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Intelligent Sentiment Mapping on Instagram for Finance Minister Purbaya Yudhi Sadewa Based on Logistic Regression

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Abstract

Instagram is one of the social media platforms used by the public to express opinions on government policies and public figures. This study focuses on the sentiment analysis of netizens' comments on the Minister of Finance of the Republic of Indonesia, Purbaya Yudhi Sadewa, who replaced Sri Mulyani Indrawati in September 2025. The research data consisted of 1,277 comments crawled from Instagram. The data processing stage included text preprocessing, labeling using a lexicon-based approach, and feature extraction with Term Frequency – Inverse Document Frequency (TF-IDF). Sentiment classification was performed using the Logistic Regression algorithm, while model performance evaluation used a confusion matrix, classification reports, and the ROC-AUC Curve. The test results showed an accuracy of 91.4% with a macro f1-score of 0.92. In the positive class, a precision of 0.89, a recall of 0.85, and an f1-score of 0.87 were obtained. The negative class obtained a precision of 0.88, a recall of 0.91, and an f1-score of 0.90. The neutral class performed perfectly, with precision, recall, and an f1-score of 1.00 each. The macro-average ROC-AUC value reached 0.985, indicating excellent model performance. The sentiment distribution was predominantly neutral (42.2%), followed by negative (33.2%) and positive (24.6%). This study provides an objective overview of public perception, with neutral opinions predominating, while criticism outweighed appreciation

Keywords: *Sentiment Analysis, Logistic Regression, Instagram, Public Opinion.*

1. Introduction

Sentiment analysis is the process of identifying and assessing a person's opinions, emotions, or attitudes towards a topic, product, or public figure based on text data, such as comments on social media, online reviews, or forums [1]-[2]. The main purpose of sentiment analysis is to find out whether public opinion is positive, negative, or neutral [3]. This method is very useful for understanding the public's perception objectively of government policies or the performance of public officials. In today's digital era, social media has become one of the main platforms for people to express their opinions, experiences, and opinions on various issues, including public policy and the performance of government officials. Instagram, as one of the popular social media, has millions of active users who regularly share content, comments, and responses to news and public figures [4]. This phenomenon shows that public opinion on social media can be a reflection of public perception of government policies and decisions.

Purbaya Yudhi Sadewa is an economist and engineer from Indonesia who currently serves as the Minister of Finance of the Republic of Indonesia since September 8, 2025. She replaced Sri Mulyani Indrawati in the cabinet reshuffle announced by President Prabowo Subianto [5]-[6]. Born in Bogor on July 7, 1964, Purbaya completed his undergraduate education in Electrical Engineering at the Bandung Institute of Technology (ITB). Later, he continued his studies in the United States and earned his Master of Science (MSc) and Doctorate in Economics from Purdue University, Indiana[7]-[8]. Purbaya Yudhi Sadewa was the Minister of Finance of Indonesia who replaced Sri Mulyani Indrawati, a figure who was previously widely known for his success in fiscal management and tax reform [9]. As a new figure in this position, Purbaya is in the public spotlight because every policy and financial decision will have a direct impact on the country's economy. Purbaya's presence triggered various opinions in the community, especially on social media such as Instagram, so that there was a need to analyze public sentiment on his performance and steps as Minister of Finance. The novelty of this research lies in the focus of analyzing public sentiment on Instagram towards the Minister of Finance Purbaya Yudhi Sadewa, the new figure who replaced Sri Mulyani Indrawati. Until now, there has been no research that specifically discusses public opinion related to the policies and performance of the latest Minister of Finance, so this research presents an up-to-date perspective that is relevant to current socio-economic conditions.

