SENTIMENT ANALYSIS ON FARMER'S PROTEST

REPORT SUBMITTED BY

ASHISH UPADHYAY

(21212003)

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DR. AMRITA DAHIYA

CYBER SECURITY RESEARCH CENTER

PUNJAB ENGINEERING COLLEGE

(DEEMED TO BE UNIVERSITY)

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1. Introduction

The farmers' protest in India is ongoing in the northern parts of India against the three farm acts passed by Parliament in September 2020. The three acts are: The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, The Farmers' (Empowerment and Protection) Agreement of Price Assurance and Farm Services Act, and The Essential Commodities (Amendment) Act. These Acts, according to the government, will "change Indian agriculture" and "attract private investment. "The Farmers' (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020, establishes contract farming, in which farmers produce crops in exchange for a mutually negotiated remuneration under contracts with corporate investors. Protesting farmers are concerned that powerful investors will bind them to unfavourable con- tracts created by major corporate law firms, with liability clauses that, in most circumstances, are beyond the comprehension of poor farmers. More than 40,000 protesters have committed themselves to ensure that the three acts are recalled as per their demand. The farmers have rejected the government proposal of suspending the laws for 18 months and the government has insisted that the protests are a result of misinformation.

The protests are an integral part of a democratic society and they can be fundamental in shaping the future of the society. When one community protests, the entire society comes forwards in in support of the community or to voice their own opinions against the community. This plays a crucial role in society's development. Many of such protests have been instrumental in discarding age-old beliefs that were not relevant in the current society. The protests also enable common people to be heard by their elected leader. At the same time, some form of protests can also cause violence and create an imbalance in society. It is important to understand the emotions behind online conversations to understand a protest because this allows us to take into consideration a broader audience and be inclusive of both direct and indirect participants. As a result of the widespread protest, there has been an influx of opinions and emotions shared by people on social media on an inter- national level. The opinions and sentiments of the public were across a diverse range. The farmers received support from all over the world with thousands of people expressing their opinions on social media. Hashtags like #farmersprotest, #iamwithfarmers, #SpeakUpForFarmers, #IStandWithFarmers and

#kisanektazindabaad were trending on twitter. However, lots of groups came forward and called it anti-national propaganda as well. Some groups also believed that the farm bills are in the favour of the farmers and the protests are being held because of a lack of information. In this fast-pacing world, information spreads digitally between users and it can also shape the way other users feel about an event. Therefore, it is crucial to understand the sentiment of the masses. Sentiment analysis is a technique of processing natural language to analyse and understand human emotions. We have used sentiment analysis to analyse twitter and hindustantimes newspaper textual data and it gives us an understanding of an important metrics: polarity. The polarity of the data ranges from -1 to +1, with -1 being a completely negative emotion, 0 being neutral and +1 being completely positive emotion. With this project, we aim to analyse and understand the sentiment of the masses regarding farmers' protest.

2. Motivation

- Project like sentiment analysis of a social event topic helps an accurate analysis of organizations to gain much better results and growth accordingly.

- Manual Surveys are expensive, time consuming and inaccurate.

- Unsocial event cause unrest in the society

3. Literature Review

S.No.	Year	Title	Accuracy of best Model	Models Used	Journal/ Confrence/ Publisher	Inferences Drawn
1	2014	Web scraping technologies in an API world	----	----	Oxford Academic	• Visual Web Ripper, Newbie, Mozenda, ScreenScraper, etc. desktop based web scrapping tools are discussed.
2	2015	Sentiments analysis of Twitter data using data mining	Random forest-99.24%	Naive bayes, KNN, Random-forest	IEEE	• Data mining classifiers is a good choice for sentiments prediction using twitter data
3	2015	Performance analysis of Ensemble methods on Twitter sentiment analysis using NLP techniques	Random forest-91%	Random forest, Decision tree	IEEE	• Prediction accuracy is increased using Disambiguation and WordNet • Extremely Randomized Trees classification has most accurate performance
4	2018	Analysis of News in the Hindustan Times and India Today	----	----	ResearchGate	• News percentage is higher in Hindustan times than India today in form of e-papers • Political news was found to be very dominating in Hindustan times over the scientific and other news
5	2021	Visualization of Twitter Sentiments on Kashmir Territorial Conflict	NRC lexicon-87.6%	NRC, Vader, MNB, Decision tree, KNN	Cybernetics And Systems: An International	• Location-based data collection has been done by extracting 60k tweets

					Journal	• The period of tweets collection is an important factor, which may affect the results strongly
6	2022	Automated Detection of Anti-National Textual Response to Terroristic Events on Online Media	HE-CM-Bert 82%	SVM, CNN, Lstm, Bi-LSTM, HE-CM-BERT	Cybernetics And Systems: An International Journal	• Vocabulary of pre-trained multilingual BERT is extended • Anti-national code-mix textual content on YouTube in the form of comments on terrorism-related videos are used at dataset.

