

# AI to Detect Social Media Users' Depression Polarity Score and Diagnose using Auto Curative Therapy

R.Danush Vikram<sup>1</sup>, Ms.K.S.Sudhishna<sup>2</sup>, M.Lingeshraj<sup>3</sup>, N.Gokulswaruban<sup>4</sup>

<sup>2</sup>Assistant Professor, Department of Information Technology, Dr. Mahalingam College of Engineering and Technology, Coimbatore, India

<sup>1,3,4</sup> Student B.Tech, IT, Department of Information Technology, Dr. Mahalingam College of Engineering and Technology, Coimbatore, India

**Abstract** - Depression is regarded as a major cause of global impairment and a leading cause of suicide. People are increasingly using social media to communicate their emotions these days. Sentiment Analysis (SA) is a computational tool for examining the polarity of emotions and ideas expressed in a text. We hope to forecast depressed individuals and quantify their depression intensity using social media (Twitter) data in this study, which will aid in sounding an alarm.

**Index Terms** - SVM, KNN, Decision Tree, and Ensemble Learning have all been used in a few related studies. Some studies use a single set of features to identify depression in their posts, such as bag of words (BOW), N-grams, LIWC, or LDA.

## I.INTRODUCTION

Depression which is caused by various reasons is a very common illness, and millions of people suffering from depression commit suicide every year. Depression can be a serious health problem, especially when it is moderate or severe. People have begun to share their opinions and actions through online forums, microblogs, tweets, and other social media as Internet usage has expanded. Sentiment analysis is a powerful tool for extracting meaningful information from unstructured data sources like tweets and reviews. The possibility of sentiment analysis for detecting depression through social media message analysis has raised awareness and interest in this topic. Because of the large quantity of data available on social media sites that could be utilised for this purpose, machine learning has become popular for diagnosing mental health concerns.

## II.LITERATURE SURVEY

Nowadays people are extensively using social media to share their day-to-day activities, thoughts, or feelings in these social media forums. These data could be effectively used for depression/Anxiety detection. Studies have shown that lot of people suffer from depression due to stress generated from various factors leading to serious health problem. The following are few research made on depression detection /Analysis.

Syms and JS.Raj in [1] used N-gram language model that suggests to classify anxiety into different levels by generating emotional characteristics and vector integration along with topical analysis. In the research of Kim Jin in [2] proposed a supervised machine learning algorithm is used for detecting post-traumatic stress disorder. Training of data is done using Twitter data set. Q Un Nisa in [5] have used CNN to do a comparative study of various classification model. Based on linguistic metadata, prediction of various emotions is done.

All these research investigations to detect depression are based on either textual data or descriptive data of people that is extracted from social media post, N-grams, Parts of Speech or any other linguistic properties.

De Choudhury et al. also discovered depressive signals in tweets written by persons with serious anxiety and depression disorders. To date, several features have been collected and used to Twitter data in order to detect depression. 2M tweets from over 476 users were collected and clinically tested and diagnosed as depressed. From this data set behavioral attributes such as emotion, language, linguistic styles other mentions on antidepressant medications were all extracted. These data could be utilised to create a depression classifier. These distinct characteristics are

used to develop an SVM classifier that can accurately predict the likelihood of depression by about 70%. Then, using SVM, which had a precision of 0.77 and took advantage of depressed people's tweets to extract characteristics that helped boost the depression detection accuracy rate, the accuracy rate of depression detection was improved. According to their findings, frequency of word usage, as well as topic modelling, are useful features for the development of prediction models. They got a 69 percent classification accuracy using the radial kernel SVM classifier in predicting depression in 81 of the 209 participants who completed a questionnaire session. Jamil came to the conclusion that combining sentiment analysis with the percentage of depressed tweets improved the precision of detecting depression. The above-mentioned research classifier was developed after being trained with data provided by 95 people who were suffering. A bidirectional GRUs for sentiment classification method proposed by Xia Sun is about adopting a novel loss function called drop loss model that classifies even hard dataset. This could be used for sentimental classification.

Research paper by Felipe Taliar obtained emotional characteristics and polarity of feelings using text-mining, pre-trained neural network model. In this complex network approaches and evaluation methods were used on depressed social media users.

