

# Sentiment Analysis of the Indriver Online Ojek Application using the Naïve Bayes Classifier Method

Muhammad Zidan Akbar<sup>1)\*</sup>, Muhammad Ikhsan<sup>2)</sup>, Ika Zufria<sup>3)</sup>

<sup>1,2,3)</sup>Universitas Islam Negeri Sumatera Utara, Indonesia

<sup>1)</sup>[rabkanadz23@gmail.com](mailto:rabkanadz23@gmail.com), <sup>2)</sup>[mikhsan@gmail.com](mailto:mikhsan@gmail.com), <sup>3)</sup>[ikazufria@gmail.com](mailto:ikazufria@gmail.com)

Submitted : Jul 24, 2024 | Accepted : Jul 31, 2024 | Published : Aug 6, 2024

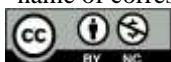
**Abstract:** According to statista.com, there are 73.1 million online motorcycle taxi users in Indonesia and there are 68.1 million active online motorcycle taxi users in Indonesia especially in the province of North Sumatra, there are 43,811 online motorcycle taxi drivers. The Indriver online motorcycle taxi application is an international online transportation service that gives passengers and drivers the freedom to negotiate prices. Sentiment analysis analyzes text to determine positive, negative, or neutral sentiments. The method commonly used in sentiment analysis is the Naïve Bayes Classifier method. This research uses quantitative methods to analyze sentiment toward the InDriver online motorcycle taxi application by utilizing the Naïve Bayes Classifier algorithm. User review data is collected from reviews on the Google Play Store, then cleaned and converted into a format suitable for statistical analysis. To analyze sentiment towards the InDriver online motorcycle taxi application using the Naïve Bayes Classifier method, collecting review data and user comments using the Python library and the Visual Studio code application, carrying out preprocessing, TF-IDF weighting, dividing the data into 70% and 30%, after that conducting testing using naïve Bayes classifier algorithm, as well as carrying out evaluation using a confusion matrix. The results of calculating the level of accuracy using the Naïve Bayes method for sentiment classification can be said to be good, this can be seen from the accuracy results on a dataset of 1393 with a comparison of training data and test data of 7:3, obtaining an accuracy value of 76%, precision of 71% , recall of 81% and f1-score of 76%. The results of this research analysis produced superior positive sentiment totaling 677 and negative sentiment totaling 608 while neutral was 90

**Keywords:** Indriver; Naïve Bayes Classifier; Online Motorbike Taxi; Sentiment Analysis

## INTRODUCTION

Online motorcycle taxis are a type of transportation that has become increasingly popular with the public in recent years. According to statista.com, there are 73.1 million online motorcycle taxi users in Indonesia and there are 68.1 million active online motorcycle taxi users in Indonesia especially for the province of North Sumatra, there are 43,811 online motorcycle taxi drivers. The Indriver online motorcycle taxi application has become one of the popular transportation alternatives in Indonesia, based on the fact that this application has been downloaded more than 150 million times and is available in more than 700 cities in 47 countries around the world.

\*name of corresponding author



Sentiment analysis analyzes text to determine positive, negative, or neutral sentiment. In the context of the Indriver online motorcycle taxi application, sentiment analysis can be carried out on user reviews of the application to find out how users respond to the application. Several classification methods can be used in sentiment analysis, namely support vector machine (SVM), Deep Learning, and also Naïve Bayes. The Naïve Bayes method is a classification method from machine learning that has the advantage of using training data samples to estimate the parameters involved. In the classification process, it can be presented quickly, and obtain high accuracy. Various methods and algorithms have been proposed from various studies related to naïve Bayes classification. Previous research used this method as a method for classifying.