4. Research Gaps

There has already been a lot of work going on to understand the farmer protest by different organisations including government. Some wants to study it because of root level problem, many wants to understand it for market analysis and many organisations wants to find a solution for the farmer's protest. For achieving these goals following research problem are deduced-:

- Lack of dataset on farmer protest.
- Lack of DECISION SUPPORT TOOL for government regarding farmer protest.

5. Objectives

The following objectives are hence set to achieve-:

- To create a diverse dataset based on farmer's protest from multiple sources.
- To understand the sentiments of the Indian citizens towards the three acts passed by the government.
- To analyse the polarity and factuality of Twitter data regarding the demonstrations by extracting twitter data.
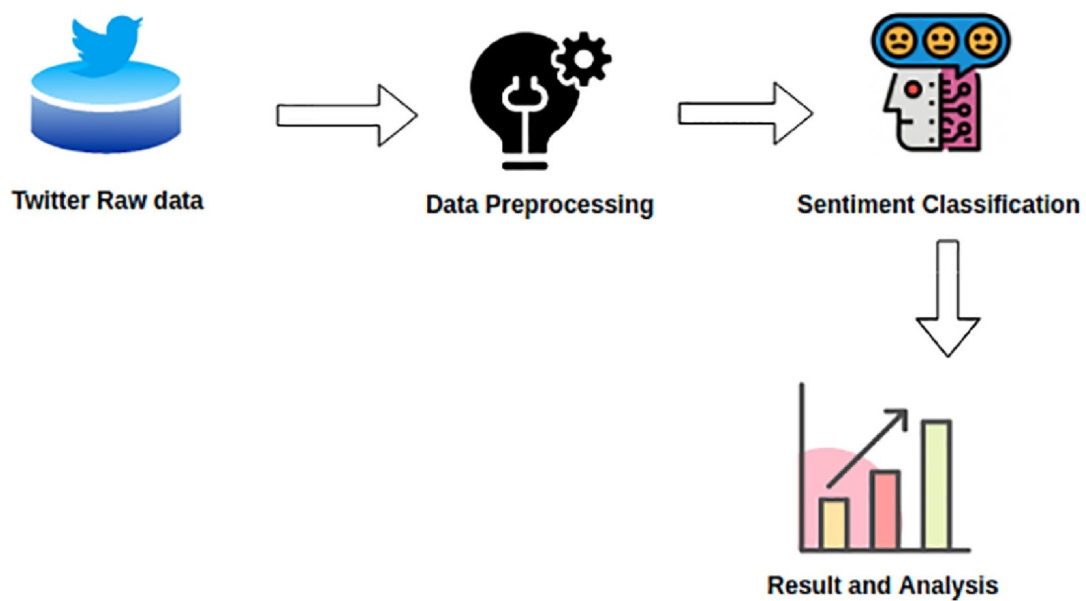
6. Methodology

Fig-1 Methodology proposed for sentiment analysis

The above flowchart shows the diagram of proposed methodology for achieving the sentiment analysis based on data collected from different sources.
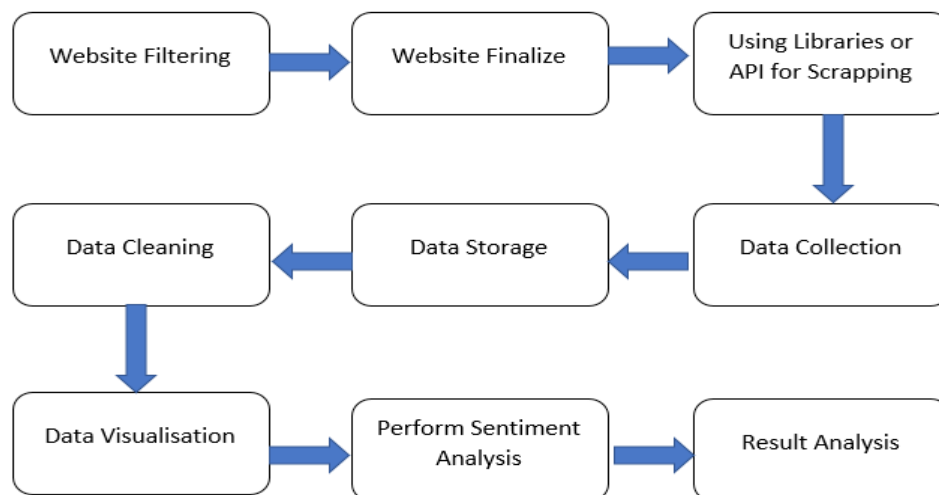

