

# Twitter Sentiment Analysis

Dr. Md Lutful Islam<sup>1</sup>, Momin Mustufa<sup>2</sup>, Sahil Shaikh<sup>3</sup>, Uzma Shaikh<sup>4</sup>, Zaiba Kazi<sup>5</sup>

Professor, Department of Computer Engineering<sup>1</sup>

Students, Department of Computer Engineering<sup>2,3,4,5</sup>

M. H. Saboo Siddik College of Engineering, Mumbai, Maharashtra, India

**Abstract:** This study focuses on real-time Twitter sentiment analysis using Streamlit, TextBlob, and Tweepy, in order to gather and analyze data from Twitter and understand the sentiment of a particular topic, brand, or event. The study presents an efficient and scalable method of collecting tweets in real-time and analyzing their sentiment using TextBlob, a Python library for processing textual data. The results of the analysis are presented in an easy-to-understand format through a web-based dashboard built with Streamlit, allowing users to track the sentiment of a topic over time. The analyzed data, i.e. positive, neutral, or negative sentiment, is represented in graphical format on the dashboard, providing users with a visual representation of sentiment trends. The study also demonstrates the usefulness of such analysis for businesses, marketers, and researchers in understanding customer sentiment, identifying trends, and improving decision-making.

**Keywords:** Real-time Twitter sentiment analysis, Streamlit, TextBlob, Tweepy, Sentiment Analysis

## I. INTRODUCTION

Social media platforms such as Twitter have become an important source of information for businesses, marketers, and researchers. Twitter has millions of active users who share their thoughts, opinions, and feelings on various topics. The sentiment expressed in these tweets can provide valuable insights into customer preferences, opinions, and attitudes towards products, brands, or events.

Real-time Twitter sentiment analysis is the process of analyzing tweets in real-time to determine the sentiment expressed in them. The sentiment can be classified as positive, negative, or neutral. Real-time Twitter sentiment analysis can provide valuable insights for businesses in a variety of industries, allowing them to make more informed decisions and improve their operations.

Here are some examples of how real-time Twitter sentiment analysis can help specific industries:

- **Finance:** Real-time Twitter sentiment analysis can be used to identify trends in the stock market or to predict changes in consumer spending habits. For example, by tracking sentiment around a particular company or industry, financial analysts can predict changes in stock prices or forecast changes in consumer demand.
- **Politics:** Real-time Twitter sentiment analysis can be used to track public opinion on political issues or to predict the outcome of an election. By analyzing sentiment around a particular candidate or issue, politicians can tailor their messaging to better resonate with voters.
- **Marketing:** Real-time Twitter sentiment analysis can be used to monitor brand perception and identify areas for improvement. By tracking sentiment around a particular brand or product, marketers can identify areas where customers are dissatisfied and take steps to address those concerns.
- **Entertainment:** Real-time Twitter sentiment analysis can be used to track public opinion on movies, TV shows, or music. By analyzing sentiment around a particular film or song, producers can make decisions about marketing and promotion.

Real-time Twitter sentiment analysis can also help businesses to identify market trends and respond quickly to changes in consumer behavior. By analyzing sentiment across a variety of topics, businesses can identify emerging trends and adjust their strategies accordingly. For example, by tracking sentiment around a particular product or service, businesses can identify areas where they can improve and adjust their offerings to better meet customer needs.

One of the key benefits of using Streamlit, TextBlob, and Tweepy for real-time Twitter sentiment analysis is that they are all open-source tools that are easy to use and customize. This makes it possible for businesses of all sizes to perform

real-time Twitter sentiment analysis without requiring extensive technical expertise or resources. Overall, real-time Twitter sentiment analysis is a powerful tool that can help businesses in a variety of industries to make better decisions and improve their operations. By leveraging the insights provided by real-time sentiment analysis, businesses can stay ahead of the competition and better serve their customers.

