International Journal of Computer Applications Technology and Research
Volume 12–Issue 11, 12 – 19, 2023, ISSN:-2319–8656
DOI:10.7753/IJCATR1211.1003

Sentiment Analysis Model for Farmers-Herders Crisis

Ukeyima, Dooshima Joyce
Department of Mathematics and Computer Science, Benue State University, Makurdi, Nigeria

Obilikwu, Patrick
Department of Mathematics and Computer Science, Benue State University, Makurdi, Nigeria

Kile, Awuna Samuel
Department of Mathematical Sciences, University of Maiduguri, Maiduguri, Nigeria

Abstract
The famer-herder crisis over scarce grazing land resources has over the years resulted to the loss of several lives and properties as well as reduction in food production in Benue State. Social media plays a key role in conflict escalation or de-escalation because they are information carriers. In this study, Sentiment analysis is used to analyse opinions of social media comments and posts about farmers-herders crisis expressed by Twitter users to ascertain the positive, negative and neutral tweets. Tweets were extracted using Python library called Snscrape, model was designed and processing was done using the Natural Language Tool Kit (NLTK) to categorize the data into positive, negative and neutral. The naïve Bayes and random forest were used for the analysis and evaluation was done using Receiver Operating Characteristics (ROC), F1 and Accuracy. The values for ROC, F1 and Accuracy for Random Forest and Naïve Bayes algorithms are 0.73, 0.61 and 0.90, and 0.70, 0.73 and 0.60 respectively. It was observed that Random Forest performed better than Naïve Bayes, and as such, can be applied towards assisting security agencies and government policies on the crisis management.

Keywords: Classification, crisis, positive, negative, neutral, tweets, sentiment analysis.

1.0 INTRODUCTION

With a population of 4,219,244 residents as of the 2006 Census, Benue State is a Nigerian state that is situated in the North Central Zone. 1976 saw the creation of the state (Commission, 2006). Its entire size is roughly 33,955 square kilometers on land. Since the majority of Benue State's indigenous population (the Tiv, Idoma, Igede, etc.) are farmers, subsistence farming serves as their primary means of subsistence. The majority of Benue State's large arable area is often used for crop cultivation, with most common crops being rice, yam, and cassava. One of the states in the nation's guinea savannah vegetation zone, Benue State is known for its long grasses and lack of swamps, making it ideal for cattle grazing. Due to these, the number of Fulani nomadic livestock breeders entering the State has increased steadily. The confrontations between farmers and herds in the Benue area have been more violent recently (Eti & Akpu, 2021). Ugwumba (2008) claims that throughout time, struggles for limited land resources and grazing land have led to persistent violent conflicts that are expanding in terms of frequency, intensity, and geographic reach.

According to (Eti & Akpu, 2021), between September 2017 and June 2018, the Nigerian herders and farmers conflict resulted in over 1,500 deaths and over 300,000 displaced people who are currently living as internally displaced persons (IDPs) in various camps, settlements, and communities. These conflicts have claimed several lives and properties in the state. The issues of food insecurity from the standpoint of food production has been made worse by the violence committed by herdsmen and native farmers in

Benue State, which has had a severe impact on national food production (Alao et al, 2019).

Babale and Nasisdi (2019) believe that during conflict, knowledge plays a crucial role in either increasing or decreasing tension. The main channel via which attitudes (i.e., biased remarks, posts, or comments) have been eradicating the current generation is social media. Because social media usage in Benue State is so unrestricted, its effects have been felt widely. This explains the recent spate of overly emotive remarks about farmers' and herders' rampage. Even while these crises have serious repercussions for the herders, indigenous farmers, and the country as a whole, occasionally they are exaggeratedly reported on social media platforms like Facebook, Twitter, Instagram, WhatsApp, Messenger, and so forth. In contrast to traditional media, where editors strictly monitor and uphold professional and ethical standards, news content is subject to internal and external scrutiny. Avoiding statements and messages that could jeopardize national unity, peace, and development is the goal here (Annual, 2018). The majority of the works that have already been done either center on rules (Krause & Grassegges, 2010) or manual feature extraction (Gitari et al, 2015). Rule-based techniques usually rely on a precompiled list or dictionary of clues and do not require learning (Haralambous & Lenca, 2014). Mehdad & Tetreault (2016) employed support vector machines (sum) to identify sentiment analysis after extracting the text's n-gram,

character level, and sentiment features. Artificial features, on the other hand, are limited to reflecting the surface features of text and are unable to comprehend content derived from deep semantic features.