Fig-2 Block diagram for phases of sentiment analysis

1. Website Filtering:

Many Websites were initially filtered for collecting data on the concerned topic. These websites were:

- Twitter
- Reddit
- Instagram
- Youtube
- Indiatimes
- Hindustantimes
- The Hindu
- Punjab Kesari

2. Website Finalize:

After Studying various sources two main sources were finalized to extract the data, these are-

1. **Twitter-:**Twitter is a hub where substantial amounts of data are being generated by users. It is reported that Twitter users generate 12 GB of data every day. It is widely utilized by the general people, who utilize it to express their opinions on a variety of public topics and to voice their complaints to businesses and government agencies. Twitter, being a social networking platform, generates data which may be used for a number of things, including analysis on certain subjects, people, and so on. With the rise of AI, we now have state-of-the-art machine learning and natural language processing algorithms at our disposal, which can be used to analyze the emotions of users' conversations on social media platforms, where it has become a key instrument in understanding human behavior, studying public relations, and helping to solve various issues

2. **Hindustan Times-:**Hindustan Times is one of the largest newspapers in India by circulation. According to the Audit Bureau of Circulations, it has a circulation of 993,645 copies as of November 2017.[1] The Indian Readership Survey 2014 revealed that HT is the second-most widely read English newspaper in India after The Times of India.[9] It is popular in North India, with simultaneous editions from New Delhi, Mumbai, Lucknow, Patna, Ranchi and Chandigarh.

3. Using Libraries or API for Scrapping:

For scrapping purpose python library selected to scrap data in form of tweets and User information.

1. **SNSCrape**

   snscrape is a scraper for social networking services (SNS). It scrapes things like user profiles, hashtags, or searches and returns the discovered items, e.g. the relevant posts.

   The following services are currently supported:

   - Facebook: user profiles, groups, and communities (aka visitor posts)

   - Instagram: user profiles, hashtags, and locations

   - Mastodon: user profiles and toots (single or thread)

   - Reddit: users, subreddits, and searches (via Pushshift)

   - Telegram: channels

   - Twitter: users, user profiles, hashtags, searches, tweets (single or surrounding thread), list posts, and trends

```
In [3]: search_term =("farmer protest","farmer","protest")
        from_date= "2021-01-01"
        end_date = "2021-08-01"

In [6]: os.system(f"snscrape --since {from_date} twitter-search '{search_term} until:{end_date}' > result-tweets.txt")
        if os.stat("result-tweets.txt").st_size == 0:
            counter = 0
        else:
            df = pd.read_csv('result-tweets.txt', names=['link'])
            counter = df.size

        print('Number Of Tweets : '+ str(counter))

        Number Of Tweets : 816267
```

Fig-3 SNSCrapeSyntax

For Scrapping data from hindustan times online platform(Website) the API selected is-

2. **ParseHub**

   A web Scrapper for non-Coders. ParseHub is an easy-to-learn, visual tool for gathering data from the web. You can use the data sourced with ParseHub to power your products, do research, create visualizations and make key business decisions. ParseHub was born out of the need to

