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Depression Detection by Analyzing Social Media Post of User

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Abstract: ***Nowadays the problem of early depression detection is one of the most important in the field of psychology .Mental health issues are widely accepted as one of the most prominent health challenges in the world, with over 300 million people currently suffering from depression alone. With massive volumes of user-generated data on social networking platforms, researchers are increasingly using machine learning to determine whether this content can be used to detect mental health problems in users. Depression as a disorder has been an excellent concern in our society and has been continuously a hot topic for researchers in the world. Despite the massive quantity of analysis on understanding individual moods together with depression, anxiety, and stress supported activity logs collected by pervasive computing devices like smartphones, foretelling depressed moods continues to be an open question. Social networks analysis is widely applied to address this problem. In this paper, we have proposed a depression analysis and suicidal ideation detection system, for predicting the suicidal acts supported the extent of depression. The present study aims to exploit machine learning techniques for detecting a probable depressed Social Media user his/her Posts. For this purpose, we trained and tested classifiers to differentiate whether a user is depressed or not using features extracted from his/her activities within the posts. classification machine algorithms are used to train and classify it in Different stages of depression on scale of 0-100%. Also, data was collected in the form of posts and were classified into whether the one that tweeted is in depression or not using classification algorithms of Machine Learning In this way Predictive approach for early detection of depression or other mental illnesses. This study's main contribution is that the exploration a neighborhood of the features and its impact on detecting Depression level. This study aims to develop a deep learning model to classify users with depression via multiple instance learning, which can learn from user-level labels to identify post-level labels. By combining every possibility of posts label category, it can generate temporal posting profiles which can then be used to classify users with depression. This paper shows that there are clear differences in posting patterns between users with depression and non-depression, which is represented through the combined likelihood of posts label category. In this research, machine learning is used to process the scrapped data collected from social media users posts. Natural Language Processing (NLP), classified using BERT algorithm to detect depression potentially in amore convenient and efficient way.***

Keywords: Machine Learning, NLP, BERT Algorithm, Classification, Social Media Post

I. INTRODUCTION

Now a days the problem of early depression detection is one of the most important in the field of psychology. Depression is additionally a typical mental issue. In today's world, the stresses of existence events in one's life could increase potentialities of depression. Over 350 million people worldwide suffer from depression, which is about 5% of the total population. Close to 800 000 people die due to suicide every year and it is statistically the second leading cause of death among people in 15–29 years old. At the same time, the major number of suicides associated with depression. Recent researches reveal that depression is also the main cause of disability and a variety of somatic diseases. The proliferations of internet and communication technologies, especially the online social networks have rejuvenated how people interact and communicate with each other electronically. The applications such as Facebook, Twitter, Instagram and alike not only host the written and multimedia contents but also offer their users to express their feelings, emotions and sentiments about a topic, subject or an issue online. On one hand, this is great for users of social networking site to openly and freely contribute and respond to any topic online; on the other hand, it creates opportunities for people working in the health sector to get insight of what might be happening at mental state of someone who reacted to a topic in a specific manner. In order to provide such insight, machine learning techniques could potentially offer some unique features that can assist in examining the unique patterns hidden in online communication and process them to reveal the mental state (such as 'happiness', 'sadness', 'anger', 'anxiety', depression) among social networks' users. Moreover, there is growing body of literature addressing the role of social networks on the structure of social relationships such as breakup relationship, mental illness ('depression', 'anxiety', 'bipolar' etc.), smoking and drinking relapse, sexual harassment and for suicide ideation.

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Younger adults, racial/ethnic minorities, essential staff, and unpaid adult caregivers reported having intimate disproportionately worse status outcomes, raised substance use, and elevated unsafe cerebration. Youth is printed as age fifteen to twenty four years, and it includes middle and late adolescence. It's characterized by current changes in physical, psychological, and social dimensions. For healthy growth and development, youth should have the simplest way of happiness, love, action, and independence and to have a purpose in life. Throughout this organic process stage, many sorts of behavior square measure developed which can cause either normalcy or status malady.