The use of the Logistic Regression method in analyzing comments, likes, and words in posts is becoming a new aspect, as it provides a clear interpretation of probabilities between independent and dependent variables (positive, negative, or neutral sentiment) [10]. Logistic Regression is a machine learning method to predict the categories of data, such as positive, negative, or neutral sentiment, based on input variables [11]-[12]. This method calculates the probability of events and converts them into category outputs, making them effective for

analyzing categorical and easy-to-interpret data. Thus, this study not only produces a classification of sentiment, but also provides quantitative insight into public perception of the latest Finance Minister's policies, something that has not been discussed much in previous studies [13].

It is hoped that this research can provide an objective picture of public perception on social media of the performance and policies of the Minister of Finance Purbaya Yudhi Sadewa. The results of this sentiment analysis can be a reference for the government or related parties in understanding public opinion and as a basis for consideration to develop policies that are more targeted. In addition, this research is also expected to be an academic reference for future research that discusses new public figures or the use of the Logistic Regression method in the analysis of public opinion.

2. Literature Review

2.1 Sentimen Analysis

Sentiment analysis is a technique in natural language processing that is used to identify and classify opinions in texts into categories such as positive, negative, or neutral. This method is often applied to data from social media, product reviews, and news to understand the public's perception of a topic or entity. Various approaches have been developed, including lexicon-based methods and machine learning [14]. The research conducted by Lawrence and Adhikari in 2023, they discussed the application of machine learning models for sentiment analysis in various fields, such as social media, consumer reviews, healthcare, and banking, as well as pre-processing and data collection techniques used in sentiment analysis.

2.2 Meachine Learning

Machine learning is a branch of artificial intelligence that allows systems to learn from data and improve its performance without being explicitly programmed [15]. In the context of sentiment analysis, machine learning is used to build models that can classify texts based on the emotions or opinions contained in them. Methods such as Support Vector Machine (SVM), Naive Bayes, and Random Forest are often used in sentiment analysis to achieve high accuracy. For example, in a study by Saifullah in 2021, they compared different machine learning methods in detecting anxiety based on social media data, showing that Random Forest provides the best accuracy in sentiment classification [16].

2.3 Minister of Finance

Sri Mulyani Indrawati served as Indonesia's Minister of Finance in three government periods: 2005–2010, 2016–2019, and 2019–2025. During his tenure, he was known as a technocrat who successfully organized the country's tax and financial system, as well as led Indonesia through the global economic crisis and the COVID-19 pandemic [17]. On September 8, 2025, Sri Mulyani was replaced by Purbaya Yudhi Sadewa in a cabinet reshuffle led by President Prabowo Subianto. This decision was taken after a series of nationwide protests related to economic inequality and benefits of legislators that sparked public dissatisfaction.

Purbaya Yudhi Sadewa, an economist and engineer who graduated from ITB and Purdue University, was inaugurated as Minister of Finance on September 8, 2025 [18]. Previously, he served as the Head of the Deposit Insurance Corporation (LPS) and has experience in the banking and capital market sectors. His inauguration was greeted with renewed hope, but also raised concerns about his limited fiscal experience. In the first two weeks of his tenure, Purbaya issued various policies to encourage economic growth, including increased liquidity and tax system reform

3. Research Methodology

3.1 Research Flow Diagram

The research flow chart is prepared to systematically describe the stages carried out in the analysis process, starting from data collection, pre-processing, sentiment labeling, feature extraction, to classification and evaluation stages. With this flowchart, the research flow becomes clearer, structured, and easier to understand. The research flow chart can be seen in Figure 1 below.