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easily parse complicated financial documents. We envision a future where anybody can query the world's structured information. ParseHub eliminates the major hurdles of gathering and cleaning data, so you can have more time to analyze useful insights.
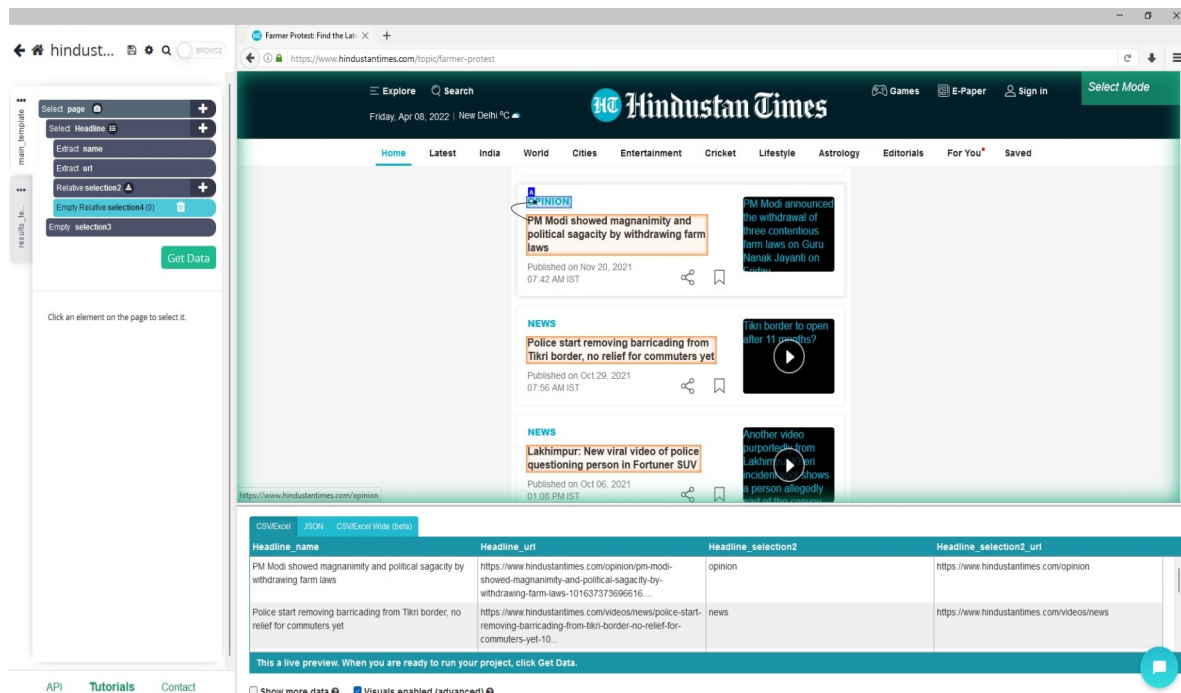

Fig-4 ParseHub implementation and GUI

- No coding required
- Free and powerful web scraping tool
- Converts website into hierarchy of elements
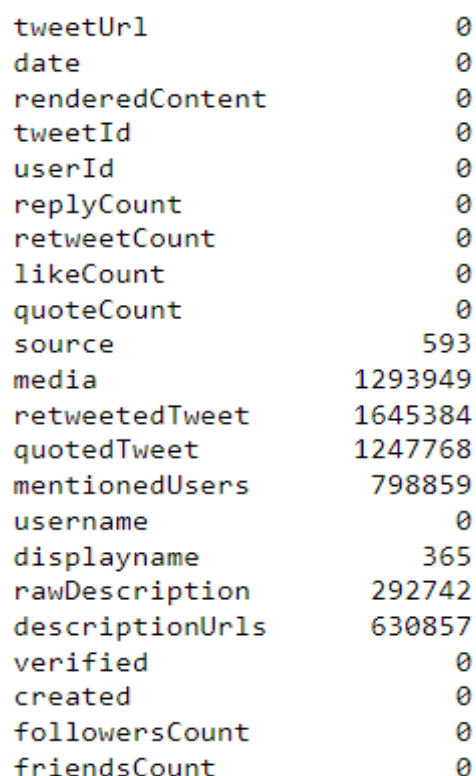
4. Data Collection:

Data is collected in form of raw tweets of users and in the form of headlines of the newspaper.

5. Data Storage:

Data is stored in the form of CSV file to be made read by python libraries in further implementation

6. DataCleaning:

The pre-processing of tweets like removal of stop words, repeated characters, special symbols pos-tagging, stemming execution can be referred to as Data Cleaning.

```
tweetUrl                  0
date                      0
renderedContent           0
tweetId                   0
userId                    0
replyCount                0
retweetCount              0
likeCount                 0
quoteCount                0
source                  593
media               1293949
retweetedTweet      1645384
quotedTweet         1247768
mentionedUsers       798859
username                  0
displayname             365
rawDescription       292742
descriptionUrls      630857
verified                  0
created                   0
followersCount            0
friendsCount              0
```

Fig-5 Data cleaning visualisation

Also additional information were taken out for the better understanding of the database such as who has maximum number of tweet in the given period and from what location the tweets are maximum.

```
Maximum tweets from account https://twitter.com/tasveersandhu 4012
```