In research conducted by (Nuria et al., 2024) entitled Maxim Sentiment Analysis with Comparison of Chi-Square and MI in Naive Bayes using 1820 data, the accuracy value produced by the Naive Bayes method with Chi-Square feature selection produces the greatest level of accuracy, namely 96.97%, precision 97%, recall 97%, f1-score 97% which produces predictions of 978 positive data and 842 negative data. Apart from that, there is also research conducted by (Sitorus, 2021) entitled Sentiment Analysis of Indriver Application Review Data on the Google Play Site Using the Naïve Bayes Classifier and Support Vector Machine Method using 1820 InDriver user data using the Naive Bayes classification method Classifier and Support Vector Machine (SVM) method. The accuracy value resulting from the two methods, namely Naive Bayes, was 74.5%, while Support Vector Machine (SVM) was 85.5%.

## LITERATURE REVIEW

### Machine Learning

Machine learning can be defined as the application of computers and mathematical algorithms adopted by learning from data and producing predictions in the future. The learning process in question is an effort to obtain intelligence through two stages, namely training and testing. The field of machine learning is related to the question of how to build computer programs to improve automatically based on experience (Roihan et al., 2020).

### Text Mining

Text Mining is a process of exploration and analysis of large datasets in the form of text to obtain useful information for a specific purpose. One of the algorithms that can be used in text mining is LDA (Latent Dirichlet Allocation). The LDA algorithm can detect topics in a document collection along with the magnitude of the occurrence of the topic in the document collection or in a particular document (Kurniawan, R.R., Zufria, 2022).

Text mining is becoming more practical for data scientists and other users. Mining and analyzing text helps organizations find potentially valuable business insights in corporate documents, customer emails, call center logs, verbatim survey comments, social media posts, medical records, and other text-based data sources. Text mining capabilities are also increasingly being built into AI chatbots and virtual agents, which companies use to provide automated responses to customers as part of their marketing, sales, and customer service operations (Runimeirati et al., 2023).

### Sentiment Analysis

Sentiment analysis processes data automatically to obtain the sentiment of a sentence. This is done to see the opinions or tendencies of public opinion whether they tend to be positive or negative. Sentiment analysis is the process of extracting, processing, and understanding data in the form of unstructured text automatically to retrieve sentiment information contained in an opinion sentence or opinion. Sentiment analysis can be applied to opinions in all fields such as economics, politics, society, and law. This Twitter social media opens a window for researchers to study emotions, moods, and public opinion through sentiment analysis (Arsi & Waluyo, 2021).

### Data Mining

There are many definitions of what data mining is. Data mining is a tool that allows users to quickly access large amounts of data. A more specific definition of data mining is a tool and application that uses statistical analysis of data. Data mining is a process of extracting or mining large amounts of data and information, which are previously unknown, but can be understood and useful from large databases and used to make very important business decisions. Data mining describes a collection of techniques

to find unknown patterns in the data that has been collected. Data mining allows users to find knowledge in database data that is impossible for users to know about (Ahmad et al., 2022).

Data Mining is a term used to describe the discovery of knowledge in databases. Data mining is a process that uses statistical, mathematical, artificial intelligence, and machine learning techniques to extract and identify useful information and bound knowledge from various large databases. Based on the understanding of data mining that has been explained above, data mining is knowledge hidden in a database that is processed to find patterns and statistical mathematical techniques, artificial intelligence, and machine learning to extract and identify knowledge information from the database (Utomo & Mesran, 2020).

### Classification

The technique of classification is to look at the variables of the existing data group. Classification aims to predict the class of an object that is not previously known. The classification consists of three stages, namely model building, model application, and evaluation. Model building is building a model using training data that already has attributes and classes. Then, the data is applied to determine the class of new data or objects. After that, the data is evaluated to see the level of accuracy of the construction and application of the model to new data. The classification process consists of two phases, namely the training phase and the testing phase. The training phase is the phase where data is used to build a model while the testing phase is testing the model that has been created with other data to determine the accuracy of the model (Nasution et al., 2019).

### Pre-Processing

This step will use text data resulting from the crawling process and will apply preprocessing techniques to clean and structure the data. Text preprocessing aims to change unstructured data into structured data.