In general, one is persuaded that the great freedom offered by social media is, in fact, mysterious by closely examining the comments. This makes it possible for disparaging remarks to be heard, which leads to the emergence and spread of outright hatred and denigration. Youths in Benue State have been reacting to herders' issues on social media, claiming that the Fulani herdsmen are staking claims to the Benue valley.

This research project proposes a data mining technique called sentiment analysis to filter out biased statements that could exacerbate the conflicts between farmers and herders in Benue State. The goal is to then provide commendable solutions to the conflicts raging the state, given the detrimental effects of fake and biased news on social media.

This aids in monitoring the polarity or duality of such data to prevent tension from unnecessarily increasing due to emotional remarks made in relation to such data. Every social media post about the problems facing Benue State's farmers and herders is scrutinized for subjectivity. In light of these worries, this study aims to characterize and contextualize the plethora of remarks and postings made on social media platforms related to the conflicts facing farmers and herders in Benue State. "Twitter" is one of the most popular social networking sites in Benue. More than 330 million people use Twitter every month (Statista, 2019). While some other social media platforms require both parties' approval in order to connect, Twitter allows users to compose brief messages within 280 characters, known as tweets (Statista, 2019). Without requiring permission, Twitter users can follow submissions—also known as tweets—from other users. It is one of the reasons Twitter is the hub for information sharing; it serves as a forum for interacting with the public and other officials as well as promoting political ideas. examining Twitter data to determine popular opinion regarding the problems facing farmers and herders. It is possible to accurately assess the dilemma facing farmers and herders, make improvements, and stop the issue from getting worse.

The major security threat Benue State now face is the perennial conflict with Fulani herders. A number of cases of killings, farmlands destruction, raping, and displaced indigenes have been reported on different social networking sites at different times. The cause of this current bout of clashes remains an issue of debate among Nigeria watchers. The conflict is becoming fierce and increasingly wide spread in Nigeria and the more social media places emphasis on an issue or event, the more people see such issues as important hence sentiment analysis focused on discovering the influence of individual feelings on social media and understanding of social realities in general. This research on farmers and herder's crisis seeks to peruse the numerous comments and posts made via social media platforms. It identifies each statement as positive, negative and neutral using data mining technique called sentiment analysis so as government can provide decision on the conflict.

The aim of the study is to develop a sentiment analysis or opinion mining model to analyse social media comment and posts about farmers/herder crises in Benue State.

The objectives of the study include:

To extract and gather social media comments and post about farmer/herder crises in Benue

To develop a model to analyze the sentiment

To perform sentiment classification on the tweets into positive, negative and neutral.

Evaluate the performance of the proposed system

This study is significant because the government can use the knowledge gotten from the findings of the research to understand the feelings of the populace about farmers/ herders' crises and how it affects them within the state. This can assist governmental policy makers in formulating policies and encourage peaceful co-existence between herdsmen and indigenous farmers.

2.0 LITERATURE REVIEW

Sentiment analysis, also known as opinion mining, is the process of identifying and categorizing subjective opinions in source materials (such as documents or sentences) by using natural language processing, computational linguistics, and text analytics, according to Luo & Xu (2019). Sentiment analysis generally seeks to ascertain the writer's attitude toward a particular subject or the document's overall contextual polarity. The author's attitude can be interpreted as their assessment or judgment, their affective state (i.e., how they are feeling when writing), or their intended emotional communication (i.e., the emotional impact they want to leave on the reader).

Guyal (2020) defines sentiment analysis as the computational analysis and identification of views and judgments within a text. Based on sentiment analysis, you may determine whether a text is favorable, negative, or neutral.

Four categories were created by Kah and Zeroual (2022) to group sentiment analysis into:

Sentiment Analysis using Fine Grins: The precision of polarity is determined using sentiment analysis. The following polarity categories can be used for sentiment analysis: extremely positive, positive, neutral, negative, or very negative. Review and rating analysis benefits from fine-grained sentiment analysis. On a rating system of 1 to 5, for instance, 1 would be seen as extremely negative and 5 as very favorable.

Aspect-Based Sentiment Analysis: Aspect-based analysis goes further than fine-grained analysis in identifying the general polarity of customer evaluations. It aids in identifying the specific topics that individuals are discussing. A consumer review for a smartphone might say, for instance, that "the camera struggles in artificial lighting conditions." It can be ascertained through aspect-based analysis that the reviewer made a comment regarding a "negative" element of the camera.

