

# Sentiment Analysis on ChatGPT

Jatin Bansal

TSLAS, Thapar Institute of Engineering and Technology, Patiala, India

Email: jrbansal\_blas20@thapar.edu

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**Abstract**— *The paper is about social media analytics. It helps to analyze people's behavior on various social media platforms like Facebook, Twitter, etc. Today's era is of AI advancements, and it will vastly affect people's lives. Thus, it becomes vital to check the thought of the common mass about AI systems. In this research paper, I have analyzed the sentiments of the Twitter audience on ChatGPT. The tweets were extracted in Python using libraries via the Visual Studios platform. Then, the analysis is done in R studio; the word cloud analysis of tweets extracted is done; thus, a discussion about frequently talked words. The sentiment analysis of tweets is also done using various libraries by dividing the sentiments into ten categories. At last, I concluded the research paper, and at the end, I recommended some points after doing the research.*

**Index Terms**— *Artificial Intelligence, ChatGPT, Twitter, Sentiment Analysis*

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## I. INTRODUCTION

Recent technological developments have made it difficult to understand the origin of texts. Nowadays, machines are replacing the tasks that only human intelligence can perform. These machines contain artificial intelligence, a set of algorithms that automates some aspects of human intelligence.

There are three generations of AI:

- **Narrow AI:** Machine intelligence equals or exceeds human intelligence for specific tasks.
- **General AI:** Machine Intelligence that meets human performance across any job.
- **Super AI:** The intelligence that transcends human intelligence.

AI has increased the spectrum in the field of technology. AI includes various core technologies such as deep learning & machine learning, natural language processing, intelligent robots, and many more. Today, natural language processing is the technology that's most talked about.

Natural language processing helps understand the structure and meaning of human-generated language. These models require a large amount of training data to make them understandable. On the 30th of November, 2022 came in the market, ChatGPT, a software model launched by OpenAI. It's the advanced version of GPT3, it can generate conversations in natural language in a better way, and it answers questions on various topics. ChatGPT consists of pre-trained language models for having conversations in natural language.

ChatGPT is available online for free and can be accessed by the user by logging in with some information, such as email address and phone number. The interface is similar to other chatting platforms like Google, Siri, etc. It is based on a model of GPT (Generative Pre-trained Transformer), it is an open-source model developed by OpenAI. It's a chatbot that solves complex problems and also writes codes. And it is said that ChatGPT will help a software developer in many areas. The incredible thing that's changing history is that ChatGPT attracted more than 1 million users in just one week

after its launch. And it's said that ChatGPT will replace Google shortly, and Google also tried to create a Chabot-like ChatGPT called Bard, but the establishment failed. In an interview, Sundar Pichai said that a software developer's job would be easier as Chatbot will perform some of the menial jobs [1]. Thus, making coding more enjoyable, like we enjoy creative writing after the advent of Google Docs or Grammarly. The CEO also talked about Bard that they will be improving the capabilities of the AI software, making it more competitive.

He also talked about the pace of AI advancement and how the pace of development should be slow. But on the other hand, he spoke about its positive side and how it will increase opportunities in the field of health, Literature and Art, Research, and other areas. ChatGPT has pros and cons; ChatGPT will help assist writers and content creators and can be used to respond to multiple language questions. But, there are some downsides of ChatGPT, as it can generate fake news or propaganda, decrease students' capability to brainstorm, increase scam potential, and lead to information overload, making it difficult to differentiate between facts and fiction.

Health is a domain that will be positively affected by the advent of ChatGPT as it helps simplify radiology reports. And in other fields, including legal and court systems, it will be beneficial to identify legal document patterns, which will help provide new insights into law. This will maintain discipline in society and develop our medical and law sectors, making the community safer and more secure.

Many types of researchers discuss about the social impact of ChatGPT in various fields. But, there needs to be more research examining the Twitter audience's sentiment on ChatGPT. Some studies explore the feelings of Twitter's audience and group them into three categories: positive, negative, or neutral. Still, my research divides the tweets into ten sentiments: anger, anticipation, disgust, fear, joy, negativity (tweets with negative emotions), positivity (those that express positive feelings), sadness, surprise, and trust. Via the research, I am presenting how people feel about

ChatGPT and what their reactions indicate by way of emotion.

During this research, several limitations were encountered that influenced the depth and scope of the study. Time and resource constraints constrained the extent of data collection, limiting the breadth of insights. Additionally, the chosen sample primarily consisted of Twitter users, leading to a need for more diversity in the dataset. This constraint may impact the generalizability of the findings. Another significant limitation was the accuracy of the data, as tweets often contain noise or misleading information that can introduce inaccuracies in the sentiment analysis. Furthermore, while effective in many cases, the chosen method of sentiment analysis may need to be more balanced with the complexity of sentiments expressed in tweets, making it challenging to capture nuances like sarcasm. These limitations underscore the need for a nuanced interpretation of the research findings.