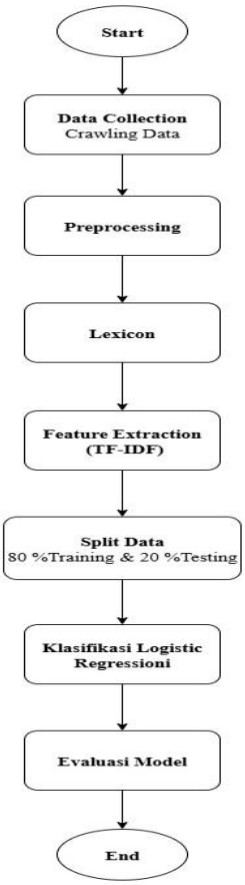

Fig. 1: Research Flow Diagram

3.2 Data Collection

The research data was collected through a crawling process on Instagram using keywords and hashtags related to the performance of Finance Minister Purbaya Yudhi Sadewa, such as #PurbayaYudhiSadewa and #MenteriKeuangan, so that 1,277 public comment data were obtained. Each data includes the comment ID, the content of the comment, the date of the upload, and the username (without publishing personal data). Furthermore, the data undergoes pre-processing in the form of text cleansing from emojis, URLs, and special characters, normalization of letters, and tokenization of words, so that it is ready to be analyzed using Logistic Regression to determine public sentiment.

3.3 Preprocessing/Cleaning

Before sentiment analysis is carried out, comment data that has been collected from Instagram must go through a preprocessing or cleaning stage to ensure that the text is clean, consistent, and ready to be processed by the algorithm. This stage includes the following steps:

1. Lowercasing, the entire text is changed to lowercase to standardize the writing format.
2. Removal of punctuation, symbols and punctuation is removed so as not to interfere with the analysis process.
3. Number Removal, all characters in the form of numbers are removed because they are not relevant to sentiment analysis.
4. Tokenizing, comments are broken down into word units (tokens) so that they are easier to process.
5. Stopword Removal, common words that have no significant meaning (such as "and", "yang", "di") are removed using the Indonesian stopword list.
6. Stemming, each word is returned to its basic form, e.g. "walk" becomes "way", to simplify the representation of the word.

This preprocessing stage produces more structured and clean data, making it easier for the Logistic Regression algorithm to classify the sentiment of public comments.

3.4 Lexicon

This stage is used to automatically label sentiment on Instagram comment data with a lexicon-based approach. This research builds a simple sentiment dictionary consisting of two main categories, namely positive (for example: good, steady, great, proud, support, believe, optimistic, cool, advanced, top, good, agree, enthusiastic, champion) and negative (for example: bad, doubtful, debt, puppet, zonk, sad, criticism, disappointed, help, weak, broken, failed, wrong, ugly). Each comment that has gone through the preprocessing stage is then compared to the list of words in the dictionary. If a comment contains more positive words then it is labeled positive, on the other hand if there are more negative words it is labeled negative, and if it does not contain both then it is labeled neutral.

3.5 Feature Extraction (TF-IDF)

At this stage, a feature extraction process is carried out to convert the processed comment text into a numerical form so that it can be understood by machine learning algorithms. The method used is Term Frequency – Inverse Document Frequency (TF-IDF), which is a word weighting technique that considers the frequency of occurrence of words in a document (comment) and its rarity across the entire document set [19]. Using TF-IDF, words that appear frequently but are not very informative, such as common words, will have a low

weight, while words that appear infrequently but have important meanings will gain high weight. In this study, each comment that has gone through preprocessing is then extracted using TfidfVectorizer with a maximum number of 1,000 features, resulting in a vector representation that is ready to be used in the sentiment classification stage using the Logistic Regression algorithm.

3.6 Classification of Logistic Regression

This stage is a classification process using the Logistic Regression method which functions to predict sentiment classes based on data that has gone through the feature extraction stage with TF-IDF. This model works by calculating the probability of each class (positive, negative, or neutral) based on the weight of words in the data, so that optimal classification results are obtained for public opinion obtained from social media.

3.6 Evaluation of the Confusion Matrix

The evaluation stage was carried out using the Confusion Matrix to measure the performance of the Logistic Regression classification model. With this evaluation, researchers can see the extent to which the model is able to distinguish sentiment precisely and consistently [20].

4. Result and Discussion

This chapter presents the results of the research that has been carried out, starting from the data processing process to analysis using predetermined methods. Each stage of the research is explained in detail, including the results of pre-processing data, sentiment labeling, feature extraction, and the application of classification algorithms. In addition, discussions were held to interpret the results obtained so that they could provide a clear picture of the performance of the methods used in sentiment analysis.

