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A Survey on Terrorist Activities Detection using Machine Learning

Pankaj Sanjay More, Vidyanand Dipak Mali, Shailesh V Kagapure, Shubham Y Dhole,

Prof. Mrs. A. V. Patil

Department of Computer Engineering, Smt.Kashibai Navale College of Engineering (SKNCOE), Pune, India

ABSTRACT: The richest source of human-generated text input is likely social media. Internet users' opinions, feedback, and criticisms are a reflection of their attitudes and feelings towards many subjects and concerns. Any group of people would not be able to read such a massive amount of material. Social media has thus developed into a crucial instrument for disseminating their ideas and persuading or luring individuals in general to participate in their terrorist actions. The most popular and convenient method for quickly reaching a large number of people is Twitter. The construction of a system that can automatically identify tweets that promote terrorism using real-time analytics and the Apache Spark machine learning framework was the main emphasis of this paper. The proposed approach attempts to increase accuracy while being fully dependent on training data. By preventing the terrorist accounts from Twitter, the public will be protected from their propaganda and fear mongering.

KEYWORDS: psychological pressure, text mining, sentiment analysis, social media, machine learning.

I. INTRODUCTION

In today's world, social media is arguably a very important factor in both an individual's life and the operation of a government. According to statistics, there are roughly 7.72 billion people on the planet, and there are undoubtedly billions of them who use the internet. There are 5.54 social media accounts per person and approximately 3.397 billion active social media accounts worldwide. It has been discussed how social media affects society, its citizens, and the data it produces as a result. Without a hint of social media's role in it, the development of the 21st century is hardly predictable. Saying that social media is omnipresent in all areas of life—including education, health care, business, disaster management, politics, and the travel and tourist sector—wouldn't be overstating the case. Of course, the use of social media for entertainment and media sharing goes without saying. Despite all the ease that social media has to offer, it also has a negative side. The flip side, improper usage of social media, also needs to be taken into consideration. On the one hand, this may appear to be bridging a communication gap and accelerating the dissemination of news among people; on the other hand, many people are abusing it severely. Misuse on a par with acts of genocide, homicides, bombings, conspiracies, etc. According to a study by [6], 76% of terrorists in the United Kingdom use the internet to plan their attacks and do research, and 90% of terrorist operations online are carried out using social media platforms. Aussie Warren Rodwell was abducted and kept captive by the terrorist group ASG in 2013 for roughly 472 days. The group made use of YouTube and Facebook for ransom videos and to demonstrate the proof of life. A thorough literature review indicated that Islamic State (ISIS) made considerable use of social media to promote their ideology and recruit members and followers. Three extremist-related groups operating in Asia Pacific, including Abu Sayyaf in the Philippines, Jamaat-e-Islami in Bangladesh, and the Uyghurs in China, have been studied for their use of proactive social media methods. This study demonstrates how these groups provide a wide range of chances to use social media to increase their reach, influence, and effect. Another example of this kind of social media abuse is the presentation of media mujahedeen, who are thought to be followers of jihadist organisations and who post propaganda online.

II. RELATED WORK

With the use of information retrieved from one of the well-known social networking websites, Twitter, [1] built a model to forecast the quantity and survival of information flows. Using the zero truncated negative binomial (ZTNB) regression approach and the Cox regression technique, respectively, the information flow size and survival were predicted. They revealed a novel finding that recognised the attitude stated in the tweet, which was found to be statistically predictive of both the size and survival of information flows of this kind. They did this by using a sample of

427,330 tweets from Twitter. Furthermore significant were URL co-occurrences and the timing differences between retweets and hashtags.

In a related study, [2] described how analysing open source communications data collected through social media platforms could shed light on the processes of community conflict that emerge after such sad incidents. They asserted that the Twitter data collected in the wake of Fusilier Lee Rigby's murder provides strong evidence in favour of Collins' three phases of conflict dynamics. Also, they examined two important claims: the first was that the disagreement was interactive, and the second was that the information provided by the digital data offered persuading insights into the intricate web of connections that emerged and formed during such a dispute.

Another fascinating investigation of this incident was published by [3], who used this case study as part of his computational criminology research. They demonstrated how cyberhate's temporal fluctuation relates to criminological theory's prevalent ideas of crime's dissemination, persistence, escalation, and de-escalation.

[4] conducted an analysis of social responses to Lee Rigby's murder using information obtained from routine twitter monitoring. They looked into a variety of online actions that have offline repercussions.

On April 15, 2013, two homemade pressure cooker bombs exploded near the finish line of the annual Boston Marathon. Three people lost their lives as a result, while hundreds more were hurt. Sixteen persons lost limbs in total. [5] analysed the social media posts that were immediately uploaded following the blasts. They discovered several phrases to show up frequently before the official reports on public safety and the media. Within minutes after the explosions, those nearby sent messages on Twitter. This aided in locating the events and determining their specifics. This exemplifies how social media can be used to identify and portray emergencies in advance.

This incident was also the subject of research by [6]. They looked at the effects of tweet characteristics on the spread of two types of messages about the marathon tragedy: rumor-related and actual messages (both in the context of the Boston tragedy). A negative binomial study revealed that factors affecting the spread of the tweet message during the bombing include the use of hashtags, the number of followers, and the reaction time. The quantity of followers showed a helpful correlation with message dissemination. The correlation between twitter reaction time and message dispersal was, however, unfavourable. It's interesting to note that messages without hashtags circulated more widely than those that did.

