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Sentiment Analysis of YouTube Comments Toward Chat GPT

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ABSTRACT

Sentiment analysis is used for analyzing the emotions and attitudes expressed in text data. In this study, sentiment analysis is used to understand people's enthusiasm toward Chat GPT. The primary objective of this study is to investigate the acceptance of people of new artificial intelligence technology, Chat GPT, that may change the future. To get a deep understanding of it, a large dataset of user comments from YouTube is collected and then data pre-processing is done by removing stop words, punctuations, and irrelevant information. Using Text Blob and VADER approaches, comments are classified into positive, neutral, and negative categories, with result 46.6%, 22.9%, 30.4% for TextBlob and 49.5%, 26.3%, 24.2% respectively for VADER. The result shows that most users have a positive sentiment to receive and use Chat GPT. The contribution of this study is to provide insights into the sentiment of people's response to Chat GPT, which can inform user acceptance of the language model development and give guide its future applications.

1. INTRODUCTION

In recent years, natural language processing (NLP), as a subfield of Artificial Intelligence (AI), has emerged as a rapidly growing field with numerous applications. Sentiment analysis is one such application. The process of sentiment analysis involves using automated techniques to detect and categorize the emotions and attitudes expressed in written or spoken language. By analyzing the text, sentiment analysis can determine whether an individual's opinions toward a particular event, product, or person are positive, negative, or neutral [1]. Many fields such as politics [2]–[4], health [5], [6], finance [7]–[9], tourism [10][10], education [11], and drug usage [12], using sentiment analysis for taking its benefits.

With the increasing popularity of social media platforms like YouTube, Twitter, and Facebook, sentiment analysis has become a valuable tool for businesses and organizations to gauge public opinion and sentiment toward their brand or product. A lot of studies use social media as the data source of sentiment analysis [4], [6], [8], [11], [13]–[16]. The top two spots in the list of the most widely used social networks and messaging platforms as of January 2023 were held by Facebook and YouTube, respectively. Facebook claimed the first position with an estimated 2.96

billion monthly active users (MAUs), while YouTube, which is owned by Google, came in second place with approximately 2.51 billion MAUs [17].

A study about sentiment analysis using lexicon-based approaches and machine learning algorithms has been done. Taj, Shaikh, and Meiji [18] propose a lexicon-based approach for sentiment analysis of news articles and found that most of news articles have positive and negative sentiments.

Sudira, Diar, and Ruldeviyani performed machine algorithms using Naïve Bayes and KNN for investigating the satisfaction of customers with digital payment services in Indonesia. The data source of this study is Instagram comments [8].

While Villanueva, Ponce, and Liñan proposed sentiment analysis of tweets using unsupervised learning techniques and the K-Means algorithm for classifying the content of affiliates of the Pension and Funds Administration (AFP). It results that the majority of people have a negative sentiment [19].

This study, will be conducted a sentiment analysis of YouTube comments toward Chat GPT, a chatbot launched by OpenAI in November 2022, that can respond to inquiries, compose works of fiction or prose, assist with debugging code, and perform other functions [20]. Chat GPT is designed to generate human-like responses to text-based prompts and has gained a lot of attention in recent years due to its impressive capabilities.

YouTube comments are an excellent source of data for sentiment analysis, as they provide a large volume of text-based feedback from users. In this study, TextBlob and VADER approaches will be used to analyze the sentiment of these comments and categorize them into positive, negative, and neutral categories.

The result of this study will provide valuable insights into the public response to Chat GPT. It also helps OpenAI and other developers in improving the performance of Chat GPT and similar language models.

RESEARCH METHODS

This section presents the steps to achieve the objective of this study. Started by collecting data, followed by text preprocessing, doing sentiment analysis using TextBlob and Vader, then continued with visualizing the result, and finally comparing the result. These steps as shown in a block diagram in Figure 1.