Depression can cause the affected person to suffer greatly and performance poorly at work, at college and in social events. A despite what you nearly actually did recently on your phone or laptop computer, it's apparently that social media was concerned. Did you catch up with friends on Facebook, post photos of your cat or video of your totter walking for 1st time on Instagram? perhaps a Twitter link brought you here. These days folks tend to specific their emotions, opinions associate degreed disclose their daily lives through an enlargement of social media platforms like Twitter, Facebook and In. stagram. These expressions square measure generally through photos, videos and primarily through posts .In this study, we aim to analyze Social Media Post to detect any factors that may reflect the depression of relevant Social Media users. Various machine learning techniques are employed for such purpose. Considering the key objective of this study, the following are subsequent research challenges addressed in paper. We have a tendency to tend to tend to aim to utilize machine learning techniques and algorithms for depression detection on social media posts of users.

II. LITERATURE SURVEY

Instrumental possibilities of analyzing the behavior of users in social networks are actively developing. In particular, methods of computational linguistics are successfully used in analyzing the posts from social media.

A data-analytic based model to detect depression of any human being is proposed in the paper. The data is collected from the users' posts of two popular social media websites: Twitter and Facebook. In this research, machine learning is used to process the scrapped data collected from SNS (Social Networking Sites) users. Natural Language Processing (NLP), classified using Support Vector Machine (SVM) and Naïve Bayes algorithm to detect depression potentially in a more convenient and efficient way. [1]

The research, employs Natural Language Processing (NLP) techniques to develop a depression detection algorithm for the Thai language on Facebook where people use it as a tool for sharing opinions, feelings, and life events. [2]

The health tweets are analyzed for Depression, Anxiety from the mixed tweets by using Multinomial Naive Bayes and Support Vector Regression (SVR) Algorithm as a classifier in paper[3].

In the paper, researchers present how to find the depression level of a person by observing and extracting emotions from the text, using emotion theories, machine learning techniques, and natural language processing techniques on different social media platforms. [4]

The paper, aims to apply natural language processing on Twitter feeds for conducting emotion analysis focusing on depression. Individual tweets are classified as neutral or negative, based on a curated word-list to detect depression tendencies. In the process of class prediction, support vector machine and Naive-Bayes classifier have been used. The results have been presented using the primary classification metrics including F1-score, accuracy and confusion matrix. [5]

The paper, proposes depression analysis and suicidal ideation detection system, for predicting the suicidal acts based on the level of depression. Real time data was collected in the form of Tweets and Questionnaires. Then, classification machine algorithms are used to train and classify it in five stages of depression depending on severity. [6]

Yates et al. used neural network model to reveal the risks of self-harm and depression based on posts from Reddit and Twitter and showed the high accuracy of this diagnostic method. The authors indicate that proposed methods can be used for large-scale studies of mental health as well as for clinical treatment[8]

O'Dea et al. examined that Twitter is progressively researched as methods for recognizing psychological well-being status, including depression and suicidality in the population. Their investigation revealed that it is conceivable to recognize the level of worry among suicide-related tweets, utilizing both human coders and a programmed machine classifier.[10]

There are a numerous and growing range of methodologies and techniques for detection of the depression level from the posts on Social Media Network. In our study, we consolidate a technical description of techniques applied for depression identification using the Natural Language Processing method classified using BERT algorithm to detect depression. The framework is comprised of Data pre-processing step, Feature extraction step following the Machine Learning classifiers, Feature analysis of the data and Experimental results

III. METHODOLOGIES

"BERT stands for **B**idirectional **E**ncoder **R**epresentations from **T**ransformers. It is designed to pre-train deep bidirectional representations from unlabeled text by jointly conditioning on both left and right context. As a result, the pre-trained BERT model can be fine-tuned with just one additional output layer to create state-of-the-art models for a wide range of NLP tasks."We developed a Bidirectional Encoder Representations from Transformers (BERT)-based model, which is a new language representation model as described in . As the name suggests, it was designed to pre-train deep bidirectional representations that can be fine-tuned with an additional output layer. For this project, this output layer - a pooled output - was used for the binary classification of the comments. From the many pre-trained models available, we chose the English-language uncased (all lowercase before tokenization) model of BERT, as case information is not particularly important to the task of social media comment classification.

