

Sentiment analysis of Twitter data regarding the agnipath scheme of the defense forces

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ABSTRACT

Due to the popularity of social media today, people frequently share such criticism on Facebook, Twitter, Instagram, and other platforms. Therefore needs to know how your input from users of social media is generated in order to ascertain the public reaction to the policy that has been enacted. However, because of the comments, it is challenging to tell how many people have responded positive or negative. The objective of sentiment analysis of tweets is to provide insight into people's attitudes and perceptions regarding an event. This study illustrates the role of Twitter in the announcement of a new army vacancy through the "agnipath scheme" dubbed "agniveer". The result of this study can be used by the defense forces and government for decision making or policies related to the agnipath scheme. The study studied 4,000 English-language Twitter posts from July 3, 2022 to July 9, 2022. Manual text analysis revealed seven basic groups of tweet sentiments. The tweets' positive, negative, and neutral emotions were shown using orange data mining software, a powerful machine learning, data mining, and data visualization toolset. Result shows that agnipath scheme is mostly accepted by the people.

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1. INTRODUCTION

The fast growth of social media in recent years has made the internet a viable platform for carrying knowledge at little cost. Opinions on a product, company, or circumstance are being mined from comments left on blogs, reviews, postings, and tweets, among other social media outlets. Considerable weight is given to an individual's disposition and emotional state when drawing conclusions about that person's behaviour. Measuring how individuals feel about a topic is called sentiment analysis, also known as opinion mining. Organizations may learn about their customers' feelings and respond appropriately by employing sentiment analysis, a technique that allows us to read and understand people's emotions and place them into meaningful buckets. Detection of the appropriate language is necessary for some analyses (such as those that seek to determine the polarity or emotion of the text, receive feedback on a specific feature, or to conduct a cross-lingual analysis), while others (such as those that seek to determine the text's authenticity) are determined by the text itself. It needs a lot of data, some of which may not be in the right format [1]. As a result, the extracted data is put through a few preparation procedures before being utilised to build the final data set. Tweets put in by people all across the world in response to global events are a gold mine of authentic and

original data. Information posted on this forum is not filtered or gate kept in any way. This has made Twitter a go-to resource for social scientists and academics interested in studying the nuances of human emotion from a variety of angles [2]. Twitter is well-known as a backchannel tool, and in the wake of natural disasters, more people have used it to show their sadness.

Twitter analysis for #Make in India, #Digital India, and #Budget 2019, to learn more about public views on government program. The tweet categorization is implemented using the deep learning technologies of an LSTM (long short-term memory), artificial recurrent neural network. The primary goal of this kind of study is to examine public sentiment towards a government program to better administer that program in the future [3]. The Indian government launched a agniphath scheme for the appointment of troops in Army, Navy and Air-force on 14th June, 2022. We will call him agniveer. By undertaking qualitative and quantitative analyses of tweets, this study intends to identify the trends of tweets and the social support supplied on social media during the scheme's introduction by human actions.

The following are some of our contributions to this paper: i) this research proposes an effective method for analyzing the sentiments of Twitter data through the orange tool; ii) the collected corpus goes through pre-processing and analysis, and then sentiment analysis is done; and iii) experiments were done with a set of real tweets to show that our method is valid and can be used.

2. THE VIRTUAL WORLD: SOCIAL MEDIA

People in the world today talk to each other through the internet. It was only a dream 30 years ago to be able to say what you thought and have your voice be heard around the world in an instant. Now that social media has come along, it's a reality. In the world we live in now, it's hard to imagine what life would be like without social media. This is a growing trend caused by improvements in information technology.

People use the virtual world not only as a way to talk to each other, but also as a place to say what they think, feel, and believe about many different things. People here don't just talk to each other because they are related or know each other. They also talk to each other on social media because they have the same interests, hobbies, and specializations. Social media has millions of active users, and that number is expected to grow to 4.5 billion by 2022 [4], [5].

2.1. Twitter mining

Twitter mining is now a popular topic since it gives vital information that is utilized and applied in several sectors. It is one of the principal research fields. Various tweets can be gathered and analyzed for research purposes utilising accessible APIs. Twitter APIs are established using authenticated queries.