## II. LITERATURE REVIEW

AI became a distinct field during the Dartmouth Summer Project held in 1956. This period was when researchers refuted the belief that 'no machine can do X'. Between 1993-2011, the world's interest in neural and genetic algorithms was rebuilt due to advancements in AI. Thus, came the era of Big Data, Deep Learning, and Artificial Revolution, which is from 2011 till present [2]. That's how came the definition of AI, "It's the capability of computer systems to perform tasks that normal humans can do." AI inherits incredible power, and it can be used for harmful purposes. Big companies like Google and Microsoft have been among the firms forming ethical guidelines. Countries in Europe were the first ones to create AI guidelines. Thus it was followed by others. UN also makes guidelines to remove AI bias to maintain justice among specific communities [3]. The advent of AI can lead to both positive and negative effects; it will lead to an unequal world between haves and have-nots, a bipolar world where China-US competition goes to the next level, not just on AI, and data and can lead to multilateral resurgence where world trade is advancing and growing [4]. Today, investment in AI is increasing by double digits over the last few years; government interest has also increased in this domain, there are many non-profit programs initiated by OpenAI and backed by Elon Musk that will benefit humanity, and currently, areas like healthcare, marketing, and finance are the areas of focus for AI investors. In the future, it's expected that there will be an increase in the chances of breakthroughs in research, neuroscience, and Quantum computing [5]. With the advancement in AI today, Natural Language Processing systems are coming into existence like ChatGPT; these systems require a large amount of training data that are hard to obtain and costly to process. ChatGPT will be helpful in scientific research, Virtual Assistant, literature and Artwork, media and news field, legal and court systems, and health and medical care [6]. Sentiment Analysis will help measure the sentiments of people via social media platforms like Twitter, Facebook, etc. The manufacturing companies are interested

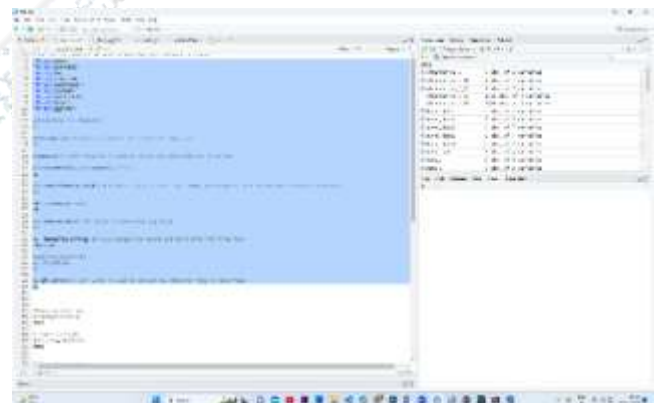
in the audience's views on these microblogging platforms. To train these models for sentiment analysis, we can use POS tags for indicating emotional labels and using Twitter API for importing corpus data [7]. We can also use the machine learning algorithms with Naïve Bayes, Maximum Entropy, and SVM methods for categorizing the data; these methods have 80% accuracy [8].

## III. OBJECTIVES

The objective of the research is to make a word cloud of the tweets which will show the basket of words primarily used in Twitter when the topic '#ChatGPT' comes. The second objective is to do the sentiment analysis on ChatGPT, launched by CEO Sam Altman of OpenAI. The research baskets the sentiment of Twitter's audience into ten different categories: anger, anticipation, disgust, fear, satisfaction, negative, positive, sadness, surprise, and trust.

## IV. RESEARCH METHODOLOGY

The research is based on unstructured data. And the data is extracted from Twitter. To extract the data, I used visual studios, where I used Python and installed a library named snscrape. It helped to pull data from Twitter following the requirement. From snscrape I imported sntwitter and thus extracted tweets in different languages. Because I needed tweets in English, that's why I used langdetect library to get tweets in the English language. Therefore, I consolidated the tweets and saved the data in Excel format. Creating four columns of data frame: the 'Date,' 'USER\_ID,' 'CONTENT,' and 'Retweet\_Count.'



**Figure 1:** The highlighted portion of the screenshot shows the word cloud program.

Now, for further research, we used R studio; firstly the analysis is done via word cloud, it is the circular shape representation of the most talked about comments by the users of Twitter. We used qdap, quanteda, tm, textstem, dplyr and wordcloud2 libraries for the word-cloud analysis, which is easily visible in Fig. 1. Its visible in Fig. 3 that the middle portion of the word cloud highlights the most talked about terms. The wordcloud2 package is used to create the word cloud, and then the wordcloud2 function displays the word



cloud.

After that, we are doing the sentiment analysis using the set of characters instead of the data frame. We use sentimentr, syuzhet and ggplot2 libraries for the sentiment analysis and the coding part is visible in Fig.2.

