WEB BASED DASHBOARD FOR COVID-19 TWITTER SENTIMENT ANALYSIS

1. INTRODUCTION

The lockdown produced due to the pandemic Covid-19 have affected all. People being loked down in there houses have only the social media platforms to meet up with the others. So the social media platforms would be ideal place to know the reactions of people during the lockdown. In order to analyze the sentiments of the people to the lockdown, the various events that took place during the lockdown, such social media platforms could be used. Twitter is one such platform and tweets would help provide the required data.

1.1 Overview

Social media platforms facilitate communications amongst human communities and help them share ideas, information, knowledge and other data with the world. These applications provide huge amounts of useful data. Some of the most commonly employed applications include Facebook, Twitter, Instagram and Reddit. The data contains not only information, knowledge, etc but also opinions, feelings, etc of people to various topics. During an outbreak or pandemic, people discuss their safety status, reports incidents and put forward various ideas to solve such crisis. This leads to the continuous creation of large amounts of data. Analysing such data to understand the sentments known as sentiment analysis, contributes to the understanding of human emotions as it can seek people's behaviours as the users engage in these social media applications.

1.2 Purpose

News about the coronavirus is spreading all over social media websites. Consequently, these

social media outlets are experiencing and presenting different views, opinions and emotions during various outbreak-related incidents. Various research articles indicate that many outbreaks and pandemics could have been promptly controlled if social media data were also considered, as they represent the public sentiment. Therefore analysing people's sentiments regarding current events, especially those related to the pandemic will yield remarkable findings. These situational information help develop the necessary strategies that would provide more efficient responses to the crisis. Twitter is one platform that provides an API for extracting the required data for analysis. Through this platform we can keep a check on the reactions of the public to various events even during lockdown. It would thus be very useful for the government to see the effect or reaction of people towards various orders or decisions.

2. LITERATURE SURVEY

Studies have been conducted to analyse the sentiments on different samples of Covid-19 specific Twitter data.

2.1 Existing Problem

As governments and organizations continue to work towards COVID-19, it is important to keep track of the sentiments of the people to the various events occuring during the lockdown and the social media platforms help us get the data. This data plays a very important role by representing the public sentiment in this lockdown situation when people are locked up at home. Thus showing it's importance when taking decisions that would affect the public, to understand the difficulties faced by people based on their sentiments, etc.

2.2 Proposed Solution

In this project we focus on people's sentiment towards the pandemic, understands the sentiments of people on decisions to extend the lockdown and to predict the possibility of riots against the government. Twitter API is used to extract the posts related to the lockdown with the help of hashtags. Each tweet received will be analyzed for emotional tone and sentiment, all data is stored in a database, with the opportunity to store historical data as well. The resulting analysis will be presented in a Node-Red based Web UI as a series of graphs and charts. This helps show the sentiments of the public during various events.

3. THEORITICAL ANALYSIS

Twitter posts extracted based on hashtags are analysed using various services provided by IBM cloud such as Node-Red, Sentiment Analyser node and Cloudant database. These services analyse the sentiment of the data and represent the ouput as charts and graphs.

3.1 Block Diagram

Block diagram depicting the various functions in the web based dashboard for covid-19 twitter sentiment analysis.
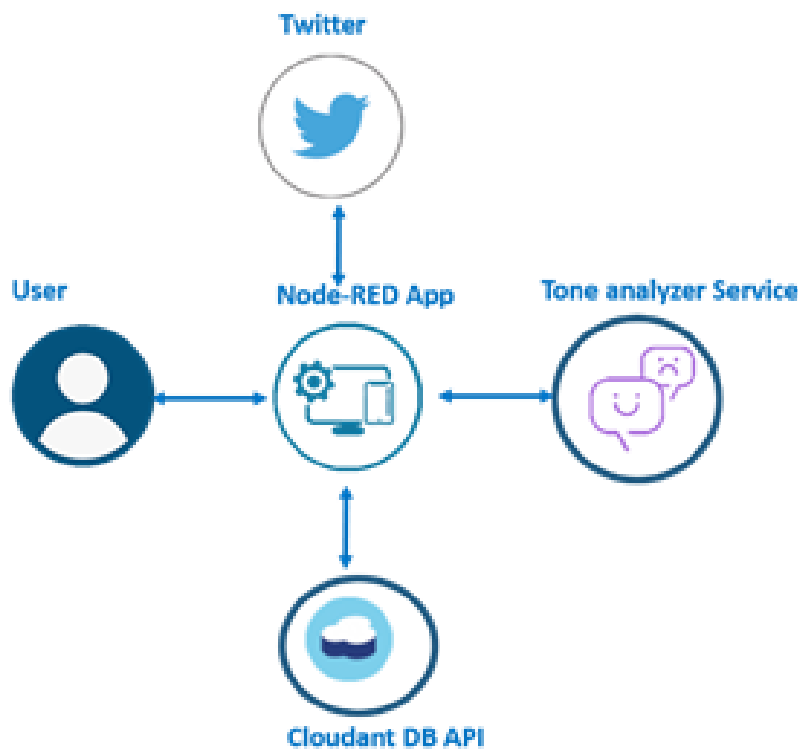

