

# Prediction of Sentiments in Support of Terrorism in Nigerian Online Social Media using Computational Linguistic Approach

Oluwafemi Oriola  
Department of Computer Science  
Adekunle Ajasin University  
Akungba Akoko, Nigeria  
[oluwafemi.oriola@aaua.edu.ng](mailto:oluwafemi.oriola@aaua.edu.ng)

**ABSTRACT** – Presently, Nigeria is battling with Niger Delta Militancy and Boko Haram Insurgency, which have been agreed to be terrorism inclined. With the popularity of indigenous Nigerian online social media in Nigeria, the level of discourse on terrorism among Nigerians has increased. Hence, many research studies have been carried out on the Nigerian online social media discourse. However, few have studied sentiments on the terrorisms using Traditional Linguistics Approaches, which are generally unautomated. The focus of this paper was to predict the sentiments in support of terrorism in Nigerian social media using Computational Linguistics Approach, which has been efficient. Two popular articles on Niger Delta Militancy and Boko Haram Insurgency in the popular Nigerian Lindaikiji Blog were used. The corpus for Niger Delta Militancy contained 162 exemplars while Boko Haram contained 75 exemplars. Probability-based Polarity Scoring Tool was used to classify the corpuses of the two articles based on Natural Language Tool Kit lexicon as positive, negative and neutral. The negative corpuses were tagged as Sympathiser, Enthusiast and Actors. Each corpus was divided into two sets with 75% used for training and 25% used for testing. Naïve Bayes (NB) and Decision Tree (DT) classifiers in Natural Language Tool Kit 3.2.4 were used for the prediction. The outcomes of the prediction of sentiments in support of Niger Delta Militancy showed that DT and NB recorded 0.75 and 0.5 accuracy respectively, while both NB and DT recorded 0.77 accuracy for Boko Haram Insurgency. Computational Linguistics Approach based on Decision Tree is recommended for predicting sentiments in support of terrorism in Nigerian online social media discourse.

**Keywords:** Terrorism, Nigerian Blogs, Sentiment Analysis, Prediction, Machine Learning

## I. INTRODUCTION

The term terrorism is a controversial term that has attracted the attention of philosophers and scholars for long [1]. It has no unified agreed upon definition in English discourse [2]. Rather, it has various academic, official and popular definitions [3]. These definitions vary in different ways because of the difficulty of defining the term and because of the disagreement about the possibility of justifying it. Yet, these definitions share certain common features as they all view terrorism as an intended violence directed against governments or citizens for religious, economic or political gains.

Presently, Nigeria has experienced terror actions in form of economic and political violence from the Niger Delta Militants in Southern Nigeria and religious extremists called Boko Haram in Northern Nigeria. Boko Haram Insurgency is one of several variants of radical Islamism to have emerged in Northern Nigeria. It claims to have its ideology embedded deeply in traditional Islamism. Its adherents are governed by the Quranic phrase: “anyone who is not governed by what Allah has revealed is among the transgressors” [4]. In 2009, the Boko Haram launched insurgency, desiring to create an Islamic state under the supreme law of Sharia. The Niger Delta Militancy evolved to reverse the economic and political conditions of the Niger Deltans [5]. The activities of Niger Delta militancy are inimical to economic growth as they have perpetrated several bombings of oil facilities and kidnappings of citizens.

Over the years, the attacks by both Niger Delta Militants and Boko Haram actors have generated media and public discussions. These have attracted researches into the media and public discourses from traditional linguistic perspectives. The works include Chilwa [6] Discourse Analysis, Agbedo [7] Stylistics, Elizabeth et al. [8] Pragmatics. With the advent of online social media, [9], [10], [11] conducted research on the bias of perpetrators in terrorism based on comments using Discourse Analysis. The result showed that online discourses exhibit both positive and negative bias, with most of the discourses positive.

In Computational Linguistics, works have been done on characterization, classification and prediction of sentiments on terrorism using twitter and other popular online social media. These include Terrorist Threat Identification using Semantic Associations and Complex Networks[12,13], Visual Analysis of Terrorists' Networks extracted from Public Knowledge Bases [14], A Microblogging-based Approach to Terrorism Informatics: Exploration and Chronicling Civilian Sentiment and Response to Terrorism Events[15], Tweeting the Terror: Modelling the Social Media Reaction to the Woolwich Terrorist Attack [16], and Predicting Online Extremism, Content Adopters, and Interaction Reciprocity [17]. These works have studied foreign blogs such as tweets, which are unpopular used in Nigeria.