4.1 Data Collection

The data used in this study is in the form of comments posted by Instagram users regarding the performance of the Minister of Finance. The data was obtained through a crawling process and collected 1,277 raw comment data. From the overall data, the attributes used for processing are in the comment text section. After the data is collected, a sentiment determination process is carried out based on the meaning contained in the comment, which is then categorized into positive, negative, or neutral sentiment. The crawling results can be seen in Table 1.

Table 1. Sample Crawling Results

This policy is information, different from Mrs. Sri Mulyani #purbaya #indonesia
Purbaya as Minister of Finance is a debt, let's see in the future #opini #kritik ☹
This policy is optimistic, different, and different, BuSriMulyani#opinion 👆
I think the failure of fiscal policy will change #kabinet #perubahan
This replacement Minister of Finance is great, hopefully the trust #berita #purbaya #perubahan
I think it would be a good idea for Yudhishthira Shaykh to be the Minister of Finance#berita #kabinet

4.2 Preprocessing/Cleaning

At this stage, the raw comment data totaling 1,277 successfully went through the preprocessing process or data cleansing. This process includes normalizing text such as lowering the letters to lower, removing punctuation and numbers, followed by tokenizing, removing stopwords, and stemming. The results of the data cleaning process can be seen in Figure 2 and Figure 3.

	komentar	cleaned
0	Kebijakan ini informasi, beda sama Bu Sri Muly...	kebijakan ini informasi beda sama bu sri mulya...
1	Kalau dilihat dari track record, dia support s...	kalau dilihat dari track record dia support si...
2	Ada yang bilang keputusan ini percaya, tapi sa...	ada yang bilang keputusan ini percaya tapi say...
3	Purbaya sebagai Menkeu itu utang, kita lihat s...	purbaya sebagai menkeu itu utang kita lihat sa...
4	Pilihan Presiden ini bagus, rakyat harus dukun...	pilihan presiden ini bagus rakyat harus dukung...
...	...	...
1272	Menteri Keuangan pengganti ini top, semoga ama...	menteri keuangan pengganti ini top semoga aman...
1273	Ada yang bilang keputusan ini gagal, tapi saya...	ada yang bilang keputusan ini gagal tapi saya ...
1274	Banyak orang bilang percaya, aku masih mikir-m...	banyak orang bilang percaya aku masih mikirmik...
1275	Pilihan Presiden ini informasi, rakyat harus d...	pilihan presiden ini informasi rakyat harus du...
1276	Pilihan Presiden ini netral, rakyat harus duku...	pilihan presiden ini netral rakyat harus dukun...

1277 rows × 2 columns

Fig. 2: Phase 1 Data Cleansing Results

	komentar	cleaned	processed
0	Kebijakan ini informasi, beda sama Bu Sri Muly...	kebijakan ini informasi beda sama bu sri mulya...	bijak informasi beda bu sri mulyani purbaya in...
1	Kalau dilihat dari track record, dia support s...	kalau dilihat dari track record dia support si...	track record support sih berita purbaya
2	Ada yang bilang keputusan ini percaya, tapi sa...	ada yang bilang keputusan ini percaya tapi say...	bilang putus percaya kabinet rakyat ekonomi
3	Purbaya sebagai Menkeu itu utang, kita lihat s...	purbaya sebagai menkeu itu utang kita lihat sa...	purbaya menkeu utang lihat opini kritik
4	Pilihan Presiden ini bagus, rakyat harus dukun...	pilihan presiden ini bagus rakyat harus dukung...	pilih presiden bagus rakyat dukung update mulyani
...	...	...	...
1272	Menteri Keuangan pengganti ini top, semoga ama...	menteri keuangan pengganti ini top semoga aman...	menteri uang ganti top moga amanah berita
1273	Ada yang bilang keputusan ini gagal, tapi saya...	ada yang bilang keputusan ini gagal tapi saya ...	bilang putus gagal ubah ekonomi kabinet
1274	Banyak orang bilang percaya, aku masih mikir-m...	banyak orang bilang percaya aku masih mikirmik...	orang bilang percaya mikirmikir ubah kritik
1275	Pilihan Presiden ini informasi, rakyat harus d...	pilihan presiden ini informasi rakyat harus du...	pilih presiden informasi rakyat dukung menkeu
1276	Pilihan Presiden ini netral, rakyat harus duku...	pilihan presiden ini netral rakyat harus dukun...	pilih presiden netral rakyat dukung berita kab...

