ANALISIS SENTIMEN PENGGUNA X TERHADAP LAYANAN *PROVIDER ICONNET* MENGGUNAKAN *NAI¨VE BAYES* DAN *SUPPORT VECTOR MACHINE*

TUGAS AKHIR

Diajukan Sebagai Salah Satu Syarat
untuk Memperoleh Gelar Sarjana Komputer pada
Program Studi Sistem Informasi

Oleh:

HANI HANDAYANI
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FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU
PEKANBARU
2024

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ANALISIS SENTIMEN PENGGUNA X TERHADAP LAYANAN *PROVIDER ICONNET* MENGGUNAKAN *NAÏVE BAYES* DAN *SUPPORT VECTOR MACHINE*

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di Pekanbaru, pada tanggal 15 Januari 2024

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Anggota 2 : Megawati, S.Kom., MT.

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Pekanbaru, 10 Januari 2024

Yang membuat pernyataan,

HANI HANDAYANI

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LEMBAR PERSEMBAHAN

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Dengan menyebut nama Allah yang maha pengasih lagi maha penyayang

Assalamualaikum Warahmatullahi Wabarakatuh.

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Pekanbaru, 15 Januari 2024

Peneliti,

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INTERNATIONAL CONFERENCE
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Dear Author(s),

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Track	:	Artificial intelligent
Paper Title	:	Sentiment Analysis of X Users on Iconnet Service Provider Using Naïve Bayes and Support Vector Machine
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Significance of Topic:	Relating to knowledge contribution	6
Presentation:	Clarity and Organisation of Content	8
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Comments	• The abstract does not clearly explain what the problem is trying to solve, what the hypotheses or research questions are, and what the implications or recommendations of the research results are. • Result are quite good presented. • Introduction need to be improved. • Why is it important to analyze the sentiment of Iconnet users? What is the purpose and benefit to Iconnet or the community? • Overall data is presented and processed, then displayed comprehensively, but in the table section that displays the results in the form of numbers, with the amount of data used it is better to use a graph so that readers can see the overall results of the data that has been processed. • In introduction, Some statements are quite general, such as the need for internet technology and the comparison of Iconnet with other providers, without providing in-depth analysis or context. • In conclusion section An explanation of how these results could affect stakeholders, such as Iconnet, its customers, or the industry.	
REVIEWER 2		
Originality:	New or Novel contribution	6
Significance of Topic:	Relating to knowledge contribution	6
Presentation:	Clarity and Organisation of Content	5
Recommendation:	Overall view and recommendation	6
Comments	• Specific objectives of the study was not proved clearly in introduction section. • Introduction should be re-written and should frame the objective deeply. Revised the Introduction so that it has the following content: 1. Problems or background or importance of research 2. Research that has been done by previous researchers related to similar or relevant problems (minimum 10 international journals published in the last 3 years) 3. The proposed method is related to the problem in point 1 and how it differs from what other researchers have done in point 2.	

	• It is not clear how the research were conducted, therefore, revised the materials and Methods section with the following contents: 1. Research location 2. Materials, tools, number samples or respondents used in the research. 3. How to obtain data and how the data applied or how the proposed method was evaluated using data from the study case? This paper still needs to be improved in terms of its English grammar or structure. There are still many spelling, vocabulary, punctuation, uppercase, and lowercase letters misuses. There are also some word selection mistakes. For the research method part, it should be written in the past tense form because this research is considered to have been completed. So, all verbs are written in the past tense rather than the present participle. Please correct it soon. • All papers submitted to the AIMS 2024 must be written in English and formatted in the standard of the publisher format (All regular papers are limited to about five (5) to six (6) pages • Show the extracted feature in relation with the number of the data. • Show the raw data and processing results.

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Tanggal : 10 September 2021

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Fakultas/~~Pascasarjana~~ : Sains dan Teknologi
Prodi : Sistem Informasi
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Pekanbaru, 15 Januari 2023
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*pilih salah salah satu sesuai jenis karya tulis