This paper therefore studies indigenous Nigerian online social media discourses on terrorism with the objective of predicting sentiments that are in support of terrorism in Nigeria using computational linguistics approach.

## II. SENTIMENT ANALYSIS

Sentiment analysis (also called sentiment mining, sentiment classification, opinion mining, subjectivity analysis, review mining or appraisal extraction, and in some cases polarity classification) deals with the computational treatment of opinion, sentiment, and subjectivity in text [18]. It intends to ascertain the attitude or opinion of a speaker or writer with respect to a certain topic or target. The attitude could reflect his/her judgment, opinion or evaluation, his/her affective state (how the writer feels at the time of writing) or the intended emotional communication (how the writer wants to affect the reader).

The existing works on Sentiment Analysis based on Computational Linguistic Approach have employed Natural Language Processing using Lexicon and Machine Learning Techniques. The review of the works is presented below:

Yi *et al.* [19] presented a Sentiment Analyzer for extracting sentiments about a given topic using Natural Language Processing Techniques. The research presented Sentiment Analyzer that extracts sentiment (or opinion) about a subject from online text documents. Instead of classifying the sentiment of an entire document about a subject, sentiment analyzer detects all references to the given subject, and determines sentiment in each of the references using natural language processing (NLP) techniques. The sentiment analyzer consisted of a topic specific feature term extraction, sentiment extraction, and (subject, sentiment) association by relationship analysis. Sentiment analysis utilized two linguistic resources for the analysis: the sentiment lexicon and the sentiment pattern database. The performance of the algorithms was verified on online product review articles ("digital camera" and "music" reviews), and more general documents including general webpages and news articles.

Godbole *et al.* [20] presented a system that assigns scores indicating positive or negative opinion to each distinct entity in the text corpus for large scale analysis for news and blogs. The main goal of the researchers was to know how sentiment can vary by demographic group, news source or geographical location. By expanding the spatial analysis of news entities to sentiment maps, they identified geographical regions of favorable or adverse opinions for given entities. Lexicon approach was used. It assigned scores indicating positive or negative opinion to each distinct entity in text corpus. The system consisted of a sentiment identification phase, which associates expressed opinions with relevant entity, and a sentiment aggregation and scoring phase, which scores each entity relative to others in the same class. Finally, the work was evaluated in aspect of knowing the significance of scoring techniques over large corpus of news and blogs.

Paltoglou *et al.* [21] performed sentiment analysis of informal communication in cyberspace. The authors studied and compared number of approaches for detecting whether a textual utterance is objective or subjective nature and in latter case detected the polarity of the utterance. The researchers addressed the problem of detecting and analyzing the affective content of textual communication in cyberspace. The ability to correctly identify the emotion state of the participant of virtual environment based solely on their textual input were argued, which is an important part of realistic and immersive environment that greatly enhances their overall experience. Experiments were carried out on real corpus of social exchanges in cyberspace and general conclusion was resulted down. Two datasets were used in order to explore whether lexicon or machine learning approaches are better suited to detect subjectivity and polarity in social textual exchange on the web. The first data was extracted from BBC messages Board, where registered users were allowed to start discussion and post comments on discussion on variety of topic. The result of the approach used by the researchers showed that lexicon based classifier was able to outperform supervised approach, especially in the task of detecting whether textual communication is objective or subjective. On the task of detecting the polarity, the lexicon based classifier outperformed other approaches in one of the two data set, indicating that a dictionary based classifier

would perform adequately in certain environments in cyberspace, elevating the need for developing training corpora of supervised algorithms. It was also showed that Naïve Bayes classifier was able to offer a more robust performance in comparison to the Maximum Entropy classifier, potentially because of the subtle differences between the training and the testing corpora.

Rajan et al. [22] presented a work on Web Sentiment Analysis using Twitter data. The research was aimed on determining the sentiment of text whether is positive or negative. The study introduced the theoretical basis of opinion mining. The approach used in the project was used to determine the sentiment of texts, whether it was positive or negative by estimating the strength of polarity, significant features and weighted average for all the sentiment in textual data.

Kaushik et al. [23] presented work on scalable, lexicon based techniques for sentiment analysis. The main focus of the research was to find a technique that can efficiently perform sentiment analysis on big data sets. A scalable and practical lexicon based approach for extracting sentiment using emoticons and hash tag was introduced. Hadoop software was used to classify twitter data without need for any kind of training. The approach used performed extremely well in terms of both speed and accuracy while showing signs that it can be further scaled to much bigger data set with better performance.

