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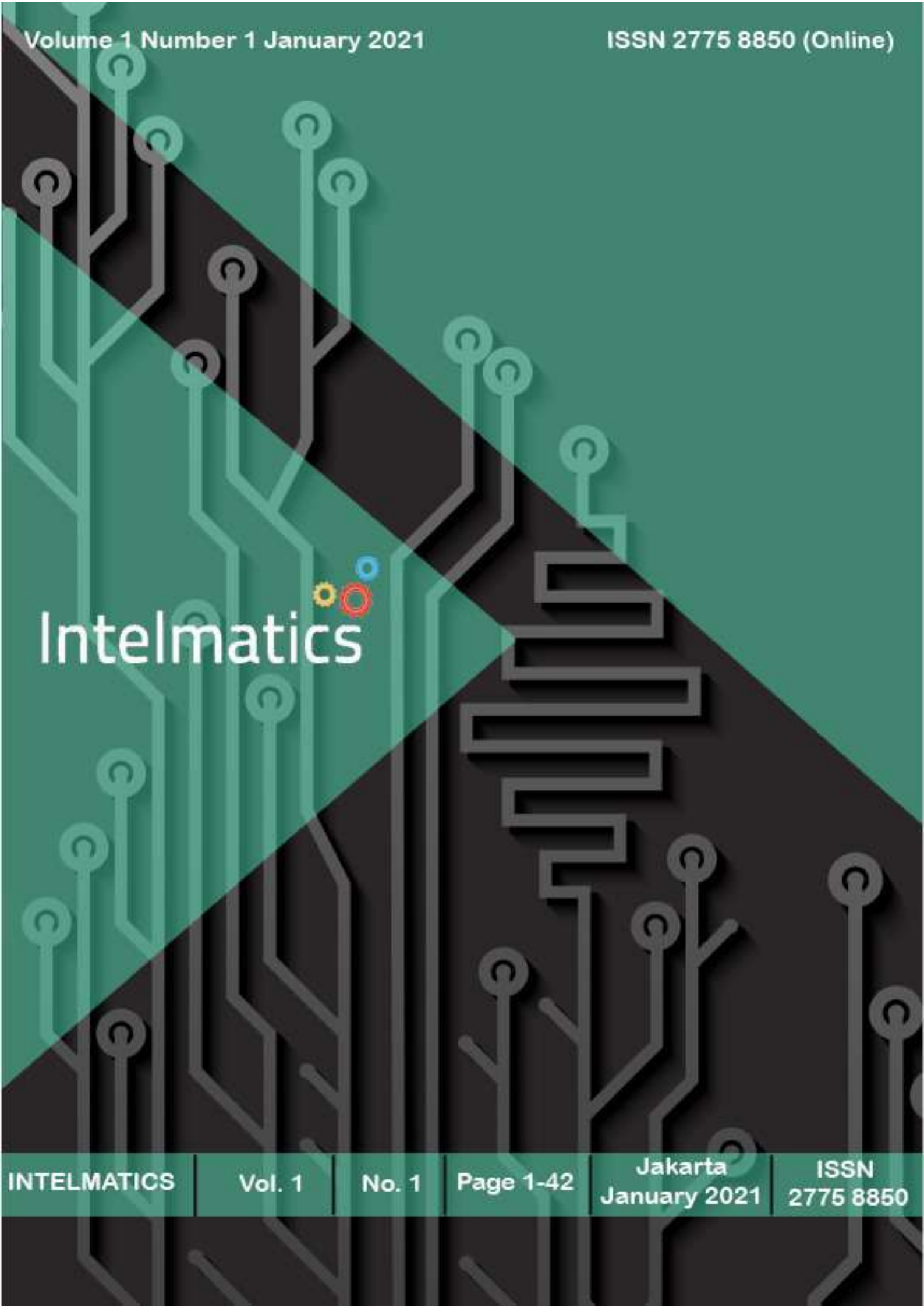