SENTIMENT ANALYSIS OF X USERS ON ICONNET SERVICE PROVIDER USING NAÏVE BAYES AND SUPPORT VECTOR MACHINE

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***Abstract*— This research responds to the rapid growth of users of Iconnet, a subsidiary of PLN, PT Indonesia Comnets Plus (ICON+), which offers reliable, affordable, and unlimited internet services. To improve its services, Iconnet needs a deeper understanding of user opinions about its connections and services. The main objective of this research is to fill this gap by performing sentiment analysis of Iconnet users' opinions on X. Using a dataset of 2720 data, this research applies the Naive Bayes Classifier (NBC) and Support Vector Machine (SVM) algorithms to classify user opinions into three classes: negative, neutral, and positive. The 10-fold Cross-Validation method is used to improve the validity of the results. Results show the superiority of the SVM model, with accuracies on connection sentiment of 92% (SVM) and 78% (NBC), and on service sentiment of 88% (SVM) and 85% (NBC). Thus, this research not only provides insight into user evaluations of Iconnet but also highlights the superiority of SVM in sentiment analysis of internet services.**

***Keywords*—Sentiment Analysis, Iconnet, X, SVM, NBC.**

I. INTRODUCTION

In finding information, technology is needed, namely the internet, so it can easily find information quickly [1]. Based on data obtained from the katadata.co.id website, the We Are Social report has recorded the number of internet users in Indonesia reaching 212.9 million in January 2023, or around 77% of the Indonesian population already using the internet [2]. It cannot be denied that the need for telecommunication services has become a basic need, several companies have begun to bring out products/services in the form of network services[3]. One of the telecommunications service providers in Indonesia is Iconnet[4].

Iconnet is a subsidiary of PLN, PT Indonesia Comnets Plus (ICON+). PT Indonesia Comnent Plus (ICON+) is a company engaged in network and telecommunications services. Iconnet comes with digital services that provide Reliable internet services (reliable network quality), Affordable (services at affordable prices and reach various regions), and Unlimited (unlimited internet access)[5]. When compared to other providers such as Indihome, in terms of price, Iconnet is more affordable where the cheapest package offered by Iconnet starts from IDR 180,000, while the cheapest Indihome package starts from IDR 280,000. The way to subscribe with Iconnet can be done through the PLN Mobile application while Indihome only provides a way to subscribe through the official website, call center, indihome booth, and Plasa Telkom. The difference is that Iconnet is of interest to internet provider users.

At the end of 2022, total number of users of Iconnet services throughout Indonesia will reach 500.000 customers. Every year, Iconnet continues to innovate with various offers to increase customer interest in using this provider. Despite experiencing significant growth in the number of subscribers, it still does not make users satisfied, both in terms of services and network systems offered.

Users complain of Iconnet's poor service when there is a disturbance. In terms of service, users often experience internet interruptions so users try to contact customer service but are not responded well by Iconnet. In addition, in terms of the network offered, users often experience internet network down or no internet network for more than 24 hours.

Figure 1. User Tweets of Iconnet

Users expressed various responses through social media, one of which was through X[6]. The public uses X to give opinions and send posts with various opinions through tweets because X has become a leading platform to express public opinion widely[7]. Opinions and comments about Iconnet are very diverse ranging from positive responses and negative responses. In this case, to improve its services, it is necessary to group public opinions on Internet providers[8].

This step aims to get deeper information about how customers respond to Iconnet services. The information

obtained will be used to identify areas that need improvement. To categorize user opinions can be done by performing sentiment analysis.

Sentiment analysis is also known as opinion mining which is a process of obtaining information from text whose results can be positive or negative[9]. With Sentiment Analysis, Iconnet will get information and can evaluate to improve the quality of service to customers[10]. Getting information from the text can be done by classifying text using text mining, which is a method for predicting class categories from data. Some of the most commonly used text classification methods are Naïve Bayes classification and Support Vector Machine (SVM)[11].

Support vector machines are applicable for categorizing tweets into positive and negative classes based on vectors, followed by assessing sentiment accuracy through frequency calculations. Linear SVC is used to predict the accuracy of classification data based on the marginal probability of the input vector[12]. The Naïve Bayes algorithm can also perform tweet classification by calculating probabilities that are calculated independently of other features that contribute to decision-making[13].