Agarwal and Sureka proposed different machine learning strategies [24], [25], [26], [27] aimed at detecting radicalization efforts, cyber recruitment, hate promotion, and extremist support in a variety of online platforms, including YouTube, Twitter and Tumblr. Their frameworks leverage features of contents and metadata, and combinations of crawling and unsupervised clustering methods, to study the online activity of Jihadist groups on the platforms.

The review showed that the works that were based on Lexicon Techniques were not fully automated while Machine Learning Techniques could not handle semantics. This paper combines Lexicon and Machine Learning Techniques in predict the sentiments in support of terrorism in Nigerian online social media in order to fill the limitation gaps in the two techniques.

### III. METHODOLOGY

#### *A. Framework for the Classification of the Sentiments*

The Sentiment Classification was carried out using Natural Language Processing involving both Lexicon Analysis and Machine Learning.

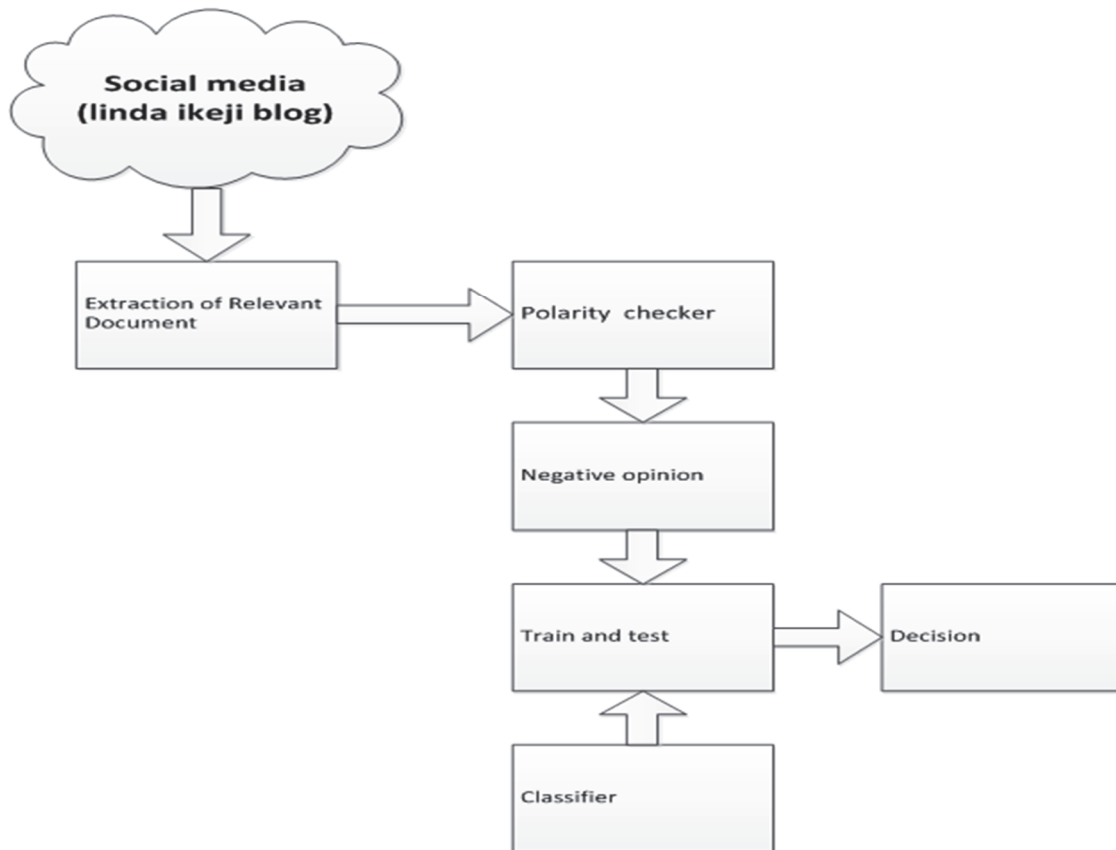


Figure 1: Schematic Diagram of the Framework for Classification of Sentiment

Corpora were extracted from social media based on topics of discourse. The commentators' texts form the exemplars which were checked by the Polarity System. The Polarity System classified the exemplars according to the opinions into Positive, Neutral and Negative. The exemplars in the 'Negative' opinion category were tagged based on the moods of the writings. The exemplars were modeled using Naïve Bayes (NB) and Decision Tree Classifier (DT). The modelling employed supervised machine learning technique. The accuracy of the prediction was used to evaluate the performance of the NB and DT classifier. Fig. 1 presents the schematic diagram of the framework.