Another study done by Guozheng Rao detected emotions of user through two hierarchical post representation model which seems to be more effective when compared to the usual depression detecting technique. They made use of Reddit Data set.

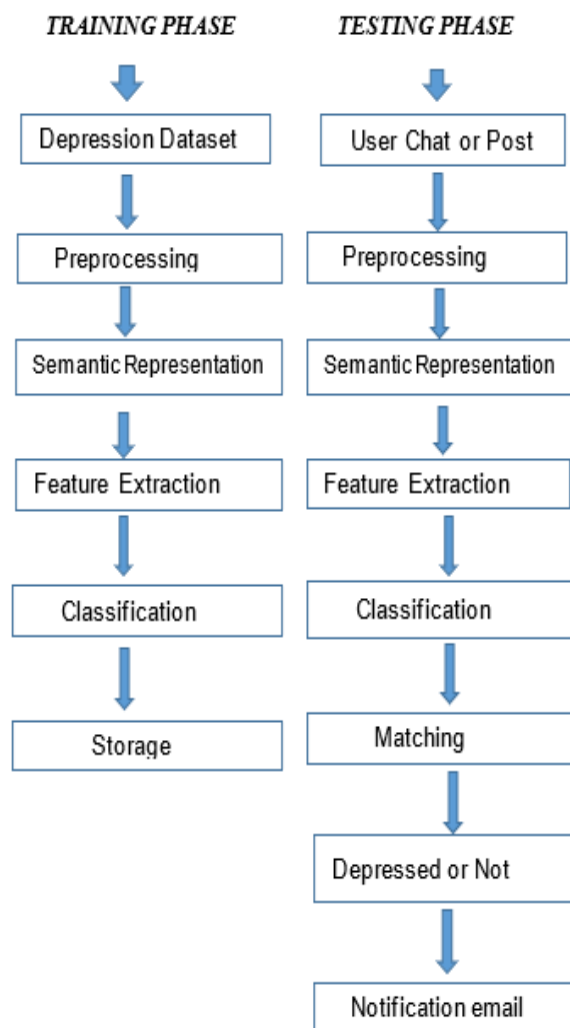
These are the few researches/studies made for detecting depression using social media data.

### III. PROPOSED METHODOLOGY

The proposed system starts by collecting data from Twitter API. The obtained data was extensively unbalanced data set of tweets. As an initial step data has to be cleaned up and balanced before processing it to get the normalized data. As part of the normalisation process, the data was segmented, stemmed, and lemmatized. The data was then analysed to determine the word score. The information was fed into a machine learning classifier that could tell the difference between depressed and non-depressed text

tweets. Training and test split sets were used to partition the data. To ensure that predictive classifiers adapt, we developed a pattern framework utilising training data. The test data is fed into the constructed classifier after the sample framework is trained with the data for evaluation.

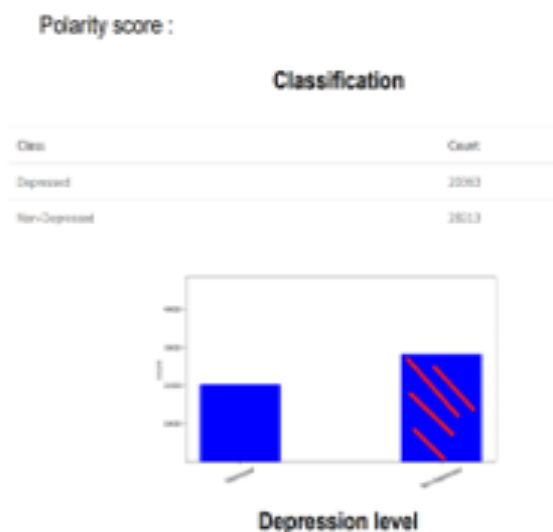
System Flow:



LE – LSTM Classifier:

1. The Lexicon Enhanced LSTM model is for sentiment analysis that improves and updates the quality of word expressions by using the previous sentiment information of the word as supplementary information.
2. According to the sentimental polarity score of words in sentiment lexicon thus used helps to categories it to depressed or non-depressed.

