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# Sentiment Analysis of Twitter Data for COVID-19 Lockdown: India Statewise Perspective

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**Abstract:** *The whole human race is acquainted with the truth that COVID-19 has taken the form of a pandemic. Almost, all the countries are endeavouring their best to circumscribe the dispersion as much as possible. This paper focuses to observe sentiments of Indians during a nationwide lockdown to find what was going on in people's minds due to lockdown and its extension announced by the Indian government. Data has collected from Twitter during the second lockdown period. The results revealed that the majority of the people shows a positive attitude for declared lockdown and need the extension of the lockdown for a month or two to control the spread across the country.*

**Keywords:** COVID-19, Lockdown, Pandemic, Sentiments, Twitter

## I. INTRODUCTION

Pandemics have always been profoundly unpredictable events in history, due to the immense complexity of the interactions between viruses and humans. Covid-19 has been originated from Wuhan, China [1]. We all are seeing the effects of COVID-19 pandemic sweeping across the world caused by a newly discovered Coronavirus [2].

The Indian Government confirmed its first case of COVID -19 on 30th January 3 [3] The transmission escalated during February and March and by the end week of March, confirmed cases crossed 1200 [3]. Due to expeditious increase in the infected cases and fear of suffering from irreparable damage, Mr. Narender Modi, Honourable Prime Minister of India enforced a nationwide lockdown for 21 days on 24<sup>th</sup> March without waiting for the problem to escalate and to control the spread of Coronavirus [4]. This announcement did not come as a bombshell to 1.3 billion populations as Indians were exposed to a partial lockdown situation in the form of Janta Curfew on 22<sup>nd</sup> March [5]. Prime Minister addressed the population by stating that Janta Curfew is just the commencement of a long battle against COVID-19 and this helped in getting ready the people mentally for nationwide lockdown.

Experts suggest the number of infections could be much higher but due to timely lockdown in India, it does not reach its worst phase as it has reached in other countries like the USA, Italy, and Spain. As per reports [3] in April month, 5,000 cases were reported on 7 April and 10000 cases on 14th April. The situation of the Coronavirus outbreak was transmuting fast, thus keeping in mind the safety of Indians, on 14<sup>th</sup> April the prime minister elongated the perpetual nationwide lockdown till 3<sup>rd</sup> May [6]. As of on 27th April, a total of 28,380 cases have confirmed by the Ministry of Health [3].

During the lockdown time, citizens were advised to be disciplined and cooperate. Moreover, they were strictly asked to maintain social distancing and stay at home.

## II. RELATED WORK

During the first lockdown period, the emotional strain was visible on people's faces and the dark cloud of depression looms large on the horizon. People have shown feelings of concern, fear, surprise, sadness, anger, and trust [7]. Overall people's attitude was positive in a manner that the government would implement the lockdown successfully and make arrangements of all the essentials for all 130 million. In the meantime, many of Indian Celebrities, Ministers [8] Gurudwara's [9] and Spiritual Gurus [10] came forward for help the nation. People offered prayers to God to get out of this worst phase. Everyone including school children has made efforts at their best to serve the nation. The majority of Indians were following guidelines imposed by the government and were adopting best practices to break the chain of Coronavirus. People were under their roof only and went out only for the essentials by following social distancing and making use of hand sanitizers and masks. Service providers worked tirelessly to provide Indians with all essentials. People appreciated government efforts and saluted the front line warriors. Overall, the first lockdown period proved to be a big achievement battling against COVID-19.

## III. DATA AND METHODOLOGY

This section discusses about datasets used and methodology adopted for data pre-processing and sentiment analysis task. Figure 1 shows the workflow of the system.

**A. Data Collection**

We have used Twitter data for our analysis. To know the feeling of Indians towards extended lockdown period, Tweets were collected for whole country India and some top most Corona affected states of India during the second lockdown. Tweets were extracted and analyzed using Python programming language. For the whole country India, We have extracted the Tweets using 4 important hashtags named #IndiaLockdown, #Coronavirusoutbreakindia, #Covid19india, and #IndiafightsCorona for 7 days from April 21<sup>st</sup> 2020 to April 27<sup>th</sup> 2020. State-wise tweets were extracted using hashtags named #Maharashtralockdown, #Gujaratlockdown, and #Delhilockdown. We have considered a total of 42000 tweets for the analysis.

