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Comparison of Social Media BOT Functions Using the K-Nearest Neighbor Method Against User Satisfaction

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Abstract

Social media is currently an alternative medium in conveying messages in the form of news and can be used as a tool to exchange news from different places. Many people use social media to express opinions, express feelings, as well as experiences and things that can be of concern. In this study, the data processing used was the K-Nearest Neighbor Algorithm with the classification method as a media for comparing the functions of the two bots, namely the WhatsApp and Telegram bots. Using SPSS (Statistical Product and Serive Solutions) and Rapidminer as a place to perform calculations and analysis. Based on the results of testing data mining with Rapid Miner, the calculation results are obtained which will be used as information to support user satisfaction in using Social Media Bots. User satisfaction is found in WhatsApp Bot users 72.22% and Telegram Bot users 28.57%. Calculations are carried out with a data mining process obtained from the K-Nearest Neighbor algorithm to make it easier to find Bot user satisfaction on both WhatsApp and Telegram social media. The WhatsApp bot is the best choice and has several useful functions as a digital communication media tool on the Internet of Things.

Keywords : Bot Functions, K-Nearest Neighbor (KNN), User Satisfaction

1. Introduction

The current rapid development of technology in the field of communication has given birth to new ideas, innovations and concepts aimed at expediting the communication process (Narti, 2017). Social media is currently an alternative medium for conveying messages in the form of news and can be used as a tool for exchanging news from different places (Anam et al., 2021). Currently, many people access social media as a tool to find the latest news that is being widely discussed by the public (Faulina et al., 2020). Many people use social media to convey opinions, express feelings, experiences and things that can be of concern (Fitriana et al., 2021).

Whatsapp and Telegram are two social media that are often used for communication and business (Siahaan et al., 2022). Technological advances have also brought the presence of internet robots or bots (Widiyono, 2021), which are special accounts on social media platforms designed to provide feedback or reply to messages automatically (Nurastuti, 2021). These bots operate automatically and are faster than humans in completing tasks (Hadi et al., 2024). However, the weakness of bots is limited understanding (Oktaladi, 2022) in understanding the context of conversations with users, so that some problems may be difficult to overcome (Marzuqin & Abidin, 2023).

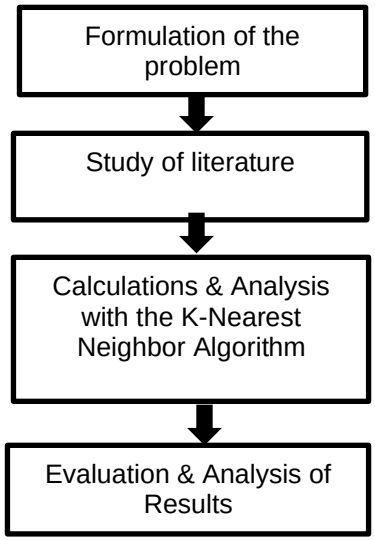
Based on the description above, the K-Nearest Neighbor (KNN) method is a popular choice in classification research (Salam et al., 2018). The KNN method is considered simple, efficient and competitive in various branches, including distinguishing WhatsApp bot and Telegram bot applications (Arifin et al.,, 2022). The aim of this research is to compare bot functions in the Whatsapp and Telegram applications on the Internet of Things (IoT) (Febriansyah & Nirmala, 2023), with the aim of making it easier for users to obtain relevant information and provide appropriate feedback (Mambu et al., ,2023)

This research will focus on implementing the K-Nearest Neighbor method to analyze the comparison of bot functions in the WhatsApp and

Telegram applications (Hariz et al., 2021). The research subjects will involve active users of WhatsApp and Telegram social media. The K-Nearest Neighbor method will be used to analyze and compare bot functions in relation to digital communication media.

