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A Survey on Psychological Disorders and Threats Detection using the Twitter Dataset

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Abstract - *One in four people within the world is going to be suffering from mental or neurological disorders in their lives. According to a study 450 million people currently suffer from mental or neurological conditions, placing mental disorders among the leading causes of ill-health and disability worldwide. (WHO) [1]. The number of individuals suffering from the mental disease is on the rise and with it the burden on health and social care use, also because of the loss of both productivity and quality-adjusted life-years. Social media platforms became a source of 'in the moment' daily exchange, with topics including well-being and psychological state. An increasing number of social networking sites makes people more engaged in their virtual life quite ever and at an equivalent time, the quantity of knowledge people put online is gigantic and also heaven for researchers conducting their research. People tend to place their thoughts online to share with the entire world which also includes suicidal thoughts. Teens are engaged considerably during a virtual world of social media like Twitter which we are going to be covered in this survey. There are various techniques, studies conducted on this topic but we are focusing on the following four topics Mental health characterization, Sentiment analysis, Cyberbullying, suicide detection.*

Key Words: Mental disorders, Suicide, Cyberbullying, sentiment computing, Text Mining, Machine Learning, Twitter.

1.INTRODUCTION

Mental and substance use disorders are the leading explanation for years lived with disability worldwide. Social media is changing the way people self-identify as suffering from a disorder and how they communicate with others.[4]

There are nearly 2.8 billion active social media users globally, of which 2.5 billion can access their accounts on mobile devices. Suicide is the second leading explanation of death globally among people 15 to 29 years of age. Almost 800,000 people die due to suicide annually. A prior suicide attempt is that the most vital risk factor for suicide within the general population.[2]

studying popular social media platforms such as Twitter holds the key to understanding what concerns patients, rather than clinicians, most, say researchers. Twitter is a growing social media site associated with cyberbullying and suicidal activities.

Also studying Sentiment analysis (SA) is a strategy used for self-detection of viewpoints combined in written text. SA has been mainly used to classify text to determine the writer's stand/alignment towards a certain topic. When posting a status on the internet, people often use dialects of the language.

So in this survey, we are going to cover different papers mainly on four topics: Mental health, sentiment analysis, depression detection, cyberbullying. Twitter currently has 353 million monthly active users[3]. This is why we are focusing on research papers that are using Twitter as their dataset.

2. LITERATURE SURVEY

According to the author **George Gkotsis**, social media platforms have become a source of 'in the moment' daily exchange, with topics including well-being and mental health. In their study, they analyzed posts from the social media platform Reddit and developed classifiers to recognize and classify posts related to mental illness according to 11 disorder themes. Using a neural network and deep learning approach, they could automatically recognize mental illness-related posts in our balanced dataset with an accuracy of 91.08% and select the correct theme with a weighted average accuracy of 71.37%. There are some Limitations also they found that some of the themes are highly interrelated and not always distinguishable as separate and exclusive classes. Another limitation of their approach is the number of mental health themes that are used in the multiclass classification task. [4]

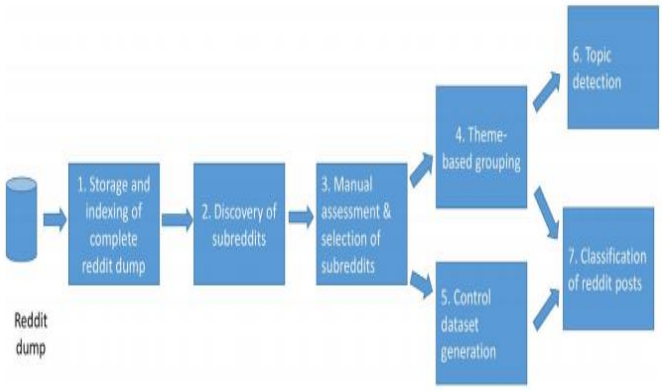

Fig -1: Name Workflow of Characterisation of mental health conditions

According to the author **Firoj Fattulal Shahare**, Nowadays social data is growing at a rapid pace, it plays a significant role in every aspect of life. The current web world range of users uses social media and social networks to browse and read news-connected information. They tend to propose a replacement methodology to try and do the drought sentiment analysis for news data. Their proposed method uses a Bayes and Levenshtein algorithm to determine the emotion into different social media news data categories.

