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ANALYSIS OF PUBLIC SENTIMENT TOWARDS NATURALIZED PLAYERS IN THE INDONESIAN NATIONAL TEAM USING THE NAÏVE BAYES METHOD

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Abstract

The increasing number of naturalized Indonesian national team players in the Garuda squad has triggered various reactions and opinions among the public, both pro and con. This study aims to identify and classify these sentiments, whether positive, negative, or neutral. The method used in this study is to use Naive Bayes because of its excellent ability to classify text based on the probability of word occurrence. In order to obtain more accurate results, several preprocessing stages need to be carried out through several steps, namely cleaning, case folding, normalization, stopword removal, tokenizing, and stemming on the data to be processed for maximum results from each stage. The results of the study showed that the majority of public sentiment tends to be more neutral towards the contribution of naturalized Indonesian national team players. To determine the percentage of results from the specified classification, a Confusion Matrix will be used. The results of the classification process using the Naive Bayes method produce data into 3 types, namely 33 positive classes, 357 neutral classes, and 13 negative classes with an accuracy value of 89%, precision 63%, recall 34%, and f1-score 33%. This sentiment analysis provides an overview of public comments regarding the presence of naturalized Indonesian national team players regarding public acceptance of the naturalization policy and can be input for PSSI in making decisions regarding the development of the national team in the future in order to improve the quality of the national team in the future.

Keywords: Naïve Bayes; Naturalization; Sentiment; Confusion Matrix

Abstrak

Peningkatan jumlah pemain naturalisasi timnas Indonesia dalam skuad Garuda telah memicu beragam reaksi dan opini di kalangan publik, baik pro maupun kontra. Penelitian ini bertujuan untuk mengidentifikasi dan mengklasifikasikan sentimen tersebut baik berupa sentimen positif, negatif, atau netral. Metode pada penelitian yang di lakukan ialah menggunakan Naive Bayes karena kemampuannya sangat baik dalam mengklasifikasi teks berdasarkan probabilitas kemunculan kata. Agar mendapatkan hasil yang lebih akurat, maka perlu dilakukan beberapa tahapan preprocessing dengan melalui beberapa langkah yaitu cleaning, case folding, normalisasi, stopword removal, tokenizing, dan stemming terhadap data yang akan diolah untuk hasil yang maksimal dari setiap tahapannya. Hasil penelitian menunjukkan bahwa mayoritas sentimen masyarakat cenderung lebih ke netral terhadap kontribusi pemain naturalisasi timnas indonesia. Untuk menentukan persentase hasil dari klasifikasi yang ditentukan, akan digunakan Confusion Matrix. Hasil proses klasifikasi menggunakan metode Naive Bayes menghasilkan data menjadi 3 jenis yaitu 33 kelas positif, 357 kelas netral, dan 13 kelas negatif dengan nilai akurasi 89%, precision 63%, recall 34%, dan f1-score 33%. Analisis sentimen ini memberikan gambaran terhadap komentar masyarakat dengan adanya pemain naturalisasi timnas Indonesia mengenai penerimaan publik terhadap kebijakan naturalisasi dan dapat menjadi masukan bagi PSSI dalam mengambil keputusan terkait pengembangan timnas di masa depan guna meningkatkan kualitas timnas kedepannya.

Kata kunci: Naïve Bayes, Naturalisasi, Sentimen, Confusion Matrix

INTRODUCTION

One of the sports that has received media attention is football (Abimanyu, Dwifebri, and Astuti 2023). The popularity of football as one of the main sports in Indonesia has received considerable attention in the mass media (Fakhrezi, Adian Fatchur Rochim, and Dinar Mutiara Kusomo Nugraheni 2023). With a large population, Indonesia has a high enthusiasm for the sport,(Prakoso, Muliawati, and Isnainiyah 2022) which includes various layers of society regardless of age (Suryani, Linawati, and Saputra 2019). In fact, Indonesia is one of the countries with the highest level of love for football in the world with 77 percent, as stated by the chairman of the PSSI Ad-Hoc Team, Dr. Ir. Agus Ambo Djiwa M P This enthusiasm is reflected in public participation in watching football matches,(Nugraha, Purbolaksono, and Astuti 2023) both on a local, national and international scale, especially when the Indonesian national team competes (Ramadhan and Setiawan 2019).