Emotional Detection Sentiment Analysis: Emotion detection aids in the identification of emotions, as the name implies. Anger, despair, joy, frustration, dread, anxiety, panic, etc. are examples of this. Lexicons, a list of words that represent specific emotions, are commonly used by emotion detection systems. Robust machine learning (ML) algorithms are also used by some advanced classifiers. Take the claim that "This product is about to kill me," for instance. could be taken to mean having panic and fear.

Intent Analysis: Companies can save time, money, and effort by accurately determining the intent of their customers. Businesses frequently wind up pursuing customers who have no intention of making a purchase anytime soon. Precise purpose analysis can overcome this obstacle. The purpose analysis aids in determining the consumer's intent, including whether they plan to buy or are only perusing. He can follow the customer and target them with ads if they are inclined to buy.

Verma (2018) distinguished between three main methods for sentiment analysis: hybrid, machine learning, and lexicon-based methods.

Lexicon-Based Approach: Opinion-bearing words are gathered and collected for use in lexicon-based sentiment analysis of text, a data analysis activity that uses opinion words and phrases without any prior information. Opinion lexicon refers to both positive and negative terms as well as opinion expressions. Unlabeled data and lexicon were employed in the lexicon-based technique. Words in the text are assessed according to opinion lexicon in order to ascertain their orientation and, consequently, the text's sentiment. The creation of opinion lexicons is essential to the lexicon-based sentiment analysis method. One of these three methods is typically used to generate opinion lexicons in lexicon-based systems.

Manual Approach: Opinion words are personally gathered according to each person's proficiency with the language and domain knowledge. This procedure takes a lot of time. This method is typically used in conjunction with automated methods to correct errors made by the latter.

Dictionary-Based Approach: Words of opinion with established orientations are gathered from lexicographical sources such as internet dictionaries. To ascertain word feelings, it makes use of opinion lexicon hierarchies, synonyms, and antonyms. Dictionary-based techniques have limitations in recognizing sentiment particular to a context because they lack domain knowledge. WordNet, SentiWordNet, secticNet, sentifull, and other dictionaries might be employed.

Corpus-Based Approach: A corpus-based approach finds and gathers opinion words in a huge corpus by using the syntactic pattern of opinion words and co-occurrence words. The context-specific classification of opinion words in dictionary-based approaches is eliminated by the corpus-based method. On the other hand, dictionary-based methods are more effective. Labeled data was employed in the corpus-based technique.

Machine Learning (ML) Approach: The foundation of these learning strategies is the construction of classifiers from labeled textual post examples. For the domain they are trained in, they function well. There are two categories of machine learning approaches.

Supervised learning: Labeled training papers are used in supervised learning techniques. The foundation of supervised learning is automatic text classification. Utilized is a labeled training set with pre-established categories. A classification model is developed to forecast a document's class by using a pre-established category. Algorithms for supervised learning include Support Vector Machine, Random Forest, Decision Tree, and Naïve Bayes.

3.0 METHODOLOGY

The study adopted the qualitative and analytical method since the nature of data gathered is expressed as opinions and analysed.
Python Snscrape library was used to mine data from twitter between a time period. Data was cleaned/ tokenized.
Sentiment detection was done, Natural Language Processing Tool Kit (NLTK), opinion was examined for subjectivity, polarity and was classified into positive, negative and neutral.
The system design is achieved using Unified Modelling Language (UML).
Supervised learning approach of Naïve Bayes algorithm and Random Forest was employed in evaluating the result in python programming language.
Receiver Operating Curve (ROC) using the True and False Positives of Naïve Bayes is used to evaluate the performance of the result of the Random Forest.

3.2 Analysis of Proposed System

The Model was developed using Python's Natural Language Processing Tool Kit (NLTK) and Naïve Bayes Classifier algorithm and Random Forest were used to analyse the data.

International Journal of Computer Applications Technology and Research
Volume 12–Issue 11, 12 – 19, 2023, ISSN:-2319–8656
DOI:10.7753/IJCATR1211.1003

NLTK is a leading platform for building python programs to work with human language data. it provides easy to use interfaces to 50 corpora and lexical resources such as WordNet, along with a suite of word processing libraries for classification, tokenization, stemming, tagging, parsing and semantic reasoning. The sentiment analysis model was developed to classify social media (Twitter) comments on the farmers/herders' conflict in Benue State into POSITIVE, NEGATIVE and NEUTRAL on a -1 to 1 scale where -1 represents negative comments, 0 represent neutral and 1 represents positive comments. The input dataset consists of tweets of individuals who expressed their feelings and concerns on the conflict on Twitter. The tweets on the farmers/ herders' conflicts in Benue State were extracted from the Twitter using a python library called Snscrape.