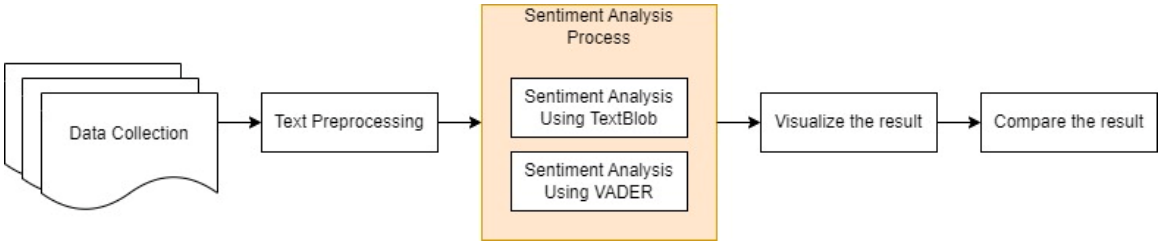

Figure 1. The Phases of The Study

1. Data Collection

For this study, user comments from videos about Chat GPT from YouTube were collected using the Python library i.e., youtube_comment_scraper_python. Using iteration, as shown in Figure 2., the URL of the video was opened, then followed by scrapping the comments in this video, continued with saving the comments into the data frame. After the iteration finished, the data frames were concatenated into one data frame. It became the dataset that was used in this study.

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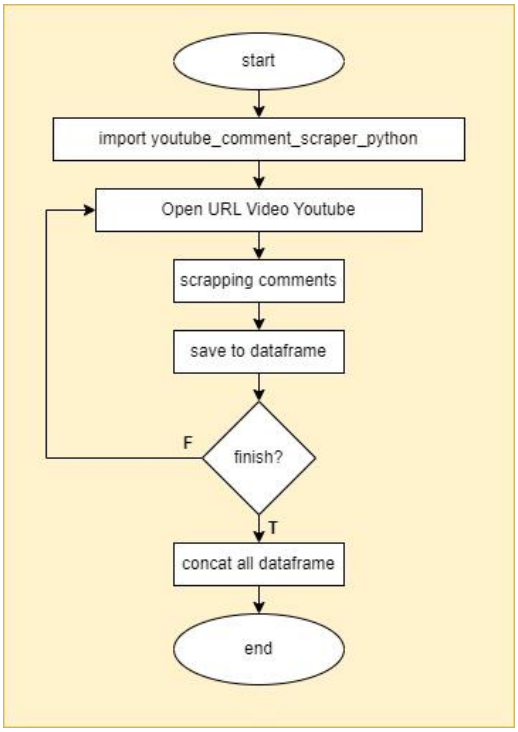

Figure 2. Data Collection

2. Text Preprocessing

Text preprocessing is a process for making sure that the data will be used for sentiment analysis is clean and good quality data. In this phase, this preprocessing includes cleansing, dropping the unused columns, tokenizing, and stopping words.

3. Sentiment Analysis

In this study, the dataset does not have a label. For that, an unsupervised approach which is using open-source Python libraries i.e., Text Blob and Valence Aware Dictionary and Sentiment Reasoner (VADER). This approach treats the text as a collection of words, which are then compared to the words found in dictionaries, which also provide the words' corresponding semantic orientation. It is thought of as the unsupervised method of sentiment analysis and is effective in figuring out a text's polarity, whether it is positive, negative, or neutral [1].

TextBlob offers a consistent API for standard natural language processing (NLP) and has features such as tokenization, POS tagging, noun phrase extraction, sentiment analysis, language translation and detection, spelling correction, n-grams, and WordNet integration [21]. The polarity value falls between -1 and +1, where positive sentiment is indicated by a polarity value of 1, whereas negative sentiment is indicated by a polarity value of -1. Subjectivity is quantified using numbers between 0 and 1. Sentences tend to be subjective rather than objective if subjectivity is less than 0.5 [14].