IV. EXISTING SYSTEM

The already existing system which provides much easy flowing way to determine depression level of user using Naïve Bayes algorithm. The extraction of textual data is done by the extraction class from Facebook with the help of Facebook graph API. After extraction, the data is pre-processed. The missing or repetitive attributes are taken care in pre-processing. Techniques like tokenization, lower case conversion, and word stemming and words removal are used for Pre-processing of data. In proposed system according to users Facebook post model can find out whether he/she in depressed or not. But only analysing post won't give accurate result so we also analyse the comments by user and his friends and his chats are also analysed as user will definitely share his depression with his friend. On basis of these analyses the users can be classified as stressed and non-stressed.

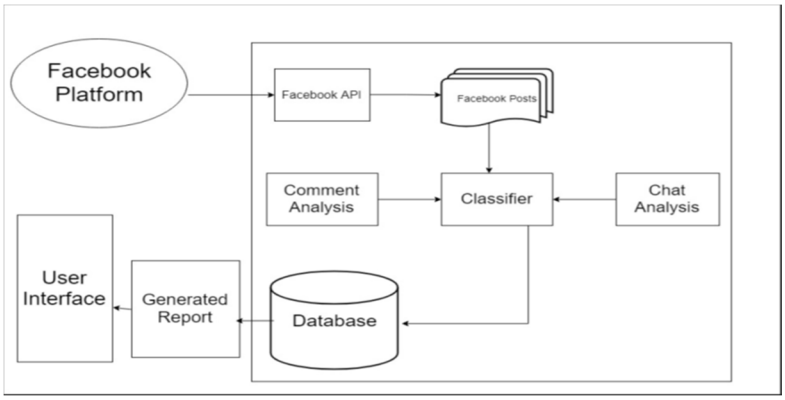


Fig. 1 Existing system of architecture

V. PROPOSED SYSTEM

Depression is serious challenge in personal and public health. One of the major solutions to this problem is detailed study of individual's behaviour attributes. These attributes are available on various social networking sites such as Facebook, twitter, Instagram etc. Social networking platform is best way to know person behaviour, thinking style, mood, egoistic networks, opinions etc. The use of social networking sites is increasing especially by young generation. The people on social media express their feelings, daily activities, opinions about various topics etc. So social networking sites are used as screening tool to predict depression levels. These social networking platforms gives person's experiences, opinions, socialization, personality. Earlier method of diagnosis of patient is not so relevant but by using user generated content on social media post helps to predict mental health levels and depression of particular individual. Our project aim is to extract information from social media posts and by having clear understanding of person's behavioural attributes and attempted questionnaires, depression levels of user is predicted. A quantitative study is conducted to train and test various machine learning classifiers to determine whether a social media post of user is depressed, from posts initiated by the user or his/her activities on Social media. Following figure illustrates the depression detection using activity and content features classification model. First, all tweets for depressed and non-depressed accounts, as well as information of user account and activities such as number of followers, number of following, time of posts, number of mentions, and number of reposts, are retrieved. Next, all posts of an account are assembled in one document. Text pre-processing is applied to all documents. First, a corpus is created and posts in each document are tokenized. BERT Classification Algorithm can be used.