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ANALYSIS OF OIL SENTIMENT SENTIMENTS ON TWITTER USING SUPPORT VECTOR MACHINE

Ibnu Bilal Marta Prawira[1*], Binti Solihah[2], Syandra Sari[3]

Informatics Engineering Program[123], Faculty of Industrial Technology, University of Trisakti

***Abstract*—Twitter is one of the social media platforms used by people in Indonesia. Twitter is often used by its users to express opinions regarding a product, institution or event. From the keyword fuel, fuel subsidy is a keyword that is currently a trending topic because changes in fuel subsidies affect the prices of other staples, to find out the value of sentiment in public opinion, sentiment analysis is one of the methods used is the support vector machine and lexicon based.**

Lexicon is a labeling method by matching the words contained in the document with the words contained in the dictionary. After labeling, the data is tested using the classification method, the classification stage is carried out after going through the preprocessing phase, where the tweet classification results tend to be positive or negative, using the Support Vector Machine method and validated by K-Fold Cross Validation.This research produced 50,001 data which were divided into 21,561 positive sentiments, 9206 neutral sentiments and 19234 negative sentiments. From these results it can be concluded that the data shows public support for rising fuel prices or changing fuel subsidy prices.

I. INTRODUCTION

CURRENTLY the use of social media such as Twitter has become a necessity in this modern era. Twitter allows users to provide responses to various hot topics and issues that occur, Twitter users can write messages, comments or any opinions on Twitter. However, with the limited scope of writing, which is only 280 characters, Twitter users write messages in the form of abbreviations. This is a problem in itself in finding sentiment in Twitter's data regarding this fuel subsidy. Therefore, the SVM method is used to obtain visualization of sentiment analysis.

II. LITERATURE REVIEW

Sentiment analysis (Opinion Mining) is a field to analyze various aspects of an entity. These aspects can be in the form of an opinion or assessment of a person's entity, an institution and even for a product and topic of events that are currently happening. This analysis aims to find the emotional value contained in these aspects. This value can be a positive or negative value.[1] Support Vector Machine is a classification method that uses a linear classifying method by finding the best hyperlane that functions as a separator between the 2 classes. The basic principle is to classify linearly and then develop it until it can be used in non-linear problems by incorporating the kernel trick concept in high-dimensional workspaces [2].

III. RESEARCH METHODOLOGY

In compiling this research, there is a flowchart diagram as follows:

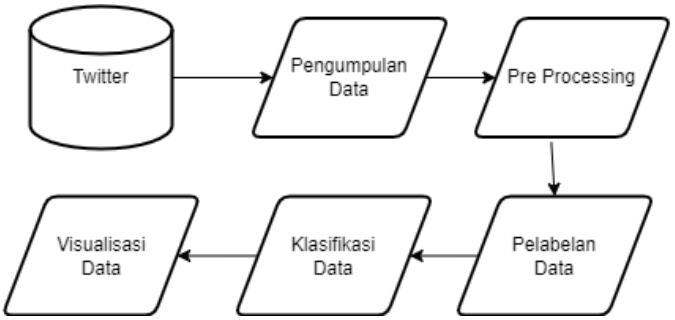

Fig.1 Reasearch Flow Chart

a. Scraping Data
Data collection is an activity that is carried out when doing research for the first time. Data collection in this study was carried out using data from Twitter with the keyword "fuel subsidies".

b. Pre Processing
From the previous data that has been collected, then do the data preprocessing to improve the raw data before labeling. Preprocessing is done in the form of Normalization, Case Folding, Cleaning, Stopword Removal and Tokenizing.

c. Labelling Data

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After the data is cleaned, labeling is done on the data. Labeling of data is done automatically using a dictionary that already contains sentiment weights (lexicon) and the total sentiment is calculated based on the total weight of all words in each data.

d. Data Classification

This process aims to process data into positive opinions and negative opinions. There are many methods for classifying data, one of which is the Support Vector Machine. Is one method for classifying data and regression. In this study, the authors used the Support Vector Machine method to classify data

e. Data Visualization

After classifying, the next thing to do is create a visualization of the data that has been labeled. The purpose of this visualization is to make it easier to read the meaning of the analysis results. This visualization can use the Word Cloud, which is to make a group of words contained in the data gather to form a group of words that have different sizes and colors based on the number of times they appear.