[7] conducted a similar investigation into this event, collecting more than 18 million tweets from 15,509 users in Paris on November 13, 2015. They gauged the intensity of their post-attack grief, rage, and worry. To analyse a social media stream that records user location and history, the authors suggested using computational focus groups and a wholly original inquiry framework. The study produced results that are not expected to appear through other media or techniques.

According to this study [8], the Convergence Behavior Archetypes that were most frequently retweeted throughout the crisis were the Helpers. The Mourners, on the other hand, had the greatest influence due to their high retweet rate. Research demonstrated that those who post emotionally charged information receive the most retweets. The Detectives also spread knowledge into other groups the most. The writers not only increased understanding about how people use social media during crises, but they also assisted crisis managers in learning more about user behaviour. Controlling the volume of data created during a crisis situation may be made easier by knowing which social media conduct has an impact.

Twitter became a crucial means of communication between the public, government, and emergency services. This made managing emergencies during crises much easier. [9] conducted an extensive analysis of crisis communication trends as they are mediated by social media. The data generated by tweets was gathered and analysed using Twitter Mate. Also, it lists the primary hashtags that the public used as well as specific Twitter handles belonging to people, Organizations, and emergency personnel. 67,849 tweets in all were collected and looked at. There were four main categories of hashtags found: social support, terror attack, locations, and organisations.

[10] has also looked into this terrorist act. They looked into user demographics, the volume of tweets, and the locations of tweets. Also, they looked at whether users in underdeveloped nations would be more likely to tweet, retweet, or

comment in the event of a terrorist incident. They define new metrics that relate to the tweet's reach and impression. They said that users from poor nations had a tendency to tweet more frequently at the beginning and during the most important phases of a terrorist incident. Also, a sizable portion of tweets—23% from women and 73% from men—came from Kenya. The most tweets were also sent in response to original posts, then retweets and responses.

III. OPEN ISSUES

This field has seen a lot of effort because of how widely used and applied it is. Some of the methods that have been used to accomplish the same goal are listed in this section. The algorithm for terrorist activity detection systems greatly distinguishes these works.

IV. PROPOSED METHODOLOGY

The system attempted to tie some semantics to the real-time data it had obtained from Twitter. In order to look for trends, the system wanted to analyse the data. We wanted to see which phrases and hashtags were most popular as well as who was positioned centrally in the network graphs. The purpose purpose was wanted to see the system system wanted to see how the system wanted to see how data had wanted to see and popularity on different metrics for different crises. data, the system wanted to see how data had had Finding out the Twitter users' crisis orientation is another goal of our proposed approach. to see who places the most emphasis on which behaviour. The system will analyse the key factors, such as postattack anxiety, rage, and grief. There needs to be a system that can produce daily analysis because there is a lot of data being collected every day. The programme hoped to be able to view tweets about terrorist incidents as they occurred. It was necessary to monitor tweets relating to terrorist attacks.

A. Architecture

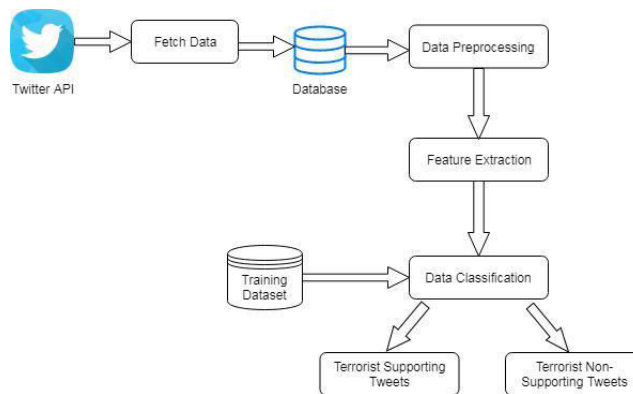


Fig. 1. Proposed System Architecture

B. Algorithm

Random Fores Machine Learning Algorithm:

Step 1: Let the number of training cases be N , and the number of variables in the classifier be M .

Step 2: The number m of input variables to be used to determine the decision at a node of the tree; m should be much less than M .

Step 3: Choose a training set for this tree by choosing n times with replacement from all N available training cases (i.e. take a bootstrap sample). Use the rest of the cases to estimate the error of the tree, by predicting their classes.

Step 4: For each node of the tree, randomly choose m variables on which to base the decision at that node. Calculate the best split based on these m variables in the training set.

Step 5: Each tree is fully grown and not pruned (as may be done in constructing a normal tree classifier).

For prediction a new sample is pushed down the tree. It is assigned the label of the training sample in the terminal node it ends up in. This procedure is iterated over all trees in the ensemble, and the average vote of all trees is reported as random forest prediction.

V. CONCLUSION

The current research primarily focuses on the use of social media as a tool for terrorism due to the rising use of social media. Social media plays a crucial role in the lives of this young youth in India, one of the largest countries in the world with more than 65% of its population under the age of 35. There is potential for confirming the altered user attitudes before and after an assault. The proposed tools will attempt to analyse the progress of counterterrorism efforts in this digital realm. Given the research that have been published and the analyses that have been done thus far, it is clear that a much bigger scale and more frequent application of data analysis are urgently required. This should be done as a safety measure, a preventive measure, and a post-attack investigation in addition to identifying terrorist activity on social media. The project may also employ machine learning techniques to develop a programme that will categorise tweets automatically and analyse their sentiment.

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