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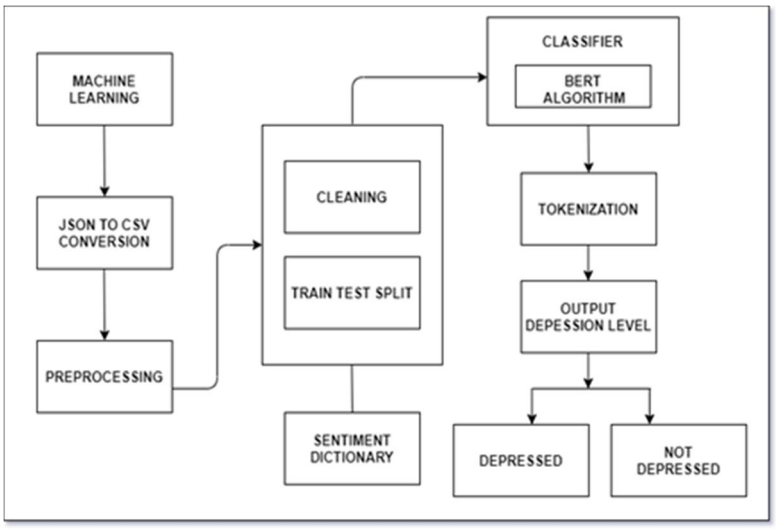
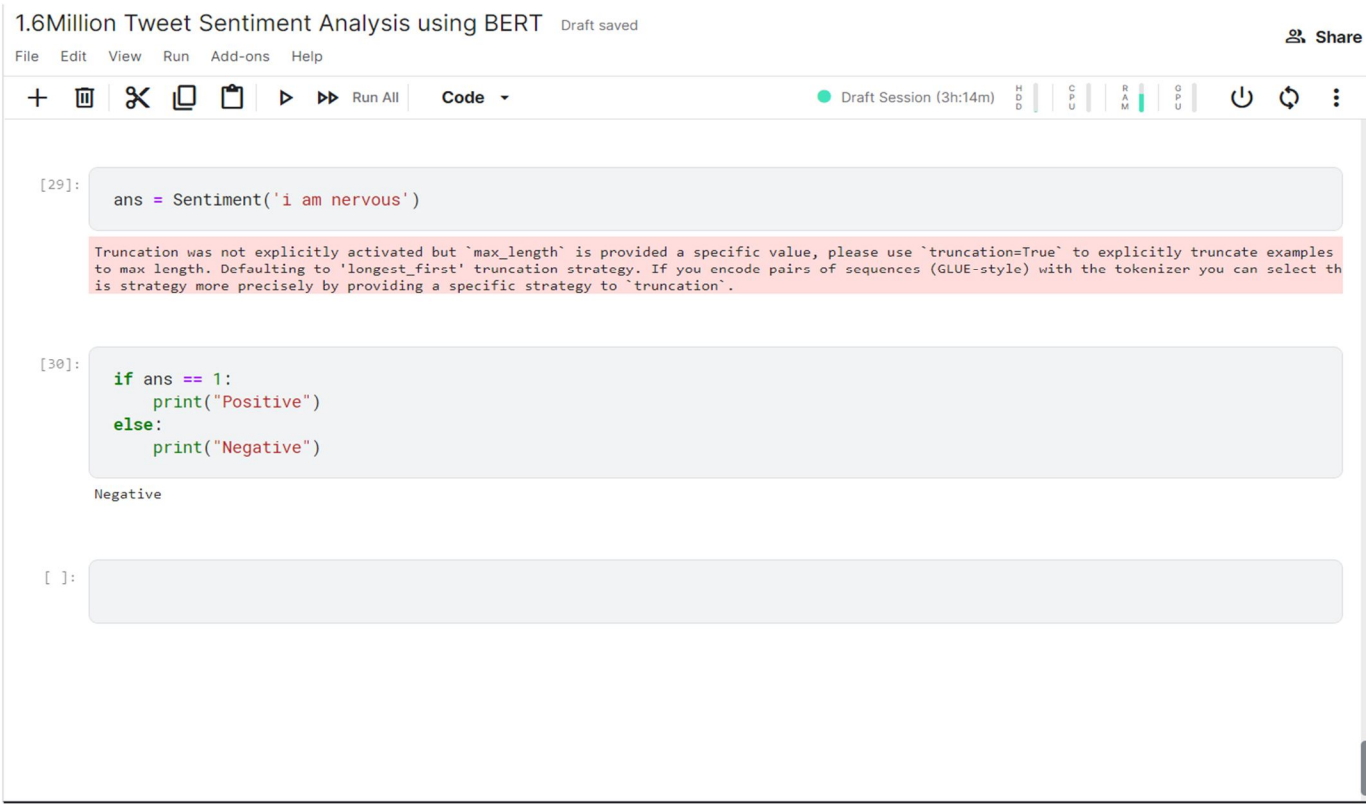


Fig. 2 Proposed system of architecture

VI. RESULT



VII. CONCLUSIONS

The proposed system would help suspected user to save his/her life, by knowing in advance whether the user is depressed and even system will send some motivational post to the user based on the level his depression. We conclude the system will be very useful in today's world where most of us don't have time to meet our friends, share their thoughts and feelings like we used in older days due to busy schedules. So, our system plays a vital role over here to avoid any unwanted human loss. The system will inform to their family members or relatives regarding the situation of depressed person.