3.2.1 How to Scrape Tweets from a User or text search with Snscrape

Snscrape includes two methods for getting tweets from Twitter: the command line interface (CLI) and a Python Wrapper. The sntwitter. TwitterSearchScaper () is the method that returns an object of tweets from the name of the user we passed into it (example John) or a phrase written. Snscrape does not have limits on numbers of tweets so it will return however many G6

tweets from that user. To help with this, we need to add the enumerate function which will iterate through the object and add a counter so we can access the most recent 100 tweets from the user. Snscrape also allows us to pass in the date from which we want to start the search and the date we want it to end in the sntwitter.TwitterSearchScraper() method.

3.3 Architecture of the proposed Model

The architecture of the model is shown in figure 1 below

Figure 1, the architecture of the proposed model consists of the cloud which represents the social media from which the farmers/ herders' conflicts data (tweets) were extracted; the Python Snscrape API which was used to extract or scrape the dataset from the social media, preprocessing (tokenized) was done the NLTK was used to classify the dataset, Naïve Bayes and Random Forest was used to evaluate the results. The steps in building the model can be represented algorithmically as shown below:

(i) Start
(ii) Crawl social media posts from twitter
(ii) Tokenise or pre-process the dataset
(iii) Detect sentiment post or comments
(iv) Classify the detected sentiment post or comments
(v) Display results
(vi) End

3.3.1 Design of the Model

The design o is achieved using Unified Modeling Language (UML) tools like use-case diagram, sequence and class diagrams. Tools employed are StarUML and Microsoft word.

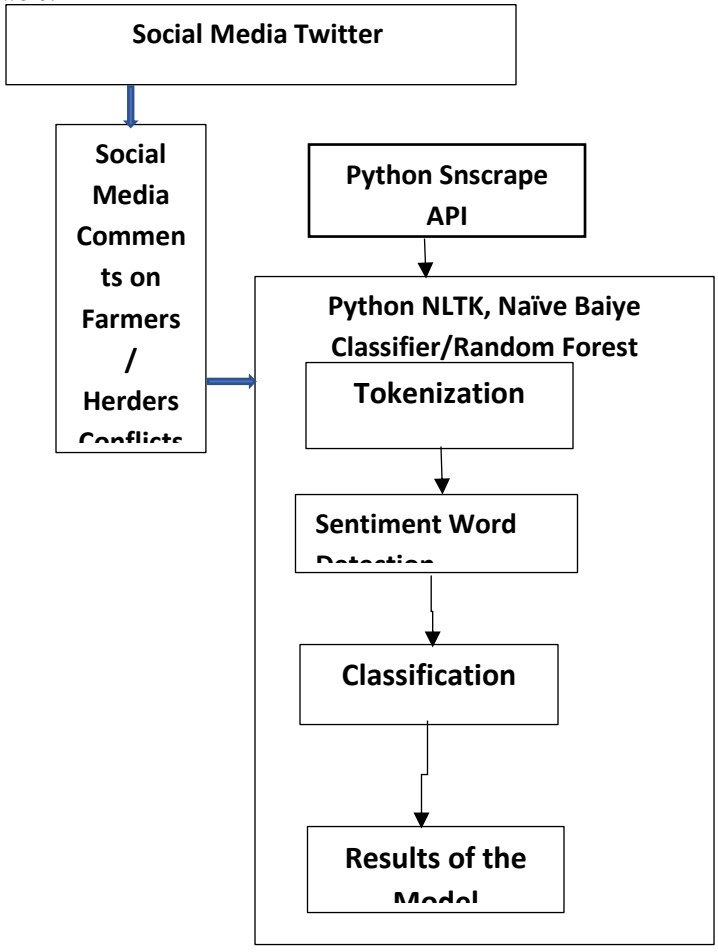

Figure 1: Architecture of the Proposed System

International Journal of Computer Applications Technology and Research
Volume 12–Issue 11, 12 – 19, 2023, ISSN:-2319–8656
DOI:10.7753/IJCATR1211.1003