FIGURE 3.1 Block Diagram of Web based Covid-19 Twitter Sentiment Analysis

3.2 Hardware / Software designing

Twitter developer account is used to extract the necessary tweets based on hashtags. Sentiment Analysis node is used to analyse the tweets. Tweets extracted are stored in the Cloudant database. Node Red platform is used for these processes. The analysed information is displayed in the Node Red dashboard as charts and graphs.

4. EXPERIMENTAL INVESTIGATIONS

The tweets are taken 5 at a time and analysed using the sentiment node. A tone analyzer node can also be set up to find the tone of the tweet. Node Red is used for creating the dashboard and displaying the graphs and charts.The tweets are stored in the Cloudant database. Then the next set of tweets are analysed and again plotted. So a continuous evaluation is presented.

5. FLOWCHART

Flow of the various processes involved in a web based dashboard for covid-19 twitter sentiment analysis of tweets.
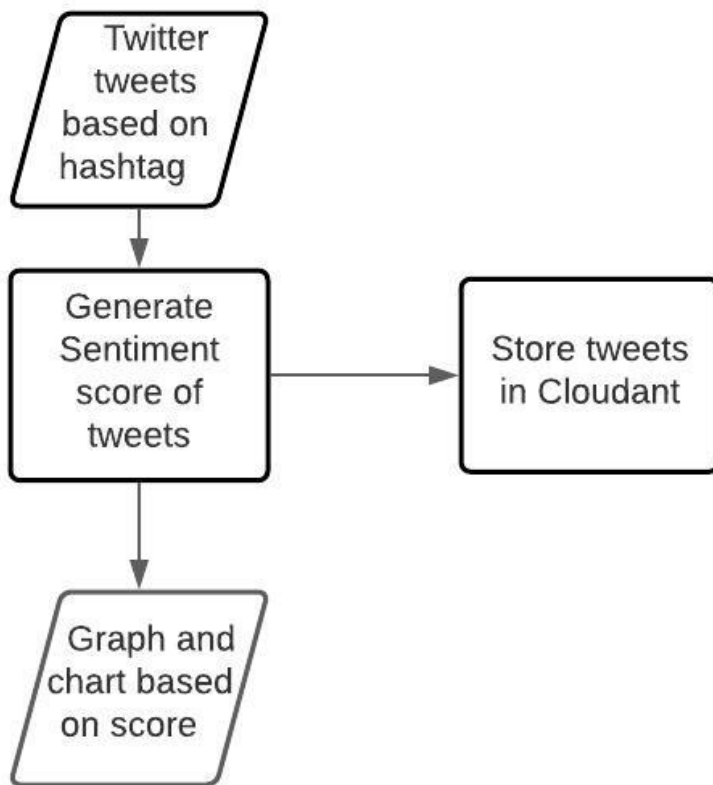

FIGURE 5.1 Flowchart of Web based Dashboard for Covid-19 Twitter Sentiment analysis

6. RESULT

The tweets are analysed and the score generated by the sentiment node is displayed using graphs and charts.
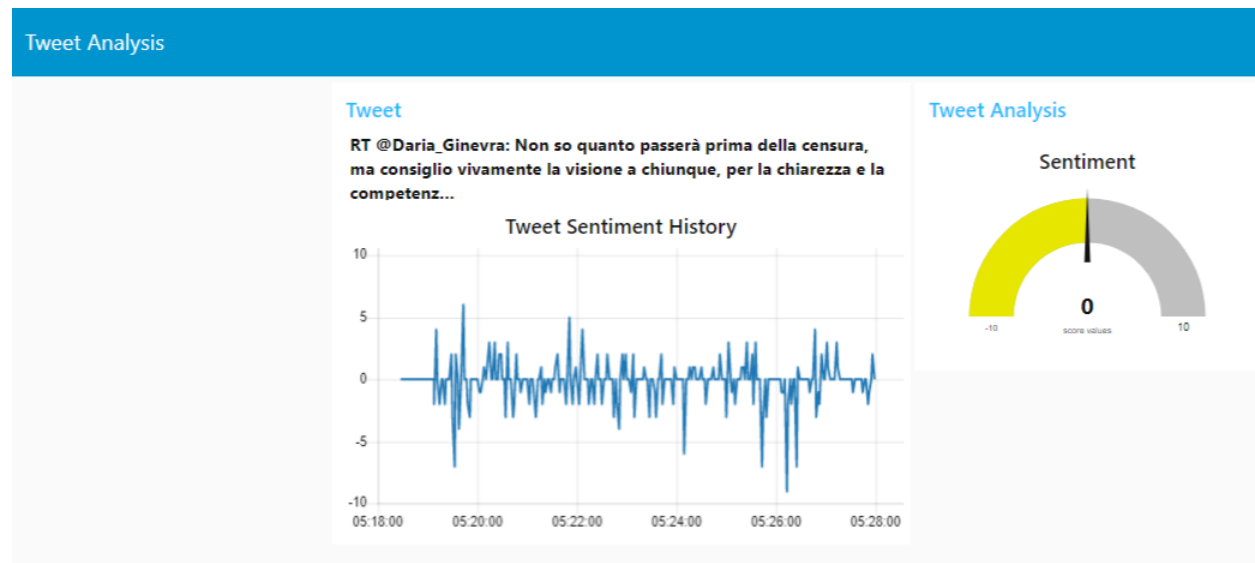