2. Research Methods

K-Nearest Neighbor (KNN) is one of the most widely used classification algorithms in machine learning methods because it is simple and easy to implement (Firdaus, 2022). The stages of the research process carried out in this study are depicted in a plot in Figure 1 below:



Source: Research, 2023

Figure 1 Research Stages

Figure 1 is the research flow stages of Comparison of Social Media BOT Functions Using the K-Nearest Neighbor Method on User Satisfaction, the following are the stages carried out in the process

Study:

1. Problem Formulation
   Before collecting data, what is done is to first look for interesting and current issues related to the use of bots. This problem is the bot's limitations in solving problems complained by users, as well as comparing the functions between the two bots. So it can be used as research, by analyzing which one is better between the two bots.
2. Literature Study
   A literature study was carried out in a research using several journals and articles related to the use of bots and the K-Nearest Neighbor algorithm for data mining. This literature study contains things to find out the comparison of two different functions of bots. Therefore, a comparative level of bot function is sought which is considered better for use as a medium of information and communication.
3. Data Collection
   A way to get some data that will later be processed for this research is data collection. In collecting data through questionnaires distributed to active WhatsApp and Telegram users to seek assessments from users with a total of 130 questionnaires and 126 questionnaires returned.
4. Calculations & Analysis with the K-Nearest Neighbor Algorithm
   In this research, the data processing used is the K-Nearest Neighbor algorithm with a classification method as a medium for comparing the functions of the two bots, namely the WhatsApp and Telegram bots.
   Using SPSS (Statistical Product and Serive Solutions) and Rapidminer as a place to carry out calculations and analysis.
5. Evaluation and Analysis of Results
   Data implementation using the SPSS program was used to carry out evaluation and final analysis. The databases under test will be linked together. The results of the data mining process are displayed in a way that is easy for researchers to understand.

3. Results and Discussion

This research uses sample data on bot functions from two different applications. The data used in this research is primary data, by filling out questionnaires by active WhatsApp and Telegram users. The sample data was taken from several assessment indicators such as the bot's ability to respond, the bot's ability to complete tasks, the ease of using the bot, and others.

The previous data had been tested for validity and reliability first to measure whether an instrument was valid and good for use in this research.

a. Calculations Using the K-Nearest Neighbor Algorithm

In this research, the k value parameter that will be used is k = 1 to k = 10. The next stage is calculating the distance using Euclidean Distance.

For training data 1 with testing data:

$$d1=\sqrt{\begin{matrix}(5-3)^2+(3-4)^2+(3-3)^2+(3-5)^2+(4-5)^2+(3-3)^2\\(3-4)^2+(3-1)^2+(3-5)^2+(3-3)^2+(3-1)^2+(3-3)^2\end{matrix}}=8{,}7177$$

For training data 2 with testing data:

$$d2=\sqrt{\begin{matrix}(2-3)^2+(3-4)^2+(2-3)^2+(4-5)^2+(4-5)^2+(4-3)^2\\(2-4)^2+(3-1)^2+(3-5)^2+(4-3)^2+(4-1)^2+(4-3)^2\end{matrix}}=6{,}1644$$

For training data 3 with testing data:

$$d3=\sqrt{\begin{matrix}(5-3)^2+(3-4)^2+(4-3)^2+(4-5)^2+(1-5)^2+(2-3)^2\\(3-4)^2+(4-1)^2+(3-5)^2+(3-3)^2+(4-1)^2+(4-3)^2\end{matrix}}=6{,}0827$$

For training data 4 with testing data:

$$d4=\sqrt{\begin{matrix}(5-3)^2+(5-4)^2+(5-3)^2+(5-5)^2+(5-5)^2+(5-3)^2\\(5-4)^2+(5-1)^2+(5-5)^2+(5-3)^2+(5-1)^2+(5-3)^2\end{matrix}}=9{,}9498$$

For training data 5 with testing data:

$$d5 = \sqrt{\frac{(5-3)^2+(3-4)^2+(3-3)^2+(3-5)^2+(5-5)^2+(5-3)^2}{(3-4)^2+(4-1)^2+(2-5)^2+(5-3)^2+(3-1)^2+(3-3)^2}} = 8{,}5440$$