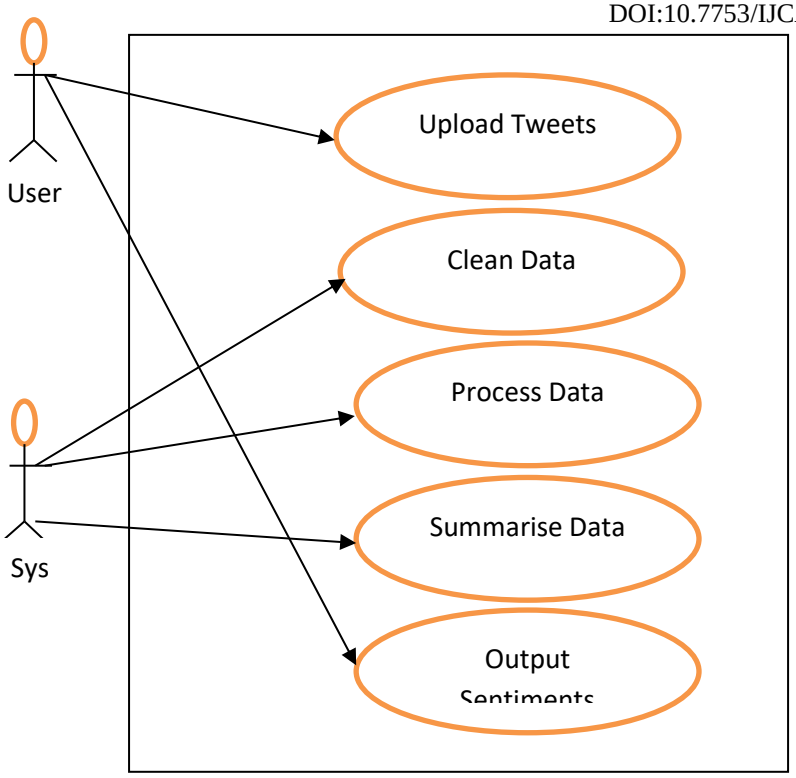

Figure 2: Use Case diagram for the Sentiments Analysis of Farmer-Herder Crisis

The User can upload or provide tweets to web system through the API. He can also see how the sentiments will be displayed, whether they are more of positive or negative, and from there guide the user towards the action that maybe taken on the stated subject. The system can perform functions like data cleaning, preprocessing and processing, summarizing and also displaying the output of the sentiments.

3.4 Sentiment Analysis classification using Natural Language Tool Kit (NLTK)

Steps below summaries how opinion mining can be performed using NLTK.

1. Importing Dataset: This is done using python's Panda library. Data is extracted and saved in a Csv file. Sample of data is shown

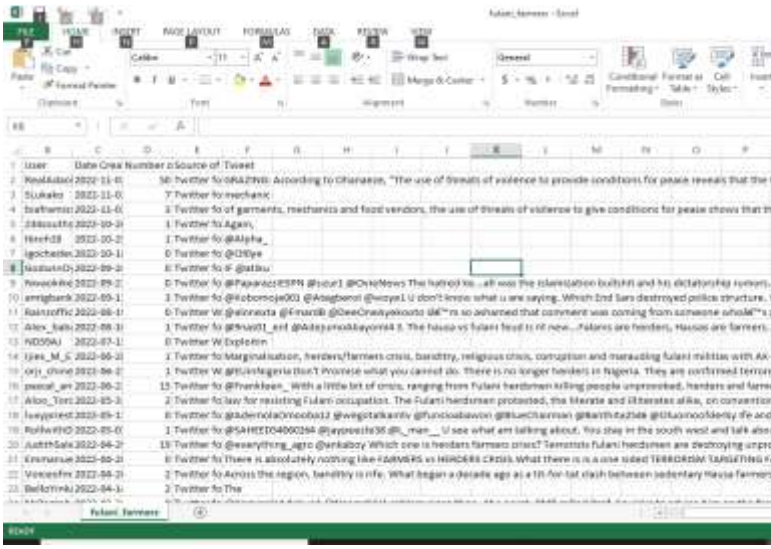

Figure 4: Sample of imported data

2. Data Processing and Visualization: After having access to the data, the data is cleaned, Punctuations and stop words are also cleaned and Classification is done with the help of NLTK library.
3. Prediction: To clarify the performance of our model, we supply different statements and allow our model using predict if its negative, positive or neutral, with -1 for negative, 1 for positive and 0 for neutral.
4. Evaluation: This was done using Naive Bayes and random forest Algorithm. Both Algorithms describe additions in detail through indications of accuracy, precision Receiver Operating Curve (ROC) in python sklearn module.

4.0 SYSTEM IMPLEMENTATION

The implementation of the system is achieved using Python programing language. SnScrape library in the Pycharm IDE is used for the data extraction. Naives Bayes and random forest algorithms are applied in the data processing of the farmer-herder crisis management system. Results gotten are tweets from Twitter about farmer-herder crisis and they are processed to determine their polarities, whether the sentiments are negatively or positively inclined, thereby enabling the decision makers towards making informed decisions.