TF-IDF Scoring. The TF-IDF process is carried out to obtain the numeric value of each text to be grouped. The TF-IDF stage starts by calculating the TF value which is the text value based on how often the text appears in the data, followed by the IDF calculation process which focuses on how often the text appears in different data and ends with the multiplication process between the TF and IDF values to obtain the numeric value of each text, so that grouping can be carried out using the Latent Dirichlet Allocation algorithm (Kurniawan, R.R., Zufria, 2022).

### Naïve Bayes Algorithm

Naïve Bayes Classifier is a classification method that is rooted in Bayes' theorem. All variables contained in the Naïve Bayes Classifier equation are considered as independent variables and have no relationship with other variables. The classification method uses probability and statistical methods proposed by British scientist Thomas Bayes, namely predicting future opportunities based on previous experience, so it is known as Bayes' Theorem. The main characteristic of this Naive Bayes Classifier is the very strong (naive) assumption of the independence of each condition/event (Rayuwati et al., 2022).

The following is the general form of Bayes' theorem:

$$P(H|X)^{\wedge} = \frac{p(H|X).P(H)}{P(X)}$$

Keterangan Rumus :

X : Classic data before validation

H : Specific classic data

P(H|X)<sup>^</sup>: Probability based on condition

P(H) : Probability

P(X|H) : Probability condition at hipotesis

P(X) : H Probability

Accuracy is defined when all conditions when predictions are made are correct when predicted. So if the accuracy value is 100%, it indicates that the condition predicts correctly like the original condition. Precision is defined as the accuracy of the system in data classification by calculating the ratio of the number of true positive conditions to all conditions predicted as positive. Recall is the relevance of a

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

system in data classification by calculating the number of true positive conditions to an original positive condition. The F-score defines the average similar value between precision and recall values (Afifah et al., 2023).

### **Flowchart**

A flowchart is defined as a tool used to document, analyze, and design programs. The flowchart helps programmers to understand program flow, code structure, and business processes. Guidelines for making flowcharts if a programmer is going to make a flowchart. (Lake et al., 2019).

### **Phyton**

Python is a high-level programming language created by Guido Van Rossum and released in 1991. Python is also a very popular language lately. In addition, Python is also a multi-functional programming language, one of which is in the fields of Machine Learning and Deep Learning. Machine Learning is a sub-unit of Artificial Intelligence that allows machines to learn independently using data without having to be programmed repeatedly by humans, while Deep Learning is a sub-unit of Machine Learning whose algorithm is inspired by the structure of the human brain called Artificial Neural Networks (Alfarizi et al., 2023).

## **METHOD**

This research uses quantitative methods to analyze sentiment toward the InDriver online motorcycle taxi application using the Naïve Bayes Classifier algorithm. There are several stages of this research, including the following:

### **Research Planning**

The initial steps include collecting data from reviews on the Google Play store. The data will then be carefully processed, including steps such as preprocessing to clean and normalize the text, as well as annotations to assign sentiment labels to each review. Once the data is ready, the next step is to divide the data into a training set and a testing set. A Naïve Bayes model will be trained using a training set to learn patterns from the data and then tested using a test set to measure its performance.

### **Data Collection**

The stage of collecting user review data regarding the InDriver online motorcycle taxi application is carried out through access to the Google Play Store platform using web scraping techniques. In this process, the Python library is used as a tool to automatically extract data from reviews left by users. In total, 1393 reviews will be retrieved by the Google Play Store.

### **Needs Analysis**

To analyze sentiment towards the InDriver online motorcycle taxi application using the Naïve Bayes Classifier method, several requirements or preparations are needed before analyzing, namely collecting review data and user comments using the Python library and the Visual Studio Code application, carrying out preprocessing, TF-IDF weighting, dividing the data into 70 % and 30%, after that, carry out testing using the naïve Bayes classifier algorithm, and carry out evaluations using the confusion matrix to find out the results of this research

### **Visual Studio Code**

At the data processing stage in Visual Studio Code, a series of steps are applied to prepare the dataset for further analysis. The first step is to import the previously collected dataset. Next, a preprocessing process is carried out which includes steps such as cleaning the data from special characters, changing the text to lowercase, tokenization, removing stop words, and other normalization processes so that the data is ready to be used for analysis.

