JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Predicting Psychological Instability Using Machine Learning

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Abstract

People all around the world put in a lot of effort to keep up with our fast-paced world, as we all know. However, as a result of this, every person has to cope with a variety of health problems, the most well-known of which is depression or stress, which can ultimately result in demise or other heinous deeds. These irregularities can be classified as bipolar disorder, which can be treated by pursuing some form of therapy advised by medical professionals. For this study, working people provided data that included a variety of questions for the melancholy identification process. The dataset was then processed using certain machine learning methods. In comparison to the other methods, the Random Forest approach provides the highest accuracy of 87.02%.

Keywords: Bipolar disorder, Random Forest, SVM, Decision Tree, Machine learning.

1. INTRODUCTION

1.1 Introduction

Daily life, relationships, and physical health can all be impacted by mental health. However, this link also functions the other way. Physical elements, interpersonal relationships, and life circumstances could all contribute to mental health issues. Taking care of mental health problems might help a person's outlook on life. By doing this, you can find harmony in your life. Stress, depression, and anxiousness are just a few examples of conditions that could affect mental health and interfere with daily activities. Most crisis centers are well-equipped to handle patients' problems during mental health crises. Most protection programs view mental illness and dependence as exceptions to general thought, not a component of it. Despite a broad trend in society,

2. Literature Survey

• **[1]] Intelligent data mining and machine learning for mental health diagnosis using genetic algorithm Azar, Ghassan & Gloster, Clay & ElBathy, Naser & Yu, Su & Neela, Rajasree & Alothman, Israa. (2015). Intelligent data mining and machine learning for mental health diagnosis using genetic algorithm. 201-206:**An incorrect diagnosis of a mental health condition results in the inappropriate therapy, an irreparable decline in the client's mental health, institutionalization, and/or early death. Each year, 12 million patients in the US receive incorrect diagnoses. This research presents a novel study that assists in the preliminary identification of the patient with a psychological disease using a semi-automated approach. This is done by comparing a patient's statement of their mental health with the DSM-IV-TR, Fourth Edition Text Revision's illustrations of various mental diseases. The study builds a semi-automated system using a combination of machine learning, genetic algorithms, and classification data mining. The objective is to ensure that a classifier is

aware of all potential mental disorders, not to totally automate the classification of mentally sick people. The patient's symptoms could be caused by mental health conditions. A knowledgeable, wise, and appropriate assessment can be made by the classifier/psychological analyst, which will result in a reliable forecast. The final decision regarding the diagnosis and course of treatment will be made by the analyst.

[2A Framework for Classifying Online Mental Health-Related Communities with an Interest in Depression B. Saha, T. Nguyen, D. Phung and S. Venkatesh, "A Framework for Classifying Online Mental Health-Related Communities With an Interest in Depression: The newly discovered human coronavirus illness COVID-19 is the sixth known pandemic following the 1918 flu pandemic. COVID-19 was discovered in Wuhan, China, and quickly spread throughout the world. Almost every country on the planet is facing this natural disaster. We offer forecasting models for the COVID-19 outbreak in Asia Pacific countries, focusing on Pakistan, Afghanistan, India, and Bangladesh. To quantify the severity of the pandemic in the near future, the newest deep learning techniques like as Long Short-Term Memory networks (LSTM), Recurrent Neural Networks (RNN), and Gated Recurrent Units (GRU) are used. When using neural networks, we take into account the time variable and data non-linearity. The key aspects of each model have been analyzed in order to forecast the number of COVID-19 cases in the coming year. 10 days. The predicting performance of the used deep learning models presented up to July 1, 2020, is more than 90% correct, demonstrating the study's dependability. In this study, the most recent deep learning techniques, such as Long Short-Term Memory networks (LSTM), Recurrent Neural Networks (RNN), and Gated Recurrent Units (GRU), are used to estimate the severity of a pandemic soon. When using neural networks, we consider the time variable and data non-linearity. The key aspects of each model have been analyzed in order to forecast the number of COVID-19 cases in the next 10 days. The predicting performance of the used deep learning models presented up to July 1, 2020, is more than 90% correct, demonstrating the study's dependability.

3. OVERVIEW OF THESYSTEM

3.1 Existing System

The suggested system considers tech workers' stress levels. The dataset under consideration is a survey of working persons that considered every conceivable query for stress detection. SVM, DT, and Random Forest are employed on the dataset for learning and detection in the designed technique, which uses the ML algorithm for stress identification. The suggested method identifies the appropriate algorithm for predicting mental disorders.

3.1.1 Disadvantages of Existing System

- Less feature compatibility
- Low accuracy.