1277 rows × 3 columns

Fig. 3: Phase 2 Data Cleansing Results

4.3 Lexicon

At this stage, comment data that has gone through a cleaning process is then labeled with sentiment using a lexicon-based approach. By utilizing a predetermined list of positive and negative words, each comment is labeled according to the meaning of the words contained in it. The results of this process show that there are three categories of sentiment, namely positive, negative, and neutral, which will be the basis in the next stage of classification. The results of the lexicon process can be seen in Figure 4.

	processed	label
0	bijak informasi beda bu sri mulyani purbaya in...	netral
1	track record support sih berita purbaya	positif
2	bilang putus percaya kabinet rakyat ekonomi	positif
3	purbaya menkeu utang lihat opini kritik	negatif
4	pilih presiden bagus rakyat dukung update mulyani	positif
5	dar opini purbaya yudhi sadewa menteri uang up...	netral
6	turut netral moga ekonomi mulyani update	netral
7	menteri uang ganti tunggu moga amanah kritik m...	negatif
8	purbaya yudhi sadewa menteri uang kritik politik	negatif
9	turut utang moga ekonomi indonesia rakyat purbaya	negatif
10	bijak support beda bu sri mulyani mulyani poli...	positif
11	purbaya menkeu juara lihat dukung	positif
12	turut moga ekonomi kabinet update	netral
13	kebijakaninioptimisbedasamabusrimulyaniopini	netral
14	track record hebat sih opini	positif
15	maju bijak fiskal ubah ubah dukung indonesia	positif
16	pilih presiden utang rakyat dukung dukung	negatif
17	pilih presiden tunggu rakyat dukung mulyani be...	netral
18	bijak informasi beda bu sri mulyani update pol...	netral
19	menteri uang ganti percaya moga amanah indones...	positif

Fig. 4: Results of Lexicon Implementation

4.5 Feature Extraction (TF-IDF)

At this stage, the labeled comment data is then converted into numerical form using the *Term Frequency–Inverse Document Frequency* (TF-IDF) method. This process generates a vector representation of each word in the comment so that it can be used as a feature on the classification model. The results can be seen in Figure 5.

	track	tuju	tunggu	turut	uang	ubah	update	utang	yudhi	zonk
0	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.0	0.0
1	0.413	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.0	0.0
2	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.0	0.0
3	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.598	0.0	0.0
4	0.000	0.0	0.0	0.0	0.000	0.000	0.347	0.000	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...
1272	0.000	0.0	0.0	0.0	0.293	0.000	0.000	0.000	0.0	0.0
1273	0.000	0.0	0.0	0.0	0.000	0.336	0.000	0.000	0.0	0.0
1274	0.000	0.0	0.0	0.0	0.000	0.323	0.000	0.000	0.0	0.0
1275	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.0	0.0
1276	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.0	0.0

[1277 rows x 194 columns]

Fig. 5: TF-IDF Results

4.5 Evaluation of the Confusion Matrix

The results of the classification model evaluation are shown through a confusion matrix which shows a comparison between the model's prediction and the actual label. From this matrix, it can be seen the amount of data that has been predicted correctly and incorrectly, so that it is a measure of the level of accuracy and performance of the model. The results can be seen in Figure 6.