Twitter users come from many walks of life. Customers range from celebrities to ordinary citizens, business owners and representatives, legislators, and even national presidents and prime ministers [6]. Text analytics refers to the practice of mining information written or spoken in the English language for insights and patterns. Utilize natural language processing to do this text mining [7], [8]. To do this, text mining/analytics use natural language processing. Natural language processing contributes to text mining by assisting the machine in understanding the text and gleaning relevant data from it. Computer science and AI-based ideas are used by NLP to process human language, analyze information, and derive actionable insights. Text analytics is a process, while NLP is the technique used to carry it out.

2.2. Sentiment analysis of twits

In this work, we make an effort to understand the context of the tweets regarding the agniphath Scheme for joining the Indian Army that have been posted on Twitter so far. It is recognized that an amount of information can be gleaned from tweets; if the data is properly processed, it may be utilised for decision making and management. Twitter data may be mined for insights into the public's sentiments through opinion mining. This information is incredibly helpful for a variety of organizations and political parties. It is common knowledge that feelings, emotions, and sentiments play a key role in the human experience. Sentiment analysis is the process of extracting such viewpoints [9].

Sentiment analysis is the process of labeling a text's feelings to determine its polarity. It may be separated into three categories: document, sentence, and aspect. When we talk about categorizing thoughts at the document level, we mean doing so throughout the entirety of the content. All sentences are examined at the sentence level to establish their polarity, which can be either positive or negative; mixed opinions may or may not be acknowledged. Aspect level is also known as entity level, and in this context, all features of the phrases are taken into account. In what context does the sentence exist? The entity-level approach is a comprehensive but difficult to implement strategy [10].

3. REVIEW OF LITERATURE

Most users share their personal thoughts and information all the time these days, which has led to a rise in the amount of information shared through social media. This information is a great source for an analyst or researcher seeking vital information for decision-making [11]. Since the beginning of the 21st century, according to [11], sentiment analysis has been one of the most intriguing and active research subjects in the field of natural language processing. The act of analyzing a person's attitude or feeling based on their written words is known as sentiment analysis [12]. Researchers have recently demonstrated new insights on this type of data and been able to categorize feelings [13]. Several methods have been proposed in the literature for doing sentiment analysis, which entails extracting lexical sentiments along with the documents [14], how bi- and tri-grams may be used to deduce an opinion [15]. Since emotions are now a prevalent way to describe sentiments, emojis may be used to represent both positive and negative emotions. It has been noticed that internet resources can offer emotional and social support [16]. Twitter, a micro blogging service, is one of these online platforms that allows users to submit real-time messages, or "tweets." Twitter has become a vital part of the routine of modern society since it provides a robust public forum where individuals may freely discuss their thoughts, ideas, and opinions on a variety of themes. Numerous studies have examined Twitter as a possible method for sharing information, gauging public opinion, and expressing emotions.

By studying tweets on the death of Michael Jackson, the king of pop, we can analyse the crucial role micro blogs play in offering emotional and social support. The findings suggest that Twitter is utilised as an informative support channel [17]. In addition to grief, other kinds of emotions, such as rumor-spreading, statements of hate, and spam, are seen to account for a significant fraction of tweets. Chen *et al.* [18] evaluated the polarity of tweets using sentiment analysis to predict future crimes. Using a machine learning technique [19], conducted a sentiment analysis on the Twitter data of the 2014 FIFA World Cup Soccer tournament. Aharony [20] evaluates Twitter as a channel for communication to determine how three political leaders-the prime minister of Israel, Benjamin Netanyahu, the prime minister of Britain, David Cameron, and the president of the United States, Barack Obama-communicate via Twitter. The statistics indicate that the president of the United States utilises Twitter more than the other two world leaders. However, all three leaders utilize twitter for outreach and openness. Goel and Mittal [21] used Twitter data, self-organizing self-fuzzy neural networks (SOFNN), and Dow Jones Industrial Average (DJIA) values to forecast financial markets. Twitter has also been examined for the dissemination of information during natural or manmade catastrophes, plights, and exigencies. During times of crisis, it is viewed as legitimate by netizens. It has been widely used to comprehend the emotions of people during and after disasters such as "Typhoon Haiyan in the Philippines" [22]. The goal of this study is to investigate and assess public emotions towards COVID-19 vaccinations across Twitter messages (positive, neutral, and negative) as well as the influence tweets have on digital social circles [23].