### B. Data Collection

The two corpora used for the analysis were obtained from Linda Ikeji's Blog [28], which is the most popular and most visited blog in Nigeria. Linda Ikeji's Blog is a blog dedicated to news, events, entertainment, lifestyle, fashion, beauty, inspiration and gossip. The blog was created in December, 2010 and has attracted 5,934,880 profile views.

The first corpus contained the discourse on article: Troops in 4 warships invade Niger delta in search of Niger Delta avengers, which consist of 162 comments [29]. The 162 comments formed the total exemplars used for the study of Niger Delta Militancy.

The second corpus contained the discourse on article: Is Boko Haram that magnanimous?, which consist of 75 comments [30]. The 75 comments formed the total exemplars used for the study of Boko Haram Insurgency.

### C. Data Analysis

The choice of classifier was limited to the library of classifiers available in Python NLTK 3.2.4 [31] as this was the toolkit chosen to classify the data. The evaluation carried out included:

- 1) *Polarity Scoring*: The polarity scoring was used to determine the opinion or bias of the exemplars of the two corpora using probability score between -1 and 1. The closeness of the probability to the maximum scores determines the vector, which can be Positive, Neutral or Negative. The positive opinions are those which had more positive words. The neutral opinions are those which had more of

those words which appeared neither among positive nor negative words. The negative opinions are those which had more negative words.

- 2) *Sentiment Prediction*: The negative opinions were selected and tagged based on the characteristic moods, which determines the sentiments. The sentiments included Sympathizer, Enthusiast and Actor. Sympathizer is the sentiment group, which mood expresses sympathy. Enthusiast is the sentiment group, which mood expresses mild affection and passion. Actor is the sentiment group, which mood expresses strong affection and passion. The following algorithms were used to predict the sentiments:
  - a. Naive Bayes was chosen because of its performance in previous works. Fig. 2 depicts the Naive Bayes model for text classification.

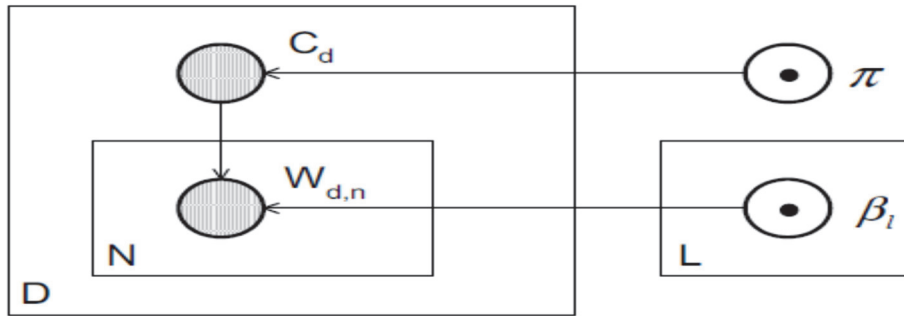


Figure 2: Naïve Bayes Model [32]

The model has  $D$  documents, each containing  $N$  words. The document is labeled a class  $C_d$ , which is generated by a distribution  $\pi$ . There are  $L$  different classes, each of which possesses a word distribution  $\beta_i$  on a vocabulary of size.

- b. *Decision Tree*: Another method for classifying data in NLTK 3.2.4 [31] is the use of decision trees. Decision trees classify instances by sorting them based on feature values. Each node in a decision tree represents a feature in an instance to be classified, and each branch represents a value that the node can assume. Instances are classified starting at the root node and sorted based on their feature values. Decision trees because of its wide usage. The models are obtained by recursively partitioning the data space and fitting a simple prediction model within each partition.

#### IV. RESULTS

##### A. Polarity Results

The result of the polarity scoring tool on Niger Delta Militancy corpus showed that 65 of the 162 exemplars were negative opinion, 59 of the opinions were positive and 88 were natural.

The result of the polarity scoring tool on Boko Haram Insurgency corpus showed that 29 of the 75 exemplars were negative opinion, 35 of the opinions were positive and 11 were natural. The results are presented in Table 1.

