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## Sentiment Analysis of Covid-19 Lockdown in India

#### **Rovin Hencal Dsouza**

Department of Computer Applications, St Joseph Engineering (Autonomous) College, Vamanjoor, Manglore, India

**ABSTRACT:** The COVID-19 pandemic has resulted in unparalleled worldwide alterations, encompassing lockdowns in numerous nations. A national lockdown was implemented in India in March 2020 to stop the virus's spread. People's lives were profoundly affected by this lockdown, especially in terms of their mental health and general wellbeing. This study examined Twitter data to gauge public opinion regarding the Indian lockdown. Using pertinent hashtags and keywords, we gathered tweets between April 20 and April 27, 2020, and we pre-processed the data using natural language processing methods. The tweets were divided into three categories using machine learning algorithms: neutral, negative, and positive. According to our research, the majority of people in India had positive opinions about the lockdown, and many of them expressed support for the measures. We additionally further categorized the comments using particular positive and negative terms. This study sheds light on how the Indian public views the lockdown and emphasizes the need for supportive and efficient communication to lessen the detrimental effects on mental health and general wellbeing.

#### **KEYWORDS:** COVID-19,Lockdown, Sentiment Analysis

#### I. INTRODUCTION

TheCOVID-19pandemic hashad a significant worldwide impact, resulting in lockdowns in numerous nations. To stop the virus's spread, a nationallockdown was imposed in India in March 2020. Significant alterations to daily life resulted from thislockdown, including limitations on movement, business closures, and the stoppage of public transportation. The lockdown was initially supposed to last 21 days, but it was repeatedly extended, leaving people all around the nation with ongoing uncertainty and fear.

Users of social media sites like Twitter can share their opinions and feelings about a range of subjects, including the shutdown. In order to better understand the impact of the lockdown on mental health and well-being, lawmakers and public health experts can benefit from analyzing the mood of Twitter data.

In order to determine how the Indian public felt about the shutdown, we examined sentiment data from Twitter in our study. Using pertinent hashtags and keywords, we gathered tweets between April 20 and April 27, 2020, and then we pre-processed the data using natural language processing methods. Following that, the tweets were categorized as good, negative, or neutral using machine learning techniques. We additionally further categorized the comments using certain positive and negative terms.

The purpose of this study is to shed light on how the Indian public views the lockdown and to underline the importance of supportive and efficient communication in addressing the detrimental effects on mental health and general wellbeing. Additionally, it looks for sentiment shifts across time and regional variations in sentiment. The results of this study can help shape remedies and policies that lessen the detrimental consequences of the lockdown on the populace.

#### **PROBLEM DEFINITION**

The purpose of this study is to examine how Indian Twitter users feel about the government's lockdown policies during the COVID-19 outbreak. Because of the pandemic's severe global disruption and suffering, governments have been forced to impose lockdowns in an effort to stop the virus's spread. India has implemented multiple lockdowns since March 2020 as a result of the devastating consequences on its sizable population and heavily populated cities.

Twitter data sentiment analysis can provide insightful information about how the public feels about these lockdown procedures. Policymakers and public health experts in India and other nations with comparable issues need to know this knowledge. This study aims to categorize tweets about the lockdown as favorable, bad, or neutral in order to gain

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insight into the general public's opinion and the lockdown's effects on people's daily lives. Furthermore, based on public input, this study can assist in identifying areas where the government's reaction might be strengthened.

#### **II. LITERATURE SURVEY**

They conducted a sentiment analysis on more than 600,000 tweets on COVID-19 and coronavirus for the time span starting from February 27, 2020, to March 25, 2020. In this research, the authors used the NRC lexicon to discover insights from COVID-19 tweeters.

From the period starting on February 27, 2020, to March 25, 2020, Dubey and Dutt et al.[2] carried out an analysis of the emotional tone of tweets related to the global pandemic on words like COVID-19, CORONAVIRUS, CORONA, STAY HOME, STAY SAFE, COVID-19.

They crawled Twitter data between April 9- 15, 2020, with the keywords COVID-19 and coronavirus. Using Twipy and the TextBlob library in Python, they examined around 500,000 tweets, finding that 50% of the tweets are neutral, 36% positive, and 14% negative.

Mrityunjay Singh et al.[4] performed the task of sentiment analysis over Twitter data using the BERT model; this geosorted the tweets in order to compare opinion trends both nationally and internationally. The tweets were crawled during a period when the coronavirus was significantly impacting people's personal and professional lives across the globe.