4. METHOD

This work has been developed by using five phases: i) tweet extraction; ii) tweet content analysis and classification; iii) preprocessing techniques; iv) emotion collection; and v) polarity identification and classification. Each step are explained in detail:

4.1. Tweets extraction

Tweets are required to complete the sentiment analysis task. Here, we retrieved tweets from the Twitter API. We must first develop a Twitter application to obtain API access. The Twitter application may be built with the Twitter app. the consumer key and access token are made available to the user once the app has been built. Both the access key and the consumer secret must remain hidden. Over 4,000 tweets related to the #agnipath scheme were collected and are now available for research.

4.2. Tweet content analysis and classification

The study utilised a naturalistic methodology to the feelings of the tweets and decide the tweet format (i.e., text, picture, or video). Initially, 150 tweets were picked at random and examined based on their sentiment features. Each tweet was thoroughly read and comprehended so that its underlying tone could be recorded. For example, after careful consideration, the tweet "agniveer scheme is a good initiative step for youth to join our country's defense system" was classified as "evishing emotions," whereas another tweet asking, "If this is true, why agniveer?" was classified as "raising questions". "Why should youth have temporary jobs?" was filed under criticism. Consequently, the tweets were classified based on the subject context they included. The attitudes of the 150 tweets were determined by manually analyzing their content. The tweets were classified into seven sentiment categories see in Table 1. This method assisted in identifying the event's numerous themes. The retrieved tweets' major themes and issues were thoroughly studied. For

the development of a theme/emotion, an inductive method was adopted. When a tweet does not fit into an existing category, a new category was created. Human inspection was used to determine the opinions expressed in all 4,000 tweets. We analyzed the 4,000 tweets and classified them into seven broad categories based on the attitudes expressed in each tweet (both those from prior studies and our own) see in Table 1 [1].

Table 1. Structured coding

Category	Definition
Evincing emotions	Share your happiness, your sadness, your anguish, your compassion, and any other negative or positive emotions you have towards the agnipath scheme applicant.
Raising question	People with inquiries about the agnipath scheme and its environs.
Criticism of the government	Government and its policies and flaws are criticised.
Assisting the government	Post in favour of the BJP government.
Increasing dissent	People are voicing objections to the agnipath project.
Distribution of news and data	Share news articles, information, and other relevant items pertaining to the agnipath scheme.
Irrelevant	Posts that have nothing to do with the event.

4.3. Preprocessing technique

This creates a pipeline for text pre-processing. It enables data transformation, tokenization, filtering, and stumbling. Transform, will maintain lower case in all twits, removing accents, parse HTML, and removing URLs: i) transform will keep all tweets in lower case, get rid of accents, parse HTML, and get rid of URLs; ii) filtering, the removal of mention (@), hashtag (#), and RT (retweet) from tweets; and iii) stemming, is the process of removing affixes from root words and changing them into their simplest form.

To create a word cloud in the orange data mining tool, we must first connect the file widget to the corpus widget, and then the corpus widget to the preprocess text widget, where data transformation, tokenization, filtering, and stemming will take place. The preprocessed text will then be linked to a word cloud widget, which will visualize the word cloud. Figure 1 shows the workflow of a word cloud in the orange data mining tool.

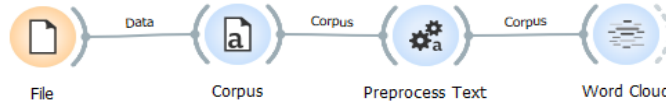


Figure 1. Workflow of word cloud

Jayashankar and Sridaran [24] proposed word clouds or tag clouds as the graphical depiction of words for a certain piece of written content, organized according to their frequency. Figure 2 represents the graphical representations of text data (word cloud) of #agnipath scheme. Figure 2(a) represents the word cloud before the preprocessing, and Figure 2(b) represents the word cloud after the processing.

