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Sentiment Analysis of 21 daysCOVID-19 Indian lockdown tweets

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ABSTRACT

Novel Corona Virus 2019 disease has changed our lives and interactions. During the COVID-19 global pandemic lockdown period, users expressed their concerns about the crises via social networks. The study analyzes the general public's response towards the COVID-19 preventive 21-day lockdown in Indiafrom25th March2020 to 14th April 2020.The Indian general public actively responded to lockdown related Twitter hashtags both positively and negatively.The dataset of the lockdown period tweets was analyzed daily to gauge the overall response of the public.The research identified the most frequently used words and word pairs as the highlights of conversations. The results of the study conclude that the presence of top negative and top positive words in the dataset can help understand the psychological state of the general public.

Keywords*: *COVID-19, Lockdown, Sentiment Analysis, Twitter, Wordcloud

I. INTRODUCTION

Novel Coronavirus disease or COVID-19has infected about 4.6 million people worldwide as of mid-May, 2020 [1]. Thediseaseoriginating from Wuhan, China,hasaffectedmost of the countries of the world.India, like many other countries, has imposed a lockdown on its citizens to slowdown the spread of the disease[2].The first complete lockdown in India was implemented for 21 days starting from 24th March 2020. People have been restricted to their homes and those who move out to support essential services are observing strict social distancing norms. Public life in India, hometo the world's second-largest population during long lockdown periods has witnessed a lot of changes. The new social order of self-isolation, quarantine and lockdowns has inspired people to communicate via social media platforms [3]. The spread of news items and the general public's response to them has been swift thanks to the social media platforms.

Twitter allows its users to share their thoughts, feelings and opinions. The general public often shares positive and negative reviews on government decisions concerning their life [4].When the Indian Prime Minister, Mr.NarendraModiannounced the first lockdown of 21 days, the Indian twitter users actively responded to the trending hashtags like #21daylockdown, #Lockdown21, #CoronaLockdownIndia and #CoronavirusLockdown.

During the lockdown of 21 days, tweets corresponding to these hashtags were mined on a day to day basis and a cumulative sentiment score was calculated for each day's dataset.

The present study has been performed to visualize the daily sentiment score of Indian user's tweets and to identify the most influential positive and negative words and word pairs that reflect the overall state of mind of the people during the 21-day lockdown. This represents the pandemic's effect on the lives of people and can help the policymakers in planning their course of action in fighting COVID-19.

II. LITERATURE REVIEW

Several researchers have tried to gauge the sentiments of citizens by mining their responses on the Twitter platform [5]. The authors have focused on different initiatives taken by the Indian government to keep the morale of the public positive.Students and teachers in the Philippines are facing new challenges in the learning processes due to the COVID19 pandemic[6].The study concluded that most of the students have expressed an inability to keep up with the new system.

Sentiment and emotion analysis was performed on the tweets of citizens of the USA and Indiaabout their leaders [7]. The sentimentsof the Indian citizenswere found to be more positive than that of the citizens of the USA.Weibo postsreveal about the mental health of the Chinese people during the COVID19 pandemic times [8].The study used Online Ecological Recognition (OER) for recognition of psychological profileusing various machine learning predictive models. The study reported a spike in negative emotions and a fall in positive emotions; people expressed more concern to health and family.

A study was conducted on the SinaMicroblogto investigate the public response to COVID19 [9]. Collected data were analyzed using the ROST Content Mining System for sentiment analysis. Changes in trends in public responses were reported which can help the government in public policymaking.Sentiment analysis of the tweets of citizens of twelve countries about theCOVID19 pandemicrevealed that there was a high positive sentiment from Belgium, India and Australia [10]. China had the most negative sentiment among the sampled countries and the most frequently used words were "Donald Trump", the name of the US president. A hopeful and positive attitude was seen in the majority of people worldwide.

III. METHODOLOGY

Tweetsfor the popular hashtags#21daylockdown, #Lockdown21, #CoronaLockdownIndia, and #CoronavirusLockdown were retrieved using Twitter API (Tweepy). Approximately 5000 tweets were extracted daily in the 21day lockdown period. Sentiment analysis helps to parse text data and compute the sentiment conveyed in it [11]. It helps to detect the polarity from the text document. User response can be positive, negative, or neutral. For each tweet, subjectivity value (range 0 to 1) and polarity value (range -1 to +1) was calculated and the total

value ofsentiment was calculated as the summation of the product of subjectivity and polarity values of the individual tweet.Table 1 provides a snapshot of the sentiment calculation process.