VADER is a sentiment analysis tool that uses rules and a lexicon to manage terms, acronyms, slang, emoticons, and emojis often used in social media. No training is required so it is often significantly quicker than machine learning algorithms. For each body of text, a

vector of sentiment scores with positive, neutral, negative, and compound polarities is generated. The normalized of each value ranges from 0 to 1 [9]. The compound polarity adds together all of the lexical ratings that have been adjusted between -1 and +1, where -1 denotes the most extreme negative and +1 denotes the most extreme positive [21] concatenated into one data frame. It became the dataset that was used in this study

4. Visualize The Result

For visualizing the result, matplotlib is used. Matplotlib is a plotting library in Python. Using a pie chart, three classes of sentiment, i.e., positive, neutral, and negative, are displayed.

RESULTS AND DISCUSSION

A total of 14623 user comments were collected using the youtube_comment_scraper_python library. It has four columns: index, Comment, Likes, Time, as presented in Table 1., the samples of collected dataset of user comments.

Table 1. Samples of Data User Comments

	Comment	Likes	Time
0	On positive thing I'm seeing with this tech is that apparently people are more conscious of negative implementations of tech.	0	2023-03-27T03:14:13Z
1	Great video, thank you for sharing i was unaware of this.	22	2023-03-27T02:46:30Z
2	Well said Tom, "..intellegent sounding results.." 2:10 It is far from human intelligence actually.	33	2023-03-27T02:24:33Z
3	And the youth of today will not know the difference or how to even critically think for themselves to identify it.	44	2023-06-05T04:39:55Z
4	Fascinating technology but dangerous.	55	2023-03-27T01:19:59Z

After preprocessing that includes dropping unused columns; stop word; removing whitespace, punctuation, emojis, special characters, number, and hashtag; turning to lowercase; the cleaned data becomes such as presented in Table 2.

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Table 2. Result of Preprocessing

Comment	Cleaned Comment
On positive thing I'm seeing with this tech is that apparently people are more conscious of negative implementations of tech.	positive thing m seeing tech apparently people conscious negative implementations tech
Great video, thank you for sharing i was unaware of this.	great video thank sharing unaware
Well said Tom, "..intellegent sounding results.." 2:10 It is far from human intelligence actually.	well said tom intellegent sounding results far human intelligence actually
And the youth of today will not know the difference or how to even critically think for themselves to identify it.	youth today know difference even critically think identify.
Fascinating technology but dangerous.	fascinating technology dangerous

Using TextBlob and VADER approach, the sentiment of user comment can be seen in Table 3. The number of comments with positive, neutral, and negative is displayed in Table 4.

Table 3. Sentiment Analysis

Text	Text Blob	VADER
positive thing m seeing tech apparently people conscious negative implementations tech	Positive	Netral
great video thank sharing unaware	Positive	Positive
well said tom intellegent sounding results far human intelligence actually	Positive	Positive
youth today know difference even critically think identify	Neutral	Neutral
unjust tyrannical society one must surprised megacorporations launching deeply flawed technologies	Negative	Negative

Table 4. Sentiment Result

	Positive	**Neutral**	**Negative**
TextBlob	6820	4449	3354
VADER	7242	3534	3847

It was observed that many user comments about Chat GPT fell into the positive categories using TextBlob approach reached 46.6% as well as VADER approach that took 49.5%, as presented in Figure 3. and Figure 4. While a minor percentage of user comments have negative sentiment using both approaches. Using TextBlob, around 22.9% of user comments are negative, while using VADER approximately 26.3% of the user comments are negative.