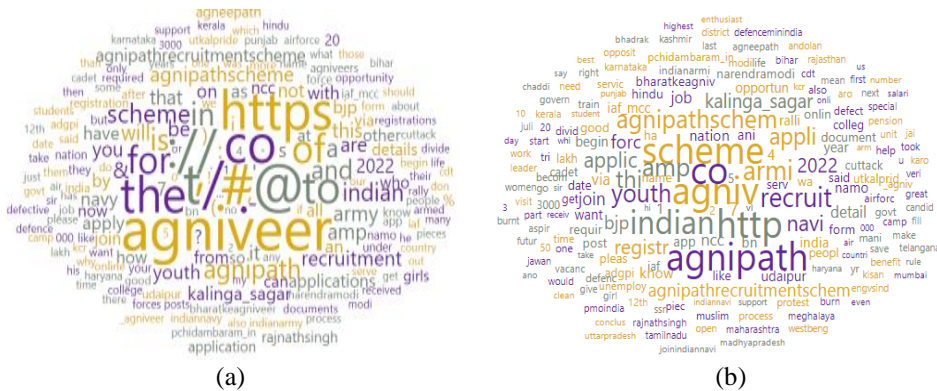


Figure 2. Word cloud of Twitter data on agnipath scheme (a) word cloud before preprocessing and (b) word cloud after preprocessing

4.4. Collection of emotion

Emotions are complex psychological states that include a subjective experience, a physiological response, and a behavioural or expressive response. On the basis of facial expression, there are six emotion categories commonly used to characterize the fundamental human emotions: anger, contempt, fear, happiness, sorrow, and surprise. “Surprise” is the most ambiguous, as it may be connected with both good and negative emotions [25]. In orange data mining tool we put preprocess data into tweet profiler widget, where we used Ekam (multiclass) algorithm for emotion count. Through select column widget we only select emotion and connect with distributions widget for displaying the emotion through bar chart. Figure 3 shows the workflow of how to calculate emotion in orange data mining tool. Figure 4 depicts emotional value (anger=16, disgust=26, fear=473, joy=2721, sadness=61, and surprise=703) for the #agnipath scheme between July 3rd and July 9th, 2022.