In an attempt to measure sentiment with internet service providers, Hasnfi et al., 2022 applying the Naïve Bayes and Support Vector Machine algorithms in X sentiment analysis of internet service providers obtained the accuracy value of each algorithm, namely Naïve Bayes obtained an accuracy of 82% and a precision value of 80%. Research conducted by Zhao using naïve Bayes and support vector machine in the classification of customer reviews on the E-commerce platform, namely SVM gets 86% accuracy while nbc is 77% but in terms of time, nbc is faster than svm in processing data[14]. While the Support Vector Machine algorithm obtained an accuracy value of 84% and a precision value of 82.8%[15]. while the research conducted by Prasetio et al., sentiment analysis on myindihome user reviews using Support Vector Machine, Naïve Bayes obtained an accuracy result of 84.86% while Support Vector Machine got an accuracy value of 86.54%[16]. Furthermore, the research conducted by Fikri et al., related to the comparison of Naïve Bayes and Support Vector Machine in X sentiment analysis obtained accuracy results using Naïve Bayes 73.65%, while Support Vector Machine 70.20%[17]. In this case, the performance of Naïve Bayes is 3.45% superior to Support Vector Machine. Research conducted by Setiawan & Utami, in analyzing the sentiment of X post-COVID-19 online lectures using Support Vector Machine and Naïve Bayes, NBC obtained an accuracy of 81.20%, time of 9.00 seconds, recall of 79.60%. SVM gets optimal results with 85% accuracy, time 31.60S, recall 84%. From these results, it is found that in terms of time, Naïve Bayes takes less time than SVM[18].

Based on previous research, the researcher will analyze the sentiment of X users towards Iconnet internet service providers using naïve Bayes and support vector machine. This classification process will divide Iconnet user reviews into three categories, which are positive, negative, or neutral reviews based on services, and internet connections taken through customer tweets on X social media and to determine the level of accuracy. This research is expected to help in providing information about the Iconnet provider for those who need it, namely for Iconnet it can be an evaluation material to improve the performance of Iconnet services through reviews from users. Customers and prospective customers will get information on how the service and connection of the Iconnet provider.

II. Research Methodology

The methodology of this study begins with collecting X data through web scraping. After collecting data, data pre-processing is conducted with several processes, such as cleaning, filtering, tokenizing, and stemming. This study uses language experts in labeling sentiment data. After that, the division of data types based on connections and services is conducted. The next step is the word weighting process using TF-IDF to determine the words that often appear in the data. After all the processes are completed, modeling is carried out and then the comparison between models is carried out to determine the performance of each algorithm and then evaluation is carried out to determine the performance of the model.

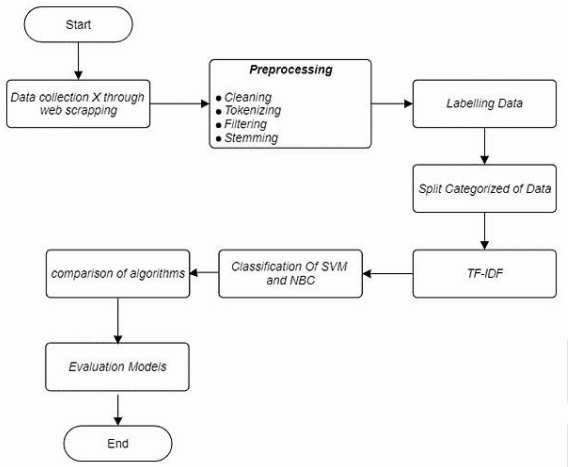

Figure 2. Research Methodology

A. Data Collection

The data collection stage is the next step that needs to be done so that the research objectives are clearer and more organized. The data collection of X tweets in this study took data from Iconnet user tweets via X using the scrapping technique.

B. Text Pre-Processing

Text preprocessing is the process of obtaining information from previously unknown text data[19]. There are several steps required in processing text, namely removing non-letter characters, converting text to lowercase, removing usernames or mentions (@), removing hashtags (#), and removing the URL or link of each tweet.

III. Results

A. Initial Data

The initial data is extracted from Iconnet user tweets via X related to the Iconnet provider. The following initial data is used in Table 1.

TABLE 1. INITIAL DATA

NO	Username	Date	Tweet
1	@syarifsoden	06/11/2022	ICONNET by @pln_123 tambah gajelas anjir, seharian No Internet, eh

			skrg can't connect #PLN #iconnetpln #iconplus daerah DIY https://t.co/OWTf4j9Sj2
2	@shintanibs	31/12/2022	@pln_123 @Iconnet_ tolong donk ini internet mati2 terus. Payah bgt jaringannya. Capek tau dikit2 mesti nelp ke CS!
…	…..	…..	….
2726	@chaengie_	23/06/2023	sumpah iconnet sering banget gangguan, mana skrg bayar lebih mahal! jaringan gangguan mulu!! 20mps cuman pake 4 hp ajloh padahal yatuhan!!