Table 1. Result of Polarity Scoring Tool

Instances	Positive	Neutral	Negative	Total
Niger Delta Militancy	65	88	59	162
Boko Haram Insurgency	35	11	29	75

##### B. Prediction Results

Each experiment was conducted using 75% data as the training set and 25% of data for the testing. The extracted training set and test set for Niger Delta Militancy in Python NLTK is presented in Fig. 3 and Fig. 4 respectively. The result for prediction of sentiments in support of Niger Delta Militancy in Python NLTK in terms of accuracy of prediction is presented in Fig. 5. The result shows the accuracy of prediction by Naïve Bayes and DT decision tree. Table 2 present the Prediction Accuracy for Naïve Bayes and DT decision tree.

```

{
  "text": "At least the NDA are fighting for there right, there request should be met, to avoid forder danger and lost of life and properties.", "label": "Sympat"},
  "text": "If I were Buhari, I would declare a state of emergency in Niger Delta and make all their monarchs history and level their creeks to tomato plantation.", "label": "Sympathizer"},
  "text": "You know,I think it is senseless that any of us comes here to applaud or praise these militants cos, truth is,they'll increase our sufferings a hundre", "label": "Sympathizer"},
  "text": "DID HOUSE REPS AND SENATE APPROVE THEIR DEPLOYMENT?HAVE THEY EXHAUSTED DIALOGUE AND DIPLOMACY,WAS THAT YARADUAS APPROACH,DONT UNDERMINE AND UNFERESTO", "label": "Sympathizer"},
  "text": "To avoid getting slaughtered, point out those retards amongst u, or at least advice them to pretend to be normal...", "label": "Sympathizer"},
  "text": "Is like they want it bloody and government will loose @the end", "label": "Actor"},
  "text": "Hmm op this will not cause more problem", "label": "Sympathizer"},
  "text": "Make dem no bomb una 4warship ooo, Dis way will even worsen de situation cos my boys aren't smiling", "label": "Actor"},
  "text": "Is either u are a militant or enemy of the state. Cos no Nigerian will celebrate this except for a blog champion like u. But mind u,ur hatred and sent", "label": "Sympathizer"},
  "text": "U are a bloody fool, what about fulani herdsmen killing innocent people? Boko haram? Buhari is brainless and a fool just like u", "label": "Sympathizer"},
  "text": "Which stupid right? They are same as BH,ISIS, and all other terrorist groups. Chasing fathom dreams. No one has the monopoly of violence, the Nigerian", "label": "Sympathizer"},
  "text": "At least the NDA are fighting for there right, there request should be met, to avoid forder danger and lost of life and properties.", "label": "Sympat"},
  "text": "If I were Buhari, I would declare a state of emergency in Niger Delta and make all their monarchs history and level their creeks to tomato plantation.", "label": "Sympathizer"},
  "text": "You know,I think it is senseless that any of us comes here to applaud or praise these militants cos, truth is,they'll increase our sufferings a hundre", "label": "Sympathizer"},
  "text": "Exactly. Useless president with no value for human life. The herdsmen attack should have been handled with military warship instead they left it for c", "label": "Sympathizer"},
  "text": "pls we are not part of biafra. We are Niger Deltans and we have the oil not the Igbos. So pls dont associate us with the East. We are South South. Let", "label": "Sympathizer"},
  "text": "U need to know that we are not interest in the body Nigeria if u like name it anything you call it stay owner own na we no want give ona oil again let", "label": "Sympathizer"},
  "text": "Exactly. Useless president with no value for human life. The herdsmen attack should have been handled with military warship instead they left it for c", "label": "Sympathizer"},
  "text": "Devil punish you if you fools can't dialogue things out then kiss my black ass.", "label": "Enthusiast"},
  "text": "Is either u are a militant or enemy of the state. Cos no Nigerian will celebrate this except for a blog champion like u. But mind u,ur hatred and sent", "label": "Sympathizer"},
  "text": "Hahaha..Ur so stupid. Is he a tyrant or a president? His life is over if he should try that", "label": "Sympathizer"},
  "text": "U are a bloody fool, what about fulani herdsmen killing innocent people? Boko haram? Buhari is brainless and a fool just like u", "label": "Sympathizer"},
  "text": "Please let him do that and kiss ths entity called Nigeria goodbye.", "label": "Enthusiast"},
  "text": "Buhari is very clueless! He will send warships for the avengers, No catapult to Fulani herdsmen, right?Foolish tribalistic in President!", "label": "E"}
]