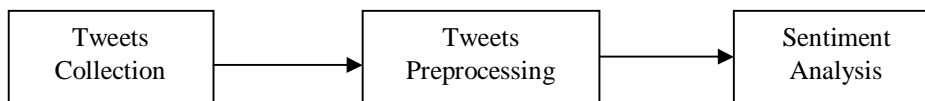


Fig. 1. Workflow of system

**B. Data Preparation and Analysis**

The collected tweets contain noisy and irrelevant data which cannot be directly used for sentiment purpose. In order to clean twitter data, pre-processing was done.

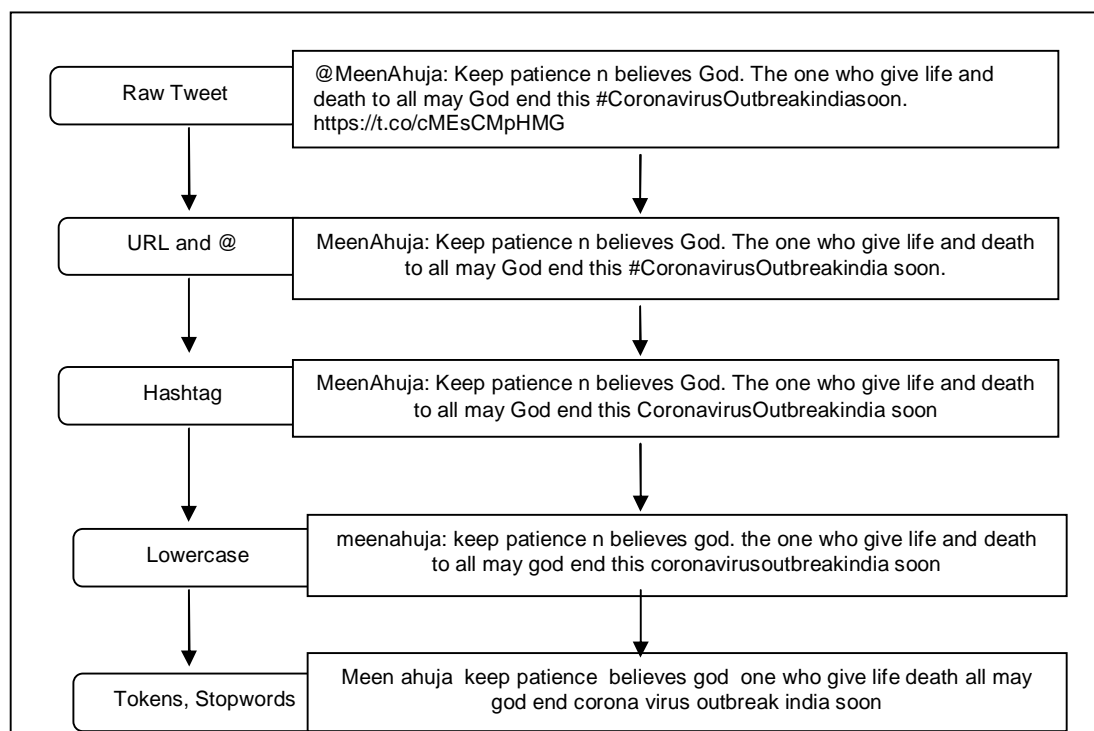


Fig.2. Pre-processing of Tweets

Figure 2 shows pre-processing steps that have been adopted for cleaning the raw tweets and are described below.

- 1) *Removal of URLs and '@' symbol:* The first step includes the removal of URLs and the words that start with '@' symbol. The entire word starts with '@' could be removed as the '@' symbol always has a username followed, which is useless.
- 2) *Removal of Hashtag (#):* The word starts with '#' is Hashtag and it gives a topic or tag to the tweet. This word might give some information but not very important. So the entire word starting with a # symbol is removed and treats the tag as a normal word in a tweet.
- 3) *Lowercase:* All the words existing in the given tweet is converted to lowercase letters.
- 4) *Tokenization:* The tweets are split into words by considering the space between them. These are called the tokens creating a bag of words.

5) *Removal of Stopwords:* There exists some common purpose words in a sentence, like ‘a’, ‘the’, ‘or’, ‘and’, ‘to’, ‘at’, etc. These words are called stopwords and appear several times in a single sentence. These words seem to be useless for sentiment analysis therefore removed from a tweet. Only the data which contribute most for the sentiment identification remains in the text.

**C. Sentiment Analysis**

In order to find sentiment of pre-processed tweets, Support Vector Machine classifier was used to categorize the sentiments in different categories. Dataset was divided in to Training and Testing datasets of ratio 70 and 30.