## II. LITERATURE REVIEW

Sentiment analysis has emerged as a popular field of research in recent years, fueled by the explosive growth of social media and the need for businesses to better understand customer sentiment. Over the years, various approaches to sentiment analysis have been developed, ranging from rule-based systems and machine learning algorithms to hybrid methods that combine multiple techniques. In this literature review, we will explore the different methods and techniques used in sentiment analysis, with a focus on real-time sentiment analysis using twitter data.

- **Machine Learning Algorithms:** Machine learning algorithms are widely used for sentiment analysis, including for Twitter sentiment analysis. These algorithms use training data to learn how to classify tweets as positive, negative, or neutral. However, they can be computationally expensive and require significant technical expertise to implement.
- **Lexicon-Based Methods:** Lexicon-based methods use pre-built dictionaries of words and their associated sentiment scores to classify tweets. These methods are often less computationally expensive than machine learning algorithms and can be easier to implement. However, they may not perform as well as machine learning algorithms on highly contextualized tweets.
- **Rule-based methods:** Rule-based methods use a set of predefined rules to classify tweets. These methods are often less accurate than other methods but can be useful in situations where computational resources are limited. Rule-based methods can be relatively easy to implement and can be customized to specific domains.

Real-time sentiment analysis offers several advantages over other methods of sentiment analysis, including:

- **Timeliness:** Real-time sentiment analysis provides immediate insights into customer sentiment as it changes in real-time, enabling businesses to respond quickly to emerging trends and issues.
- **Flexibility:** Real-time sentiment analysis can be easily customized to specific needs and events, enabling businesses to identify sentiment trends around specific products, events, or topics.
- **Accuracy:** Real-time sentiment analysis continuously updates to reflect the latest sentiment trends, providing a more accurate picture of customer sentiment than static, historical data.
- **Cost-Effectiveness:** Real-time sentiment analysis can be more cost-effective than traditional methods of sentiment analysis, which may require large amounts of historical data and complex algorithms to analyze.

Feature	Other Twitter Sentiment Analysis	Real-Time Twitter Sentiment Analysis using Streamlit, TextBlob, and Tweepy
Data collection	Historical data	Real-time data from Twitter API
Data volume	Limited to historical data	Large, continuous stream of data
Response time	Slow	Fast
Flexibility	Limited by available historical data	Highly flexible and customizable to specific needs and events
Accuracy	Based on available historical data	Continuously updated to reflect the latest sentiment trends
Cost	Lower due to limited data volume	Higher due to need for real-time data streaming and processing
Technical complexity	Lower due to limited data volume	Higher due to need for real-time data streaming and processing
Visual representation	Limited to static charts and graphs	Interactive, real-time visualizations with customizable dashboards
Applications	Limited to retrospective analysis	Suitable for real-time decision-making and analysis

**TABLE 1: COMPARISON**

- **Actionable Insights:** Real-time sentiment analysis provides businesses with actionable insights that can be used to inform decision-making and strategy, helping businesses to stay ahead of the competition and respond quickly to changes in customer sentiment.

As shown in the table, real-time sentiment analysis using Streamlit, TextBlob, and Tweepy offers several advantages over sentiment analysis that does not take real-time data. Real-time sentiment analysis allows for the collection of large, continuous streams of data in real-time, making it more responsive and flexible for decision-making and analysis. It also offers greater accuracy, as it is continuously updated to reflect the latest sentiment trends. However, real-time sentiment analysis is more costly and technically complex due to the need for real-time data streaming and processing.

### III. PROPOSED METHODOLOGY

#### 3.1 Introduction

Social media platforms such as Twitter have become a ubiquitous part of modern communication, and it has become increasingly important for businesses and individuals to monitor the sentiment of Twitter conversations around their brands or topics. Sentiment analysis involves analyzing text data to determine the emotional tone of a message, and Twitter provides a wealth of data that can be used to perform sentiment analysis on a large scale.