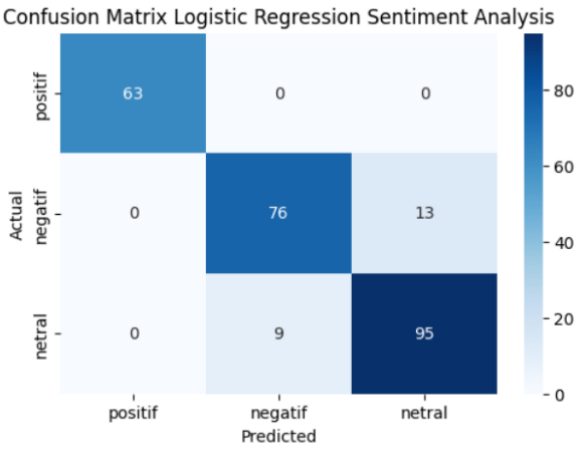

Fig. 6: Evaluation of the Confusion Matrix Model

Figure 6 shows the confusion matrix of the classification results using the Logistic Regression method on the sentiment analysis of Instagram comments. From the images, it can be seen that in the positive class, the model managed to correctly predict as many as 63 data without any prediction errors. In the negative class, there are 76 data that are predicted to be correct, but there are still 13 data that are

incorrectly predicted as neutral. Meanwhile, in the neutral class, the model correctly predicted 95 data, although there were 9 data that were incorrectly predicted as negative. Overall, this confusion matrix illustrates that the model is able to classify sentiment with a fairly good level of accuracy, although there are still misclassifications, especially in negative and neutral classes.

Accuracy: 0.9140625

	precision	recall	f1-score	support
positif	0.89	0.85	0.87	89
negatif	0.88	0.91	0.90	104
netral	1.00	1.00	1.00	63
accuracy			0.91	256
macro avg	0.92	0.92	0.92	256
weighted avg	0.91	0.91	0.91	256

Fig. 7: Classification Report

Figure 7 The results of the sentiment classification evaluation show that the model achieved an accuracy of 91.4%, with good performance in each class. The positive class had a precision of 0.89, a recall of 0.85, and an f1-score of 0.87 from a total of 89 test data, while the negative class obtained a precision of 0.88, a recall of 0.91, and an f1-score of 0.90 from 104 test data. Meanwhile, the neutral class showed perfect results with precision, recall, and f1-score of 1.00 each on 63 test data. The macro average reached 0.92 and the average was weighted 0.91, indicating that the model was able to classify sentiment in a balanced and consistent manner despite the different amounts of data for each class.

4.7 Roc Curve Logistic Regression

At this stage, the performance of the Logistics Regression model is further evaluated using the Receiver Operating Characteristic (ROC) Curve. This graph shows the relationship between True Positive Rate (TPR) and False Positive Rate (FPR) values, so it can illustrate the model's ability to distinguish between each sentiment class. The results can be seen in Figure 8.

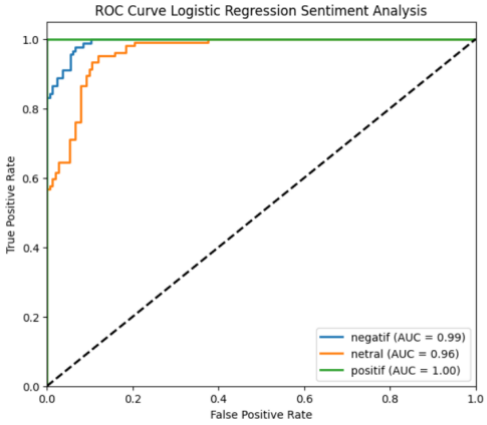

Fig. 8: Roc Curve Logistic Regression

Figure 8 shows the ROC (Receiver Operating Characteristic) curve as a result of classification using the Logistic Regression method in sentiment analysis. The graph shows the model's performance in distinguishing positive, negative, and neutral classes. The AUC (Area Under Curve) values obtained for each class are 0.99 on negative sentiment, 0.96 on neutral sentiment, and 1.00 on positive sentiment. This indicates that the model has an excellent ability to separate data between sentiment classes. Overall, the ROC-AUC Score (macro-average) value of 0.985 indicates that the Logistic Regression model used has a very high classification performance and is able to distinguish the three sentiment labels with near-perfect accuracy.