**IV. RESULTS AND DISCUSSIONS**

Tweets have been analysed for whole “India” and Top affected states named “Maharashtra”, “Delhi” and “Gujarat”.

Table 1 shows details of total Tweets for India and Table 2 shows State-wise total Tweets.

Figure 3 shows the feeling of Indians behind the tweets during the second lockdown period. The most effective sentiment that stood out is positive. The Indian government was putting all their efforts to make this extended lockdown also a success. The entire nation was on lockdown to control the spread of COVID -19 but some of the Bravehearts like Police, Doctors, Nurses, Telecom operators, and Sweepers working around the clock. Due to these efforts, some of the States become Corona-free also. The actions taken by India’s prime minister was appreciated by all. Some of the people show negative feelings due to their anger towards the people that were not strictly following the lockdown. The next prominent sentiment that can be seen as the Extension of lockdown. Due to the present situation of COVID -19 as on 29<sup>th</sup> April, people were anxious and need the lockdown to be extended beyond 3<sup>rd</sup> May for a month or two to control the spread of the virus.

Table 1 India total tweets

Country	Tweets				
	Total	Positive	Negative	Extend	Open
India	31553	17345	4064	9564	580

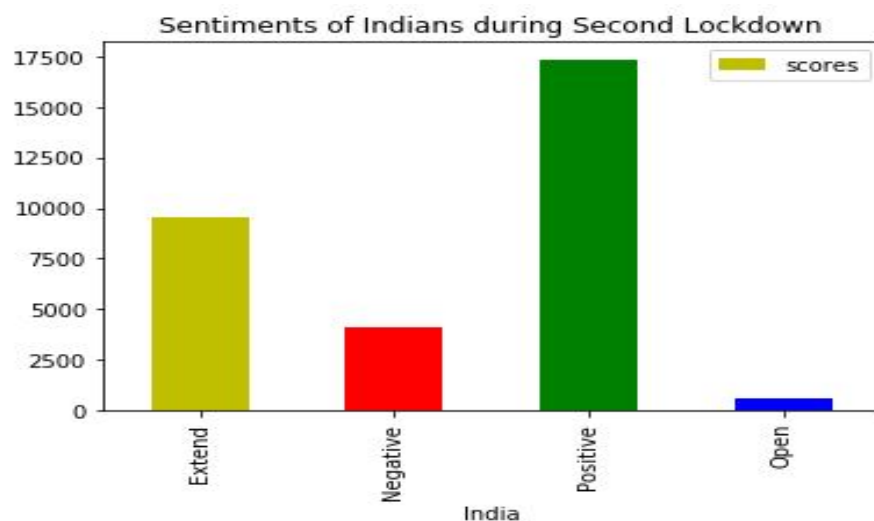


Fig. 3. Sentiments of Indians during the second lockdown

The next sentiment was to Open the lockdown. Very few people belonging to Corona-free states which were under green zone want the lockdown to be opened in a planned manner. Though this number was very less because people knew that opening the lockdown means to ask for trouble.

Figure 4 shows Statewise hidden sentiments behind the second lockdown. It can be observed that people of various states have shown a positive attitude towards the lockdown. Chief Ministers of many states sent transport buses to bring back students trapped in Kota. Due to appropriate action taken by leaders, the positive sentiment stood out. The next observed sentiment was the Negative attitude of different states of people. People were annoyed due to the rise of new cases even after 30 days of lockdown and showing anger for the foolish people that threw stones on the police and Doctors. People were not strictly following the protocols of lockdown. Middle-class people also showed anger as they had no income for the last one month to run their life. The next observed and prominent sentiment was an extension of lockdown. People felt that they must have a strict lockdown extension to contain the spread of COVID-19 and ought to be strictly followed. In the containment and red zones, not even a single Indian asked the government to open the lockdown.