On the one hand, some people support this policy because they consider it a realistic effort to improve the performance of the national team (Jafar Sidiq and Nur Rachman 2023) . They believe that naturalized players, who generally have more international experience, can have a positive impact on team play (Sri Rahayu et al. 2024). On the other hand, some people think that this policy can hinder the development of local players and damage the identity of the national team as a representation of the country (Ningrum 2024). The existence of these different views makes public sentiment towards naturalized players an interesting topic for further research (Rahman et al. 2023).

Sentiment analysis is the process of analyzing a person's opinion based on events that are happening (Helena and Panjaitan 2025), be it positive or negative (Pravina 2022). Usually in sentiment analysis, the value in sentiment analysis is divided into three, namely positive, negative, and neutral(Azhar et al. 2020). So that in the data division process, positive sentiment and negative sentiment can be found (Sholeha et al. 2022). The purpose of sentiment analysis is to assess emotions and opinions about a product, or service (Sari et al. 2024). Sentiment analysis is widely used because it has advantages in data processing speed because this sentiment analysis can be done automatically so it does not take a long time(Styawati et al. 2021). With this study, researchers can understand people's views on the impact of naturalized players on the Indonesian national team (Al Fath, Arini, and Hakiem 2020) . Sentiment analysis can provide valuable insight into the level of concern, dissatisfaction, or even support for the naturalized player (Tanggu Mara, Sediyono, and Purnomo 2021).

The results of research conducted by (Prasetyo and Cimahi n.d.2025). state that based on the review data to be tested which is labeled manually using the Naïve Bayes method, the resulting accuracy value will be a benchmark for finding the best tester model for sentiment classification cases. It is known that the data used amounted to 220 with 110 negative data classified 85 data declared negative as predicted and 25 data predicted positive but the results were negative, as well as 110 positive data classified 92 as predicted and 18 data predicted negative but the results were positive (Sudirjo et al. 2023). Based on the calculation results, the accuracy value obtained is 80.45%.

The naturalization of foreign football players for the Indonesian national team has generated both pros and cons in society, reflected in comments on YouTube. This study aims to analyze netizen sentiment using the Naive Bayes algorithm. Data was taken from 509 comments and analyzed using RapidMiner. The best results were obtained after a single test, with an accuracy of 72.55%, a precision of 83.58%, and a recall of 76.71%. The majority of comments were positive toward naturalization, with 268 entries labeled positive and 80 labeled negative.

These findings demonstrate the effectiveness of Naive Bayes in classifying social media sentiment and indicate public support for the player naturalization policy.

The difference between previous research and this one is that the author will use comments about national team players taken from the comment section. In this study, (Manullang and Prianto 2023)the author uses three categories: positive, negative, and neutral.(Atha Anastasya et al. 2024) The author will classify them using the Naive Bayes method. Furthermore, the results of this study can also provide input for policymakers to understand public response and consider the social impact of each policy.

RESEARCH METHODS

A research framework is a systematic plan or guide that guides and organizes the entire research process. It includes the strategies and methodologies that the researcher will use to collect, analyze and interpret data, and ensures that the research is conducted in a logical, structured and repeatable manner. The research framework

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provides a theoretical and operational foundation for the study and helps the researcher continue to carry out his or her initial objectives, as well as minimize bias and error.

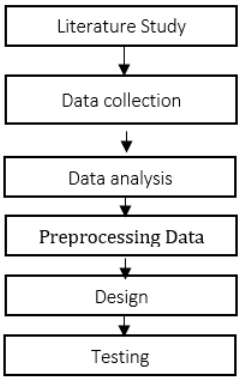

Figure 1. Research Framework

The framework helps the researcher organize the findings in the form of reliable and testable conclusions. It is clear that the research framework is an essential element of any research that helps ensure that the research will be conducted to the highest possible standard and will have a meaningful impact on science or practice.

Literature Study

Literature review is the process of researching and reviewing existing books, articles, journals and other information sources to understand what is already known about a topic. The main objective is to find out what has already been researched, discover key ideas, and identify areas that still need further research. This study helps researchers get a complete picture of the topic being studied and ensures any new research conducted has a solid foundation. It also helps researchers to avoid duplicating existing research, as well as to formulate more precise and evidence-based research questions.