```

Figure 3: Extracted Training Set for Niger Delta Militancy Corpus

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... ("you can't use fire to quench fire. at least our president should know that as an ex military man. my concerns a", "label": "Sympathizer"),
... re for the poor citizens in those area. God help them may Ode not repeat itself", "label": "Sympathizer"),
... ("Instead of dialoguing with them, you are sending innocent soldiers to kill them...", "label": "Sympathizer"),
... ("What I am thinking is the militants have pre-installed these explosive devices. It seems no amount of military", "label": "Sympathizer"),
... presence will stop the bombings. All the militants will just do is remotely control the explosions without being", "label": "Sympathizer"),
... close to the environment. The government needs to monitor the entire pipework and see if they can detonate anythi", "label": "Sympathizer"),
... ng they find. It is obvious that they were busy arming themselves during the period they were given contracts to", "label": "Sympathizer"),
... protect the pipellnes and waters.", "label": "Enthusiast"},
... ("Send another 4 warships to sambisa too ln search of BH the blood suckers,before coming to us, that is justice", "label": "Actor"),
... "Actor"),
... ("Make dem no bomb una 4warship ooo, Dis way will even worsen de situation cos my boys aren't smiling", "label": "Actor"),
... ("JUST LIKE THAT. ALL THIS TROUBLE ARE JUST BECAUSE WE HAVE A PRESIDENT WHO IS ILL ADVICE BY HIS ABOKI INNER CIRC", "label": "Sympathizer"),
... LE AND THEY ALL HAVE IT WRONG", "label": "Sympathizer"),
... ("Rubbish!Av dey caught d Avengers so far already.Dey are just dere to opress d villagers already.But dey is God o", "label": "Sympathizer"),
... buarized president.Mtchew.....", "label": "Sympathizer"),
... ("Y didn't PMB go for the fulani herdsmen like that. Now oil money matter than human life. Rubbish! I thought he", "label": "Sympathizer"),
... promised to clean up Niger Delta when he wins. He failed to do that and still increased fuel price. Guys just dey", "label": "Sympathizer"),
... vex! He should do his part and those avengers will relax. Keep going to war cos of oil money that is only opened", "label": "Sympathizer"),
... to his northern brothers. Yeye dey smell!", "label": "Sympathizer"),
... ("You guys are only worsening the situation...these guys need dialogue", "label": "Sympathizer"),
... ("Mtcheeeew! This is medicine after death.", "label": "Actor"),
... ("Pls Mr President Negotiate with them ,don't start what u can't finished. I think your medulla oblongata is acti", "label": "Sympathizer"),
... ng funny right now.", "label": "Sympathizer"),
... ("Is either u are a militant or enemy of the state. Cos no Nigerian will celebrate this except for a blog champio", "label": "Sympathizer"),
... n like u. But mind u,ur hatred and sentimental judgement will ruin u.", "label": "Enthusiast")
... ]

```

Figure 4: Extracted Test Set for Niger Delta Militancy Corpus

```

... ]

In [50]: with open('train_data.json', 'r') as fp:
...       nb = NaiveBayesClassifier(fp, format='json')
...       with open('train_data.json', 'r') as fp:
...           dt = DecisionTreeClassifier(fp, format='json')
...

In [51]: nb.accuracy(test)
Out[51]: 0.5

In [52]: dt.accuracy(test)
Out[52]: 0.75

```

Figure 6: Result for Prediction of Sentiments in support of Niger Delta Militancy



Table 2: Prediction Accuracy for Naïve Bayes and DT

Classifier	Prediction Accuracy
Naïve Bayes	0.5
DT	0.75

The extracted training set and test set for Boko Haram Insurgency in Python NLTK is presented in Fig. 7 and Fig. 8 respectively. The result for prediction of sentiments in support of Boko Haram Insurgency in Python NLTK in terms of accuracy of prediction is presented in Fig. 9. The result shows the accuracy of prediction by Naïve Bayes and DT decision tree. Table 3 present the Prediction Accuracy for Naïve Bayes and DT decision tree.

