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The Framework for Multitask Cyberbullying Detection Modal

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ABSTRACT: Nowadays due to the multimodality of content cyberbullying detection is becoming challenging. This work is an attempt to find out the role of emotion, sentiment, and sarcasm in identifying cyberbullying from multimodal data content. The system is generating multimodal data content called MultiBully annotated with emotion, sarcasm, and sentiment labels collected from social media platforms. In this modal, the system will be going to find out the harmfulness score of bullying statements from a meme. Dataset will consist of both text and images in the code-mixed form. By proposing two frameworks BERT+ResNet-Feedback and CLIP-CentralNet to capture cyberbullying statements with other multitask like sentiment analysis, emotion, and sarcasm detection.

KEYWORDS: Multimodal, sarcasm, cyberbullying, sentiment, Emotion, multitasking, and meme.

I. INTRODUCTION

Cyberbullying is the process of sending wrong messages, humiliating, teasing, embarrassing, taunting, defame to a person or community which causes heated debate among users. Cyberbullying is mostly seen on social networking sites where users reply to posts with bullying words to threaten or insult other users. Cyberbullying is considered a misuse of technology. According to the latest survey done all over the world data day by day, cases are increasing on cyberbullying. To solve this problem many natural language processing techniques are proposed by various authors which are time taking and not automatic. With machine learning and artificial intelligence advancement, models can be created and automatic detection can be implemented. By proposing two multitask multimodal frameworks BERT+ResNet-Feedback and CLIP-CentralNet for sarcasm, sentiment, and emotion-aided cyberbullying detection. Post of cyberbullying is quantified by incorporating a harmfulness score in the dataset.

Now introducing emotion-sarcasm-sentiment-aware cyberbullying detection from multilingual multimodal memes. One of the special things about this modal is passing an input of meme means both text and image by which modal can capture bullying text and image Mobile Ad Hoc Networks (MANETs) consists of a collection of mobile nodes which are not bounded in any infrastructure. Nodes in MANET can communicate with each other and can move anywhere without restriction. This non-restricted mobility and easy deployment characteristics of MANETs make them very popular and highly suitable for emergencies, natural disaster and military operations.

II. MOTIVATION

In the current system, it is difficult to recognize whether the victim is truly bullied or not because current models do not understand the emotion and sarcasm behind it. Hence, got the motivation to develop a system that detects cyberbullying through a meme.

III. LITERATURE SURVEY

1. Cyberbullying Detection Through Sentiment Analysis. Prof. Kiran Deshpande Information Technology A.P Shah Institute of Technology Thane, India.

Various kinds of emotional analyses and sentiments of its users are available in the form of electronic media on a social media platform. Analyzing the sentiments or reactions of the users on a particular post or image is a very difficult task. This project aims to automate the task of analyzing the reactions to the posts and generate a report

based on the outcome. The current system of social media platforms provides very little or no freedom to the [1] administrators of important accounts like businesses or colleges to analyze the sentiments related to their activities. Limited services available and or the right kind of analysis charges a fortune. Lexicon libraries are available in the sentiment analysis model. A sentiment lexicon has a labeled list of features, which are regarding their sentiments as positive or negative. Here, the words are classified into binary classes that are either positive or negative.

In this, machine learning approaches have also been proposed. Some of the proposed models in this paper are Naïve Bayes, maximum entropy, and support vector machine. On social media, the analysis carried out on the actions of the user's media through the sentiment model is depicted in the pie chart. MongoDB, Express.js, Node.js, and React.js are the Programming languages, libraries, and tools used. The solution will be useful in businesses or universities to analyze users' sentiments related to their circle. The analysis would help universities and organizations improve their future activities and help find alarming situations, such as depressed users. The advantage of the solution is that system uses modern technologies that make the application more secure, scalable, robust, and fast. As the activities won't be tracked the users would still retain their privacy.

2. Cyberbullying Detection Through Sentiment Analysis by Jalal Omer Atoum

This paper is an overview of cyberbullying which occurs mostly on social networking sites. Instagram, Facebook, Twitter, and some popular social media platforms are globally used especially by the young generation. Cyberbullying is a serious problem in social media. Various techniques and methodologies are used to detect [2]t cyberbullying. In this research paper, machine learning techniques are used. First of all, just need to capture sentiment analysis statements and after that based on them, need to detect bullied statements. In simple words, the supervised machine learning algorithm named SVM and the Naïve Bayes algorithm are used to classify bullied statements.

3. An application to detect cyberbullying using machine learning and deep learning techniques by mitushi raj, samridhi Singh, Kanishka Solanki, and Ramani Selvanmbi.

A lot of people are engaged with social media. Instagram and Facebook are popular platforms to express their emotions, find comfort, and form communities. Cyberbullying includes sending, posting, or [3] sharing negative, harmful, and false. In this paper deep learning is used to detect bullying statements. This works on real-time tweets and posts. This application can detect cyberbullying posts written in English, Hindi, and multilingual data.