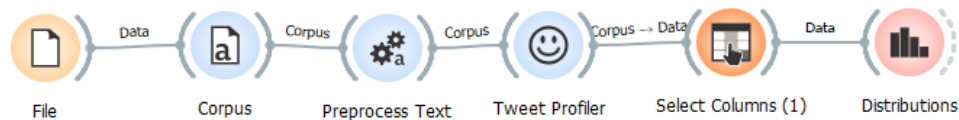


Figure 3. Workflow for calculation of emotion

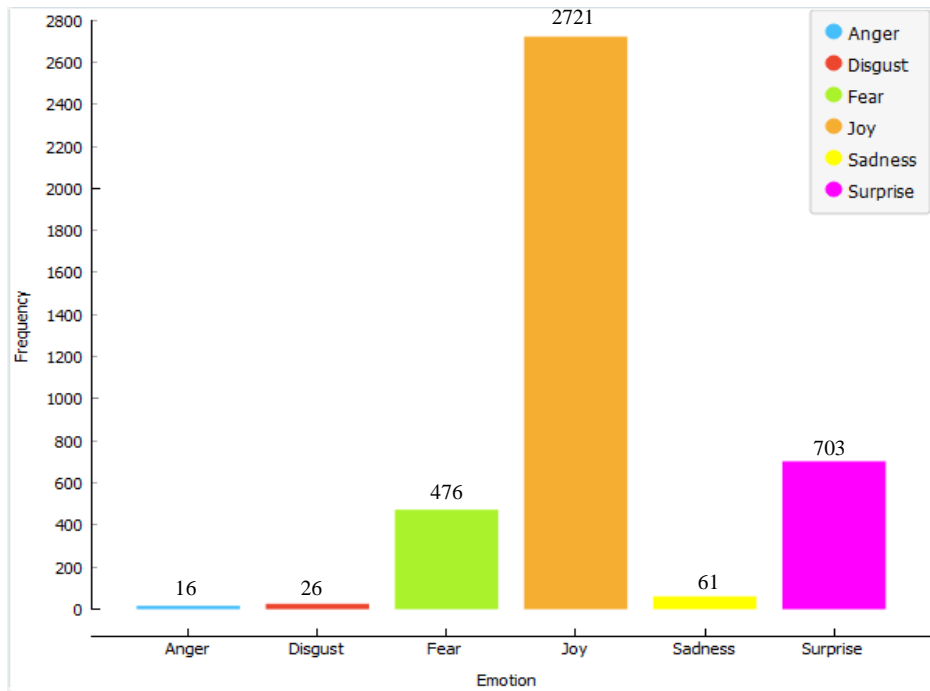


Figure 4. Emotion class bar diagram for #agnipath scheme

4.5. Polarity identification and classification

Polarity is the emotional condition that determines whether a sentence is positive or negative. Orientation, often known as polarity, is the emotion represented in the statement. A text can be categorized as either positive, negative, neutral, and compound. Depending on the comparison with positive and negative terms, it is simple to determine a tweet’s score. Figure 5 shows the workflow of polarity class. Orange data mining tool provide six types of tool for sentiment analysis which corporate within sentiment analysis widget. The tools are Liu-hu, valence aware dictionary and sentiment reasoner (VADER), Multilingual, SentiArt, LilaH, and custom dictionary. We used VADER tool. It is a social media-specific lexicon and rule-based sentiment analysis tool. Sentiment analysis in VADER is grounded in a vocabulary that translates word meanings into numerical representations of how strongly people feel about certain topics. The overall tone of a document may be determined by tallying up the weight of its individual words.



Figure 5. Workflow of polarity class (sentiment analysis)

Figure 6 depicts average sentiment score of 4,000 tweets regarding agnipath scheme. We can observe through graph that neutral sentiment has maximum number (3456.68), compound sentiment (503.19), positive (376.28), and negative (167.01). If we calculate the percentage of the polarity analysis, we get neutral=86.41%, compound=12.57%, positive=9.40%, negative=4.17 % sentiment of agnipath scheme.

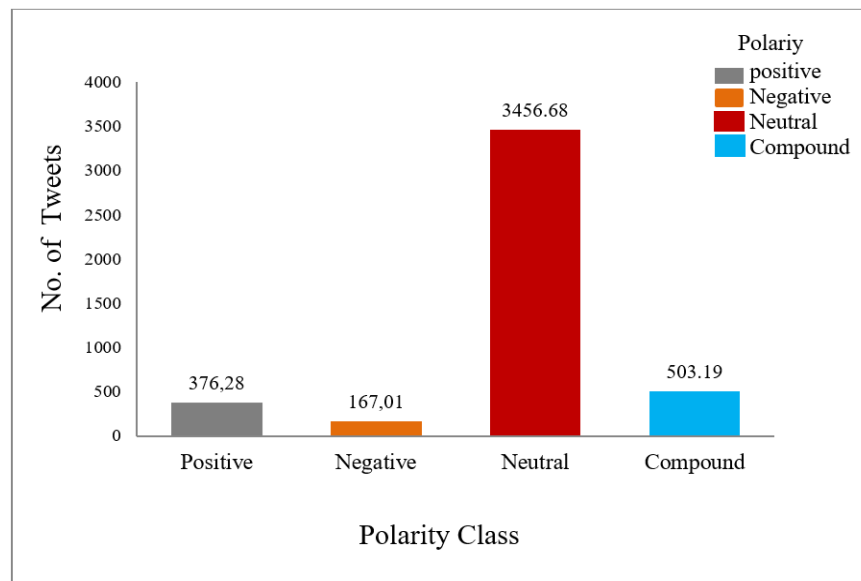


Figure 6. Sentiment score of 4,000 tweets about # agnipath scheme

5. CONCLUSION AND FUTURE SCOPE

The methodology employed in this article was sound and methodical. Before doing sentiment analysis on the tweets, the text was analyzed. The data set utilized in the study is primary and of sufficient quantity. The selection of the tools in this work was based on a comprehensive literature research. We know that a tweet doesn't have a set format; the only rule is that the text can't be too long. Since the tweets came from the Internet, there were no labels showing how people felt about them. The lack of labels for how people felt and the noise in the tweets made the paper harder to understand.





Using the orange data mining tool, a novel method was presented in this article for doing sentiment analysis on a linguistic dataset. The method was described in detail. The result shows that most of the people express joy about the agnipath scheme. and the surprised people comes under the second highest category. Result shows that agnipath scheme is mostly accepted by the people. This means that was not rejected as much as the media was showing the rejection of this scheme.

This study, notwithstanding its merits, has several shortcomings. First, the suggested method can only process tweets in the English language. This is a disadvantage due to the enormous volume of tweets regarding agnipath Scheme available in other languages. We intend to apply this approach to further languages, like Malyalam and Kannad. In addition, our dataset is rather small (7-day period) and restricted to a particular use case. This raises the question of the generalizability of our findings. We intend to collect further information on this occurrence. Furthermore, our present research is restricted to the textual tweets data received from Twitter. In the future, new data such as images, sounds, internet articles, and other forms of multimedia may be contributed to this data collection.





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