### **Testing**

Training data will be used to train the model while testing data will be used to test the performance of the model that has been trained. The results of this data processing will be the basis for sentiment analysis using the Naïve Bayes Classifier method.

### **Implementation**

After getting the results of the data processing using the Naïve Bayes Classifier method, reprocessing is carried out using the confusion matrix to get the results of accuracy, precision, recall, and f1-score.

The model design consists of naïve Bayes in this research, namely;

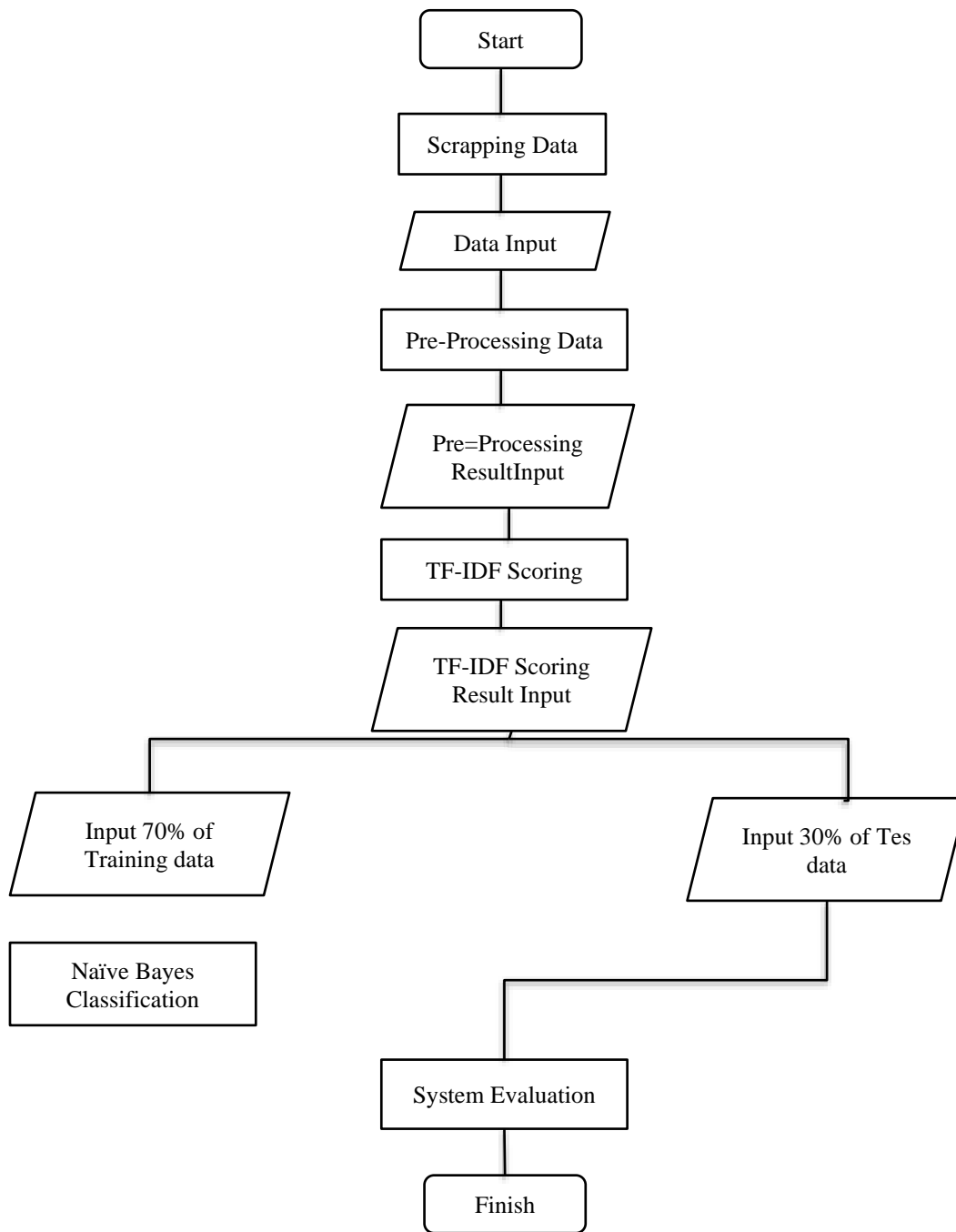


Figure 1. Model design of Naïve Bayes

**RESULT**

The following is a flow that explains the system stages during the data preprocessing process which includes case folding, filtering, tokenizing, slang word conversion, stopwords, and stemming.

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

**Case folding**

This stage is the stage of the conversion process of changing capital letters to lowercase for all existing sentiments.

Table 1. Case folding stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	kalau udah ada autobid baru bisa naikin
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	kenapa ya system sekarang makin buruk
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	semoga akun saya bisa gacor, mengais

1393 rows x 4 columns

**Reduplication Elimination**

At this stage, it will detect the repetition of words in all sentiments. For example, the word 'you're welcome' will be changed to 'same' to minimize redundancy in the analysis process.

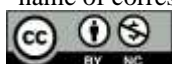
**Filtering**

Read each line of data and detect whether there are letters, numbers, symbols, emojis, and punctuation.

Table 2. Filtering stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system ...
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	Kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	Kalau udah ada autobid baru bisa naikin ...
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	Pembaruan terus tapi makin gak jelas gini ...
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	AUTOBID untuk semua driver, driver need ...
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	Indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	Aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	Kenapa ya system sekarang makin buruk

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	Susah dapat orderan sekarng.. 10 kali ditolak ...
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	Semoga akun saya bisa gacor, mengais rezeki ...

1393 rows x 4 columns