Table 1. Sentiment Calculation

Tweet	Polarity (p)	Subjectivity (s)	Sentiment (p * s)
going really difficult parents find different reasons fight during lockdown	-0.25	0.8	-0.2
This generous gesture welcome such free distribution defeating purpose SocialDistancingNow	0.2	0.65	0.13
Good measures by the government to keep us safe	0.6	0.8	0.48
Students classes stay connected with your studies during Lockdown with Creative Critical	0.25	0.9	0.225
farmer also very upset lockdown harvesting farmers debt and crisis	-0.6	0.62	-0.372
Support the government, hopes alive	0.7	0.6	0.42
This happens when incompetent announces lock down India without preplanned Poor people suffer	-0.3	0.4	-0.12

Significant words get repeated in the tweets and their frequency summarizes the meaning conveyed in the dataset. These words are the main focus of the discussion topics among the general public as shownin figure 1. Top wordpairs identified in the dataset have been listed in table 2.

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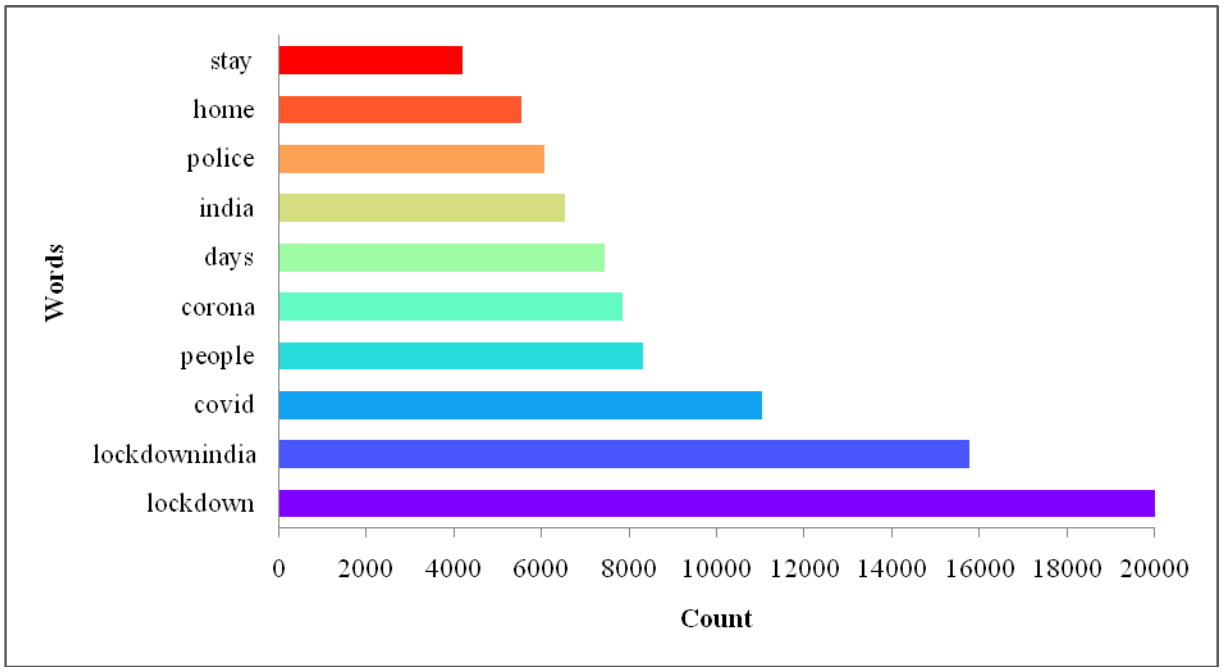

Figure1: Bar chart showing the most frequently used words

Table 2.Top word pair

Wordpair	Frequency
somebody, sent	76
sent, told	76
told, exactly	76
exactly, year	76
year, happened	76
happened, nation	76
nation, goes	76
locality, daylockdown	76
doctor, treated	75
treated, locality	75

Based on the frequency of words, aword cloud was generated for the visual representation andbetter understanding of popular words in the conversations as shown in figure 2.

