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401014, Jan. 2024, doi: 10.26877/ASSET.V6I1.17821.

[6] M. R. Firmansyah and Y. P. Astuti, "Stroke Classification Comparison with KNN through Standardization and Normalization Techniques," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401012, Jan. 2024, doi: 10.26877/ASSET.V6I1.17685.

[7] M. Y. Hadiyanto, B. Harsono, and I. Karnadi, "Zonation Method for Efficient Training of Collaborative Multi-Agent Reinforcement Learning in Double Snake Game," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401011, Dec. 2024, doi: 10.26877/ASSET.V6I1.17562.

[8] R. A. Ramadhan, D. Swanjaya, and R. Helilintar, "Optimizing Predictive Accuracy: A Study of K-Medoids and Backpropagation for MPX2 Oil Sales Forecasting," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 02401010, Dec. 2024, doi: 10.26877/ASSET.V6I1.17665.

[9] G. Widotomo, D. Nurkertamanda, and H. Suliantoro, "Improving Analysis of Risk-Based Maintenance Management Strategies Through Reliability Centered Maintenance. Case Study : Coal Crushing Plant. Central Kalimantan. Indonesia," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240109, Dec. 2024, doi: 10.26877/ASSET.V6I1.17529.

[10] A. N. Cahyani, J. Zeniarja, S. Winarno, R. Tsaniya, E. Putri, and A. A. Maulani, "Heart Disease Classification Using Deep Neural Network with SMOTE Technique for Balancing Data," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240108, Dec. 2024, doi: 10.26877/ASSET.V6I1.17521.

[11] A. P. Cahyani and A. Susanto, "A Good Result for Blowfish Image Encryption Based on Stepic," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240107, Dec. 2024, doi: 10.26877/ASSET.V6I1.17332.

[12] P. W. Permatasari and J. Aryanto, "Overcoming The Buildup of Queues By Carrying Out the Concept of Self-Service Using Responsive Web-Based Applications," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240105, Dec. 2024, doi: 10.26877/ASSET.V6I1.17440.

[13] A. S. Dewantara and J. Aryanto, "Implementation Of A Web-Based Chatbot Using Machine Learning For Question And Answer Services In Universities," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240106, Dec. 2024, doi: 10.26877/ASSET.V6I1.17590.

[14] A. P. Cahyani and A. Susanto, "A Good Result for Blowfish Image Encryption Based on Stepic," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240107, Dec. 2024, doi: 10.26877/ASSET.V6I1.17332.

[15] E. Hertnacahyani Herraprastanti, M. A. Ashraf, Y. Martin, S. Saputra, and H. Suryanto, "Portable Incinerator Capacity of 5000 Grams with Used Fuel Oil," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240103, Dec. 2024, doi: 10.26877/ASSET.V6I1.17108.

[16] I. P. Kamila, C. A. Sari, E. H. Rachmawanto, and N. R. D. Cahyo, "A Good Evaluation Based on Confusion Matrix for Lung Diseases Classification using Convolutional Neural Networks," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240102, Dec. 2024, doi: 10.26877/ASSET.V6I1.17330.

[17] E. A. Sofyan, C. A. Sari, E. H. Rachmawanto, and N. R. D. Cahyo, "High-Quality Evaluation for Invisible Watermarking Based on Discrete Cosine Transform (DCT) and Singular Value Decomposition (SVD)," *Advance Sustainable Science, Engineering and Technology*, vol. 6, no. 1, p. 0240101, Dec. 2024, doi: 10.26877/ASSET.V6I1.17186.

[18] R. Maylano, Y. #1, W. Widiarto, and A. Wijayanto, "Otomasi dan Monitoring Hidroponik pada Tanaman Selada dengan Metode Sonic Bloom Berbasis IoT," *JEPIN (Jurnal Edukasi dan Penelitian Informatika)*, vol. 8, no. 3, pp. 422–431, Dec. 2022, doi: 10.26418/JP.V8I3.57392.

[19] A. Yuniar and R. #1, "Klasifikasi Citra Burung Jalak Menggunakan Artificial Neural Network dan Random Forest," *JEPIN (Jurnal Edukasi dan Penelitian Informatika)*, vol. 8, no. 2, pp. 255–268, Aug. 2022, doi: 10.26418/JP.V8I2.53480.

[20] A. Suparno and S. Yos Sudarso Purwokerto, "Chat Bot sebagai implementasi Pemanfaatan Teknologi Artificial Intelligence dengan Channel Telegram," vol. 12, p. 2020, doi: 10.33488/1.ma.2.1.275.