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Depression Detection using AI, ML and NLP

Ruchita Chavan, Maithili Baviskar, Mrunal Gosavi, N Parth Goyal
Department of Computer Engineering and Science
Smt. Kashibai Navale College of Engineering, Pune, Maharashtra, India

Abstract: *Suicide is one of the most serious social health issues that exist in today's culture. We can refer suicidal thoughts to act of killing yourself intentionally. It can be used as a suicide risk measure. India is among the top countries among in the world to have annual suicide rate. Social networks have been developed as a first-rate factor for its users to communicate with their interested friends and proportion their captions, photos, and videos reflecting their moods, emotions, and sentiments. To increase and put in force a version which takes a facial expression image as an enter and symptoms. Based on that, it predicts if the patient is suffering from anxiety, depression or not. We can train version using photographs of various emotions in it & will use it for prediction. Image captioning can be accomplished after prediction for higher visualization of report. We will also use text mining (NLP) technique on various inputs taken in the form of audio and video to convert it into text. At final, we can make final choices based on above two techniques. And with this, we will be able to generate a detailed dashboard of user disease status and his history. With the help of all this data we can design webapp for above system. We will use CNN algorithm for speed up detection of depressed character instances and approach to become aware of high-quality answers of mental health troubles. We suggest system learning method as an efficient and scalable technique. We document an implementation of the proposed method. We have evaluated the efficiency of our proposed technique the usage of a set of various psycholinguistic features. We show that our proposed method can extensively improve the accuracy and category blunders price.*

Keywords: CNN, Depression, Suicide rate, Emotions

I. INTRODUCTION

Depression is the most prevalent mental illness in the United States, where each year, 7% of the population will suffer from at least one major depressive episode. Depression is also the cause of two-thirds of suicides and is estimated to cost over $70 billion dollars annually in the US. Millennial's have the higher rate of depression than any other generation. When a person is suffering from depression his approach is negative towards everything. Depression is like negative way of living their life. Several machine-learning methods to automatically classify depression have been proposed. These methods treat depression detection as a classification problem where they infer users' depression levels (e.g., their PHQ-9 scores). Such machine learning classification methods face a challenging dataset imbalance problem arising from depression occurring at a low frequency in the general population, yielding imbalanced datasets. There are some machine learning techniques by using them it is possible to detect various patterns in persons text, audio, and video to reveal his mental state. We can use image preprocessing, feature extraction, feature classification for face detection (such as ‘happiness,’ ‘sadness,’ ‘anger,’ ‘anxiety,’ ‘contempt’, ‘fear’, ‘disgust', 'surprise’). Its diagnosis is made if at least five of the below symptoms occur almost every day for at least 2 weeks: 1. Depressed Mood 2. Loss on interest in activities 3. Suicidal thoughts 4. Feeling of worthlessness or hopelessness 5. Worsened ability to think and concentrate. In this study we aim to analyze data gathered from user in the form of audio, video or text to detect any factor that may reflect the depression of user. key objective of this study is-

Defne what depression is and what are the common factors contributing toward depression?

The factors to look at while analyzing depressed person behavior?

What is the relationship between these factors and attitude toward depression?

A.CNN Algorithm- it works by getting some images of various emotions as an input, give them a value and then distinguish between them. It is widely used for image/object recognition and classification. It is an image processing algorithm.

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B. Naive Bayes Classifier -Naive Bayes Classifier is a classifier which implements Bayes theorem with a solid (naive) independence assumption, particularly, independent feature model. Bayes Theorem works on conditional probability which finds out the probability of an event given that some other event has already occurred

There are various factors which are being analyzed by this model. Video, audio, and text is taken as input. Model will analyze this data and will try to find out patterns in this data that resembles to symptoms of depression and some other patterns also. With this processing it will predict if person is suffering from depression. After that webapp will ask for person's interest. And if he gets detected with depression, the app will give recommendations to that person according to his interest in making him feel good. Chatbot system is also provided to interact with person in question answer pattern.