### Tokenizing

Tokenization is the process of breaking text into smaller units, which are usually referred to as "tokens".

Table 3. Tokenizing stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	[tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	[kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	[kalau udah ada autobid baru bisa naikin
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	[pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	[autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	[indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	[aman dan nyaman]
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	[kenapa ya system sekarang makin buruk]
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	[susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	[semoga akun saya bisa gacor, mengais

1393 rows x 4 columns

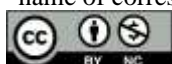
### Normalization

Normalization in the context of sentiment analysis refers to words or phrases that are used in informal conversations and often have special meanings or connotations in certain circles.

Table 4. Normalization stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	kalau udah ada autobid baru bisa naikin
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	indriver cepat merespon

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

1389	Aman dan nyaman	5.0	Positif	aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	kenapa ya system sekarang makin buruk
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	semoga akun saya bisa gacor, mengais

**Removal**

Stopwords are common words that appear frequently in text but tend to have no special meaning or significance in natural language analysis or sentiment analysis. Stopwords usually consist of words such as "and", "or", "in", "to", "the", "this", and the like

Table 5. Removal stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	kalau udah ada autobid baru bisa naikin
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	kenapa ya system sekarang makin buruk
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	semoga akun saya bisa gacor, mengais

1393 rows x 4 columns

**Stemming**

Stemming, which is the process of breaking down word variants into basic words according to the word being processed. For example, the word being processed is Indonesian, to break down word variants into basic words must be by Indonesian language rules or by KBBI. (Isnain et al., 2021)

Stemming is a morphological process in natural language processing that involves removing the beginning or ending of a word to produce the base form or root of a word. The stemming process aims to reduce data dimensions, overcome keywords, and increase accuracy.