For training data 6 with testing data:

$$d6 = \sqrt{\frac{(5-3)^2+(2-4)^2+(3-3)^2+(3-5)^2+(4-5)^2+(2-3)^2}{(4-4)^2+(4-1)^2+(3-5)^2+(3-3)^2+(4-1)^2+(4-3)^2}} = 7{,}3484$$

For training data 7 with testing data:

$$d7 = \sqrt{\frac{(3-3)^2+(3-4)^2+(3-3)^2+(3-5)^2+(3-5)^2+(3-3)^2}{(3-4)^2+(3-1)^2+(3-5)^2+(3-3)^2+(3-1)^2+(3-3)^2}} = 6{,}5574$$

For training data 8 with testing data:

$$d8 = \sqrt{\frac{(5-3)^2+(1-4)^2+(2-3)^2+(2-5)^2+(2-5)^2+(3-3)^2}{(2-4)^2+(3-1)^2+(3-5)^2+(2-3)^2+(2-1)^2+(3-3)^2}} = 7{,}5498$$

For training data 9 with testing data:

$$d9 = \sqrt{\frac{(4-3)^2+(3-4)^2+(3-3)^2+(3-5)^2+(3-5)^2+(4-3)^2}{(4-4)^2+(4-1)^2+(3-5)^2+(4-3)^2+(3-1)^2+(4-3)^2}} = 7{,}1414$$

For training data 10 with testing data:

$$d10 = \sqrt{\begin{matrix}(5-3)^2+(3-4)^2+(5-3)^2+(5-5)^2+(2-5)^2+\\(1-3)^2(1-4)^2+(1-1)^2+(5-5)^2\\+(1-3)^2+(5-1)^2+(1-3)^2\end{matrix}} = 7{,}3484$$

For 100 training data with testing data:

$$d100 = \sqrt{\begin{matrix}(1-3)^2+(5-4)^2+(4-3)^2+(5-5)^2+(2-5)^2+\\(1-3)^2(1-4)^2+(3-1)^2+(1-5)^2\\+(1-3)^2+(3-1)^2+(4-3)^2\end{matrix}} = 0$$

Then obtain the distance between testing data and training data:

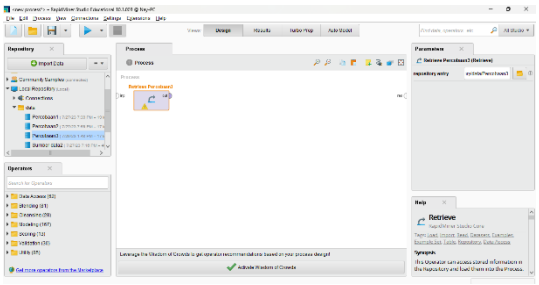
Table 1. Distance Obtained from Testing Data

Data ke-	Euclidean Distance	Label
1	8,7177	WhatsApp
2	6,1644	WhatsApp
3	6,0827	WhatsApp
4	9,9498	WhatsApp
5	8,5440	WhatsApp
6	7,3484	WhatsApp
7	6,5574	WhatsApp
8	7,5498	WhatsApp
9	7,1414	Telegram
10	7,3484	WhatsApp
..	..	..
100	0	WhatsApp

Source: Research, 2023

Table 1. Obtaining Testing Data Distances shows the results of obtaining distances from testing data to each training data. The next stage is to determine groups of test data based on the majority labels of the k nearest neighbors. Because the value of k = 5, the 5 smallest distances are taken, namely d100, d3, d2, d7 and d9. Next is to implement the K-Nearest Neighbor algorithm using the Rapidminer operator.