Table 2: Statewise total tweets

State	Tweets			
	Total	Positive	Negative	Extend
Maharashtra	4340	2500	600	1240
Delhi	4044	2000	942	1102
Gujarat	4784	2723	852	1209

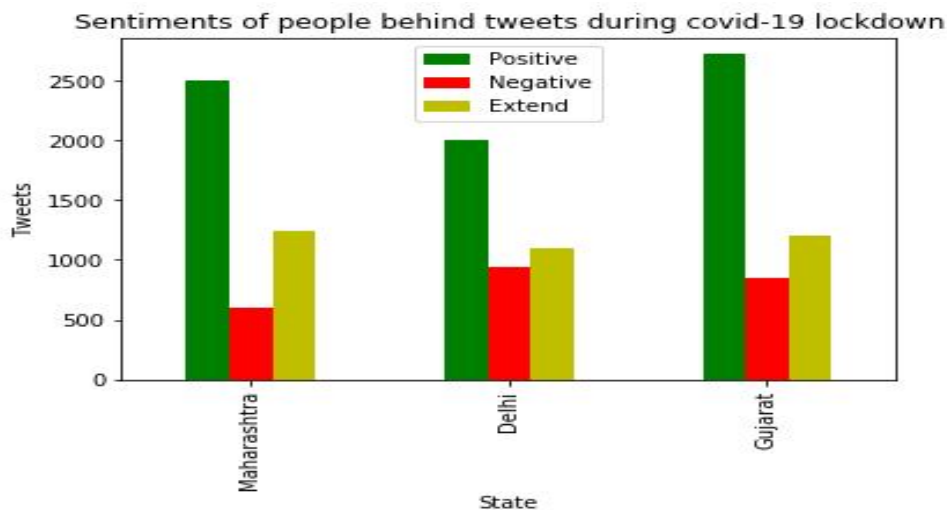


Fig. 4. Statewise sentiments of Indians during the second lockdown

Figure 5 to 7 shows Comparison of Sentiments of overall India, joint sentiments of all States and India with all states. It can be observed that among all the graphs, overall Positive sentiment stood out afterwards Extension sentiment followed by Negative sentiment. Majority of people were in favour of ongoing Lockdown and its extension. Very few people were in favour to open the lockdown.

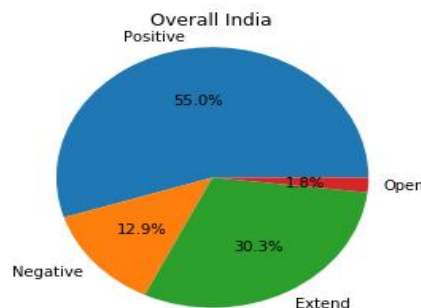


Fig. 5. Percentage of different sentiments of Overall India

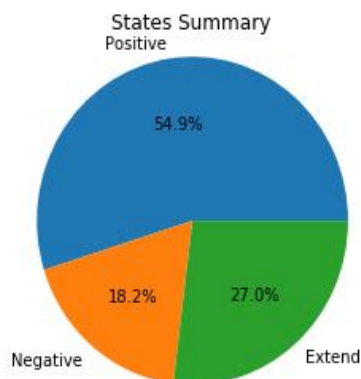


Fig. 6. Percentage of Joint sentiments of all states

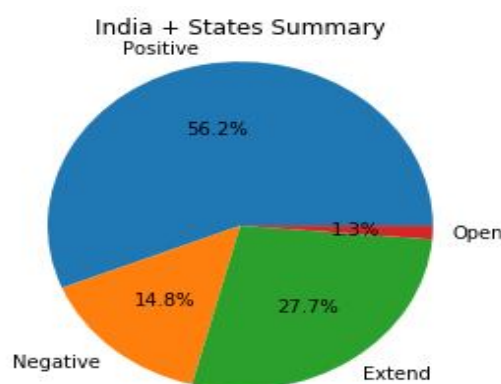


Fig. 7. Percentage of sentiments of India with all states

In a nutshell, given the scale of the challenge, India's response to COVID-19 has been backed to date by coordinated action plans. India is one of the best-performing countries in this global fight against Coronavirus. India's proactive plans hold lessons for the other countries too. This is the result of the collective effort of law-abiding citizens who have maintained the Modi Government lockdown guidelines. There is currently no vaccine and appropriate treatment for COVID-19. The COVID-19 impact will remain visible in the coming months. Masks and face covers will be part of life. There is still a long road ahead. Breaking the chain is the only way to defeat corona.

### V. CONCLUSION AND FUTURE WORK

Indians over twitter advised the whole nation to be responsible and need to take all precautions to keep our society healthy & safe. A healthy immune system is Key to being prepared to fight the deadly Coronavirus. So people were advising to boost their immunity level. This paper analysed sentiments of Indians during second lockdown. Majority of people were happy with the government decision of being under lockdown for few days or months. They demanded the extension of lockdown period. In the midst of all this, negative sentiment was also seen out. Future work may involve analyzing tweets for all lockdown periods to observe the change from beginning to the end.

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