IV. DISCUSSION

The data before and after case folding is as shown in the following table:

Before Case Folding	After Case Folding
@addiems Kalo d layani nanti gila kayak mrka! Hidup penuh kepalsuan krna hobi dengerin dongeng sambil menghayal bbm turun, subsidi lancar🤣🤣masih byk org baik yg mendukung mas dgn tulus..! 👍	@addiems kalo d layani nanti gila kayak mrka! hidup penuh kepalsuan krna hobi dengerin dongeng sambil menghayal bbm turun, subsidi lancar🤣🤣masih byk org baik yg mendukung mas dgn tulus..! 👍

the data before and after cleansing is as shown in the following table:

Before Cleansing	After Cleansing
@addiems Kalo d layani nanti gila kayak mrka! Hidup penuh kepalsuan krna hobi dengerin dongeng sambil menghayal bbm turun subsidi lancar🤣🤣masih byk org baik yg mendukung mas dgn tulus..! 👍	Kalo d layani nanti gila kayak mrka Hidup penuh kepalsuan krna hobi dengerin dongeng sambil menghayal bbm turun subsidi lancer masih byk org baik yg mendukung mas dgn tulus

the data before and after Tokenizing is as shown in the following table:

Before Tokenizing	After Tokenizing
di ujung sana microfon berbunyi jadi rakyat jangan cengeng di ujung sana pula mulut pejabat berbunyi postur apbn tersandra subsidi memberatkan keuangan pemerintah keputusan bbm naik tak bisa di hindari hayo siapa yang cengeng	['di', 'ujung', 'sana', 'microfon', 'berbunyi', 'jadi', 'rakyat', 'jangan', 'cengeng', 'di', 'ujung', 'sana', 'pula', 'mulut', 'pejabat', 'berbunyi', 'postur', 'apbn', 'tersandra', 'subsidi', 'memberatkan', 'keuangan', 'pemerintah', 'keputusan', 'bbm', 'naik', 'tak', 'bisa', 'dihindari', 'hayo', 'siapa', 'yg', 'cengeng']

The data before and after Normalization is as shown in the following table:

Before Normalize	After Normalize
pembodohan akal subsidi ke masyarakat itu bkn bagi uang memangnya cukup sementara inflasi efek kenaikkan bbm mencekik rakyat bagai menggarami air laut berobatlah kau periksa apakah urat syaraf di otakmu msh normal	pembodohan akal subsidi ke masyarakat itu bohong bukan bagi uang memangnya cukup sementara inflasi efek kenaikkan bbm mencekik rakyatbagai menggarami air laut berobatlah kau periksa apakah urat syaraf di otakmu masih normal

The data before and after Stopword Removal is as shown in the following table:

Sebelum Stopword	Setelah Stopword
gara gara erick thohir jadi komisaris bbm naik	gara gara jadi komisaris naik

The next stage is that the Vader library will change its default dictionary (English) to an Indonesian dictionary made by researchers from Inset research (Indonesian Sentiment). This dictionary contains Indonesian words where each word is given a value from -5 to +5.