II. RELATED WORK

1. Madhurima Hooda, Aashia Roy Saxena, Dr. Madhulika, Babita Yadav -" A Study and Comparison of Prediction Algorithms for Depression Detection among Millennials: A Machine Learning Approach Proposed a system for detection of depression among millennials. In this research work

They had focused on three major methods use for prediction of depression-

Using Machin Learning Classifier and WEKA

Using Imaging and Machine Learning Methods

Using Risk Factors to detect the most consistent and accurate of them all.

In this model they had provided various section like-

Section 2- Gives the overview of different prediction algorithm for depression. Section3- provides observation from the past studies. Section 4- provides the basic discussion of the outcomes derived from the past studies. Section 5- gives result

2. Walter Gerych, Emmanuel Agu, Elke Rundensteiner Data Science and Computer Science Programs, Worcester Polytechnic Institute, Worcester, MA 01609, USA-" Classifying Depression in Imbalanced Datasets using an Autoencoder-Based Anomaly Detection Approach*" -some machine learning classification methods was facing a challenging dataset imbalance problem because depression occurs at low frequency and result of this it generates imbalanced dataset.

The model they introduced Machine learning classification on significantly imbalanced datasets can be reformulated as an anomaly detection problem, where instances of the minority class are considered anomalies. This anomaly detection methods need only to learn patterns indicative of the majority class, and classify inputs. After this using One Class SVM (Support Vector Machine) algorithm autoencoder classify test set of users as either depressed or not depressed. This model works with extremely imbalanced dataset

3. Harsh Pawar, Pranav prabhu, Ajay Yadav, Vincent Mendonca, Joyce Lemos [6], a chatbot is designed by way of them the usage of expertise in database. The proposed machine has online enquiry and online chatbot machine. The improvement is accomplished the usage of diverse programming languages by way of creating a consumer pleasant graphical interface to send and get hold of response. The primary reason is it uses sq. (dependent question language) for sample matching that has been saved in application

4. Jeevan Thukrul1, Aditya Srivastava2, Gaurav Thakkar- "DoctorBot- An Informative and Interactive Chatbot for COVID-19"-

Here in chatbot Random Forest Algorithm is implemented to search the response in dataset. They designed the doctor Bot using retrieval-based approach by employing natural language processing. The chatbot analyze the query requested by user and recognizes user intent. The word emending based on frequency is used to predict appropriate response