```
[
  {"text": "BUHARI IS A SCAM!APC IS A SCAM!!CHIBOK IS A SCAM!!", "label": "Enthusiast"},
  {"text": "You are on point sir..", "label": "Enthusiast"},
  {"text": "Nice write up!. So many questions but few answers... the only logical explanation is that boko haram is in factions Long live LIB", "label": "Sympathizer"},
  {"text": "For where??? We r seeing d acting rather d chibok actors r really Good and who so ever da is directing and editing dis series needs kudos. Pls sir can I faint for Nigeria now??", "label": "Enthusiast"},
  {"text": "I agree with you", "label": "Enthusiast"},
  {"text": "Reno It was a faction of Boko Haram that released the girls.The other faction is still at war even now with Nigeria e.t.c", "label": "Sympathizer"},
  {"text": "Nigerians are still living in d dark, ask urself somebody is to write exams, GCE can not speak English, so d girls are complete in number till date, their no long use for bombing, Nigeria wake up", "label": "Enthusiast"},
  {"text": "Nigeria is one big theatre where the absurd hold center stage.Why would the girls not be allowed to speak to the press?If they were held captive by psychopaths,blood thirsty vampires and rapists like the notorious Boko Haram,how come only one of them is carrying a baby.Compare this to the rescued girls or displaced ones in IDP camps in the Northeast who are looking hagar and malnourished.Something does not add up.The truth shall be told one day soon.", "label": "Enthusiast"},
  {"text": "You are most probably right", "label": "Enthusiast"},
  {"text": "BUT WHY BOKO HARAM AND SHEKAU DONT SHOW VIDEOS RELEASING THE GIRLS RUP WILL MAKE VIDEO SHUD HE IS STILL"}
]
```

Figure 7: Extracted Training Set for Boko Haram Insurgency Corpus

```
In [75]: test = [
...: ("Reno thanks for your comment; many Nigerians are lacking in critical social analysis, hence the ignorant commen
...: ts levied on you. The recently released Chibok girls look well fed . it's not easy to feed one person especially
...: in contemporary Nigeria, let alone 82. How is it that BH is able to feed these girls? Why is these release coming
...: just at the same time Buhari was leaving for medical trip to London? Alot is amiss here;some political monsters
...: are scoring cheap political points feeding BH and trying to divert public attention from ailing Buhari to we'll f
...: ed Chibok girls. Nigerians shine your eyes, this govt is a scam. Thumbs up, Reno", "Enthusiast"), ("who u still
...: believe there is chibok girl,i laugh in latin,okay even if there is, is that why this government will encourage
...: d abductors,why will they even negotiate with those sadists in the first place,well u believed buhari has done we
...: ll ab?In no time everyone will regret this,come to think of this maybe since buhari has decided to release d bok
...: o haram leader and also paid them in dollars,do u think this scenario will not repeat it's self,i must confess ne
...: gotiating with a terrorist in order for d chibok girls to be released if at all there is anything like chibok gir
...: ls is not d best option,i hope d boomb* will stop,but if not u are d biggest fool just like this current govern
...: ment.", "Sympathizer"), ("I said it from DAY One that these girls abduction was politically motivated and a compl
...: ete SHAM. The truth can only be hidden for so long. Where did Boko Haram get the resources to keep these girls lo
...: oking so good when they themselves were dying from hunger. Nigerians are too gullible. The whole truth will come
...: to light someday. Thank you Reno.", "Sympathizer"), ("Olofin The idiot called Buhari with too much clue has destr
...: oyed our Economy with his empty head. Only fools like you will believe this Chibok crap", "Enthusiast"), ("Had sa
...: me thoughts myself. Couldn't understand how this negotiation could be possible shortly after a serious altercatio
...: n with BH. The girls also look very nourished considering they had been kidnapped for three years. I agree with R
...: eno, it all doesn't add up at all", "Enthusiast"), ("Reno, I see things from your point of view. I have asked, wh
...: y media people are not allowed to interview at least between twenty to thirty of them? Which location were they kept
...: and they all look unruffled? I smell a rat my bbrother.", "Enthusiast"), ("Nothing like missing chibok girls... g
...: ovt out of confusion, lies n deceit. Where's our president and his health status. This new chibok girls distraction n
...: eed to stop..", "Enthusiast"), ("This APC drama since on Sunday is so hilarious that I cannot stop wondering why
...: they keep thinking Nigerians are as gullible as before. So to distract Nigerians for the President's incompetency
...: and medical trip abroad, they released these girls they held hostage just to seize power from GEI believing Nige
...: rians would be taken by their effectiveness. APC, no we are not STUPID as before. You kidnapped these girls and h
...: ave housed and fed them strictly for your selfish self-centered purpose, not knowing you are actually toying with
...: your own unborn generation's future. Try other better tricks next time.", "Enthusiast"), ("Think so too", "Enthu
...: siast")
...:]
```

Figure 8: Extracted Test Set for Boko Haram Insurgency Corpus

