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Prediction of Mental Health in Human Being Using Machine Learning

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Abstract:- Depression is considered as one of the major health issue in today's world. People with depression will go undiagnosed. The mental health doesn't show any symptoms like physical disorder. The mental disorder can only be identified by oral confirmation from the patient whereas the patient accepts that he/she is depressed. The mental health of the patient must be monitored on a regular basis to lead a happy and peaceful life. This paper suggests machine learning technique in predicting depression at early stage in an automated This paper provides the survey about the use of machine learning techniques in the analysis of depression with their research issues.

Keywords:- *Depressed, Monitored, Machine Learning, Social Media.*

I. INTRODUCTION

Machine learning is one of the trending algorithms that helps the software applications to predict accurately without explicit programming. The key thing of Machine learning is to construct algorithm that input given to the system is processed using the statistical analysis to produce output.

Machine learning is classified into two types as supervised ML and unsupervised ML. Supervised ML is method of mapping an Input to corresponding output based on the training set that is passed to the system initially. The trained set of Supervised learning is set of pair consisting of pair of input and output. Depression is one such disorder where the people started feel bored to do activity which they used to enjoy. Depression has become one of the common disorders for all age group. In a research conducted by World health Organization it is predicted that depression will be second major disorder by the end of 2022. The early stage of depression show anger outburst , sleep disturbances, low energy, poor concentration etc., In worst cases depression leads to suicidal attempts. The depression can be cured only when it is predicted and taking proper treatment. The depression can't predicted using clinical equipment so, our project is aimed to predict depression using machine learning algorithms. Our dataset consists of 63 features and 1400 entries. Depression is predicted by calculating accuracy error rate , precision and by using confusion matrix. According to the survey most of the employees are suffering from depression and it would be difficult for everyone to undergo treatment.

II. EXISTING AND PROPOSED SYSTEM

A. Existing System

In the existing project the LIFE EVENT INVENTORY scale is used to predict the level of depression. In order to Predict depression accurately those Prediction Systems uses 24 standard questions. The traumatic and non-traumatic events are considered as the important predictors for designing the project.

B. Proposed System

The traumatic and non-traumatic events are considered as the important predictors for designing the project. The traumatic and non-traumatic events are considered as the important predictors for designing the project.

The treatment recommended by our project are interaction with friends and family, attending regular sessions and some medications.

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III. DATASET AND MODEL DESCRIPTION

A. *Dataset Description*

The dataset is taken from OSMI 2016 survey. The dataset is collected from the employees of different organization and work positions. The dataset consists of 63 fields and 1400+ employee details.

B. *Model description*

Recently machine learning has its own impact in each and every field.

The treatment recommended is a non-personalized recommender in which treatment is recommend based on the current mental health disorder.