B. Division of data categories

In this study, sentiment data was categorized based on iconnet connections and services. Sentiment data related to connections can be seen in Table 2, and sentiment related to services can be seen in Table 3.

TABLE 2. SENTIMENT CONNECTION DATA

NO	Tweet
1	Ini gimana dah, iconnet saya dari tadi malam sampai sekarang masih ga ada internet min @pln_123
2	Flop bgt iconnet saat w lagi mehibur diri tahun baru ga bisa kemana mana gegara badan babak belur sikampret malah gangguan
…	….
911	"Mau punya internet atau wifi pribadi di rumah ?? ya ICONNET PLN solusinya, harga murah dan terjangkau BUMN membangun negeri .. Minat, please call me on number 089517055849 https://t.co/iIw5flcrRR"

TABLE 3. SENTIMENT SERVICE DATA

NO	Tweet
1	Pelayanan iconnet ampun deh.. nyesel bayar lagi ðŸ˜©
2	Min @pln_123 mohon info paket wifi iconnet untuk berlangganan gmn caranya? Ingin mendapatkan pelayanan yg baik saja @IndiHomeCare sudah bikin kecewa mendapatkan pelayanan yg baik saja sudah bikin kecewa
…	….
578	@pln_123 halo min kenapa wifi iconnet tidak dapat di gunakan? Terhubung tetapi tidak bisa menyediakan layanan internet.

C. Cleaning Data

The processing data in the form of text will be cleaned first to clean up non-standard words, symbols, hashtags, usernames, URLs, change uppercase letters to lowercase letters, and the same comments, so the results will be as in table 4 and table 5.

TABLE 4. CONNECTION CLEANING RESULT

NO	Tweet
1	ini gimana dah iconnet saya dari tadi malam sampai sekarang masih ga ada internet min
2	flop bgt iconnet saat w lagi mehibur diri tahun baru ga bisa kemana mana gegara badan babak belur sikampret malah gangguan
…	….
911	mau punya internet atau wifi pribadi di rumah ya iconnet pln solusinya harga murah dan terjangkau bumn membangun negeri minat please call me in numbre

TABLE 5. SERVICE CLEANING RESULT

NO	Tweet
1	pelayanan iconnet ampun deh nyesel bayar lagi
2	min mohon info paket wifi iconnet untuk berlangganan gmn caranya ingin mendapatkan pelayanan yg baik saja sudah bikin kecewa
…	….
578	halo min kenapa wifi iconnet tidak dapat di gunakan terhubung tetapi tidak bisa menyediakan layanan internet

D. Pre-Processing

The pre-processing stage involves preparing raw data for subsequent processing. This phase includes tasks such as eliminating irrelevant data and transforming data into a more system-friendly format. Python programming language, coupled with Google Colab tools, is employed for data pre-processing. The data pre-processing stage in this research is cleaning, filtering, and stemming. During the filtering phase, important words will be extracted from a sentence which aims to make sentences that are considered unimportant such as punctuation marks and stopwords. The following stopwords used can be seen in Table 6.

TABLE 6. STOPWORD LIST

No	Stopword	No	Stopword	No	Stopword
1	ada	11	akhirnya	21	apa
2	adalah	12	aku	22	apaan
3	adanya	13	akulah	23	apabila
4	adapun	14	amat	24	apalagi
5	Agak	15	amatlah	25	apatah
6	Agaknya	16	anda	26	artinya
7	Agar	17	andalah	27	asal
8	Akankah	18	antar	28	asalkan
9	Akhir	19	antara	….	
10	Khiri	20		758	yang

In the steaming process, the affixed words will be converted into basic words. In this step, it is done by finding the basic word in each word using the literary module in Python. The results of text pre-processing related to connections can be seen in Table 7 and related services in Table 8.

TABLE 7. CONNECTION STEMMING RESULT

NO	Tweet
1	gimana dah iconnet malam ga internet min
2	flop bgt iconnet w mehibur ga mana gegara badan babak bur sikampret ganggu
…	….
911	internet wifi pribadi rumah ya iconnet pln solusi harga murah jangkau bumn bangun negeri minat please call me in numbre

TABLE 8. SERVICE STEMMING RESULT

NO	Tweet
1	layan iconnet ampun deh nyesel bayar

2	min mohon info paket wifi iconnet langgan gmn layan yg bikin kecewa	
…	….	
578	halo min wifi iconnet hubung sedia layan internet	

E. Labelling Results

The results of tweets about Iconnet-related connections after pre-processing, then labeling by experts who are a lecturer in Indonesian and the author. the results of the positive class are 66, the negative are 740, and the neutral class 198 can be shown in Table 9.