4.1 System Implementation Algorithm

The algorithm for system is as given below.
Step 1: Collect data about farmer-herder crisis from Twitter using tools, functions and algorithms
Step 2: Process the collected data
Step 3: Analyze the collected data to give you the polarities
Step 4: Visualize the processed data to bring out meaning from the sentiments.

4.2 System Results

Results obtained from the system are presented in this section. Screenshots and graphical illustrations presented in the diagrams below are results of extracted processed tweets about farmer-herder crisis in Benue State. Details of the

processed results are:
Total tweets extracted: 576
Duration of extraction: From 2020 to 2022
Number of positive sentiments: 183
Number of negative sentiments: 226
Number of neutral sentiments: 167
The visualization of the processed extracted data is thus presented in screenshots from the system and evaluation diagrams as shown.

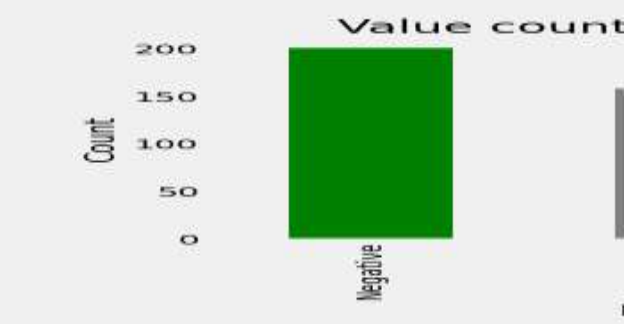

Figure 5: Bar chart Representation of the polarities of Twitter Sentiments of Farmer-Herder Crisis

Figure 5 shows the processed word count representation and the polarities. It can be seen that polarities are represented in bars and distinguished by colors with 'green', 'ash' and 'red' representing the negative, positive and neutral polarities respectively. Extracted and processed words count shows that negative sentiments were more and should affect decision taking accordingly.

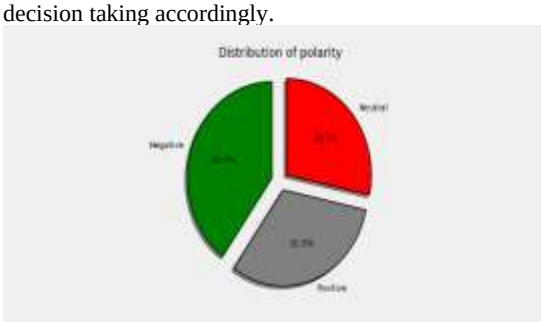

Figure 6: Pie Chart distribution of the Sentiments Analysis

Figure 6 shows the percentage distribution of processed polarities. The negative, positive and neutral polarities have percentage distributions of 40.1%, 31.5% and 28.3% respectively. This indicates that the negative polarity has more representation in the processing of extracted words from Twitter giving credence to the severity of the crisis calling for urgent attention.

Scatter Graph of Subjectivity vs Polarity

It shows output for all tweets, while polarity is concentrated at the centre, subjectivity is mostly spread at the edges, it shows a negative correlation than the positive correlation.

Figure 7: Scatter Graph of Subjectivity versus Polarity showing the analysis of the sentiments, shows the scatter of subjectivity against polarity

Word Cloud

This was created to understand which words have been used in most of the tweets.

Figure 8: Word cloud

Top Words

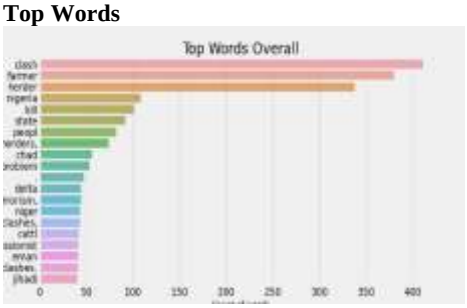

Figure 9: Farmer-Herder Top Words Extracted from Twitter

Figure 9 shows words extracted from Twitter and processed about farmer-herder crisis. It is bar chart and the words are plotted against the total counts. The words 'clash', 'farmer' and 'herder' appears most as can be seen from the word cloud giving an indication that words extracted and processed from Twitter about this subject are correctly extracted.