b. Implementation Data Distance Using RapidMiner Da

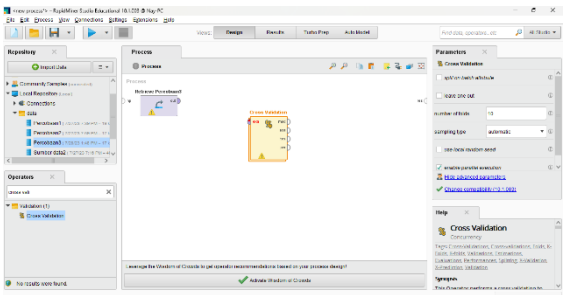


Source: Research, 2023

Figure 2. Rapid Miner Testing Data Input

The reason for using the Rapid Miner application is that it can analyze data that can be integrated with various programming languages easily. RapidMiner provides a UI for designing data analysis, where RapidMiner produces an XML file that is able to explain the analysis process that the user will apply to the data.

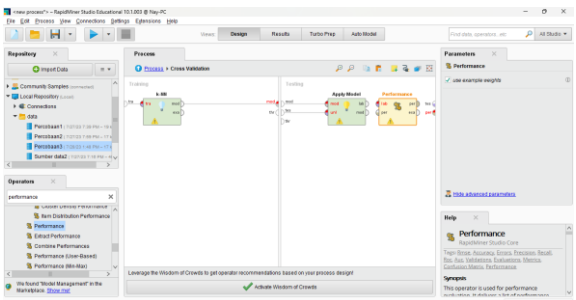
Figure 2 shows the process of inputting cross validation operators into Rapid Miner Studio processing.



Source: Research, 2023

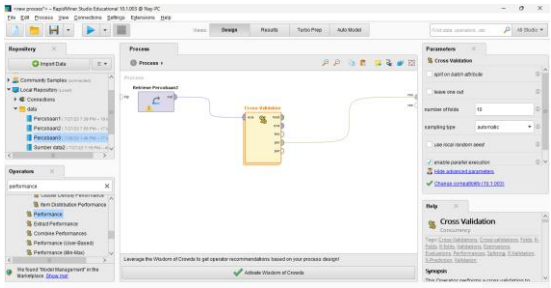
Figure 3. Addition of the Cross Validation operator

Figure 3 shows the process of adding Cross Validation operators



Source: Research, 2023

Figure 4. Addition of the Apply model operator and performance

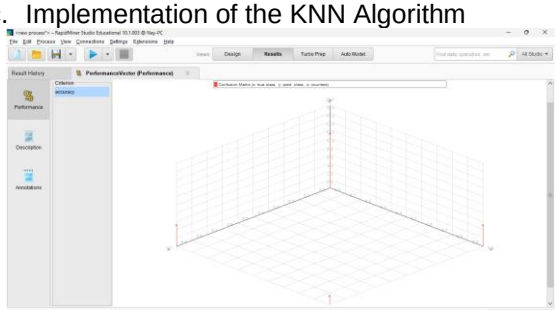


Source: Research, 2023

Figure 5. Data connected with cross validation

Figure 5 shows data that has been connected to cross validation.ion

c. Implementation of the KNN Algorithm



Source: Research, 2023

Figure 6. Plot View Results on Rapid Miner

d. Accuracy Results

The accuracy results of the dataset that has been tested on Rapidminer are as follows:

$$curacy = \frac{TP + TN}{TP + TN + FP + FN} = \frac{77 + 7}{77 + 7 + 12 + 30}$$

$$= \frac{84}{126} = 0{,}6667$$

accuracy: 66.67% +/- 10.99% (micro average: 66.67%)

	true WhatsApp	true Telegram
pred. WhatsApp	77	30
pred. Telegram	12	7
class recall	86.52%	18.92%

Source: Research, 2023

Figure 7. K-Nearest Neighbor Accuracy Results The results of the accuracy of adding up the accuracy values in this study were 0.6667 or 66.67%.

e. Recall Results

recall: 18.33% +/- 17.48% (micro average: 18.92%) (positive class: Telegram)

	true WhatsApp	true Telegram
pred. WhatsApp	77	30
pred. Telegram	12	7
class recall	86.52%	18.92%