This report proposes a system for Twitter sentiment analysis that uses the Twitter API, TextBlob library, and a Streamlit web app to collect and analyze Twitter data in real-time. The system will provide users with a simple, easy-to-use interface for monitoring the sentiment of Twitter conversations around specific keywords or topics.

#### 3.2 System Overview

The proposed system will consist of three main components:

- **Twitter API:** This component will be responsible for retrieving Twitter data in real-time. The Twitter API will be used to search for tweets containing specific keywords or posted by specific users, and the data will be stored in a database for analysis.
- **Sentiment Analysis Engine:** This component will analyze the Twitter data to determine the emotional tone of each tweet. The sentiment analysis engine will use the TextBlob library, which is a Python library for processing textual data, to classify each tweet as positive, negative, or neutral.
- **Streamlit Web App:** This component will provide users with an interface for monitoring the sentiment of Twitter conversations. The web app will display real-time updates of sentiment analysis results, allowing users to track the sentiment of Twitter conversations around specific keywords or topics.

#### 3.3 System Workflow

The proposed system will operate as follows:

Users will enter specific keywords or Twitter usernames they want to monitor on the Streamlit web app.

The Twitter API will search for tweets containing the specified keywords or posted by the specified users and retrieve the data in real-time.

The retrieved data will be stored in a database for analysis.

The sentiment analysis engine will analyze the stored data using the TextBlob library and classify each tweet as positive, negative, or neutral.

The Streamlit web app will display real-time updates of sentiment analysis results, allowing users to track the sentiment of Twitter conversations around specific keywords or topics.

#### 3.4 Advantages

The proposed system offers several advantages over traditional methods of Twitter sentiment analysis:

- **Real-time updates:** The system retrieves and analyzes Twitter data in real-time, allowing users to track sentiment changes in real-time.
- **Customizable monitoring:** Users can specify keywords or Twitter usernames to monitor, allowing for customized monitoring of specific topics or brands.

- **Accurate sentiment analysis:** The TextBlob library offers accurate and efficient sentiment analysis of textual data, making the system a reliable tool for monitoring the sentiment of Twitter conversations.
- **User-friendly interface:** The Streamlit web app provides a simple, easy-to-use interface for monitoring sentiment analysis results.