Polarity score:



We have developed a framework that operates effectively and offers the greatest accuracy outcomes. Our system's LSTM maintains the words stored in memory for a long time, allowing it to compare words for the detection of depression from textual tweets. The overall performance of the created trained model is better and more satisfactory. For the entire training dataset, the accuracy and recommended framework are well reflected. It reflects the training data cycle and the high level of accuracy achieved.

#### IV.CONCLUSION

- 1 Detection and Classification of depression levels is critical for different types of posts in social media.
- 2 In this project, we have proposed a framework that classifies depression levels using LE-LSTM algorithms.
- 3 The accuracy of the project is 92.8%
- 4 If the person's situation is not good or if he or she is in a bad circumstance, an alert will be sent to the appropriate person's relative mail, resulting in the person's life being saved from an unanticipated event.
- 5 The mechanism does analyze the tweets for the purpose of prediction of depression without checking the validity of tweets.

#### REFERENCES

- [1] Smys, S.; Raj, J.S. Analysis of Deep Learning Techniques for Early Detection of Depression on Social Media Network—A
- [2] Kim, J.; Lee, D.; Park, E. Machine Learning for Mental Health in social media: Bibliometric Study. *J. Med. Internet Res.* 2021, 23, e24870. [CrossRef]
- [3] Comparative Study. *J. Trends Comput. Sci. Smart Technol. (TCSST)* 2021, 3, 24–39
- [4] J. Yadav, D. Kumar and D. Chauhan, "Depression Detection using Pre-Trained BERT Model," 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), Coimbatore, India, 2020, pp. 1096-1100,
- [5] Un Nisa, Q.; Muhammad, R. Towards transfer learning using BERT for early detection of self-harm of social media users. In Proceedings of the Working Notes of CLEF 2021—Conference and Labs of the Evaluation Forum, Bucharest, Romania, 21–24, September 2021.
- [6] R.R.Dalvi,S.BaliramChavanandA.Halbe,"Detecting A Twitter Depression Using Machine Learning," 2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2020, pp. 297-301,
- [7] John Hani, Mohamed Nashaat, Mostafa Ahmed, Zeyad Emad, Eslam Amer and Ammar Mohammed, "Social Media Depression Detection using Machine Learning" *International Journal of Advanced Computer Science and Applications(IJACSA)*,10(5),2019.
- [8] [R. Pawar and r. R. Raje, "multilingual Depression detection system," 2019 iee international conference on electro information technology (eit), brookings, sd, usa, 2019, pp. 040-044, doi:10.1109/eit.2019.8833846.
- [9] [Monirah Abdullah Al-Ajlan and Mourad Ykhlef, "Deep Learning Algorithm for Depression Detection" *International Journal of Advanced Computer Science and Applications(IJACSA)*, 9(9), 2018. <http://dx.doi.org/10.14569/IJACSA.2018.090927>
- [10]J. D. Immanuel, H. M. Ragavan, P. G. Rani, K. Niveditaa and G. Manikandan, "AI to Detect Social Media users Depression Polarity Score," 2022 International Conference on Sustainable Computing and Data Communication Systems

(ICSCDS), 2022, pp. 415-418, doi:  
10.1109/ICSCDS53736.2022.9761007

- [11] Yang Y, et al. User interest and social influence-based emotion prediction for individuals. In: Proceedings of the 21st ACM international conference on Multimedia. 2013. New York: ACM
- [12] Islam MR, Kamal ARM, Sultana N, Moni MA, Islam R. Depression detection using K-Nearest Neighbours (KNN) classification technique. In: International conference on computer, communication, chemical, materials and electronic engineering, February 8–9, 2018, Rajshahi, Bangladesh.
- [13] Hosseinifard B, Moradi MH, Rostami R. Classifying depression patients and normal subjects using machine learning techniques. In: 2011 19th Iranian Conference on Electrical Engineering (ICEE). 2011.
- [14] Gilbert E, Karahalios K. Predicting tie strength with social media. In: Proceedings of the SIGCHI conference on human factors in computing systems. New York: ACM; 2009.