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Detection of Cyberbullying on Social Media Using Machine Learning

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ABSTRACT

Cyber bullying is a major problem encountered on internet that affects teenagers and also adults. It has lead to mis happenings like suicide and depression. Regulation of content on Social media platforms has become a growing need. The following study uses data from two different forms of cyber bullying, hate speech tweets from Twitter and comments based on personal attacks from Wikipedia forums to build a model based on detection of Cyber bullying in text data using Natural Language Processing and Machine learning. Three methods for Feature extraction and four classifiers are studied to outline the best approach. For Tweetdata the model provides accuracies above 90% and Wikipedia data it gives accuracies above 80%.

1.INTRODUCTION

Now more than ever technology has become an integral part of our life. With the Evolution of the internet. Social media is trending these days. But as all the other things mis users will pop out sometimes late sometime early but there will be for sure. Now Cyber bullying is common these days.

Sites for social networking are excellent tools for communication within individuals. Use of social networking has become widespread over the years, though, in general people find immoral and unethical ways of negative stuff. We see this happening between teens or sometimes between young adults. One of the negative stuffs they do is bullying each other over the internet. In online environment we cannot easily said that whether someone is saying something just for fun or there may be

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other intention of him. Often, with just a joke, "or don't take it so seriously," they'll laugh it off Cyber bullying is the use of technology to harass, threaten, embarrass, or target another person. Often this internet fight results into real life threats for some individual. Some people have turned to suicide. It is necessary to stop such activities at the beginning. Any actions could be taken to avoid this for example if an individual's tweet/post is found offensive then maybe his/her account can be terminated or suspended for a particularperiod.So, what is cyber bullying??

Cyber bullying is harassment, threatening, embarrassing or targeting someone for the purpose of having fun or even by well-planned means

Researches on Cyber bullying Incidents show that 11.4% of 720 young peoples surveyed in the NCT DELHI were victims of cyber bullying in a 2018 survey by Child Right and You, an NGO in India, and almost half of them did not even mention it to their teachers, parents or guardians. 22.8% aged 13-18 who used the internet for around 3 hours a day were vulnerable to Cyber bullying while 28% of people who use internet more than 4 hours a day were victims. There are so many other reports suggested us that the impact of Cyber bullying is affecting badly the peoples and children between age of 13 to 20 face so many difficulties in terms of health, mental fitness and their decision making capability in any work. Researchers suggest that every country should have to take this matter seriously and try to find solution. In 2016 an incident called Blue Whale Challenge led to lots of child suicides in Russia and other countries . It was a game that spread over different social networks and it was a relationship between an administrator and a participant. For fifty days certain tasks are given to participants . Initially they are easy like waking up at 4:30 AM or watching a horror movie . But later they escalated to self harm which let to suicides. The administrators were found later to be children between ages 12-14.

2.LITERATURE SURVEY

In recent years, the proliferation of social media platforms has different facilitated unprecedented levels of connectivity and interaction among individuals worldwide. However, this surge in online communication has also brought to light the darker side of digital interaction—cyber bullying. Defined as the deliberate and repeated use of digital technology to harass, intimidate, or harm

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others, cyber bullying poses significant challenges to the well-being and safety of individuals, particularly adolescents and young adults who are among the heaviest users of social media platforms.

The anonymity, accessibility, and instantaneous nature of social media platforms provide cyberbullies with the perfect environment to target their victims with impunity. Unlike traditional forms of bullying, cyberbullying transcends physical boundaries, making it difficult for victims to escape or seek refuge from their tormentors. Consequently, the need for effective strategies to detect and combat cyberbullying in social media has become increasingly urgent.

This literature survey aims to provide an overview of existing research efforts focused on the detection of cyberbullying in social media. By synthesizing findings from various studies, we seek to identify current trends, challenges, and opportunities in this burgeoning field. Moreover, we aim to highlight key methodologies, algorithms, and technologies employed in cyberbullying detection, along with maintain their respective strengths and limitations.

3.EXISTING SYSTEM

Hsien[1] used an approach using keyword matching, opinion mining and social network analysis and got a precision of 0.79 and recall of 0.71 from datasets from four websites.Patxi Gal´an-Garc´ıa et al.[2] proposed a hypothesis that a troll(one who cyberbullies) on a social networking sites

under a fake profile always has a real profile to check how other see the fake profile. They proposed a Machine learning approach to determine such profiles. The identification process studied some profiles which has some kind of close relation to them.

The method used was to select profiles for study, acquire information of tweets, select features to be used from profiles and using ML to find the author of tweets. 1900 tweets were used belonging to 19 different profiles. It had an accuracy of 68% for identifying author. Later it was used in a Case Study in a school in Spain where out of some suspected students for Cyberbullying the real owner of a profile had to be found and the method

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worked in the case. The following method still has some shortcomings.

For example a case where trolling account doesnt have a real account to fool such systems or experts who can change writing styles and behaviours so that no patterns are found . For changing writing styles more efficient algorithms will be needed.

Mangaonkar et al. [3] proposed a collaborative detection method where there are multiple detection nodes connected to each other where each nodes uses either different or same algorithm and data and results were combined to produce results. P. Zhou et al.[4] suggested a B-LSTM technique based on concentration. Banerjee et al.[5]. used KNN with new embeddings to get an precision of 93%.