The contents of the Inset dictionary (Indonesian Sentiment) are as shown in Figure 19 below (To the left of the Positive Dictionary and to the Right of the Negative Dictionary):

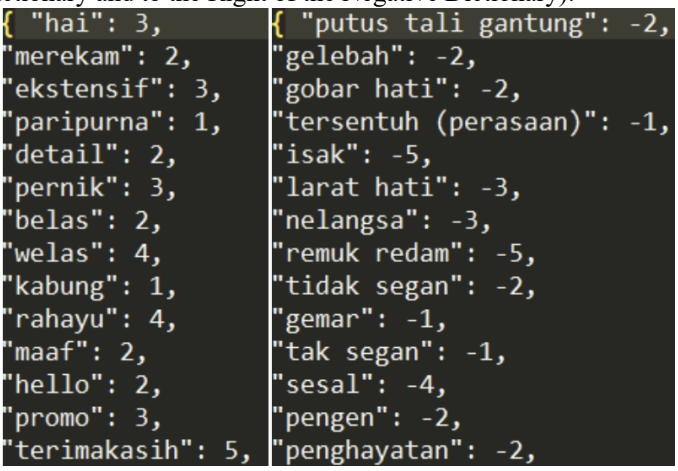

Fig.2 Inset Dictionary Positive and Negative

And the results of this stage are as shown in the image below

tweet	sentimen
official riset malaysia dinikmati kelompok menengah akui mobil usaha an	Negatif
downgrade mobil pertamax pertalite ratio kompresi aman aman pertamax	Positif
krena budaya banding potongan banding potongan tinggal bekukan pssi lu	Negatif
politisi golkar pelaku pelaku penyalahgunaan ditindak	Netral
najeges pecat semoga sanksi teruus bola hemat sumberdaya bermanfaat	Positif
semoga sanksi minimal hitung hitung hemat apbn sumberdaya uang pajak	Negatif
politisi golkar pelaku pelaku penyalahgunaan ditindaktegas	Netral
roemah dinaikkan mengimbangi memberatkan bersubsidi kebanyakan dim	Negatif
indo lebih baik ginian bunuh sipil	Negatif
plajoe cyber ri analogi tepatdangdutan kebutuhan tersier tetangga sdgkan	Positif
punyaku sebulan calon gara kakak susah terima	Negatif

Fig.3 The result of the data labeling process

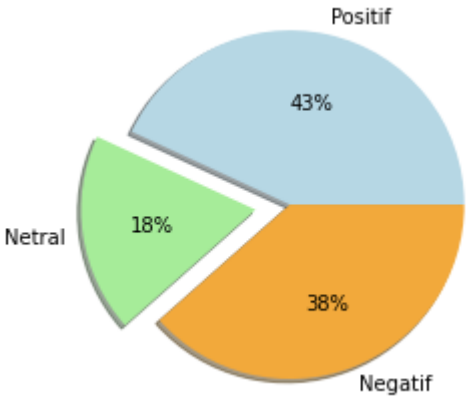

Fig.4 Pie Chart of Labeling Results

Fig.5 Wordcloud of labeling results (Positive Data)

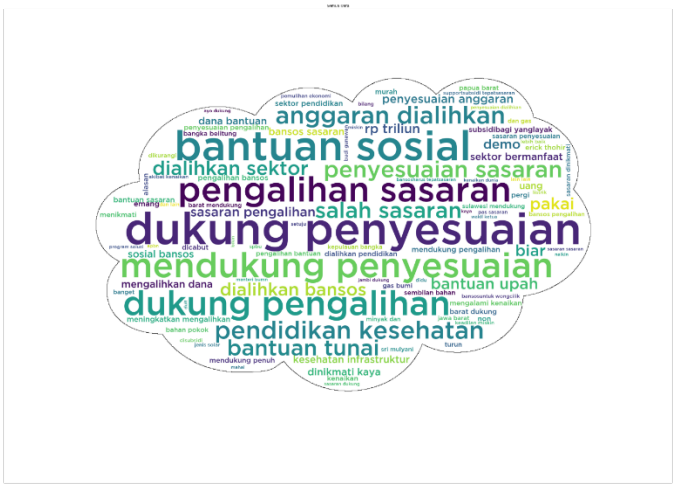

Fig.6 Wordcloud of labeling results (All Data)

Fig.7 Wordcloud of labeling results (Negative Data)

The next stage is data that has gone through a data weighting process, the data then enters the classification stage. This stage aims to classify data based on sentiment that has been obtained before. At this stage the classification is carried out using the Linear Kernel Support Vector Machine (SVM) and RBF methods because the two kernels are kernels that have fairly accurate accuracy.