Fig-6 Max tweet user info

```
Maximum tweets from location India 13748
```

Fig-7 Max tweet location info

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6. Data-Visualisation:

To understand the data and what keyterms are used exactly repetitively on these social platform data visualisation is an important step. To visualise the data in such a form that even a non-coder person can understand it we used a library called WordCLoud- A word cloud (also known as a tag cloud) is a visual representation of words. Cloud creators are used to highlight popular words and phrases based on frequency and relevance. They provide you with quick and simple visual insights that can lead to more in-depth analyses.
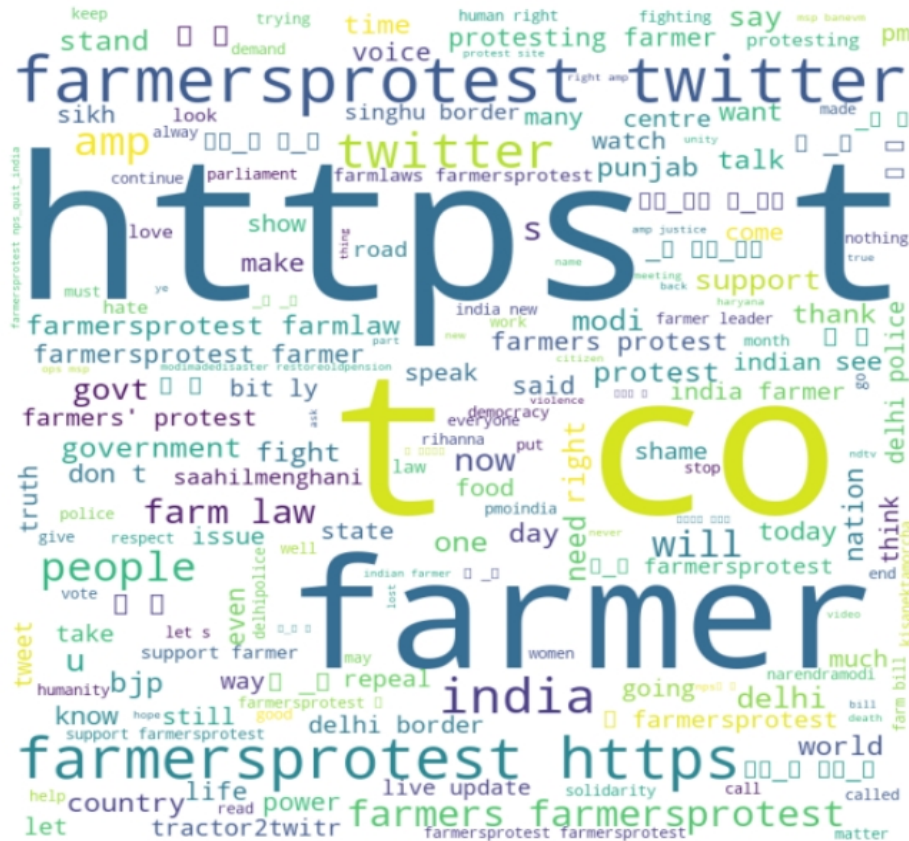

Fig-8 WordCloud for frequent word usage of tweet and Newspaper

8. Perform Sentiment Analysis:

With all the steps completed from scrapping to collecting data to cleaning it and then visualising it. The final step took was to apply the sentiment analysis using the python library called

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Text blob- It is a Python library for processing textual data. It provides a simple API for diving into common natural language processing (NLP) tasks such as part-of-speech tagging, noun phrase extraction, sentiment analysis, classification, translation, and more.

Text blob uses sentiment property, which returns a namedtuple of the form Sentiment(polarity, subjectivity). The polarity score is a float within the range [-1.0, 1.0]. The subjectivity is a float within the range [0.0, 1.0] where 0.0 is very objective and 1.0 is very subjective.

The polarity whereas calculates the values on the range [−1,1], −1 defines a negative sentiment and 1 defines a positive sentiment. Negation words reverse polarity causing it to fall below 0. It calculates the range on the basis of how happy a statement seems.