FIGURE 6.1 Twitter Analysis Dashboard

7. ADVANTAGES & DISADVANTAGES

Advantages:
- This project provides a pictorial representation of the sentiments of the tweets in the form of graph and chart. For more understanding some of the tweets are also displayed.
- This project provides a representation of the sentiment of the public from twitter posts. This helps the in situations like the lockdown, where people have no other means to express opinion.
- It provides tweets associated to various situations.

Disadvantages:
- Here we analyse the posts of people on twitter but does not consider the images that can be part of the tweet. The analysis of the image would help provide more details regarding the sentiment of the posts.
- Multiple platforms are not analysed and only tweets from twitter is considered.

8. APPLICATIONS

- This project provides a visual representation of the score of the sentiments of tweets hence the huge amount of data now available can be broken down into a graph or chart which is easier to understand.
- The project helps gather data from the public even when a situation like the lockdown persists. So this analysis gather data from all locked up at home.
- This project could be used by the authorities to know the reactions of people to various decisions taken by them and make the necessary changes if required.

9. CONCLUSION

In this project, we analyzed the sentiments of COVID-19 related tweets in several ways. The charts and graphs help provide a pictorial representation of the score of sentiments. To fight the coronavirus we not only need the guidance from the government but also a positive attitude from the public. Our analysis provides a potential approach to reveal the public's sentiment status and help institutions respond timely to it. Current data obtained are essential for fighting similar outbreaks in the future and to stand in the face of these crises, not only as medical doctors and researchers but also as scientists from all domains, communities and decision-making bodies. In addition, studies based on the data should consider how various areas can be an asset in the future. From the perspectives of computer science, technologies, such as AI, IOT and different analysis procedures, can contribute to making a difference. Proper usage of these data can help prevent the re-emergence of another such crisis.

10. FUTURE SCOPE

The project provides a graphical representation of the textual posts from twitter. Since images also contribute to the sentiment of a post, analysis of images could help improve the accuracy of the graphs and charts. If more granular data such as geographic data, demographic information, and so on are taken, further insights can be generated, such as public sentiment monitoring the hardest-hit areas. This would help problems of various regions to be observed as well.

11. BIBLIOGRAPHY

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- "Steps to set up Twitter Credential".
  https://node-red.gitbook.io/node-red-twitter/workshop/twitter-credentials-setup

- "Listen for Tweets for a specific word, hashtag or handle".
  https://node-red.gitbook.io/node-red-twitter/workshop/tweet-simple-1

- "Search for positive or negative tweets. You could retweet positive tweets or SMS tweets to your friends. Sentiment Twitter flow".
  https://node-red.gitbook.io/node-red-twitter/workshop/tweet-sentiment

APPENDIX

A. Source code

[{"id":"6198e496.532d5c","type":"tab","label":"Tweet Dashboard","disabled":false,"info":""},{"id":"907892f7.fb033","type":"debug","z":"6198e496.532d5c","name":"Positive Tweet debug","active":false,"console":"false","complete":"payload","x":900,"y":280,"wires":[]},{"id":"cece2126.6e9c","type":"switch","z":"6198e496.532d5c","name":"Positive / Negative Tweets","property":"sentiment.score","propertyType":"msg","rules":[{"t":"gte","v":"2","vt":"num"},{"t":"lt","v":"0","vt":"str"}],"checkall":"true","outputs":2,"x":610,"y":340,"wires":[["907892f7.fb033"],["b0840e12.c43f1"]]},{"id":"43337e3b.c8918","type":"debug","z":"6198e496.532d5c","name":"msg.sentiment.score","active":false,"console":"false","complete":"sentiment.score","x":600,"y":300,"wires":[]},{"id":"3118dd7a.9a7032","type":"twitter out","z":"6198e496.532d5c","twitter":"","name":"Retweet positive tweets","x":910,"y":320,"wires":[]},{"id":"e506f12e.75cff","type":"twitter in","z":"6198e496.532d5c","twitter":"","tags":"#covid19,#pandemic,#lockdown extend","user":"false","name":"Listen to twitter feed","inputs":1,"x":110,"y":100,"wires":[["37ae2fc8.29251","d1fab5df.0b7568","d79d2556.265