IV. ARCHITECTURE

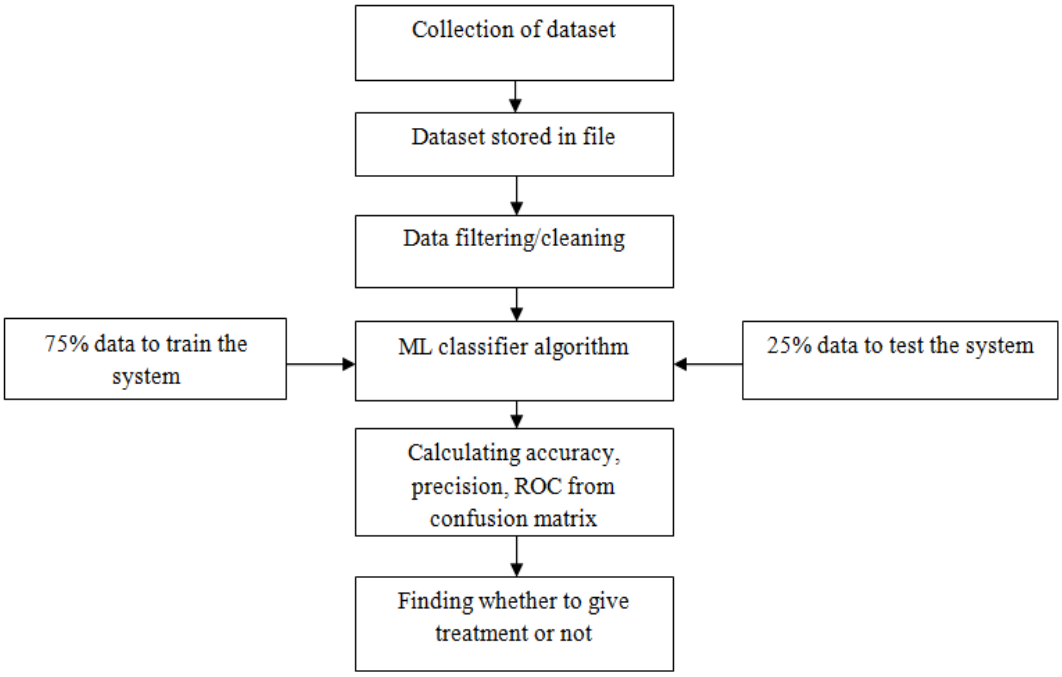

Fig 1:- The architecture of CD-Diet

A. *Employee Details*

The patient details included their basic information which is required for their authentication.These information is collected from employees at the time of the survey.

B. *Prediction Algorithm*

Random forest is one the learning method of classification and regression method which helps to construct a multitude of decision tree. Random forest is commonly known as collection decision tree. Random forest is one the supervised machine learning classification algorithm. Random forest is constructed based on collection of IF-ELSE statements. The training dataset is passed as input with the target features, the set of rules are formulated by the decision tree in random forest based on the input. The formulated rules are later used perform predictions for the testing dataset. Gini index calculation is used for calculating nodes in the decision tree.

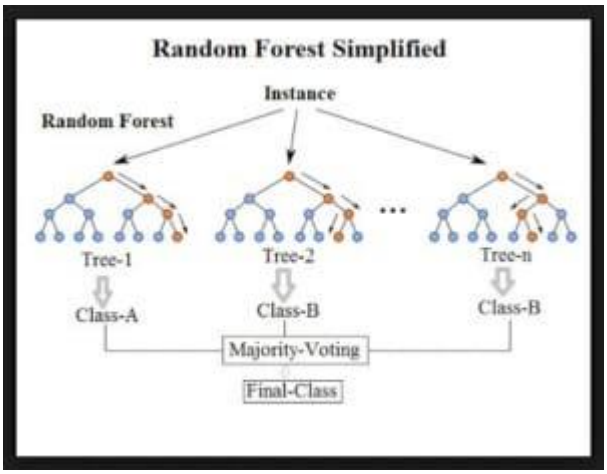

Fig 2:- Random Forest Architecture

V. PERFORMANCE EVALUATION

Approaches	Precision (%)	Test Accuracy (%)	AUC
Random Forest	90.55	83.72	84.30
Boosting	87.06	82.09	82.15
KNN	91.62	81.39	82.76

Table 1:- CNN Results

In comparison with other algorithms our model which uses Random forest 83.92 stands out with the best accuracy compared to Boosting and KNN. Though the Precision of KNN is highest we select Random forest for its highest accuracy score and better performance than other algorithms.

Recall is defined as the total number of results which are correctly fetched by our algorithm. Specificity deals with the number of cases algorithm turn out to predict negative results. Specificity is less in compare with other algorithm.