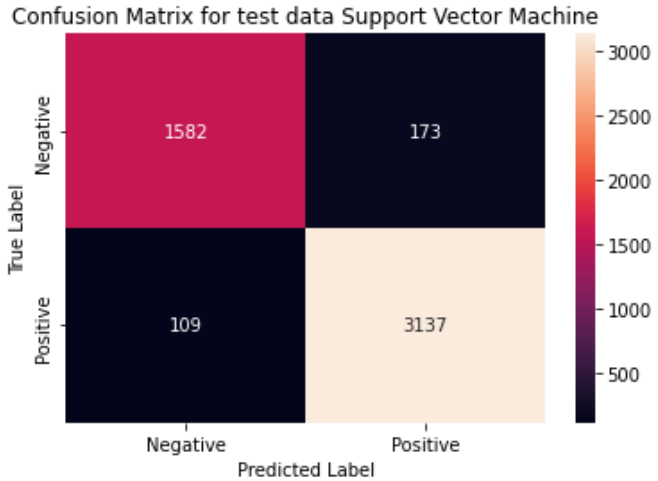

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Fig.8 Confusion Matrix of Linear SVM

```
Support Vector Machine Acuracy: 94.36112777444511 %
Support Vector Machine Precision: 94.77341389728096 %
Support Vector Machine Recall: 96.64202094886014 %
Support Vector Machine f1_score: 95.69859670530812 %
==================================================
```

	precision	recall	f1-score	support
Negatif	0.94	0.90	0.92	1755
Positif	0.95	0.97	0.96	3246
accuracy			0.94	5001
macro avg	0.94	0.93	0.94	5001
weighted avg	0.94	0.94	0.94	5001

Fig.9 The results of the visualization of linear SVM accuracy

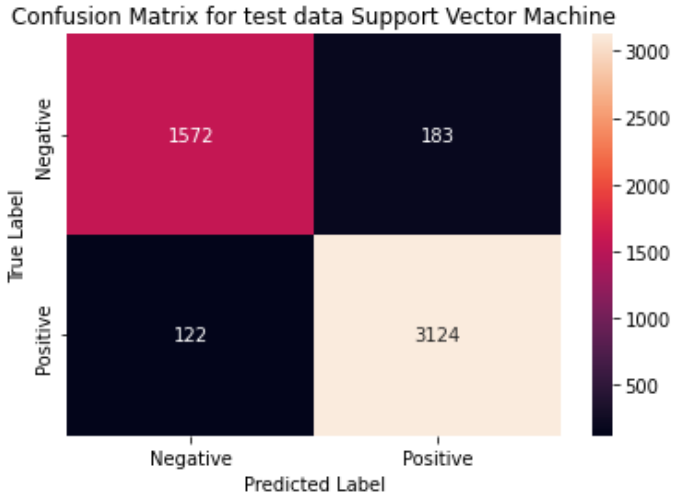

Fig.10 Confusion Matrix of RBF SVM

```
SVM RBF Acuracy: 93.90121975604879 %
SVM RBF Precision: 94.46628364076201 %
SVM RBF Recall: 96.24152803450401 %
SVM RBF f1_score: 95.34564321684725 %
==================================================
```

	precision	recall	f1-score	support
Negatif	0.93	0.90	0.91	1755
Positif	0.94	0.96	0.95	3246
accuracy			0.94	5001
macro avg	0.94	0.93	0.93	5001
weighted avg	0.94	0.94	0.94	5001

Fig.11 Results from visualization of SVM RBF accuracy

V. CONCLUSION

The data obtained in scrapping data is 50,001 data. The results of the sentiments obtained using Vader in this study were positive by 43% (21,561 data), negative by 38% (19,234 data) and neutral by 18% (9,206 data). From these results it can be concluded that it shows public satisfaction with the policies issued.

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