VIII. ACKNOWLEDGMENT

It gives us great pleasure in presenting the preliminary project report on '**DEPRESSION DETECTION BY ANALYZING**

A. Social Media Post of User'.

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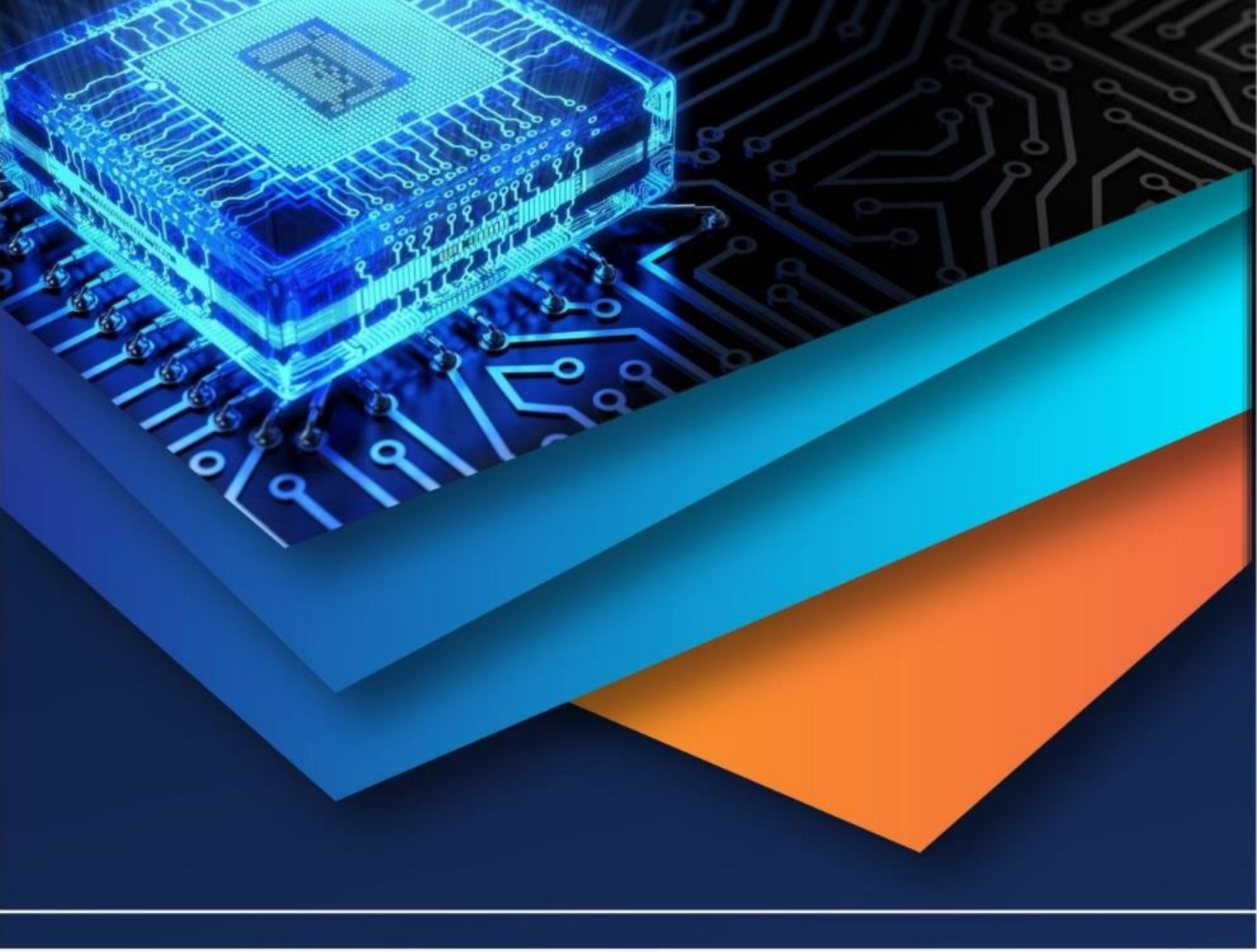
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