Table 6. Stemming stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	kalau udah ada autobid baru bisa naikin

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	kenapa ya system sekarang makin buruk
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	semoga akun saya bisa gacor, mengais

### TF-IDF scoring

This stage is where the scores of all terms (words) are calculated based on the intensity of their appearance in the dataset. The following are the results of the TF-IDF process.

Table 7. TF-IDF scoring stage

	Content	score	label	preprocessing
0	tidak kompeten, tim it tidak jelas, system ...	1.0	Negatif	tidak kompeten, tim it tidak jelas, system
1	Kepada pihakindriver mohonuntuk ...	1.0	Negatif	kepada pihakindriver mohonuntuk ...
2	Kalau udah ada autobid baru bisa naikin ...	1.0	Negatif	kalau udah ada autobid baru bisa naikin
3	Pembaruan terus tapi makin gak jelas gini ...	1.0	Negatif	pembaruan terus tapi makin gak jelas
4	AUTOBID untuk semua driver, driver need ...	5.0	Positif	autobid untuk semua driver, driver
...	...	...	...	...
1388	Indriver cepat merespon	5.0	Positif	indriver cepat merespon
1389	Aman dan nyaman	5.0	Positif	aman dan nyaman
1390	Kenapa ya system sekarang makin buruk	2.0	Negatif	kenapa ya system sekarang makin buruk
1391	Susah dapat orderan sekarng.. 10 kali ditolak ...	1.0	Negatif	susah dapat orderan sekarng.. 10 kali
1392	Semoga akun saya bisa gacor, mengais rezeki ...	5.0	Positif	semoga akun saya bisa gacor, mengais

### Splitting

This stage is the stage where the dataset will be divided into training data and test data. In the analysis carried out, the ratio between training data and test data is 7: 3. In the first dataset there are 1393 data, therefore the training data in the first dataset is 975 while the test data is 418

Table 8. Splitting stage

...	Data Latih	:	975 data
	Data Uji	:	418 data

\*name of corresponding author



This is anCreative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

**Naïve Bayes Process**

The final stage of the analysis carried out was the application of the Naïve Bayes algorithm. The classification process will train the model that was created during the training process to make predictions on predetermined test data

Table 9. Final stage of Naïve Bayes

Akurasi	0.7554479418886199	
[[153	0	35]
[21	0	4]
[41	0	159]

The resulting classification label will be compared with the actual label so that the accuracy, precision, recall, and f1-score values of the model used on the dataset will be known.