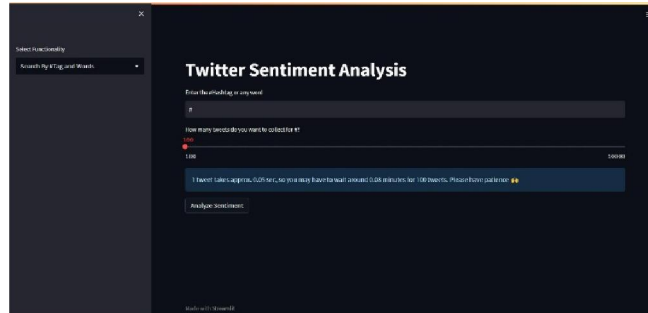


Fig: 1 Dashboard

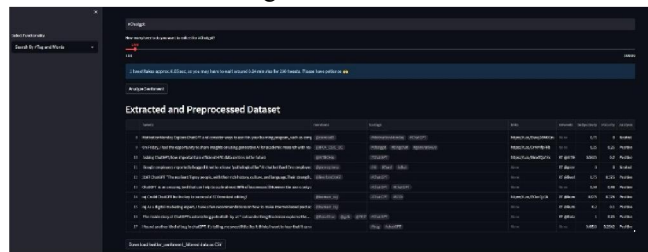


Fig: 2 Extracted and Preprocessed Dataset

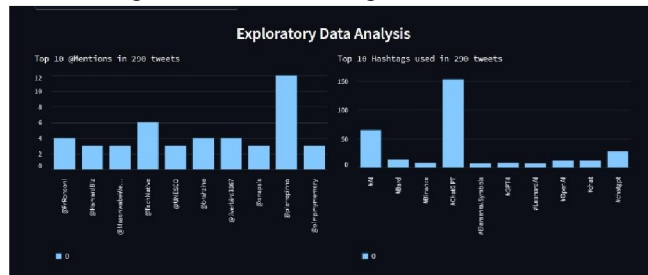


Fig: 3 Exploratory Data Analysis

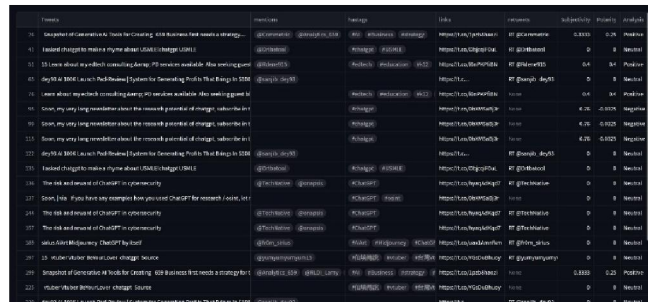


Fig: 4 Tweets that contain top 10 links used

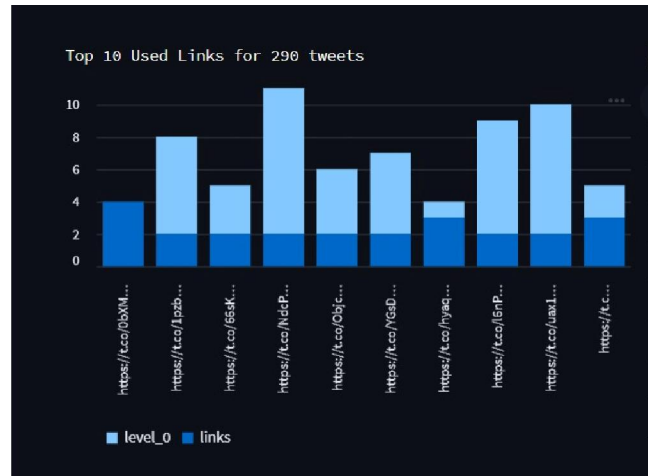


Fig: 5 Top 10 used links for 290 Tweets

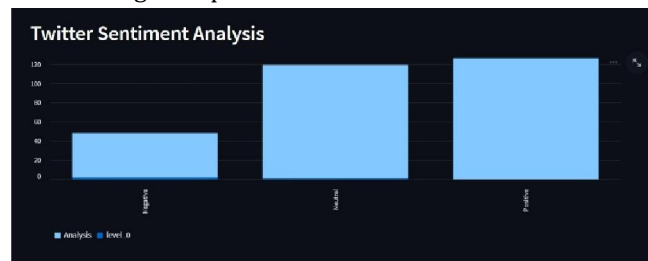


Fig: 6 Twitter Sentiment Analysis Bar Graph

#### IV. CONCLUSION

In conclusion, the proposed system for Twitter sentiment analysis using API, TextBlob library, and Streamlit web app offers a powerful and user-friendly way to monitor the sentiment of Twitter conversations. By using the Twitter API and TextBlob library, the system provides accurate and efficient sentiment analysis of Twitter data in real-time, allowing users to track sentiment changes and monitor specific topics or brands. The Streamlit web app provides a simple and intuitive interface for monitoring sentiment analysis results, making the system a valuable tool for businesses and individuals alike.

Real-time Twitter sentiment analysis has the potential to revolutionize the way businesses and individuals analyze and respond to social media data. The ability to monitor public opinion in real-time can help businesses and organizations stay ahead of trends and react quickly to potential crises. With the user-friendly interface provided by tools such as Streamlit, TextBlob, and Tweepy, real-time sentiment analysis is becoming more accessible and easy to use for businesses and individuals alike. Additionally, the graphical representation of the results can make the data easier to interpret and use in decision-making. As social media continues to grow and evolve, the importance of real-time sentiment analysis will only continue to increase.

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