9e8"]]},{"id":"37ae2fc8.29251","type":"debug","z":"6198e496.532d5c","name":"msg.tweet details","active":false,"console":"false","complete":"tweet","x":490,"y":60,"wires":[]},{"id":"8e 101cb9.e345f","type":"sentiment","z":"6198e496.532d5c","name":"Sentiment of Tweets","x":340,"y":320,"wires":[["43337e3b.c8918","cece2126.6e9c","df46dc1e.87c03"]]},{"i d":"b0840e12.c43f1","type":"debug","z":"6198e496.532d5c","name":"Negative Tweets","active":false,"console":"false","complete":"payload","x":880,"y":400,"wires":[]},{"id": "d1fab5df.0b7568","type":"function","z":"6198e496.532d5c","name":"Remove URLS and replace #","func":"var tweet = msg.tweet.text;\nvar newtweet = tweet.replace(/#/g, \" Hash tag \");\n\n// regex from https://stackoverflow.com/questions/1500260/detect-urls-in-text-with-javascript\nmsg.payload = newtweet.replace(/(([a-z]+:\/\/\/)?(([a-z0-9\-]+\.)+([a-z]{2}|biz|com|co|edu|gov|info|net|org|ly))(:[0-9]{1,5})?(\/[a- z0-9_\-\.~]+)*(\/([a-z0-9_\-\.]*)(\\?[a-z0-9+_\-\.%=&]*)?)?(#[a-zA-Z0-9!$&'()*+.=-_~: @/?]*)?)(\\s+|$)/gi, \"see short URL \");\nreturn msg;","outputs":1,"noerr":0,"x":520,"y":140,"wires":[["ac99559c.232458","8e101cb9.e345f"]]}, {"id":"ac99559c.232458","type":"debug","z":"6198e496.532d5c","name":"","active":true,"conso le":"false","complete":"payload","x":790,"y":140,"wires":[]},{"id":"d79d2556.2659e8","type":" debug","z":"6198e496.532d5c","name":"","active":false,"console":"false","complete":"tweet.text ","x":480,"y":100,"wires":[]},{"id":"7e812fa.d0d6ed","type":"function","z":"6198e496.532d5c", "name":"Store Tweet data","func":"// tweet object includes a timestamp_ms\nmsg.payload = { \"timestamp\" : msg.tweet.timestamp_ms ,\n \"tweet\" : msg.tweet.text,\n \"sentiment\" : msg.sentiment.score};\nreturn msg;","outputs":1,"noerr":0,"x":590,"y":480,"wires":[["b9a084c2.62abf8"]]},{"id":"df46dc1e.87 c03","type":"delay","z":"6198e496.532d5c","name":"","pauseType":"rate","timeout":"5","timeo utUnits":"seconds","rate":"5","nbRateUnits":"10","rateUnits":"second","randomFirst":"1","rand omLast":"5","randomUnits":"seconds","drop":false,"x":380,"y":520,"wires":[["aa91881.303557 8","7099a758.087f58","7e812fa.d0d6ed"]]},{"id":"b9a084c2.62abf8","type":"cloudant out","z":"6198e496.532d5c","name":"","cloudant":"","database":"twitter","service":"node-red-n boit-2020--cloudant-1609423107851-91518","payonly":true,"operation":"insert","x":770,"y":48 0,"wires":[]},{"id":"289bfe9d.d28e32","type":"ui_text","z":"6198e496.532d5c","group":"b3b75e 7b.7f54e","order":1,"width":0,"height":0,"name":"","label":"","format":"{{msg.payload}}","layo ut":"row-left","x":770,"y":520,"wires":[]},{"id":"9b380c14.6b45a","type":"ui_gauge","z":"6198 e496.532d5c","name":"","group":"ec53287d.0da428","order":1,"width":0,"height":0,"gtype":"ga ge","title":"Sentiment","label":"score values","format":"{{value}}","min":"-10","max":10,"colors":["#00b500","#e6e600","#ca3838"], "seg1":"","seg2":"","x":780,"y":560,"wires":[]},{"id":"d18c5ec4.8e5f1","type":"ui_chart","z":"6 198e496.532d5c","name":"","group":"b3b75e7b.7f54e","order":2,"width":0,"height":0,"label":"

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