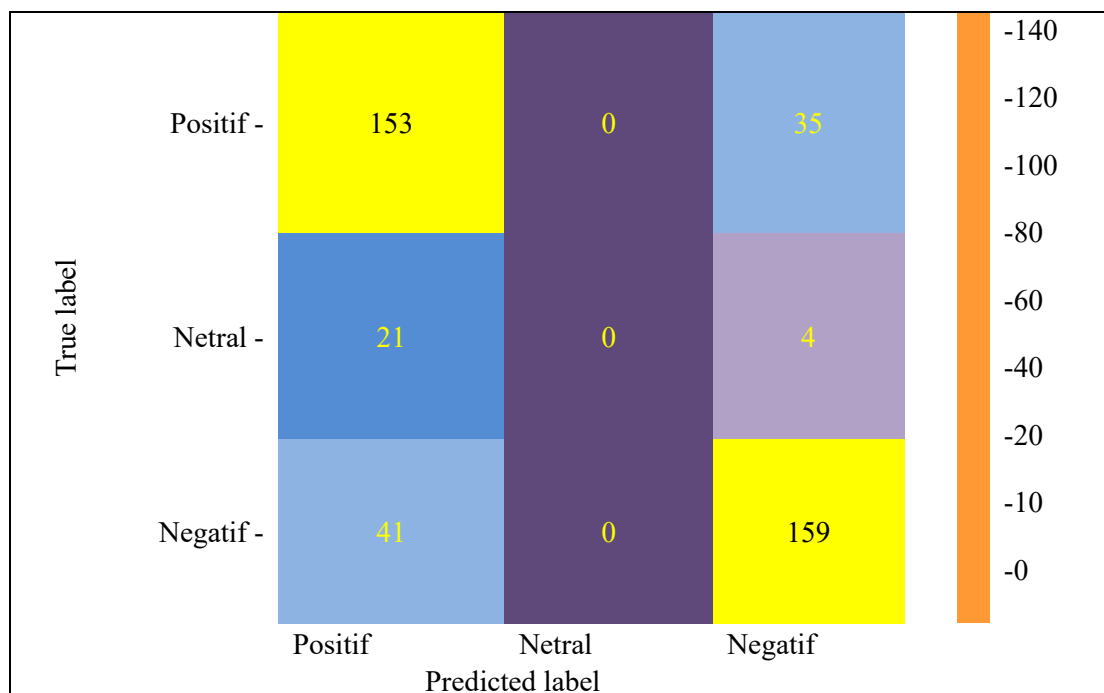


Figure 2. The Resulting classification labels

**DISCUSSION**

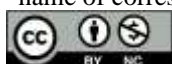
Overall, the above values can be presented in a classification report. The following is a classification report from the analysis process using the Naïve Bayes method.

Table 10. Classification Report

	precision	recall	F1-score	support
Negatives	0.71	0.81	0.76	188
Netral	0.00	0.00	0.00	25
Positif	0.80	0.80	0.80	200
Accuracy			0.76	413
Macro avg	0.50	0.54	0.52	413
Weight avg	0.71	0.76	0.73	413

From the calculation results above, it can be seen that the total number of test data is 805 data the accuracy value is 75%, the precision is 71%, the recall is 81%, f1-score is 76%. This research was conducted to develop a system capable of performing sentiment analysis and categorizing reviews that users post on the Play Store regarding the Indriver application. The method applied in the data

\*name of corresponding author



classification process is the Naïve Bayes Classifier (NBC), with the main focus of this research being to test the level of accuracy of the system that has been built. The results of this study indicate that NBC has succeeded in providing an extraordinary level of accuracy, which will provide a positive contribution for students and researchers in analyzing public views on this topic.

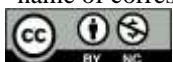
### CONCLUSION

In this research, a dataset obtained from the Play Store application was used using the Python library as a data scrapper, totaling 1393 data. After manual filtering by removing slang words, reduplication, and punctuation, 2937 words were obtained. The application of the Naïve Bayes algorithm in this research is to use the probability method to classify and make predictions on 975 training data and 418 test data using the Python library. The results of calculating the level of accuracy using the Naïve Bayes method for sentiment classification can be said to be good, this can be seen from the accuracy results on a dataset of 1393 with a comparison of training data and test data of 7:3, obtaining an accuracy value of 76%, a precision of 76%. 71%, recall of 81% and f1-score of 76%. The results of this research analysis produce superior positive sentiment totaling 677 and the number of negative sentiment 608 while neutral 90. The amount of training data in the system influences the system's predictions. Apart from the amount of data, the quality of the training data also plays a role because the higher the quality of the data, the system will get a larger vocabulary so that it will be more precise in predicting sentiment classes.