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III. SYSTEM ARCHITECTURE

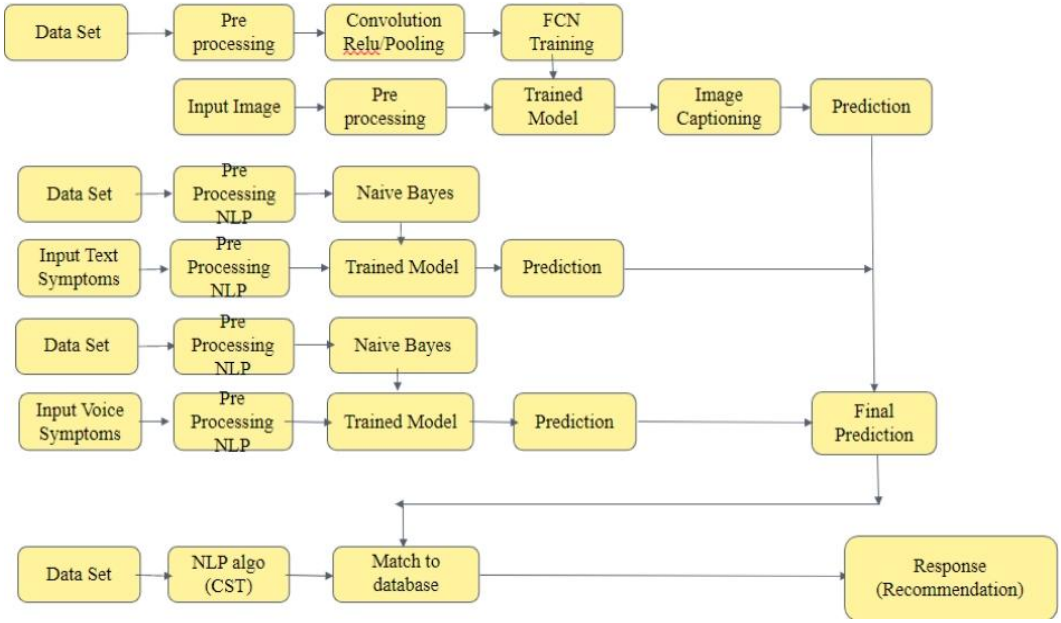

Figure: System Architecture

The processed system takes a facial expression as an input from video also takes audio and text as an input from user and by processing this the person is in depression or not is determined. For processing input text and input voice data naïve bayes and NLP is used. For image classification CNN is used. For converting audio to text Google text to speech API is used

Step 1: Obtain input data from user in form of:
Facial expression(video)
Text
Audio
Step 2: classify the images using ML based Algorithm, and apply image captioning.
Step 3: this generates detailed dashboard of user status
Step 4: providing chatbot
Step 5: NLP is used to generate response matching to Input sentence from user
Step 6: Give personalized recommendation

IV. CONCLUSION

Heterogenous patterns of anxiety and depression will be cured such emotional AI and ML based solution can prove to be beneficial in detecting analyzing and preventing depression and cure it. Thus, we will create a bot that can make probabilistic assessments and provide autonomous responses to the users. The need is to build up a database where all the related information will be stored and used for further update Chatbot will provide personalized recommendation

REFERENCES

[1]. A. Haque, M. Guo, A. S. Miner, and L. Fei-Fei, "Measuring depression symptom severity from spoken language and 3d facial expressions,"

[2]. J. R. Williamson, D. Young, A. A. Nierenberg, J. Niemi, B. S. Helfer, and T. F. Quatieri , "Tracking depression severity from audio and video based on speech articulatory coordination," Computer Speech & Language, vol. 55, pp. 40–56, 2019.

[3]. Mandar Deshpande, Vignesh Rao "Depression Detection using Emotion Artificial Intelligence."

[4]. Madhurima Hooda, Aashie Roy Saxena, Dr. Madhulika, Babita Yadav -" A Study and Comparison of Prediction Algorithms for Depression Detection among Millennials: A Machine Learning Approach"

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[5]. F. P. Polly and S.K. Shil, "Detection and classification of HGG and LGG brain tumor using machine learning", International Conference on Information Networking, 2018

[6]. Nilesh Bhaskar Rao Bahadure, Arun Kumar Ray and Har Pal Thethi," Image Analysis for MRI Based Brain Tumor Detection and Feature Extraction Using Biologically Inspired BWT and SVM", Hindawi International Journal of Biomedical Imaging volume 2017.

[7]. Zeynettin Akkus, Alfiia Galimzianova, Assaf Hoogi , Daniel L. Rubin and Bradley J. Erickson, "Deep Learning for Brain MRI Segmentation: State of the Art and Future Directions" J Digit Imaging DOI 10.1007/s10278-017- 9983-4, 2017

[8]. Israel D. Gebru, Xavier Alameda-Pineda, Florence Forbes and Radu Horaud, "EM Algorithms for Weighted-Data Clustering with Application to Audio-Visual Scene Analysis "IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. xx, no. y, 2016.

[9]. D. Suresha and N. Jagadisha, "Detection of Brain Tumor using Image Processing", Fourth International Conference on Computing Methodologies and communication, 2020

[10]. Ashfaq Hussain and Ajay Khunteta," Semantic segmentation of brain tumor from MRI images and SVM Classification using GLCM (Gray Level Co-occurrence Matrix) features", Second International Conference on Inventive Research in Computing Application, 2020

[11]. Natural Language Processing Future Chandhana Surabhi. Implementing College Enquiry chatbot. K

[12]. Programming challenges of Chatbot: Current and Future Prospective AM Rahman, Abdullah Al Mamun, Alma Islam

[13]. Evaluating Natural Language Understanding Services for Conversational Question Answering Systems.

[14]. Daniel Braun, Adrian Hernandez Mendez, Florian Matthe's, Manfred Langen.