TABLE 9. CONNECTION SENTIMENT LABELLING RESULT

	Tweet	Sentiment
1	gimana dah iconnet malam ga internet min	Negative
2	flop bgt iconnet w mehibur ga mana gegara badan babak bur sikampret ganggu	Negative
…	…	…
911	halo min iconnet rumah gabisa akses internetnya	Negative

Meanwhile, the results of Iconnet tweets related to services after pre-processing positive classes amounted to 46, negative classes 491, and neutral classes amounted to 44 can be seen in Table 10.

TABLE 10. SERVICE SENTIMENT LABELLING RESULT

No	Tweet	Sentiment
1	tatsumi ganti iconnet bang layan inet pln	Positive
2	layan iconnet ampun deh nyesel bayar	Negative
…	…	…
578	erick jaring iconnet wilayah jatim ganggu internet solusi dr cs tunggu dg estimasi informasi langkah konkret baik layan perintah kalah dg swasta	Negative

F. Term Frequency- Inverse Document Frequency (TF-IDF)

Following the preprocessing stage, data is transformed into numeric format using the TF-IDF weighting method. This technique assigns weights to words based on term frequency (tf) and inverse document frequency (IDF). The TF-IDF computation is implemented in Python through the Sklkit-learn model. The process occurs post-division of training and test data. A concise summary of TF-IDF results for connection-related sentiments is presented in Table 11, indicating a total of 90 words for connection-related sentiment data.

The TF-IDF results on the connection sentiment data indicate the words "iconnet" and "busuk" appear most frequently in several documents.

TABLE 11. TF-IDF RESULT OF CONNECTION

No	Terms					
	bagus	bayar	iconnet	Pln	busuk	Wifi
1	0	0	0,166022	0,270293	0,324908	0
2	0	0	0,252704	0	0,636847	0
…	…	….	…	…	…	…
911	0	0	0,173913	0	0,702499	0,409259

Meanwhile, service-related sentiment data totaling 153 words and TF-IDF results indicate the words "admin" appear most frequently in several documents. it can be shown in Table 12.

TABLE 12. TF-IDF RESULT OF SERVICE

No	Terms					
	admin	bayar	cs	iconnet	Internet	customer
1	0,362843	0	0	0	0,445166	0
2	0,232547	0	0	0,085572	0	0,239967
…	…	…	….	…	…	…
578	0,554336	0,328621	0	0	0	0

G. Splitting Training Data and Testing Data

Following the outlined methodology, this research aims to partition the dataset, comprising 2720 data points, into training and testing sets after various pre-processing stages and the TF-IDF phase. Subsequently, the NBC and SVM algorithms will be applied for testing purposes.

H. Naïve Bayes Classifier (NBC) and Support Vector Machine (SVM) Classification

In this study, sentiment classification was carried out using two algorithms, namely NBC and SVM.

I. K-fold Cross Validation Of NBC

In alignment with the findings of experiments using K-fold Cross Validation NBC, sentiments related to connections obtained the highest accuracy at K-3 with an accuracy value of 93.7%, and sentiments related to services at K-4 with 95% accuracy, as shown in Figure 3.

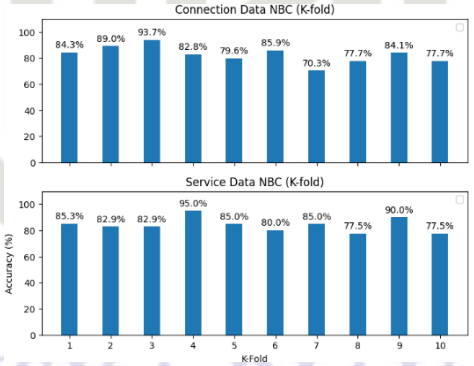

Figure 3. Result K-Fold Cross Validation SVM

J. K-fold Cross-Validation Of SVM

According to the results of experiments using K-fold Cross Validation SVM, sentiment related to connections obtained the highest accuracy at K-10 with an accuracy value of 92% and sentiment related to services at K-2 with 95% accuracy, as shown in Figure 4.