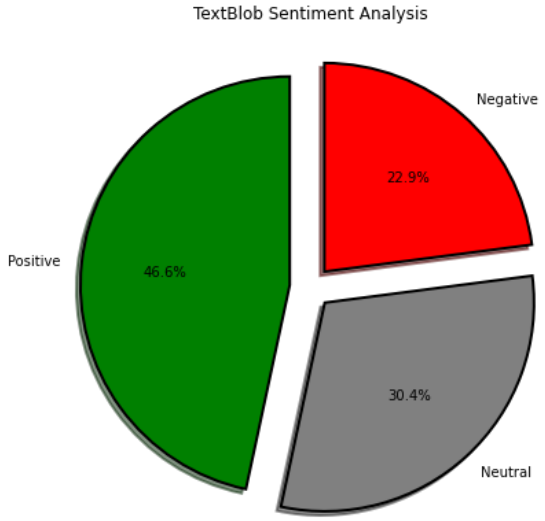

Figure 3. TextBlob-Based Sentiment Analysis

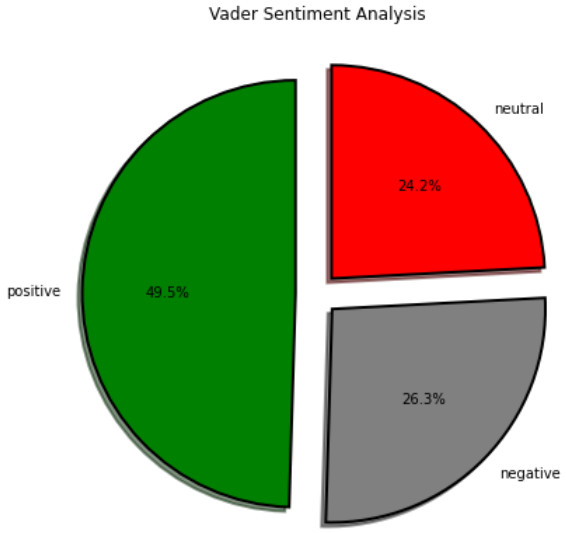

Figure 4. VADER-based Sentiment Analysis

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Based on graphically visualization represented in Figure 5., comparation between the sentiment result based on TextBlob and VADER approaches is not much different. The result shows that users have a positive response of the new technology, Chat GPT, that may change the future. It means users realize that AI technology gives benefit for them, and it drives them to learn new skills to implement Chat GPT for their businesses or their daily lives.

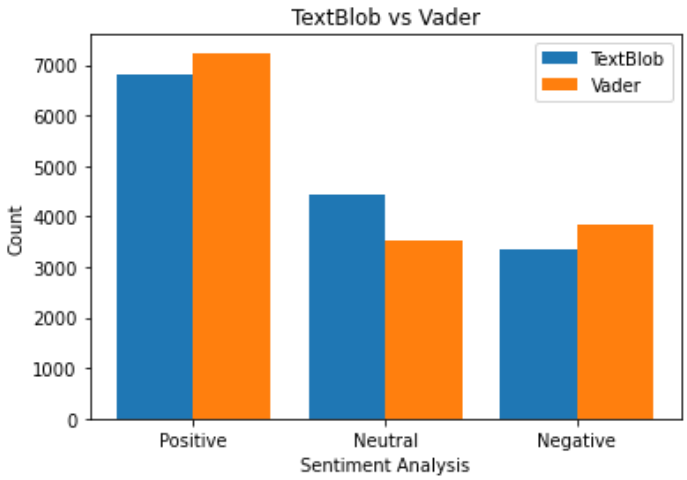

Figure 5. TextBlob versus VADER

CONCLUSIONS AND RECOMMENDATIONS

This study investigates the response of people about the booming AI technology Chat GPT. By sentiment analysis approaches of user comments that scraped from videos about Chat GPT in YouTube, it may be concluded that people are interested in and accept Chat GPT as new technology that may help their businesses or improving their daily productivity. It is presented by positive, neutral, and negative comments categorised using the Text Blob and VADER techniques, with the results being 46.6%, 22.9%, and 30.4% for TextBlob and 49.5%, 26.3%, and 24.2% for VADER, respectively.

Future studies are recommended to continue analysis of the sentiment of people towards Chat GPT using various machine learning approaches. Also, data sources to be analyzed may be taken from various social media.

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