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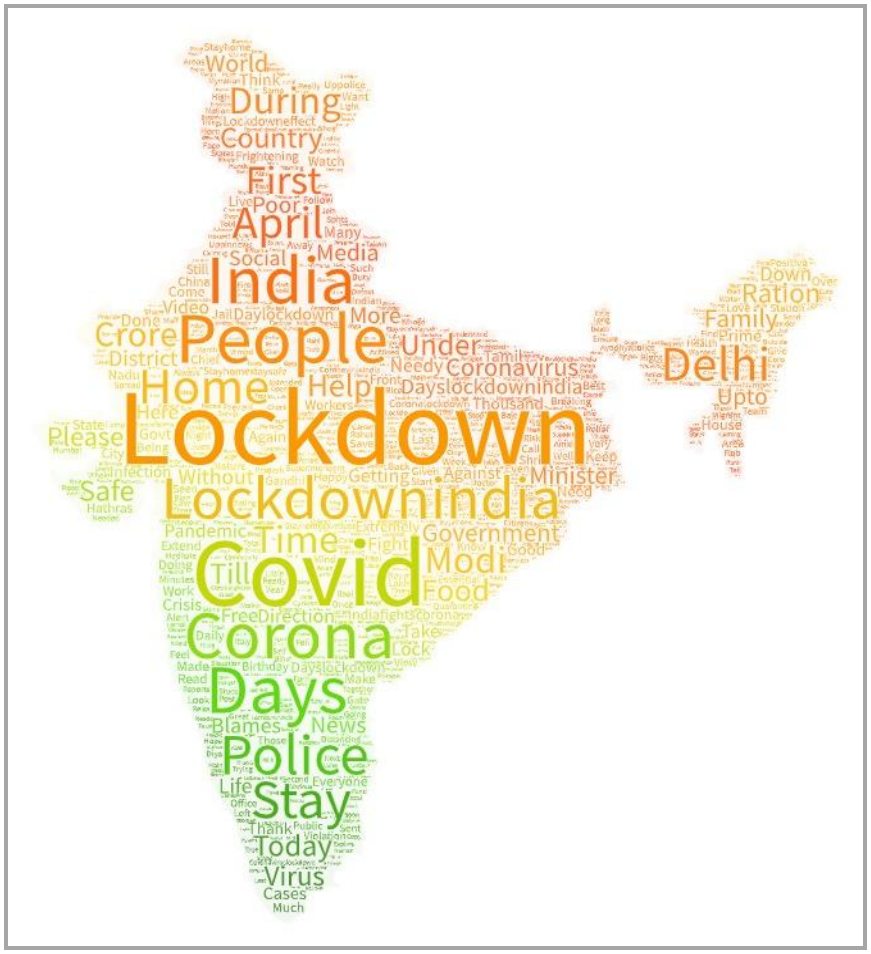

Figure2. Word Cloud of the dataset

IV. RESULTS

Sentiment analysis of the tweet dataset for the lockdown period reveals the most frequently used words which resulted in both positive and negative sentiments. The dataset was sorted according to the sentiment value columns separating negative and positive sentiment tweets. Table 3(a) lists the top positive words and table 3(b) lists the top negative words in the dataset. Table 4 (a) lists the top positive word pairs and table 4 (b) lists the top negative word pairs in the dataset.

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Table 3 (a)Top positive words (b) negative words

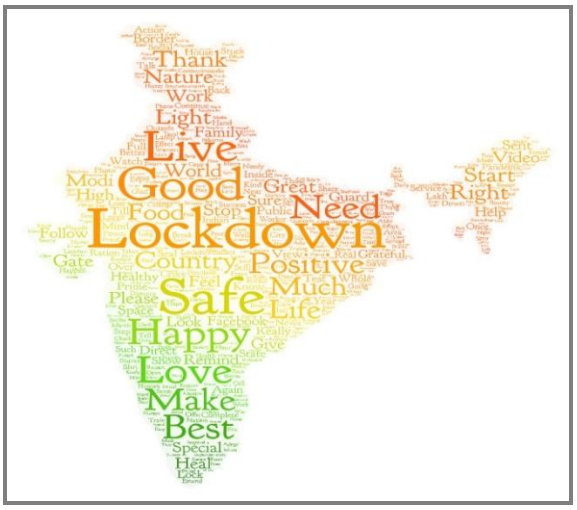
Word	Frequency
lockdown	4647
safe	1580
good	1102
happy	1055
positive	1017
love	1013
need	961
country	914
live	842
thank	771

Word	Frequency
family	1550
ration	1494
extremely	1469
frightening	1463
covid	1112
poor	1024
corona	733
police	642
spread	460
needy	420

Table 4 (a)Top positive wordpairs (b) negative wordpairs

Word pair	Frequency
happy,birthday	339
reminder,love	320
doing,great	144
thank,vibhatomar	119
great,look	119
vibha,efforts	119
today,food	119
beautiful,picture	73
very,happy	68
kind,attention	64