4. Cybercrime detection in online communications: The experimental case of cyberbullying detection in the Twitter network. Mohammed Ali Al-garadi, Kasturi Dewi Varathan, Sri Devi Ravana.

In this paper set of different features derived from Twitter like activity, tweet, network, user, and supervised machine learning solution is developed. It is said that machine learning approaches provide better results based on features used and the presence of independent features. Here observations from the set are selected based on previously done cyberbullying research. [4] Then observations are converted into potential features to enhance discriminative power. After that different machine-learning algorithms were applied to detect cyberbullying with high accuracy.

IV. PROBLEM STATEMENT

Cyberbullying has been one of the serious problems in the computer domain since users have got many social media platforms to use. Now anyone can bully through a meme. To solve this issue, Here proposing a cyberbullying detection system, Multitask Framework For Cyberbullying Detection, which simultaneously detects bullied statements and images.

V. EXISTING SYSTEM

There are many projects built on cyberbullying using various techniques like multinomial naïve Bayes and fuzzy rules, SVM, and CNN on a single kind of input data like either image or text. These used algorithms have some drawbacks and they lead to less accurate results. Most of the system that performs sentiment and emotion analysis use some nltk libraries, lexical database WordNet, and SentiWordNet to find the right sentiment score for the words. In case of the cyberbullying detection, the traditional method CNN-CB algorithm is used with 95% accuracy. Moreover, a supervised learning approach Support Vector Machine (SVM) is used to detect bully based on gender.

Now, these all models can make simultaneously but can't train simultaneously. This is the biggest drawback of the system. To overcome this drawback below proposed system is given.

VI. PROPOSED SYSTEM

As per the diagram, there are three phases shown. The first phase is about data collection. The second phase is about data preprocessing and feature extraction. Last, the third phase is about algorithm performance and results. Here the system is collecting datasets from some social media platforms like Twitter, Facebook, or Instagram. These datasets are in form of a meme which contains both text and image. After that, all noisy and irrelevant data will be clarified. Image data and text data will be handled separately.

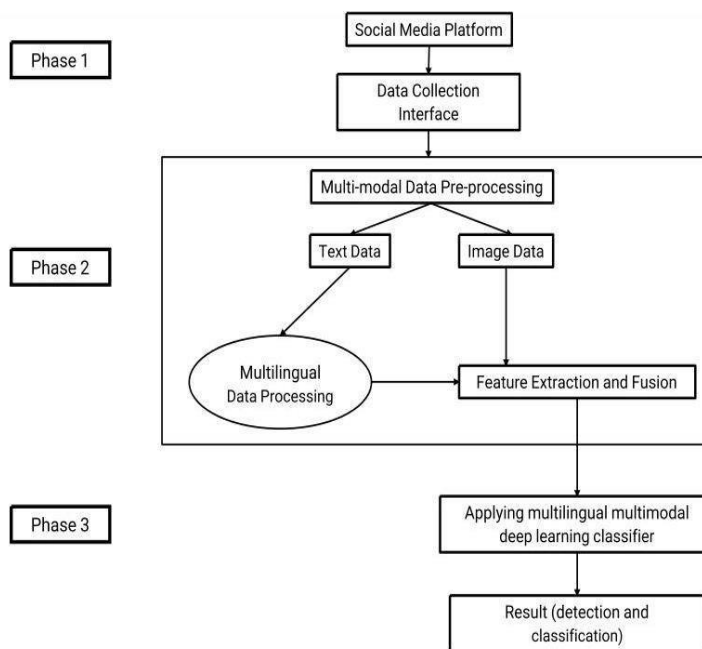


Fig -1: Data flow of modal

On the text data, by performing multilingual data processing by which model gets the meaning of a text in English. Here in the text, use the BERT algorithm to avoid ambiguity in sentences. Another hand on the image the system applies the ResNet algorithm. After that clip algorithm will be used to extract the feature again. At last, two frameworks named feedback multitask and CentralNet were used to capture sarcasm, emotion, sentiment, and cyberbullying detection.

VII. ALGORITHMS

1. **BERT -:** BERT is a transformer-based language model. Most of the sentences in this meme dataset are written in Hindi-English code-mixed form, so here utilized a specific BERT variant, i.e., m-BERT, which has been trained in 104 different languages, including Hindi and English.
2. **ResNet -:** ResNet, short for Residual Network is a classic neural network used as a backbone for many computer vision tasks. ResNet architecture uses the CNN blocks multiple times, so let's create a class for CNN block, which takes input channels and output channels.
3. **CLIP -:** CLIP (Contrastive Language-Image Pre-Training) is a neural network trained on a variety of (image, text) pairs. It can be instructed in natural language to predict the most relevant text snippet, given an image, without directly optimizing for the task, similar to the zero-shot capabilities of GPT-2 and 3.

VIII. CONCLUSION

The multimodal and multi-lingual approach can significantly reduce cyberbullying in cross-language and improve the quality of life of individuals affected by cyberbullying each year.

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