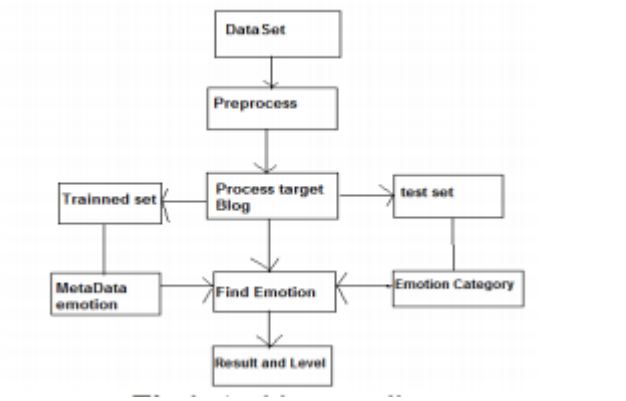

Fig -2: System architecture to detect emotions on social media

With the help of their algorithm, they can easily distinguish an emotional text from news events and data. Emotion is not easy to find from large data because users use several texts to define an emotion but it's not easy to define in a category, but their approach uses a specific way to find this text from a larger amount of data.[5]

According to the author **Ghelmar Astoveza**, their study aims to classify suicidal tweets using Artificial Neural Network (ANN), and the data collected were annotated as "non-risky" or "risky," and was classified correctly by a trained classifier. They found in this study using unigrams and bigrams to describe a complete process of classifying tweets. The data gathered was then put in an excel file for data labeling to increase the accuracy of the model. Their study found that 91% of the non-risky tweets were classified correctly and only 9% misclassifying 9% of those labeled as 'risky' It was also found that 65% of risky tweets were labeled correctly and 35% were misclassified as 'unsafe' and 65% were labeled as 'unacceptable'.[2]

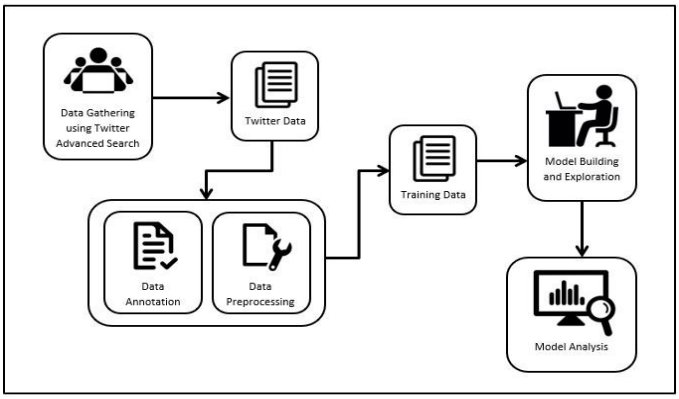

Fig -3: Phases of suicidal behavior detection

According to the author **Salim Alami**, exponential development in online social media allows users around the globe the possibility to share and communicate information and ideas freely. So to develop user profiles of cybercriminals, text mining techniques are an effective way to detect and predict criminal activities in microblog posts. This emerging media has become a dominant communication tool and it has been used as a communication channel in several events, especially "The Arab Spring" and the Boston Attack. The evaluation of their proposed approach is done within real posts.

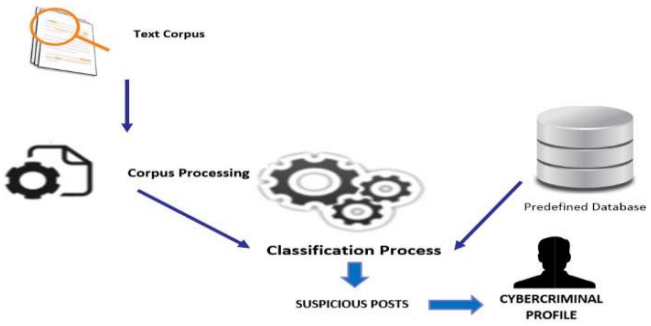

Fig -4: Classification process of cyber crime profilying

They Conclude that the proposed approach is based on a calculation of a similarity distance to detect and predict criminal activities. The purpose of this approach is to

decompose each post in terms and compare them automatically to a predefined suspicious terms database. For future work, they are planning to improve the system in terms of execution time, developing new scoring methods, and using other knowledge resources to improve precision rates. According to the author, their proposed solution presents an idea of a global research project including an automatic system for detecting suspicious profiles in the social media profiles, through which we can uncover suspicious behavior.[6]

3. CONCLUSIONS

The study of mental health and its disorder and its impact on society is important. From the survey, we see that day by day active users on social media are increasing, and people are expressing their emotions on social media so it is necessary to study the data and design a system to detect their mental health condition in early stage and take actions accordingly. Which results in saving lots of lives. By combining Mental health characterization, Sentiment analysis, Cyberbullying, suicide detection we can create a single system that will work for all mentioned conditions and can improve the time complexity.

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