Word pair	Frequency
country,world	221
world,threat	221
threat,covid	221
covid,spread	221
spread,country	219
complaint,information	69
something,deadly	68
people,distress	46
active,cases	36
world,virus	35



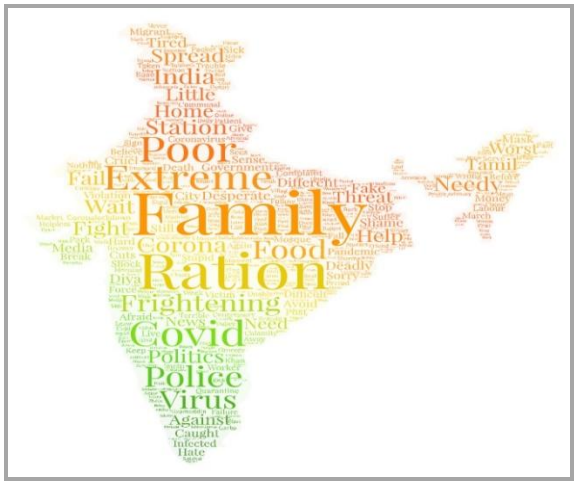


Figure 3(a) Positive wordcloud(b) negative wordcloud

The total day-wise sentiment was plotted as shown in figure 4. The psychological state of the general public is reflected in the overall sentiment score of a particular day and also as a whole for the entire lockdown duration.

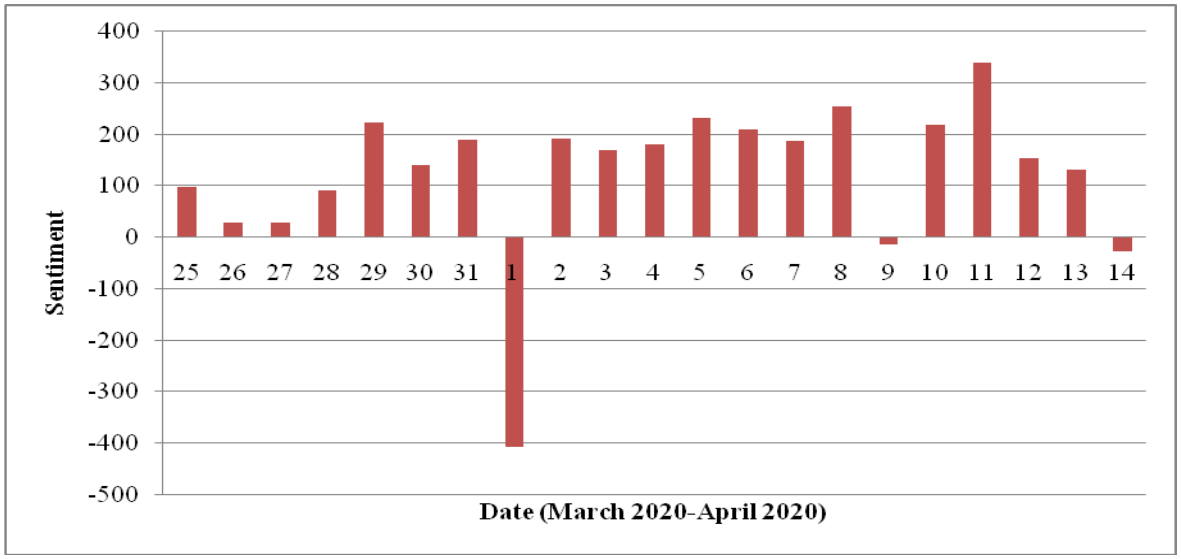


Figure4: Bar graph showing sentiment of the 21 days

Out of the 21 days, the overall sentiment for three days (1stApril, 9th April and 14th April) was negative and the sentiment for the rest of the days was positive which corresponds to the presence of negative and positive words in the tweets of those days respectively.

V. CONCLUSIONS

Analysis of tweet dataset about prevailing situations such as COVID-19 can be used as an indicator of the general public's overall sentiment. The frequency of words and word pairs posted by users in their posts reveals the overall situation of a region or a country. This can help policymakers in gauging the situation in the event of a pandemic and plan to cope with it. Words like "ration" concern about the availability of food; "threat" and "complaint" alarm about the well being of people. Tracking the respondents can help policymakers in resolving the issues and helping the people.

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