```

IPython: webby/Desktop
File Edit View Search Terminal Tabs Help
root@algorithm: /home/webby/Desktop IPython: webby/Desktop CYBORG001 CYBORG001

In [54]: from textblob.classifiers import NaiveBayesClassifier, DecisionTreeClassifier
In [55]: with open('data.json', 'r') as fp:
...:     nb = NaiveBayesClassifier(fp, format='json')
...:
In [56]: with open('data.json', 'r') as fp:
...:     dt = DecisionTreeClassifier(fp, format='json')
...:
In [57]: nb.accuracy(test)
Out[57]: 0.7777777777777778
In [58]: dt.accuracy(test)
Out[58]: 0.7777777777777778
In [59]: █
    
```

Figure 9: Result for Prediction of Sentiments in support of Boko Haram Insurgency

Table 3: Prediction Accuracy for Naïve Bayes and DT in Boko Harm Insurgency

Classifier	Prediction Accuracy
Naïve Bayes	0.77
DT	0.77

In Fig. 10, a chart showing the comparison of the performance of Naïve Bayes and DT in Niger Delta Militancy and Boko Haram Insurgency Instances of Terrorism is presented.

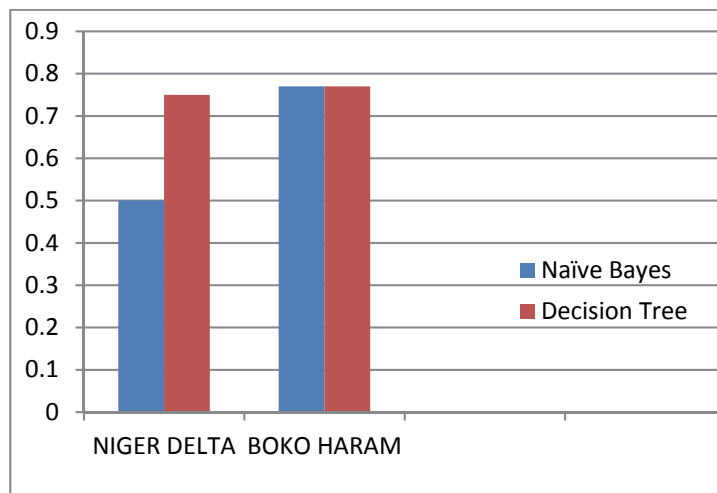


Figure 10: Chart Showing the Performance of Naïve Bayes and Decision Tree in Niger Delta Militancy and Boko Haram Insurgency Instances

The results for prediction of sentiments in support of Niger Delta Militancy in Fig. 5 and Table 2 show that the accuracy of prediction by Naïve Bayes and DT decision tree were 0.5 and 0.75 respectively. The results for prediction of sentiments in support of Boko Haram Insurgency in Fig. 9 and Table 3 show that the accuracy of prediction by Naïve Bayes and DT decision tree were 0.77 and 0.77 respectively. These show that DT is better than Naïve Bayes in predicting sentiments in support of Niger-Delta Militancy, while both Naïve Bayes and DT show same ability in predicting sentiments in support of Boko Haram Insurgency. The results showed that DT is a better choice than Naïve Bayes for predicting sentiments in support of terrorism in Nigerian online social media since the accuracy of DT in Niger-Delta Militancy and Boko Haram Insurgency were 0.75 and 0.77 respectively.



## V. CONCLUSION

Terrorism is a menace, which has generated various opinions from bloggers in online social media in Nigeria. In this work, the opinions in blogs about Niger Delta Militancy and Boko Haram Insurgency were studied by classifying the opinions as positive, negative and neutral using Python NLTK lexicon. The outcome conformed to [9], [10], [11] in terms of the distribution into positive and negative opinions. The sentiments behind the negative opinions were studied based on a subjective sentiment classification scheme of sympathizer, enthusiast and actors. Supervised Machine Learning Technique was used to model the prediction of the sentiments. The results of the model showed that Decision Tree is better than Naïve Bayes in the prediction of sentiments in support of terrorism in Nigerian online social media.

Thus, Computational Linguistic Approach based on Decision Tree is recommended for predicting sentiments in online social media. In Future, different types of decision trees aside the NLTK Decision Tree and other classifiers will be applied to evaluate larger corpora.

## ACKNOWLEDGEMENT

The author acknowledges the student members of computational linguistics unit of Adekunle Ajasin University, Akungba Akoko, Nigeria for their support.

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