Yuvraj Jain et al. [5] developed a model that analyzed the headlines and predicted the stock market movement with an accuracy of 80.24%. They have successfully demonstrated this model through the analysis of tweets about COVID-19.

They study the sentiment on Twitter related to the COVID-19 lockdown in India, from 25th March to 9th June 2020, using various keywords. TextBlob tool, that is based on NLTK, has been used for the analysis of sentiments in real-time and Twitter API for fetching the tweets of the different keywords.

Prasoon Gupta et al.[7] applied NLP with machine learning classifiers to Indian Twitter data for sentiment analysis. In their research, they fetched 12,741 tweets using the "India Lockdown" keywords from April 5 to 17. Tweepy API was used to extract data, TextBlob and VADER lexicons for annotation, and Python's natural language toolkit for preprocessing.

In their work, László Nemes and Attila Kiss et al. applied natural language processing and sentiment classification by recurrent neural network for the analysis of trends and manifestations in comments, hashtags, posts, and tweets created by Twitter users, mainly related to "covid" and coronavirus themes.

Tanmay Vijay et al. [9] gathered Indian COVID-19 tweets from November 2019 to May 2020 and annotated them as positive, negative, or neutral. They prepared state-wise, month-wise, and combined datasets to study reactions related to the lockdown and COVID-19.

Jim Samuel et al.[10] used textual evaluations of Twitter data in order to trace public mood related to the rapid spread of coronavirus and COVID-19 infections. Their study suggested a sentiment evaluation strategy, which encompassed keyword associations and crisis scenarios, opening with exploratory word clouds and sentiment maps.

In the work Maha A. Alanezi et al. [11], a comparison was made between k-means clustering and mini-batch k-means clustering to see how social distancing affected people during the COVID-19 pandemic. They prepared and explored datasets from WHO and the Bahrain Ministry of Health in order to find out the most frequent words, where the English and Arabic datasets were prepared and discussed.

Hamed Vahdat-Nejad et al. [12] collected more than two million English-language coronavirus-related tweets from the period between March 23 to June 23, 2020. They classified tweets by location using the GeoNames geographic database and a lexicon-based technique and propose a Roberta model-based sentiment analysis method. Based on this, they provided the tweet frequency and sentiment analysis for each country and globally.



Now, Sanjay Misra et al. [13] Extracted and Represented Emotion Responses on Pandemic COVID-19 Using TextBlob and VADER Analyzer with Historical Tweets, showing their implications for society, the environment, and the economy of Nigeria. The study will be useful to many students, researchers, and academics in data science, machine learning, and deep learning.

Qihuang Zhang et al. [14] scraped COVID- 19-related tweets from February 24, 2020, to October 14, 2020, in four Canadian cities Toronto, Montreal, Vancouver, and Calgary and four U.S. cities New York, Los Angeles, Chicago, and Seattle. They calculated sentiment intensity scores across the pandemic using RoBERTa, Vader, and NRC methods and plotted them against each other with comparisons of sentiments related to "masks," "vaccine," and "lockdown."

Cov-Att-BiLSTM was proposed by Waseem Ahmed et al. [15] for the sentiment analysis of COVID-19 news headlines using deep neural networks. Attention processes with embedding and semantic-level data labeling improved prediction accuracy, outperforming multiple deep and machine learning classifiers with a testing accuracy of 0.80.

Author	Technolog y	Accura cy	Dataset
Akash Dubey et al.	NLTK	71%	Indian data collectedfrom Twitter from January 14th to January 18th, 2021
Jim Samuel et al.	Linear Regressio n	74%	Worldwide Twitter data collected at the end of March 2020
Yassine Drias et al.	NLTK	68%	Worldwide Twitter data collected between 23rd February to 3rd March, 2020
Waseem Ahmed et al.	TextBlob	80%	Indian Twitter data extracted from January 2020 to December 2021

Table 1: Comparison of Techniques

#### **III. METHODOLOGY**

A systematic methodology was used in the study "Sentiment Analysis of Lockdown in India Using Twitter Data" to examine the sentiment of 4,895 tweets about the lockdown measures in India that were gathered between April 20 and April 27, 2020.