DISADVANTAGES

1. A vocabulary is not designed from all the documents. The vocabulary may consist of all words (tokens) in all documents or some top frequency tokens

2. Tf-Idf method is not similar to the bag of words model since it uses the same way to create a vocabulary to get its features.

4.PROPOSED SYSTEMS

Cyber bullying detection is solved in this project as a binary classification problem where we are detecting two majors form of Cyber bullying: hate speech on Twitter and Personal attacks on Wikipedia and classifying them as containing Cyber bullying or not.

Tokenization: In tokenization we split raw text into meaningful words or tokens. For example, the text “we will do it” can be tokenized into ‘we’, ‘will’, ‘do’, ‘it’. Tokenization can be done into words called word tokenization or sentences called sentence tokenization. Tokenization has many more variants but in the project we use Regex Tokenizer. In regex tokenizer tokens are decided based on rule which in the case is a regular expression. Tokens matching the following regular expression are chosen Eg For the regular expression ‘\w+’ all the alphanumeric tokens are extracted.

Stemming: Stemming is the process of converting a word into a root word or stem. Eg for three words ‘eating’ ‘eats’ ‘eaten’ the stem is ‘eat’. Since all three branch words of root ‘eat’ represent the same thing it should be recognized as similar. NLTK offers 4

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types of stemmers: Porter Stemmer, Lancaster Stemmer, Snowball Stemmer and Regexp Stemmer. The following project uses PorterStemmer.

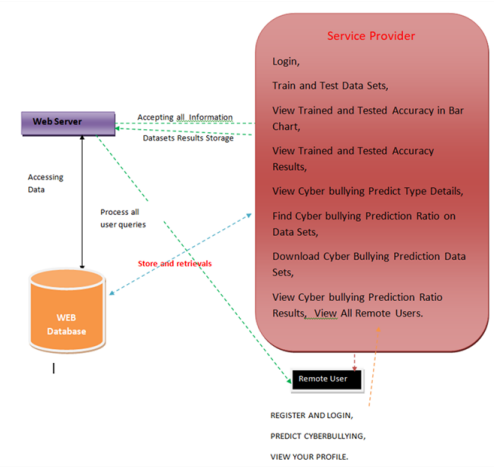
Stop word Removal: Stop words are words that do not add any meaning to a sentence eg. some stop words for english language are: what, is, at, a etc. These words are irrelevant and can be removed. NLTK contains a list of english stop words which can be used to filter out all the tweets. Stop words are often removed from the text data when we train deep learning and Machine learning models since the information they provide is irrelevant to the model and helps in improving performance.

ADVANTAGES

1. Common Bag of Words model takes as input of multiple words and predicts the word based on the context. Input can be one word or multiple words.

2. CBOW model takes a mean of context of input words but two semantics can be clicked for a single word. i.e. two vector of Apple can be predicted. First is for the firm Apple and next is Apple as a fruit.

5.ARCHITECTURE



In the above architecture by using the we use the web database to store the data . and then data is accessed to the web server.

Data in Remote user and service provider are store in the web data base and we can retrieve the data like login , register view profile , predict the data from web server

6.MODULES

Service Provider: In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such as Login, Train and Test Data Sets,View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results,View Cyber bullying Predict Type Details, Find Cyberbullying Prediction Ratio

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on Data Sets,Download Cyber Bullying Prediction Data Sets, View Cyber bullying Prediction Ratio Results,View All Remote Users.

View and Authorize Users: In this imodule, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

Remote User: In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like REGISTER AND LOGIN, PREDICT CYBERBULLYING, VIEW YOUR PROFILE.

7.OUTPUT SCREENS

Login Screen:

Register Screen:

Service Provider Screen:

Prediction Ratio Screen:

Output Screen:

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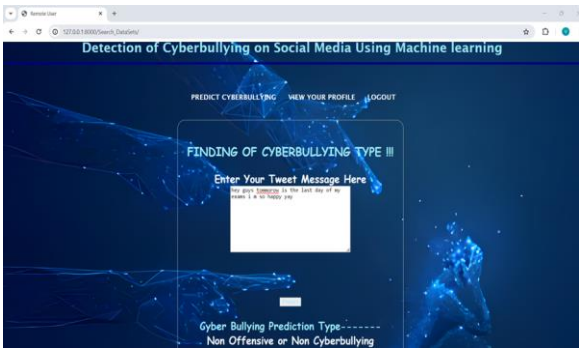

7. CONCLUSION

Cyber bullying across internet is dangerous and leads to mis happenings like suicides, depression etc and therefore there is a need to control its spread. Therefore cyber bullying detection is vital on social media platforms. With availability of more data and better classified user information for various other forms of cyber attacks Cyber bullying detection can be used on social media websites to ban users trying to take part in such activity In this paper we proposed an architecture for detection of cyber bullying to combat the situation. We discussed the architecture for two types of data: Hate speech Data on Twitter and Personal attacks on Wikipedia. For Hate speech Natural Language Processing techniques proved effective with accuracies of over 90 percent using basic Machine learning algorithms because tweets containing Hate speech consisted of profanity which made it easily detectable. Due to this it gives better results with BOW and TF-IDF models rather than Word2Vec models However, Personal attacks were difficult to detect through the same model because the comments generally did not use any common sentiment that could be learned however the three feature selection methods performed similarly.Word2Vec models that use context of features proved effective in both datasets giving similar results in comparatively less features when combined with Multi Layered Perceptrons.

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