ROC CURVE

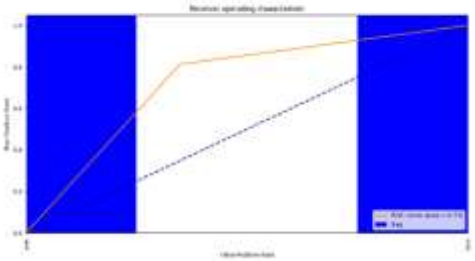

Figure 10: Sentiment Analysis Evaluation of Twitter Farmer-Herder Crisis System

Figure 10 shows the evaluation of the farmer-herder crisis sentiments analysis system. It applied the Receiver Operating Characteristic (ROC) and plotted 'True Positive Rates' against 'False Positive Rates'. The ROC area under the curve was 0.73.

4.3 System Performance Evaluation

The system developed in this study is evaluated using ROC, F1 and accuracy.

The table of performance evaluation of the developed system given below:

Table 4.1: Performance evaluation of the developed system

	ROC	F1	Accuracy
Random Forest	0.73	0.61	0.90
Naïve Bayes	0.70	0.73	0.60

From the table 1.0, the values of ROC and accuracy for the random forest algorithm are higher than the Naïve Bayes Algorithm; the F1 value for random forest is lower than that of naïve bayes. Since the ROC and accuracy of the random forest algorithm is better than that of naïve bayes, it therefore means that the random forest algorithm performed better than the naïve bayes algorithm in this study.

4.4 Discussion of Results

Results obtained for the sentiment analysis system are inform of total tweets extracted, number of positive tweets, number of negative tweets, number of neutral tweets and their representations pictorially. The system was implemented using two algorithm and the results of their performance compared. Total number of tweets extracted were 576 for the duration of 2020 to 2022. Number of positive sentiments were 183, number of negative sentiments, 226 and number of neutral sentiments gotten was 167.

The processing of these tweets was achieved using two algorithms, random forest and naïve bayes. Results of processing were gotten based on receiver operating characteristics (ROC), F1 score and accuracy.

Results from the random forest showed that ROC had a value of 0.73, the F1 score was 0.61 and the accuracy of the algorithm stood at 0.90. The second algorithm, the naïve bayes algorithm shows a ROC of 0.70, F1 score of 0.73 and the accuracy value of 0.60. This shows that the first algorithm, random forest in this case performs better than naïve bayes. Impliedly, random forest should be adopted and used in similar scenarios. The ROC curve shows a tradeoff between sensitivity (TPR) vs 1-specificity (FPR). The area under the curve is 0.73 indicating an accurate test and the value is good and it suggest that, 73% chance that the model predicted accurately. The dashed line in the ROC curve shows random classifier consistency.

The above results representation shows that tweets extracted from Twitter contained key words that can be analyzed to proffer solutions or prevent a dangerous occurrence of the crisis if systems like this are put in place and monitored real time to obtain information and make informed decisions. The system evaluation using ROC plot of 'True Positives Rates' against the 'False Positive Rates' also gives an acceptable of 0.73.

5.1 SUMMARY

The study looked at sentiment analysis and how it can be applied towards tackling serious problems bedeviling human lives. Specifically, farmer-herder crisis in Benue State was looked into. Social media in shaping lives and events and as such, can be considered as a precursor towards many issues around human. Twitter was adopted and applied in this study. Tweets about farmer-herder crisis were extracted and analyses for emotions or opinions as expressed by Twitter users. Naïve Bayes and random forest algorithms were used in evaluating the extracted tweets. Negative polarity tweets surpassed both the positive and neutral polarities. A model for sentiments analysis operations for farmer-herder crisis management was also developed. This clearly indicates that the farmer-herder crisis problem is a serious problem deserving all approaches in solving and preventing the crisis. The evaluation of the system using Receiver Operating Characteristics (ROC), F1 and accuracy using two algorithms, that is Random Forest and Naïve Bsayes give the values 0.73, 0.61 and 0.90, and 0.70, 0.73 and 0.60 respectively, indicating that the random forest algorithm performed better than the naïve bayes algorithm since the ROC and accuracy are higher as compared to the other algorithm, as such, random forest algorithm may be adopted in similar situations to give better results.

Major highlights of the research are:

- The paper proposes an approach that uses Python Natural Language Processing Tool Kit and machine learning algorithms to analyze and evaluate social media (tweets) opinions that are expressed during farmer/herder crisis in Benue State.
- The extracted tweets are processed using Python's Natural Language Processing Tool Kit, and the major categorization is considered as the people's opinion.
- The opinions are categorized into positive, negative and neutral.
- The performance evaluation shows that the random forest algorithm performed better than the naïve bayes algorithm since it returned higher values for ROC and accuracy.