Time and Place of Research

This research is centered on analyzing public sentiment towards naturalized players in the Indonesian national team, while the media is used as a place for data collection, namely the Twitter platform which has hashtags or discussions about the Indonesian national team naturalized players.

Research Target / Subject

Data collection is a systematic process of gathering information or data needed to answer research questions, validate hypotheses, or assess research results. This data can be quantitative (numbers and statistics) or qualitative (descriptions and observations). The main purpose of data collection is to collect accurate information that can be verified, so that research findings can be trusted and used to create informative reports. the data collection techniques used are observation, interviews and questionnaires.

Procedure

At this stage, the process where the data is changed and adjusted so that the resulting data is more accurate and easier to analyze. This data preprocessing aims to keep the data processed is high quality data so that the resulting analysis or model is the best. Regardless of this, data preprocessing is an important stage in the data analysis process as it maintains the quality of the data used, in turn improving the quality of the analysis results.

Data, Instruments, and Data Collection Techniques

Data preprocessing is the process of preparing raw data so that it is ready for use in analysis or modeling. This stage is where the data is transformed and adjusted to make the resulting data more accurate and easier to analyze. Data preprocessing aims to ensure high-quality data, thus ensuring the best possible analysis or model. Furthermore, data preprocessing is a crucial stage in the data analysis process because it maintains the quality of the data used, ultimately improving the quality of the analysis results.

This data can be quantitative (numbers and statistics) or qualitative (descriptions and observations). The main purpose of data collection is to gather accurate information that can be verified, so that the research findings can be trusted and used to create an informative report. The following are data collection techniques

1. Observation

Observation data collection techniques are carried out through direct observations made by researchers to the object under study directly at the scene of the event. It can be human behavior, phenomena, or the process of change.

2. Interviews

Interviews are a data collection technique by taking data directly by communicating directly with respondents or informants. Interviews can provide an in-depth understanding of an individual's experiences, views, or knowledge of the research topic.

3. Questionnaires

Questionnaires are used to obtain answers directly from respondents. This method can help get answers from a large number of respondents. There are two types of questionnaire questions: open and closed. However, accurate questionnaire question preparation is required to get the appropriate answers.

4. Literature Study

Literature study or literature study aims to find various theories that are relevant to the problem being studied as reference material in discussing the research results.

Data analysis technique

In a research, data analysis is needed so that the research can run well and smoothly. In this research, a dataset is needed about Public Sentiment towards Naturalized Players in the Indonesian National Team, the data is obtained from the twitter platform (X) which posts related to Naturalized Players in the Indonesian National Team. The keywords used to collect data such as "Naturalized Players", "Indonesian National Team", and "Public Views".

RESULTS AND DISCUSSION

Data Set

Data scraping in Google Colab is done using several Python libraries. The first step is to open Google Colab and create a new notebook. Next, install the required libraries, such as requests, beautifulsoup4, and lxml, using the !pip install command. These libraries are used to access and process data from web pages. After installation, import the required libraries into the notebook using the import command. Then, specify the URL of the web page you want to extract data from. The page is accessed using the requests library, and its HTML content is processed using BeautifulSoup.

Next, specify the section of the web page you want to extract, such as the news headline, description, or link. The extraction process is performed by searching for specific HTML tags using the find or find_all functions. The extracted data is then stored in a table using pandas.DataFrame.

In this study the authors will analyze sentiment data in the form of public opinion on foreign nationals who want to obtain Indonesian citizenship by raising the topic of naturalization of players on the Indonesian national team through social Media x, with data collection. The data collection process carried out in this study was by crawling data into a CSV file. The number of comments used was calculated from January to April 2025, as a data set of 2,000 comments.