By calculating the polarity of the news headlines and tweets a sentiment score will be assigned, and the computation is calculated in such a way that if the score is less than 0, the sentiment is returned as negative. If the polarity is greater than 0, then the sentiment is returned as positive. In all other cases, the score will be 0 and the sentiment is returned as neutral.

	renderedContent	Polarity
0	They can't be farmers. Looks like Gundas are h...	0.700000
2	#FarmersProtests are super spreaders. Probably...	0.333333
4	Yes, they are supreme spreader. #FarmersProtes...	0.000000
6	Rightly speak against kumbh mela and election ...	0.140693
8	They are goons, they are not farmers. #Farmers...	0.000000

	Headline	Polarity
0	PM Modi showed magnanimity and political sagac...	0.000000
1	Police start removing barricading from Tikri b...	0.000000
2	Lakhimpur: New viral video of police questioni...	0.136364
3	What happened in Lakhimpur Kheri: Sequence of ...	0.000000
4	'Nobody takes responsibility when...': Supreme C...	0.000000

Fig-9 Polarity Count of tweets   Fig-10 Polarity Count of News Headlines

9. Result Analysis:

After Sentiment analysis is performed the result is visualised in the form of percentage. This result can be used to understand the sentiment of collected data.

7. Implementation

Step 1 Collecting the data-

The data is collected by using the API and Python library and then it is stored in the form of CSV file in the local system.

The Key words for extraction of data are "Farmer Protest", "Farmer", "Protest"

For the tweet extraction the range chosen is from 01-jan-2021 to 01-Aug-2021 as at this time the protest was on its peak and large number of people were involved in people. More than 8+lac tweets are extracted in the process.