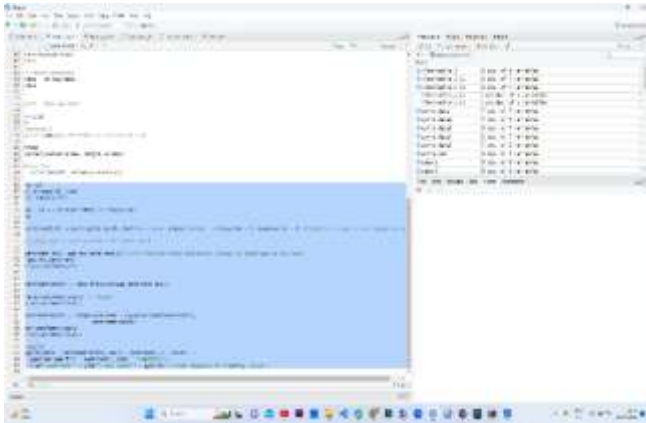


Figure 2: The highlighted portion in the screenshot shows the program for sentiment analysis.

The analysis part helps to categorize the tweets into anger tweets, anticipation tweets, disgust tweets, fear tweets, satisfaction tweets, negative tweets, positive tweets, sadness tweets, surprise tweets, and trust tweets. And this output is shown in the form of a bar graph, showing ten different sentiments in the form of a chart.

### V. ANALYSIS AND DISCUSSION

After extracting the tweets, the word cloud of the tweets is made in the software. Fig. 3 shows the word cloud, we can see that 'ai' comes in the middle of the cloud. It shows that it is the most talked about the word. It is easily visible from the cloud that people know about ChatGPT as the users know that OpenAI introduces ChatGPT. On average, six to seven users know that ChatGPT can be helpful for work, business, artwork, content work, and many other spheres. Users also say that ChatGPT will help learn new things in education. People are more optimistic about the effect of ChatGPT. This shows that people are adopting ChatGPT.



Figure 3

The extraction of tweets is also used for sentiment analysis in the research paper. The bar chart for sentiment analysis is visible in Fig. 4. In the diagram, it's visible that approximately 750 counts of the word out of 800 say that the users are mostly positive about ChatGPT, taking reference to previous research saying that people are optimistic about ChatGPT as it is going to help the software developers, Q&A testing, Analysis, education system, and other fields to prosper further. Tweets like '#ChatGPT might lead to a 4-day work week, but we need to ensure job security and fair distribution of work.' shows that people are interested in how ChatGPT will make their business lives easy and comfortable. The audience is excited about the way ChatGPT is going to innovate businesses.

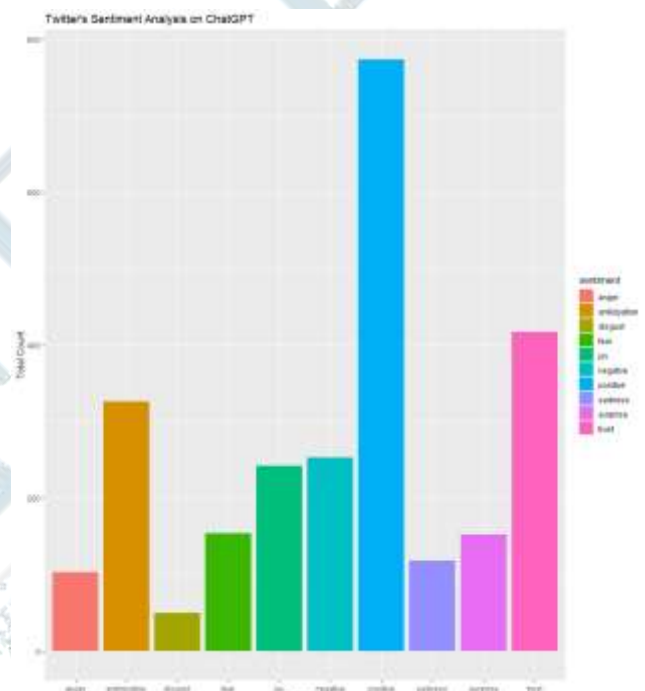


Figure 4

There are significantly fewer negative responses about ChatGPT; just 220 words show that people are pessimistic about the introduction of ChatGPT. And people want to trust AI technology. They are interested in how ChatGPT will increase the productivity of businesses.

### VI. CONCLUSION

Twitter is the emerging social media tool for analysis, and organizations, politicians, and actors are increasingly using this social platform to see the sentiments of the audience out there about their products. They know the platform as the best medium to market and increase the brand name of their company's product. And users increasingly use the platform to openly share their opinions about the world's various happenings and experts' advice about new gadgets. The sentiment analysis clearly shows that most users are optimistic about the device introduced by OpenAI and that it

will positively affect the world. People are also somewhat fearful of how ChatGPT will compete with humans in the future after more advancements.

The audience knows which fields will be replaced and improved by ChatGPT. They are more interested in the future after ChatGPT's launch, how it will advance the technology field, and ease the job of software developers.

## VII. RECOMMENDATIONS

Some people were fearful about ChatGPT that ChatGPT would compete with humans. Thus, it should not replace humans but ease their lives. Government should make policies accordingly, slowing the pace of AI development. Businesses should start creating jobs in new fields after the ChatGPT launch rather than decreasing job opportunities. And, Government of India should introduce AI guidelines as it will limit the powers of the market in AI development.

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