5.2 Conclusion

This study has achieved the development of a system for managing farmer-herder crisis in Benue State. Sentiment analysis is the technical approach used here and opinions of social media users about the crisis especially Twitter were considered. The data gotten was analyzed using machine learning classification algorithms, Naïve Bayes and random forest. It is evident that this system developed can be a guide to decision makers in providing solutions to this hydra-headed

problem. As such, decision makers, researchers and other interested parties are encouraged to make use if the services offered by the system in tackling these problem and other related ones.

5.3 Recommendations

The government can use the finding of the research to understand the feelings of the populace about farmers/herders' crises and how it affects the state. Further research can also be done in this area using other scientific methods, approaches and technologies. Also, other social media handles can be adopted for opinion mining for different scenarios.

6 REFERENCES

[1] Verma, B. and Thakur, R. S. 2018. Sentiment Analysis Using Lexicon and Machine Learning Based Approaches: A Survey. Proceedings of International Conference on Recent Advancement on Computer and Communication, Lecture Notes in Networks and Systems 34, retrieved from https://doi.org/10 on 26-01-2023.

[2] Guyal, K. 2020. Top 4 Types of Sentiment Analysis & Where to Use. Retrieved from https://www.upgrad.com/blog/types-of-sentiment-analysis/ on 26-01-2023

[3] Alao, D. O., Shaibume, B., Ogunwemimo, T., Alao, E. M. and Ogunwemimo, O. 2019. Herdsmen/Native Farmers' Violence in Benue State and Food Security in Nigeria. Mediterranean Journal of Social Science, 10(6).

[4] Babale, A. M. and Nasidi, Q. Y. 2019. Role of Mass Media towards Ending Fulani Herdsmen and Farmers Conflicts in Benue State. KIU Journal of Humanities, 4(1): 15–22.

[5] Commission, N.P. 2006. National Population Statistics, https://en.m.wikipedia.org

[6] Eti, C. E. and Akpu, B. U. C. 2021. Agro – Pastoralist Conflicts in Benue State Nigeria: Hazards and Imperative for Human Rights Protection. International Journal of Management, Social Sciences, Peace and Conflict Studies (IJMSSPCS), 4(3) :241 – 253.

[7] Gitari, Z., Jun Long and Hanyurwimfura, D. 2015. A Lexicon-based Approach for Hate Speech Detection. April 2015 International Journal of Multimedia and Ubiquitous Engineering 10(4):215-230 DOI:10.14257/ijmue.2015.10.4.21

[8] Guyal, K. 2020. Top 4 Types of Sentiment Analysis & Where to Use. Retrieved from https://www.upgrad.com/blog/types-of-sentiment-analysis/ on 26-01-2023

[9] Haralambous, Y. and Lenca, P. 2014. Text Classification Using Association Rules, Dependency Pruning and Hyperonymization. Published in DMNLP@PKDD/ECML 28 July 2014.

[10] Ugwumba, A. 2008. Prevalence of Herdsmen and Farmers Conflict in Nigeria. International Journal of Innovative Studies in Sociology and Humanities, 3(1).

[11] Karause, G. and Grasseggles, A. 2010. Assessment of the Effect of Farmers-Herdsmen Conflicts on National Integration in Nigeria. International Journal of Humanities and Social Sciences, 8 (10), 118—128. DOI: 10.30845/ijhss.v8n10p13.

[12] Mehdad, Y. and Tetreault J. 2016. Do Characters Abuse More Than Words? Proceedings of the 17th Annual Meeting of the Special Interest Group on Discourse and Dialogue. DOI:10.18653/v1/W16-3638.

[13] Statista. 2019. Considerations on the use of instagram as a pedagogical tool under the view of contextualized education. Journal **o**f Creative Education**,** Vol.12 No.7, July 27, 2019.

[14] Alao, D. O., Shaibume, B., Ogunwemimo, T., Alao, E. M. and Ogunwemimo, O. 2019. Herdsmen/ Native Farmers' Violence in Benue State and Food Security in Nigeria. Mediterranean Journal of Social Science, 10(6).

[15] Kah A.E and Zeroual, I. 2022. "Sentiment analysis of students' Facebook comments toward university announcements," 2022 5th International Conference on Networking, Information Systems and Security: Envisage Intelligent Systems in 5g//6G-based Interconnected Digital Worlds (NISS), Bandung, Indonesia, 2022, pp. 1-5, doi: 10.1109/NISS55057.2022.10084994.