4.8 Word Cloud- All Comments

To provide a visual representation of the data, Word Cloud was created that displayed the most frequently appearing words from all comments. This visualization helps identify the dominant keywords that are widely used by users in providing responses. The results can be seen in Figure 9.

Fig. 9: Word Cloud- All Comments

Figure 9 shows Word Cloud depicting the word distribution of all the analyzed comments, where the word size indicates the level of frequency. It can be seen that the words purbaya, minister of finance, glorious, people, wise, and support dominate, indicating that the public conversation is mostly focused on the figure and position of the Minister of Finance as well as the issue of support and policies that are considered wise. In addition, words such as criticism, change, and debt also appear that reflect a critical view of policy, while the words moga, amanah, and enthusiasm show positive support and hope. Thus, Word Cloud reflects a variety of public opinions that include appreciation, criticism, and expectations for the government's role in the economic and political fields.

4.8 Sentiment Comparison

At this stage, a comparative analysis of sentiment classification results was carried out on comments obtained from Instagram. Visualizations in the form of graphs are used to show the distribution of the proportions of each sentiment, i.e. positive, negative, and neutral. This comparison aims to provide a clearer picture of the tendency of public opinion and the proportion of sentiment dominance to the performance of the Minister of Finance. The results of the sentiment comparison can be seen in Figure 10.

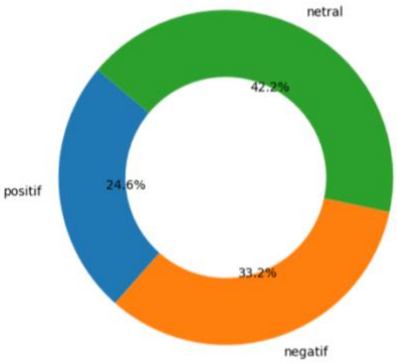

Fig. 10: Sentiment Comparison

Figure 10 shows the results of the sentiment comparison from the prediction using the Logistic Regression method visualized in the form of a doughnut diagram. From these results, it can be seen that comments with neutral sentiment dominate by 42.2%, followed by negative sentiment by 33.2%, and positive sentiment by 24.6%. This indicates that the majority of the comments analyzed tend to be neutral or descriptive without a strong emotional charge, while negative comments are more than positive, indicating a relatively higher level of criticism or dissatisfaction than appreciation or support.

5. Conclusion

The results of this study indicate that sentiment analysis of Instagram user comments regarding Finance Minister Purbaya Yudhi Sadewa using the Logistic Regression method can produce accurate and informative classification results. From a total of 1,277 comments collected through web crawling, preprocessing stages such as case folding, tokenizing, stopword removal, and stemming were performed to prepare the data for analysis. Sentiment was determined using a lexicon approach and categorized into three classes: positive, negative, and neutral. The developed Logistic Regression model demonstrated excellent performance with an accuracy rate of 91.4% and an ROC-AUC value of 0.985, indicating a high ability to differentiate the three sentiment categories. Overall, this study demonstrates that Logistic Regression can be effectively applied in intelligent sentiment mapping on social media. Based on the analysis, comments with neutral sentiment dominated at 42.2%, followed by negative at 33.2%, and positive at 24.6%. Word cloud visualizations show that public discussion focused heavily on Purbaya Yudhi Sadewa's policies, performance, and personal character, with words such as "wise," "support," "criticism," and

"debt" appearing frequently. Thus, this study provides a comprehensive overview of public perception of the Minister of Finance in the digital realm and demonstrates the potential for applying machine learning to analyze public opinion more broadly.

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