Source: Research, 2023

Figure 8. K-Nearest Neighbor Recall Results The result of the total recall in this study was 0.1833 or 18.33%.

f. Precision Results

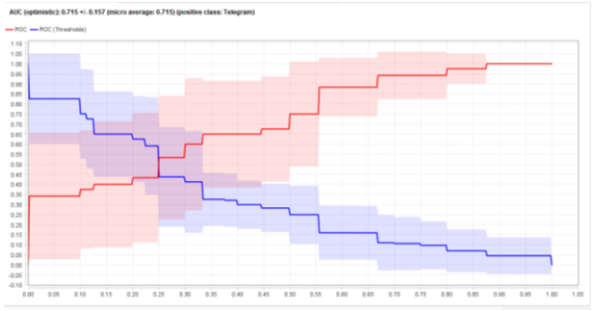
precision: 36.84% (positive class: Telegram)

	true WhatsApp	true Telegram
pred. WhatsApp	77	30
pred. Telegram	12	7
class recall	86.52%	18.92%

Source: Research, 2023

Figure 9. Precision K-Nearest Neighbor results

g. ROC Curve



Source: Research, 2023

Figure 9. ROC Curve Display

Table 2. Evaluation Measures for Level 1

Error Rate Formula	K-Nearest Neighbor
Error Rate = 1 – accuracy	= 1 – 66,67% = 0,33%

Based on the results of data mining testing with Rapid Miner, results were obtained calculations that will be used as information to support user satisfaction in using Social Media Bots. User satisfaction is 72.22% for WhatsApp Bot users and 28.57% for Telegram Bot users. And the accuracy results from this research were 66.67%, recall 18.33%, and precision 36.84%.

The calculations are carried out using a data mining process obtained from the K-Nearest Neighbor algorithm to make it easier to find Bot user satisfaction on both WhatsApp and Telegram social media.

4. Conclusion

In this research, to find the level of user satisfaction in using bots on several platforms, using the K-Nearest Neighbor method. Where is the K-Nearest method Neighbor is a method that can be used to determine data processing that is considered accurate. Apart from using the K-Nearest Neighbor algorithm, this research also uses the SPSS application and Rapidminer, which is software that is used specifically for data processing. SPSS is used to process data in order to determine valid and realistic variable values. Meanwhile, Rapidminer is used to process data mining.

The calculation results will be used as information to support user satisfaction in using Social Media Bots. User satisfaction is 72.22% for WhatsApp Bot users and 28.57% for Telegram Bot users. And the accuracy results from this research were 66.67%, recall 18.33%, and precision 36.84%.

References

Anam, M. K., Pikir, B. N., & Firdaus, M. B. (2021). Penerapan Na ̈ıve Bayes Classifier, K-Nearest Neighbor (KNN) dan Decision Tree untuk Menganalisis Sentimen pada Interaksi Netizen danPemeritah. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, *21*(1), 139–150. https://doi.org/10.30812/matrik.v21i1.1092

Arifin, A. D., Arieshanti, I., & Arifin, A. Z. (2022.). *Implementasi Algoritma K-Nearest Neighbour Yang Berdasarkan One Pass Clustering Untuk Kategorisasi Teks*.

Faulina, A., Chatra, E., & Sarmiati, S. (2020). Peran buzzer dan konstruksi pesan viral dalam proses pembentukan opini publik di new media. *JRTI (Jurnal Riset Tindakan Indonesia)*, *7*(1), 1. https://doi.org/10.29210/30031390000

Febriansyah, E., & Nirmala, E. (2023). Perancangan Sistem Informasi Jual Beli Properti Menggunakan Chat Bot Telegram Yang Terintegrasi Dengan Web Menggunakan Metode Prototype. *Jorapi : Journal of Research and Publication Innovation*, *1*(2). https://jurnal.portalpublikasi.id/index.php/JORAPI/index