	A
1	'#FarmersBill200 #FarmerProtest are political. Not #TooMuchDemocracy but #TooMuchPolitics #ApprovalVoting https://t.co/xLxZDk3iDS'
2	@DritawT @DBWades India was pretty good in handling the situation. Things went south when some guys from US/UK decided to use the pandemic to bring about the regime change.. Home
3	'by blocking free transit" on roads to and from the capital
4	'by blocking free transit" on roads to and from the capital
5	'Aarya Babbar Energetic &amp
6	'@harmanoid_ @noorpariii I went offline for a bit after the farmers protest was over just to re login to see people thought I died haha'
7	"The President of #Pérou deploys the army and institutes a curfew as protests by transporters and farmers against rising fuel prices and inflation escalate in the country with road blockages
8	'Labor member to run as independent in Hunter to protest at 'captain's pick' of Daniel Repacholi https://t.co/jBKOFMrSuf QLD Farmer to NSW Farmers what a idiot Daniel Repacholi he loves C
9	'@mskathait @narendramodi There is nothing getting better. Ur Modi is just focusing on 2 states UP and Gujarat where he have vote bank. After Farmer protest. Modi is targeting Punjab .. ev
10	Williston, North Dakota. Farmers' union with the county commissioners to protest the selling of land to corporation farms in Williams County and to discuss the protection of the family-size fan
11	'@turbotechdog @GeorgeMonbiot @NFUtweets Fair enough.\n\nPeople are pressurising &amp
12	'@KVishReddy @trspartyonline @INCTelangana @BJP4Telangana This protest continues for few days
13	'@samsecular1 @porusofpanjab @pb08wale3 @punjabiztweet I quit going to gurudwaras after the farmer protest debacle. It brought out some truth'
14	'The President of #Peru deploys the army and institutes a curfew as protests by transporters and farmers against rising fuel prices and inflation escalate in the country with road blockages
15	Opposing hindi isn't a new phenomenon in karnataka. in 1960s there were rallies held by farmers and student organisations against imposition of hindi,a school boy was shot dead during the p
16	'SSS pulls out of MVA alliance to protest state's 'anti-farmer' policies https://t.co/5ZGMaVH34c'
17	@PostSuspension1 @_Avykt Opposing hindi isn't a new phenomenon in https://t.co/qouytK56wM 1960s there were rallies against held by farmers and student organisations against impositic
18	'@ratnagiri31 @amitksrawat @hvgoenka @yours_rehan So farmer protests was covered very much by each media house'
19	For all the talk of #india not having #riots and #protests under #modi , nothing could be further from the truth. \n\nDon't also forget the supreme court judges first time public press conference p
20	Held dharna yesterday at Kalwakurthy along with farmers and MLA G. Jaipal Yadav to protest against centre's refusal to procure paddy from Telangana in rabi season. @JaipalYadavTRS @tr
21	'@DrRanjithReddy @trspartyonline TRS is a party known for agitations. We achieved the State through protests. We will fight for justice to Telangana farmers #TRSwithFarmers'
22	'For those who were denying Khalistan angle in Punjab n farmers protest https://t.co/Li5PYjmlnc'
23	'@LogicalHindu_ @anushrikejriwal Toh kab train honge? Delhi riots aur farmers protests ke time bhi yahi suna tha.. This can't be our standard response everytime.'
24	'Farmers are being fleeced in Mandies. \nNow farmers perforce have to protest for MSP to ensure that they get their input cost back. https://t.co/aCeJm6e0LR'
25	'@lindaarella @NickBuckleyMBE #SpongerJohnson\n\nThat was Churchill .. 1943 Bengal famine\n\nSTOLE food for British stomachs despite protests from his own officials stationed in India\
26	'@GarvSeSecular I don't think so. Indians have lost the plot now. If farmers protest couldn't shake their souls then nothing else can'
27	'Our democracy is better than Canada. We never had to bring emergency for any protest. Our farmers protested for 1 year and we talked with them and solved it. But Canada which is in top 1(
28	'@tanvi_madan Forget anti-CAA/Farmer protests
29	'Mahua Moitra speaking to The Fauxy said "Govt farmers protest farm laws Rajya Sabha Modi cowardly courage Amit Shah NRC China Border Covid" loudly.\n\n😂😂😂😂 https://t.co/7K6O
30	'किसान मोर्चा की विचारधारा पूरे देश में तेजी से फैल रही है
31	'@orutwasam @TonyKingv20 @MutemiWaKiama @DavidNdii By the time they did handshake
32	'अंधभक्ती के लक्षण https://t.co/FKRloyDety'
33	'@the_queen__bean sorry - "says something." Same with the 2006 megamarches that stopped a horrible federal bill
34	Modi's party BJP wins big in Uttar Pradesh, India's most populous state\n\nwhat is with this guy's popularity despite all those farmer protests and struggling pandemic recovery economy?\nhtt
35	'@northof83 @howisthismylif @RickNichollsCKL @fordnation Farmers once that I could remember and put their government in check. Protests are not allowed? Then let's Self Govern'
36	'@ARanganathan72 @arpitbhtnagar We must thank Rihaana for her support for farmer protest.'
37	'குறைதீர்வு நாளில் கூட்டத்தில் வெளிநடப்பு செய்து விவசாயிகள் ஆர்ப்பாட்டம்\n\n#NewsJ #Vandavasi #PaddyPurchase #Farmers #Protest \n\nhttps://t.co/cHQeboKCLa'
38	@SpicyNo0dl3 @slayer_left @_Ashusays_ @Nikkkhil10 @ANI Essential Commodities (Amendment) Act\n\nOthers were bad too\n\nFarmers who didn't want to be slaves of corporates and w
39	'@Kay41444006 @tequieremos only few times but they are \ni have saw them what they say and what was happening in india during caa protest
40	'Farmers' platform Samyukt Kisan Morcha (SKM)
41	'The epicentre of the farmers' protest were Punjab
42	@MandarSawant184 @Agnimitraaa It's Lokmat so I am very sure it's fake & also since farmer protest there is a rumour mongering on Modi Shah relationship Which is again not believabl
43	'हरियाणा में किसानों की महापंचायत\n#FarmersProtest https://t.co/FRmnPjT0cU'
44	'Adams Morgan Plaza was recently fenced off by @TruistNews despite a nearly 50 year old public use easement that allowed farmers market
45	'@LiveLawIndia Never saw this farsightedness of court in case of CAA Delhi riots or farmers protests .. why different scales?'

Fig-11 Extracted Raw tweets

And for Hindustan times 5days newsheadlines are extracted from 22-01-2021 to 27-01-2021 and 50 headlines are extracted.

	A	
1	Headline_name	
2	PM Modi showed magnanimity and political sagacity by withdrawing farm laws	
3	Police start removing barricading from Tikri border, no relief for commuters yet	
4	Lakhimpur: New viral video of police questioning person in Fortuner SUV	
5	What happened in Lakhimpur Kheri: Sequence of events according to both sides	
6	'Nobody takes responsibility when…': Supreme Court on Lakhmipur Kheri incident	
7	Lakhimpur Kheri violence resonates in Punjab, protests held across state	
8	Bharat Bandh impact: Gurugram border choked, traffic stopped at other points too	
9	'Kisan Mahapanchayat' in Muzaffarnagar on Sunday, UP govt beefs up security	
10	Punjab farmers' stir: Amarinder Singh approves higher price for sugarcane crop	
11	Punjab farmers' protest: 27 trains cancelled on fifth day of stir | 10 points	
12	Punjab farmers' protest: Railway to refund ₹53 lakh to over 12,000 passengers	
13	'Farmers know how to teach a lesson': Rakesh Tikait's fresh warning to Centre	
14	Farmer protest to begin at 11am, area around Jantar Mantar turns into a fortress	
15	Kisan Panchayat, I-Day: Delhi Police deploys 3-layered security cover	
16	'Kisan Panchayat': 200 farmers to visit Jantar Mantar everyday from July 22	
17	Farmers' protest: Delhi Police asks DMRC to close 7 stations 'if needed'	
18	On fight against farm laws, Amarinder Singh threatens to move Supreme Court	
19	Another activist Shubham Kar Chaudhari gets relief in toolkit case	
20	Govt ready to amend farm laws, says Union minister Narendra Singh Tomar	
21	Probe not against Tendulkar or Lata Mangeshkar but against BJP IT cell: Deshmukh	
22	Toolkit case: Court to hear Nikita Jacob's anticipatory bail plea on March 9	
23	'Centre can buy farm produce at MSP', says Kejriwal; shares formula	