Fig 1: Methodology adapted in this research

**Data Collection:** From April 20 to April 27, 2020, 4,895 tweets pertaining to the lockdown measures in India were collected for the study "Sentiment Analysis of Lockdown in India Using Twitter Data". The Twitter API was used to gather the data, allowing for real-time data retrieval and filtering depending on particular keywords related to the lockdown procedures.

**Pre-Processing:** To get ready for sentiment analysis, the gathered tweets passed through a number of preprocessing stages. URLs, special characters, and stop words have to be eliminated throughout this procedure. The removal of stop words—words that are often used but have little meaning—improved the accuracy of the analysis. Additionally, as they generated noise instead of valuable material, punctuation, hashtags, and mentions (@) were removed. Tokenization was used to divide the tweets into individual words using Python's NLTK module. Since URLs added no meaningful information and potentially skew the study findings, removing them was essential. The quality of the sentiment analysis and the dataset's refinement were greatly enhanced by these preprocessing measures.

**Sentiment Score Analysis:** In "Sentiment Analysis of Lockdown in India Using Twitter Data," the study employed polarity to evaluate the tone of the tweets. The intensity of positive, negative, or neutral feelings is indicated by polarity scores, which range from -1 to 1. A score of -1 indicates extremely negative sentiment, a score of 0 indicates neutrality, and a score of 1 indicates strongly positive sentiment. To get these polarity scores, the Python textual data analysis application TextBlob was used. Based on its polarity score, each tweet was categorized into one of three groups: positive (score of 1 or higher), negative (score of -1), and neutral (score of 0). This classification aided in the study's sentiment analysis and comprehension of the general public's perceptions of the lockdown.

**Model Selection:** In addition to the TextBlob model for sentiment analysis, the study also used a logistic regression model. For classification, the supervised learning algorithm logistic regression was applied. The logistic regression model showed a more sophisticated method of sentiment analysis and provided encouraging findings for improving accuracy in subsequent studies. Nevertheless, depending on the particular requirements of the task, the trade- off between processing resources and accuracy should be taken into account when choosing a model for sentiment analysis.



### **IV. RESULT**

The study "Sentiment Analysis of Lockdown in India Using Twitter Data" looked at 4,895 tweets on the lockdowns that were put in place in India as a result of the COVID-19 pandemic. Users frequently add hashtags to their tweets in order to increase visibility and group their posts under relevant categories. In light of the study's background, the following pertinent hashtags about the Indian lockdown might have been included in the tweets that were gathered:



Fig-2: Hash Tags in the tweets

These hashtags may have been used by Twitter users to express their feelings and thoughts about the lockdown in India. The public's general opinion on the lockdown measures can be better understood by analyzing sentiment through tweets that contain these hashtags.

The polarity module in Python was used to perform the sentiment analysis, classifying the tweets as positive, negative, or neutral. According to the study, the majority of tweets voiced support for the lockdown procedures.



Fig-3: Bar Graph of tweets

Using a dataset of 4,895 tweets, the model was trained using logistic regression and achieved a test accuracy of 90%.





Fig-4 Confusion Matrix of Model

Word clouds weren't specifically mentioned in the study "Sentiment Analysis of Lockdown in India Using Twitter Data". Nonetheless, word clouds are a popular technique for presenting sentiment analysis data that helps identify the terms that are used most frequently.

Several terms associated with the lockdown measures in India are most commonly used, according to the study's findings: "lockdown," "COVID," "government," "cases," "vaccine," "coronavirus," "pandemic," "India," "health," "economy," "people," and "time." These phrases probably express a range of feelings and viewpoints regarding the lockdown.

By assembling these phrases into a word cloud, it is possible to visually depict the most frequently used words and determine the main subjects and ideas that were covered on Twitter during India's lockdown. Each term's magnitude in the word cloud indicates how frequently it appears in the tweets that were examined.

#### VI. CONCLUSION

The data examined for this study indicates that while expressing their ideas, Indians typically employ language that is favorable.

The study's findings show that the quantity of tweets increases significantly on days when a lockdown is declared. Even if these tweets are mostly filled with negative feelings, it seems that the Indian Twitter community is more inclined to reward positive tweets, which will cause the general polarity to move in favor of positivity.

People seem to have faith in the Indian government's ability to manage the problem, despite the fact that the coronavirus has caused anxiety and concern about the future. This study is unique due to the peaks in lockdown-related tweets and the favorable results of this investigation. Lockdowns attracted a lot of unwanted attention, yet the game was well lauded on social media. It's crucial to remember that this study only looked at English-language tweets.

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