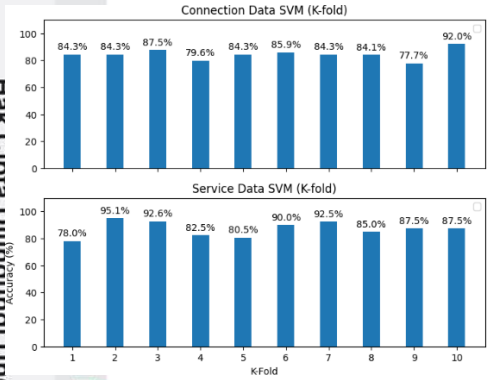

Figure 4. Result K-Fold Cross Validation SVM

K. *Evaluation Models*

After training on the dataset, the next model evaluation is carried out which aims to measure the extent to which the model can work on the dataset used. After evaluating the model, the results of each algorithm are obtained. The model evaluation results can be seen in Table 15.

TABLE 13. CONFUSION MATRIX RESULT OF CONNECTION

Sentiment Of Connection			
Algorithm	*Accuracy*	*Precision*	*Recall*
Naïve Bayes Classifier	78%	62%	78%
Support Vector Machine	92%	91%	89%

Evaluation results were obtained on sentiment data related to connections in which the NBC algorithm got an accuracy of 78%, precision of 62%, and recall of 62%. While SVM has an accuracy of 92%, 91% precision, and 89% recall.

TABLE 14. CONFUSION MATRIX RESULT OF SERVICE

Sentiment Of Service			
Algorithm	*Accuracy*	*Precision*	*Recall*
Naïve Bayes Classifier	85%	79%	85%
Support Vector Machine	88%	81%	84%

Model evaluation results on sentiment data related to services in which the NBC algorithm gets an accuracy of 85%, precision of 79%, and recall of 85%. While SVM has an accuracy of 88%, 81% precision, and 84% recall. After evaluating the model, it was obtained that the accuracy value of SVM was greater than NBC on connection-related sentiment data and service-related sentiment data. It means that SVM is superior in classifying data than NBC. As a result of the connection sentiment, the number of each class Negative is 81% (740 classes), Positive 7% (66 classes), and Neutral 11% (108 classes). Meanwhile, the results of service-related sentiment get the number of Negative classes 84% (491 classes), Positive 8% (46 classes), and Neutral 8% (44 classes).

The results obtained by the negative class are more than other classes from both connection-related sentiment data and service-related sentiment. This indicates that in terms of connection and service on Iconnet, more attention should be given to getting more negative opinions.

L. *Word Visualization*

Word cloud is a visualization of words used to analyze the frequency with which words appear in textual document s[20]. In this study, it will identify the words that appear most often in conversations about Iconnet services. The word cloud will display reviews about Iconnet based on service and connection. can be seen in Figures 5 and 6.

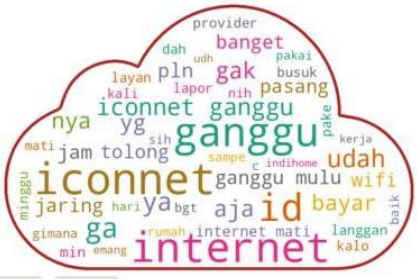

Figure 5. Word Cloud Of Connection

Figure 5 is a word cloud display about connections, in which the words that often appear about Iconnet on platform X are the words " Iconnet", 'internet", "ganggu", and others.

Figure 6. Word Cloud Of Service

Meanwhile, Figure 6 is a word cloud display about services, in which the words that often appear about Iconnet on platform X are the words "iconnet", "ganggu", "cs", and others.

IV. Conclusion

Based on the study conducted in analyzing user opinions, the results were obtained:

1. This research conducts sentiment analysis by comparing the Naïve Bayes Classifier (NBC) and Support Vector Machine (SVM) algorithms using the K-Fold Cross Validation validation method with a value of K = 10. The processed data is divided into two types, namely connection-related sentiment data and service-related sentiment data which results in different comparisons.
2. The accuracy results on connection-related sentiment data using the NBC algorithm are 78% and on SVM 92%. While in service-related sentiment data, the NBC algorithm gets 85% accuracy and 88% SVM. This means that SVM is superior to NBC.
3. In this study, labeling was carried out by language experts and it was found that there were many negative sentiments about Iconnet, where connection-related sentiment data got 81% or 740

negative classes, while service-related sentiment data got 84% or 491 negative classes. This can certainly be an evaluation material for iconnet in paying attention to the services and connections offered to users.