Fig-12 Headlines Extraction by HindustanTimes

Step 2 Cleaning and visualisation-

Data is cleaned and visualised

```
data=data.drop_duplicates(subset=['renderedContent'])
data.head()
```

	tweetUrl	date	rer
0	https://twitter.com/Abhimanyu_1987/status/1376…	2021-03-30 03:29:56+00:00	
2	https://twitter.com/Abhimanyu_1987/status/1397…	2021-05-26 10:12:29+00:00	#F
4	https://twitter.com/Abhimanyu_1987/status/1397…	2021-05-26 04:05:51+00:00	#F

Fig 13- Removing duplicate data

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Also data is filtered on the basis of English language. As we are applying the analysis in only one language.

```
data=data[['renderedContent','lang']]
data.head()
```

	renderedContent	lang
0	They can't be farmers. Looks like Gundas are h...	en
2	#FarmersProtests are super spreaders. Probably...	en
4	Yes, they are supreme spreader. #FarmersProtes...	en
6	Rightly speak against kumbh mela and election ...	en
8	They are goons, they are not farmers. #Farmers...	en

Fig-14 Language filter

Step 3 Performing sentiment analysis-

With the help of the Polarity Score sentiment is assigned to polarity count.

The polarity is converted to sentiment tag and Sentiment tag is encoded to a numeric value as-

Negative being 0

Neutral being 1

Positive being 2

	renderedContent	Sentiment	encoded_cat
0	They can't be farmers. Looks like Gundas are h...	Positive	2
2	#FarmersProtests are super spreaders. Probably...	Positive	2
4	Yes, they are supreme spreader. #FarmersProtes...	Neutral	1
6	Rightly speak against kumbh mela and election ...	Positive	2
8	They are goons, they are not farmers. #Farmers...	Neutral	1

Fig 15- Sentiment and encoded value

Step 4 Collecting result-

By Counting the number of the values of Positives, Neutrals, and Negatives the result is deduced.

```
data.Sentiment.value_counts()

Neutral     44783
Positive    38966
Negative    19098
```

Fig 16- Result in numeric term

```
: round(data['Sentiment'].value_counts()*100/len(data),2)

: Neutral     43.54
  Positive    37.89
  Negative    18.57
```

Fig 17- Result in percentage form

8. Use Case

This study might be valuable in the field of public policy, where governments may use machine learning techniques to improve decision-making and conduct mass behavioural analysis

The study can also be beneficial to analyse multiple protests happening internationally with a more inclusive approach to various local languages.By using WordCloud data and polarity of statements, government could tackle protest even before they start.

9. Results And Conclusion

Data is collected

1. In form of tweets

2. In form of News Headlines

In this project, we have explored ways to understand the sentimentality of people by building a sentiment analysis model and identifying the direction the protest is leading towards.

We discovered that the bulk of tweets are neutral, with positive sentiments coming in a close second and negative sentiments coming in last.

10. Future Work and Discussion

1. Calculating the sentiment analysis on the basis of single language increases the risk of missing out many important information of local languages and hence Multilingual sentiment analysis can be implemented in the future for more better understanding.

2. The Polarity based sentiment analysis is not much accurate when gets checked by expert testing. To increase the accuracy and results More lexicon based libraries and classifiers can be explored to implement sentiment analysis.

3. The dataset used by twitter and Hindustan times are both labelled. When using the classifiers approach Labelled data can increase the risk of over fitting the model, hence sentiment analysis can be implemented on unlabelled dataset.

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