conversati	created_a	favo	full_text	id_str	image_url	in_reply_t	lang
1,93E+18	Fri May 23	0	Tim Merah Putih disebut saat ini memiliki 1	1,93E+18	https://pbs.twimg.co		in
1,93E+18	Fri May 23	0	Timnas Indonesia Akan Kebanjiran Pemain	1,93E+18			in
1,93E+18	Fri May 23	0	Patrick Kluivert memanggil 19 pemain natu	1,93E+18			in
1,93E+18	Fri May 23	0	Patrick Kluivert memanggil 19 pemain natu	1,93E+18			in
1,93E+18	Fri May 23	0	Pakar sepak bola China memberikan penila	1,93E+18			in
1,93E+18	Fri May 23	0	Pakar sepak bola China memberikan penila	1,93E+18			in
1,93E+18	Fri May 23	735	Budi vs Budi 1) 21 Mei 2024 Awal Mula Mer	1,93E+18	https://pbs.twimg.co		in

Figure 2. Data Set

Data Labeling

The labeling process in sentiment analysis experiments using the Naive Bayes method involves assigning a sentiment category to each piece of text, such as comments, reviews, or tweets. This labeling aims to identify whether a piece of text is positive, negative, or neutral. At this stage of the research, a label is given to each review column that has meaning according to the positive, neutral, and negative sentiment classes. Sentiment labeling calculations have obtained the results of comparing the amount of sentiment class data as follows:

Table 1. Data Labeling

Sentiment	amount
Positive	200
Neutral	1760
Negative	40
Total	2000

There are 3 sentiment classes, namely positive, negative and neutral, for the results of labeling sentiment classes on comments on the naturalization of Indonesian national team players can be seen as follows

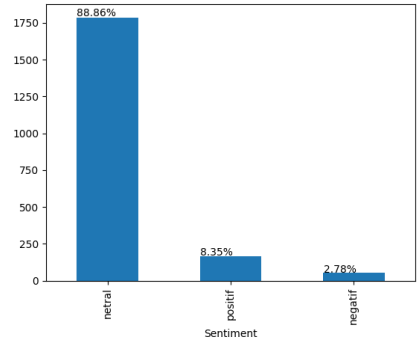

Figure 3. Sentiment Class of Player Naturalization

Prerocessing Data

This stage involves data processing with preprocessing which goes through six stages, namely cleaning, case folding, normalization, tokenizing, stopwords removal, and stemming.

Table 2. Sentiment Class of Player Naturalization

Prerocessing	Sentimen
Cleaning	The Red and White team is said to currently have 19 naturalized players against China so this will not be an easy match.
Case Folding	The red and white team is said to currently have 19 naturalized players against China so this will not be an easy match.
Normalisasi	The red and white team is said to currently have 19 naturalized players against China so this will not be an easy match.
Tokenizing	'team', 'red', 'white', 'called', 'when', 'this', 'have', 'player', 'naturalized', 'for', 'against', 'china', 'so', 'this', 'not', 'will', 'be', 'match', 'which', 'easy'
Stopword Removal	'team', 'red', 'white', 'have', 'player','naturalized', 'against', 'china', 'match', 'who', 'easy'
Steaming	'team', 'red', 'white', 'belong', 'play', 'naturalized', 'opponent', 'china', 'match', 'iyang', 'easy'

Can be seen in table 3.2 at this stage is a flow that explains at what stage the system performs the preprocessing process including the stages of claning, casefolding, neomalization, stopwords, tokenizing and stemming in order to get meaningful vocabulary only.

TF-IDF Weighting

The next stage after passing the sentiment class labeling stage is the TF-IDF (Term Frequency-Inverse Document Frequency) weighting stage, which at this stage uses the technique of calculating each weighting word (term) in the document data.

Table 3. Inverse Document Frequency Calculation Process for Training Data

Vocabulary.	TF Neutral	TF Positive	TF Negative	DF	N/DF	IDF
Grup	1	1	0	2	1,5	0.176091
Red	1	0	0	1	3	0,477121
White	1	0	0	1	3	0,477121
Courtesy	1	0	0	1	3	0,477121
Play	1	1	1	3	1	0
Naturalization	1	1	1	3	1	0
opponent	1	0	0	1	3	0,477121
China	1	1	0	2	1,5	0.176091
Yang	1	0	1	2	1,5	0.176091
Easy	1	0	0	1	3	0,477121
Patrick	0	1	0	1	3	0,477121