### REFERENCES

- Afifah, T. A., Martiansah, R., Alviyoni, M., & Arifin, A. (2023). Perbandingan Algoritma Klasifikasi C4.5 Dan Naive Bayes untuk Memprediksi Gagal Jantung. *SENTIMAS: Seminar Nasional Penelitian Dan Pengabdian Masyarakat*, 78–85. <https://www.kaggle.com/datasets/fedesoriano/heart-failure-prediction>,
- Ahmad, I., Samsugi, S., & Irawan, Y. (2022). Implementasi Data Mining Sebagai Pengolahan Data. *Jurnal Teknoinfo*, 16(1), 46. <http://portaldata.org/index.php/portaldata/article/view/107>
- Alfarizi, M. R. S., Al-farish, M. Z., Taufiqurrahman, M., Ardiansah, G., & Elgar, M. (2023). Penggunaan Python Sebagai Bahasa Pemrograman untuk Machine Learning dan Deep Learning. *Karya Ilmiah Mahasiswa Bertauhid (KARIMAH TAUHID)*, 2(1), 1–6.
- Arsi, P., & Waluyo, R. (2021). Sentiment Analysis of Discourse on Moving the Indonesian Capital City Using the Support Vector Machine (SVM) Algorithm. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, 8(1), 147. <https://doi.org/10.25126/jtiik.202183944>
- Isnain, A. R., Sakti, A. I., Alita, D., & Marga, N. S. (2021). Sentimen Analisis Publik Terhadap Kebijakan Lockdown Pemerintah Jakarta Menggunakan Algoritma Svm. *Jurnal Data Mining Dan Sistem Informasi*, 2(1), 31. <https://doi.org/10.33365/jdmsi.v2i1.1021>
- Kurniawan, R.R., Zufria, I. (2022). Penerapan Text Mining Pada Sistem Penyeleksian Judul Skripsi Menggunakan Algoritma Latent Dirichlet Allocation(LDA). *Indonesian Journal of Computer Science*, 11(3), 1035–1052. <https://doi.org/10.33022/ijcs.v11i3.3120>
- Lake, I. R., Colón-González, F. J., Barker, G. C., Morbey, R. A., Smith, G. E., & Elliot, A. J. (2019). Machine learning to refine decision making within a syndromic surveillance service. *BMC Public Health*, 19(1), 1–12. <https://doi.org/10.1186/s12889-019-6916-9>
- Nasution, D. A., Khotimah, H. H., & Chamidah, N. (2019). Perbandingan Normalisasi Data untuk Klasifikasi Wine Menggunakan Algoritma K-NN. *Computer Engineering, Science and System Journal*, 4(1), 78. <https://doi.org/10.24114/cess.v4i1.11458>

\*name of corresponding author



This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

- Nuria, D. P., Enri, U., & Umaidah, Y. (2024). Analisis Sentimen Maxim dengan Perbandingan Chi Square dan MI pada Naive Bayes. *Jurnal Pendidikan Tambusai*, 8, 16070–16081. <https://www.jptam.org/index.php/jptam/article/view/14669>
- Rayuwati, Husna Gemasih, & Irma Nizar. (2022). IMPLEMENTASI ALGORITMA NAIVE BAYES UNTUK MEMPREDIKSI TINGKAT PENYEBARAN COVID. *Jurnal Riset Rumpun Ilmu Teknik*, 1(1), 38–46. <https://doi.org/10.55606/jurritek.v1i1.127>
- Roihan, A., Sunarya, P. A., & Rafika, A. S. (2020). Pemanfaatan Machine Learning dalam Berbagai Bidang: Review paper. *IJCIT (Indonesian Journal on Computer and Information Technology)*, 5(1), 75–82. <https://doi.org/10.31294/ijcit.v5i1.7951>
- Runimeirati, Abdul Muis, & Figur Muhammad. (2023). Pelatihan Text Mining Menggunakan Bahasa Pemrograman Python. *Abdimas Langkanae*, 3(1), 36–46. <https://doi.org/10.53769/abdimas.3.1.2023.83>
- Sitorus, P. R. (2021). *Analisis Sentimen Data Ulasan Aplikasi Indriver pada Situs Google Play Menggunakan Metode Naive Bayes Classifier dan Support Vector Machine (Doctoral dissertation)*. Universitas Sumatera Utara.
- Utomo, D. P., & Mesran, M. (2020). Analisis Komparasi Metode Klasifikasi Data Mining dan Reduksi Atribut Pada Data Set Penyakit Jantung. *Jurnal Media Informatika Budidarma*, 4(2), 437. <https://doi.org/10.30865/mib.v4i2.2080>