4. Based on the results that it has obtained, the iconnet is to improve its performance, especially in terms of services and internet connections offered.

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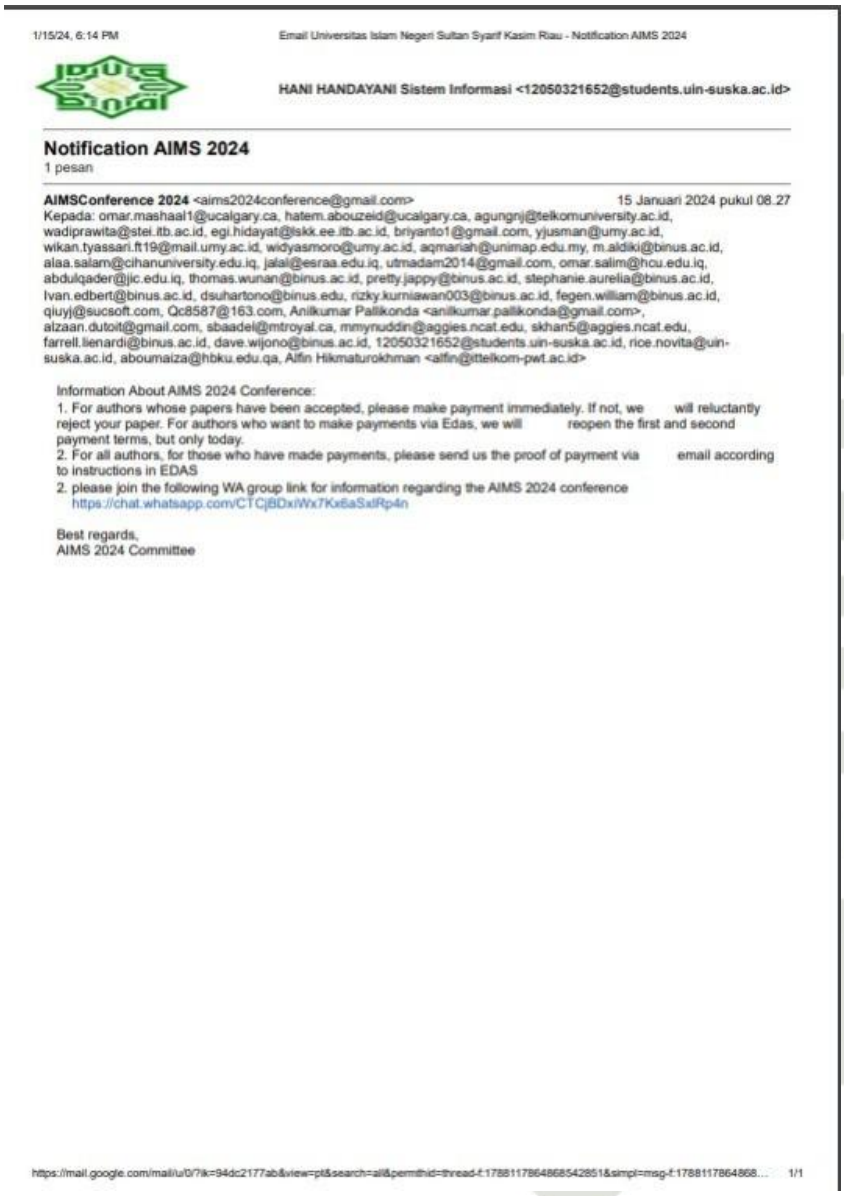
LAMPIRAN A

POSTER KEGIATAN

LAMPIRAN B

SURAT DARI JURNAL

B.1 E-mail Accepted



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B.2 Email Review dan Comments

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Artificial Intelligence and Mechatronics Systems
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The reviews are below:

SIMILARITY RATING (0-100)	