CONFUSION MATRIX

Accuracy is determined to determine how much measurement error can occur when calculating the dataset used. Confusion Matrix is a performance measurement for classification problems for the research that the author discusses about where the output can be two or more classes.

```
MultinomialNB Accuracy: 0.8883374689826302
MultinomialNB Precision: 0.6293532338308457
MultinomialNB Recall: 0.3434343434343434
MultinomialNB f1_score: 0.3331783306207859
confusion_matrix:
 [[  0  13   0]
 [  0 357   0]
 [  0  32   1]]
====================================================

              precision    recall  f1-score   support

     negatif       0.00      0.00      0.00        13
      netral       0.89      1.00      0.94       357
     positif       1.00      0.03      0.06        33

    accuracy                           0.89       403
   macro avg       0.63      0.34      0.33       403
weighted avg       0.87      0.89      0.84       403
```

Figure 4. Naïve Bayes Classification Model

Test data containing 20% of the total data has been classified using the naive bayes method where the test data has a new class from the

previous class. In this classification result, the number of neutral sentiments is more than the positive and negative sentiment classes.

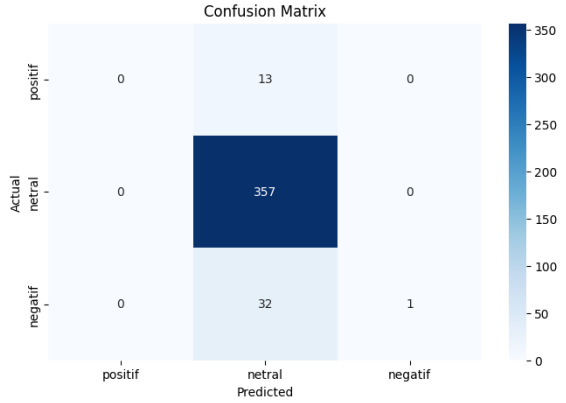

Figure 5. Confusion Matrix

The description of Figure 3. 6 will explain that the picture above shows the distribution of data predictions TP (True Positive), TNt (True Neutral), TN (True Negative), FP (False Positive), FNt (False Neutral), FN (False Negative) Based on Figure 4.25, the accuracy value will be calculated as follows: Description:

$$\frac{TP+TN}{TP+TN+FP+FN}\ 100$$

$$0 + 357 + 1 = 358$$

$$0 + 13 + 0 + 0 + 357 + 0 + 0 + 32 + 1 = 403$$

$$358 \div 403 = 0.88 * 100 = 88\%.$$

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of research on Sentiment Analysis of naturalization comments on Indonesian national team players using the Naive Bayes Method, it can be concluded as follows:

To do the application of the naïve bayes algorithm, several stages can be carried out as follows:

a. The first stage that needs to be done in the application is data collection and then the data is labeled to each data according to the classification class used in the research, namely the positive class, neutral class, and negative class.

b. In order to get more accurate results, it is necessary to do a text preprocessing stage by going through several steps, namely cleaning, case folding, normalization, stopword removal, tokenizing, and stemming of the data to be processed to remove noise. Then the words or terms in the review data are given weight using TF-IDF.

c. Furthermore, applying the naïve bayes algorithm where in this study the naïve bayes algorithm is used to calculate the class probability of a review that has no known class so that it can be known that the review belongs to a positive class, neutral or negative class.

In its application to the review data on comments on the naturaliassi of Indonesian national team players using manual labeling where neutral sentiment is superior at 1760 compared to the positive sentiment class of 200 and the negative sentiment class of 40. In other words, people comment on the application of naturalization of Indonesian national team players, namely giving a good response.

The results of the classification process using the Naive Bayes method produce data into 3 types, namely 33 positive classes, 357 neutral classes, and 13 negative classes with an accuracy value of 89%, precision 63%, recall 34%, and f1-score 33%. This sentiment analysis provides an overview of public comments regarding the presence of naturalized Indonesian national team players regarding public acceptance of the nat uralization policy and can be input for PSSI in making decisions regarding the development of the national team in the future in order to improve the quality of the national team in the future.

Suggestion

This study demonstrated good accuracy, suggesting that further research could utilize other algorithms, such as the decision tree method, or other methods other than the Naive Bayes algorithm, to achieve optimal results.

The author realizes that this paper is far from perfect, and therefore, readers' criticism and suggestions are highly appreciated for future success.

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