Firdaus, A. (2022). Aplikasi Algoritma K-Nearest Neighbor pada Analisis Sentimen Omicron Covid-19. *Jurnal Riset Statistika*, 85–92. https://doi.org/10.29313/jrs.v2i2.1148

Fitriana, F., Utami, E., & Al Fatta, H. (2021). Analisis Sentimen Opini Terhadap Vaksin Covid - 19 pada Media Sosial Twitter Menggunakan Support Vector Machine dan Naive Bayes. *Jurnal Komtika (Komputasi Dan Informatika)*, *5*(1), 19–25. https://doi.org/10.31603/komtika.v5i1.5185

Hadi, M., Rahaningsih, N., & Danar, R. (2024). Analisa Performa Sistem Smart Home Berbasis Iot Menggunakan Telegram Messenger Bot Dan Nodemcu ESP 32. In *Jurnal Mahasiswa Teknik Informatika* (Vol. 8, Issue 1).

Hariz, W.-, Sudana, D., & Gunawan, W. (2021). Pengaruh Penggunaan Bot Werewolf Telegram pada Penguasaan Kosakata Siswa Sekolah Menengah Atas. *Jurnal Penelitian Pendidikan*, *21*(2), 12–24. https://doi.org/10.17509/jpp.v21i2.37421

Mambu, J. G. Z., Pitra, D. H., Rizki, A., Ilmi, M., Nugroho, W., Leuwol, N. V, Muh, A., & Saputra, A. (2023). Pemanfaatan Teknologi Artificial Intelligence (AI) Dalam Menghadapi Tantangan Mengajar Guru di Era Digital. *Journal on Education*, *06*(01), 2689–2698.

Marzuqin, A. K., & Abidin, R. Z. (2023). Prototype Box Penerima Paket Otomatis Untuk Mengamankan Paket Melalui Bot Telegram Dengan Menggunakan Nodemcu. In *Jurnal Mahasiswa Teknik Informatika* (Vol. 7, Issue 6).

Nurastuti, W. (2021). *Whatsapp Business Sebagai Alat Bantu Pedagang Pasar Tradisional Pada Era New Normal Di Kota Yogyakarta*. *5*(2), 443.

Oktaladi, F. (2022). *Penggunaan Media Pembelajaran MIBOTER (My Islamic Bot Interactive) dalam Meningkatkan Pengetahuan Dasar Islam pada Siswa Kelas 2 SD*. https://www.ejournal.jendelaedukasi.id/index.php/JJP

Narti, Sri. (2017). Pemanfaatan “Whatsapp” Sebagai Media Komunikasi Dosen Dengan Mahasiswa Bimbingan Skripsi (Studi Analisis Deskriptif Pada Mahasiswa Ilmu Komunikasi Bimbingan Skripsi Universitas Dehasen Bengkulu Tahun 2016) Oleh: SRI NARTI. In *Jurnal Professional FIS UNIVED* (Vol. 4, Issue 1). www.vemale.com

Salam, A., Zeniarja, J., Septiyan, R., & Khasanah, U. (2018). *Analisis Sentimen Data Komentar Sosial Media Facebook Dengan K-Nearest Neighbor (Studi Kasus Pada Akun Jasa Ekspedisi Barang J&T Ekspress Indonesia)*.

Siahaan, C., Adrian, D., & kunci, K. (2022). Media Sosial Instagram sebagai Sarana Berkomunikasi di Lingkungan Masyarakat. In *Agustus* (Vol. 5, Issue 8). http://Jiip.stkipyapisdompu.ac.id

Widiyono, A. (2021). Pengaruh Penggunaan LMS dan Aplikasi Telegram terhadap Aktivitas Belajar. *Jurnal Penelitian Ilmu Pendidikan*, *14*(1), 91–101. https://doi.org/10.21831/jpipfip.v14i1.37857