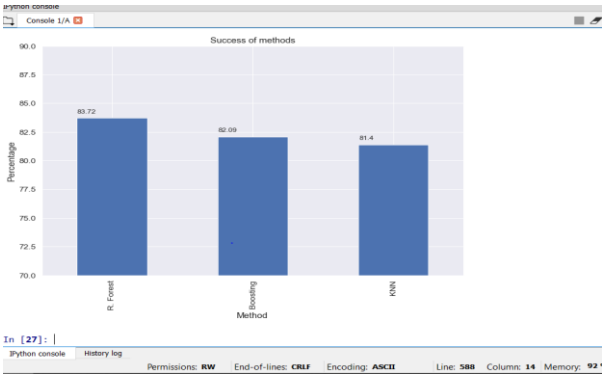

Fig 3

VI. SCREENSHOTS

Index	Index	Treatment	eatment_recoome
0	1059	1	Cognitivre behavioral th…
1	411	1	Cognitivre behavioral th…
2	342	0	
3	1295	0	
4	483	1	Cognitivre behavioral th…
5	1014	1	Cognitivre behavioral th…
6	1308	1	Cognitivre behavioral th…
7	31	1	Cognitivre behavioral th…
8	467	1	Cognitivre behavioral th…
9	477	0	
10	1046	1	Cognitivre behavioral th…
11	474	0	
12	533	1	Cognitivre behavioral th…
13	920	1	Cognitivre behavioral th…
14	1231	1	Cognitivre behavioral th…
15	34	0	
16	443	1	Cognitivre behavioral th…
17	1149	0	
18	295	1	Cognitivre behavioral th…
19	1103	1	Cognitivre behavioral th…
20	817	0	
21	1391	0	
22	529	1	Cognitivre behavioral th…
23	1236	1	Cognitivre behavioral th…

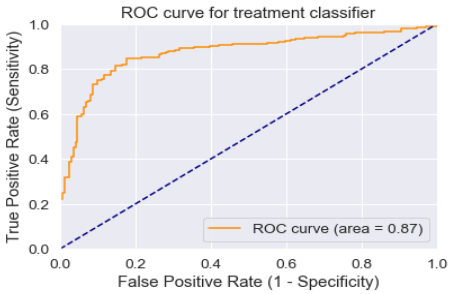

Fig 4:- Boosting ROC curve

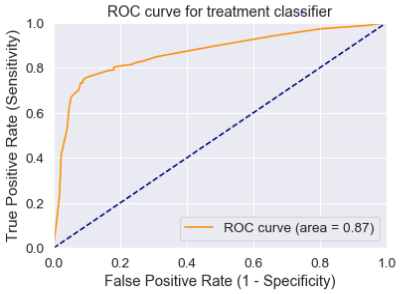

Fig 5:- KNN ROC curve

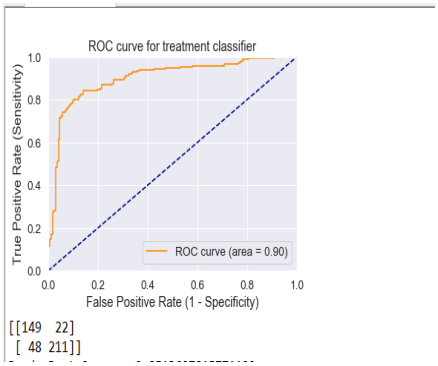

Fig 6:- Random Forest ROC curve

VII. CONCLUSION AND FUTURE WORKS

This model is aimed at predicting depression with high accuracy. It attempts to predict depressive disorders of an individual. Thereby can prevent the other diseases rooted from depression at initial stage itself. Here the algorithms used are very stable and are compared to check which classifier produces high accuracy in prediction. Performance of different machine learning algorithms such as AdaBoost, KNN and Random Forest were compared. ROC Curve, Confusion matrix and classification report are used to check the quality. Metrics such as accuracy, precision, F1- score, error rate, TP, TN, FP, FN are being used for comparison to find which classifier is efficient in terms of accuracy. This model can be extended to get more accuracy. We have used the same dataset to train and test the model which can be extended by proving new dataset as an input to test the trained system. This model can be further optimized and feature selection algorithms can be implemented to get better results.

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