REVIEWER 1		
Originality:	New or Novel contribution	6
Significance of Topic:	Relating to knowledge contribution	6
Presentation:	Clarity and Organisation of Content	8
Recommendation:	Overall view and recommendation	6
Comments	• The abstract does not clearly explain what the problem is trying to solve, what the hypotheses or research questions are, and what the implications or recommendations of the research results are. • Result are quite good presented. • Introduction need to be improved. • Why is it important to analyze the sentiment of Iconnet users? What is the purpose and benefit to Iconnet or the community? • Overall data is presented and processed, then displayed comprehensively, but in the table section that displays the results in the form of numbers, with the amount of data used it is better to use a graph so that readers can see the overall results of the data that has been processed. • In introduction, Some statements are quite general, such as the need for internet technology and the comparison of Iconnet with other providers, without providing in-depth analysis or context. • In conclusion section An explanation of how these results could affect stakeholders, such as Iconnet, its customers, or the industry.	
REVIEWER 2		
Originality:	New or Novel contribution	6
Significance of Topic:	Relating to knowledge contribution	6
Presentation:	Clarity and Organisation of Content	5
Recommendation:	Overall view and recommendation	6
Comments	• Specific objectives of the study was not proved clearly in introduction section. • Introduction should be re-written and should frame the objective deeply. Revised the Introduction so that it has the following content: 1. Problems or background or importance of research 2. Research that has been done by previous researchers related to similar or relevant problems (minimum 10 international journals published in the last 3 years) 3. The proposed method is related to the problem in point 1 and how it differs from what other researchers have done in point 2.	

LAMPIRAN C

SURAT PERNYATAAN PELABELAN

C.1 Pakar Bahasa

SURAT PERNYATAAN

Saya yang bertanda tangan di bawah ini :

Nama	: Nuratika, S.Hum., M.Pd
Tempat/Tanggal Lahir	: Sibiruang, Koto Kampar/ 02 Desember 1988
Pekerjaan	: Dosen dan Penulis
Alamat	: Rokan Hulu

Menyatakan dengan sesungguhnya bahwa benar memvalidasi untuk pelabelan sentimen Yang bersifat Positif, Negatif dan Netral dalam tweet X terhadap provider Iconnet sebanyak 2720 data dalam tugas akhir dari :

Nama	: Hani Handayani
NIM	: 12050321652
Jurusan	: Sistem Informasi
Judul Tugas Akhir	: Analisis Sentimen Pengguna *X* Terhadap Layanan *Provider Iconnet* Menggunakan *Naïve Bayes* dan *Support Vector Machine*

Demikian surat pernyaatn ini saya buat dengan sesungguhnya tanpa paksaan dari pihak manapun. Atas perhatiannya saya ucapkan terimakasih.

Rokan Hulu, Oktober 2023
Yang membuat Pernyataan

Nuratika, S.Hum.,M.Pd

DAFTAR RIWAYAT HIDUP

Hani Handayani lahir di Kota Pekanbaru, pada tanggal 01 Agustus 2002. Peneliti merupakan anak dari Bapak Indrawanto dan Ibu Riyanti. Peneliti adalah anak kedua dari tiga bersaudara. Pada tahun 2007 peneliti memulai pendidikan dengan masuk TK Dharma Bakti di Desa Petai dan lulus pada tahun 2008. Lalu melanjutkan pendidikan Sekolah Dasar di S-D Negeri 001 Petai. Peneliti menyelesaikan pendidikan Sekolah Dasar pada tahun 2014. Setelah menyelesaikan pendidikan Sekolah Dasar peneliti melanjutkan pendidikan tingkat SLTP di SMP Negeri 1 Singingi Hilir yang selesai pada tahun 2016. Peneliti melanjutkan pendidikan tingkat SLTA di SMAN 1 Singingi Hilir. Setelah menyelesaikan pendidikan di SMAN 1 Singingi Hilir pada tahun 2020, peneliti pun melanjutkan pendidikan dengan menjadi mahasiswa Program Studi Sistem Informasi Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau dan peneliti menyelesaikan kuliah Strata satu (S1) tersebut pada tahun 2024.

SURAT PERNYATAAN PUBLIKASI JURNAL

Saya yang bertanda tangan dibawah ini :

Nama	: Hani Handayani
NIM	: 12050321652
Jurusan	: Sistem Informasi
Judul Tugas Akhir	: *Sentiment Analysis of X Users On Iconnet Service Provider Using Naïve Bayes and Support Vector Machine*

Dengan ini menyatakan bahwa akan melengkapi seluruh kelengkapan administrasi Tugas Akhir Program Studi Sistem Informasi Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau **berupa bukti pelaksanaan *conference* secara lengkap**. Demikian surat pernyatan ini di buat untuk dipergunakan sebagaimana mestinya.

Pekanbaru, 10 Januari 2024

Yang membuat pernyataan

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