3.2 Proposed System

The suggested system considers tech workers' stress levels. The dataset under consideration is a survey of working persons that considered every conceivable query for stress detection. SVM, DT, and Random Forest are employed on the dataset for learning and detection in the designed technique, which uses the ML algorithm for stress identification. The suggested method identifies the appropriate algorithm for predicting mental disorders.

3.3 Methodology

In this project work, I used five modules and each module has own functions, such as:

1. System Module
2. User Module

1.System:

1.1 Receive Datasets:

Receive Datasets from the user

1.2 Preprocessing:

Perform preprocessing on data sets

1.3Training:

Use the pre-processed training dataset to train our model using LGBM algorithms.

1.4 Generate Results:

View Results generated

2.User:

2.1 Upload

The user needs to upload the data.

2.2 View-Data

Later on user can upload data

2.2 View Pre-processing:

Later on user can view the preprocessing of data.

2.3 View training:

Later on, user can view the training of data..

4 Architecture

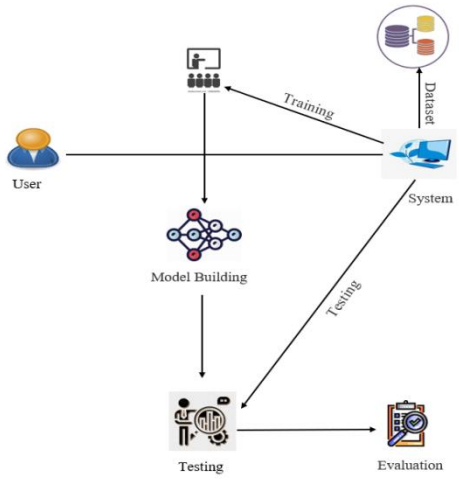

Fig 1: Frame work of proposed method

5 RESULTSSCREEN SHOTS

Head:

```
df.head()
```

	Age	Gender	Country	state	self_employed	family_history	treatment	work_interfere	no_employees	remote_work	...	anonymity	leave	mental_health_con
0	37	0	45	10	0	0	1	1	4	0	...	2	2	
1	44	1	45	11	2	0	0	2	5	0	...	0	0	
2	32	1	7	45	2	0	0	2	4	0	...	0	1	
3	31	1	44	45	2	1	1	1	2	0	...	1	1	
4	31	1	45	37	2	0	0	0	1	1	...	0	0	

Describe:

```
df.describe()
```

	Age	Gender	Country	state	self_employed	family_history	treatment	work_interfere	no_employees	remote_work	...	anc
count	1.259000e+03	1259.000000	1259.000000	1259.000000	1259.000000	1259.000000	1259.000000	1259.000000	1259.000000	1259.000000	...	1259.
mean	7.942815e+07	0.794281	37.792893	31.188245	0.142971	0.390786	0.505957	2.335981	2.783161	0.298650	...	0.
std	2.818299e+09	0.404387	13.320224	15.959628	0.388852	0.488121	0.500163	1.373980	1.740247	0.457848	...	0.
min	-1.726000e+03	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.
25%	2.700000e+01	1.000000	42.000000	18.000000	0.000000	0.000000	0.000000	1.000000	1.000000	0.000000	...	0.
50%	3.100000e+01	1.000000	45.000000	37.000000	0.000000	0.000000	1.000000	3.000000	3.000000	0.000000	...	0.
75%	3.600000e+01	1.000000	45.000000	45.000000	0.000000	1.000000	1.000000	3.000000	4.000000	1.000000	...	2.
max	1.000000e+11	1.000000	47.000000	45.000000	2.000000	1.000000	1.000000	4.000000	5.000000	1.000000	...	2.

Info:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1259 entries, 0 to 1258
Data columns (total 26 columns):
 #   Column                     Non-Null Count  Dtype
---  ------                     --------------  -----
 0   Timestamp                  1259 non-null   object
 1   Age                        1259 non-null   int64
 2   Gender                     1259 non-null   object
 3   Country                    1259 non-null   int32
 4   state                      744 non-null    object
 5   self_employed              1259 non-null   int32
 6   family_history             1259 non-null   int32
 7   treatment                  1259 non-null   int32
 8   work_interfere             1259 non-null   int32
 9   no_employees               1259 non-null   int32
 10  remote_work                1259 non-null   object
 11  tech_company               1259 non-null   object
 12  benefits                   1259 non-null   object
 13  care_options               1259 non-null   object
 14  wellness_program           1259 non-null   int32
 15  seek_help                  1259 non-null   object
 16  anonymity                  1259 non-null   int32
 17  leave                      1259 non-null   int32
 18  mental_health_consequence  1259 non-null   int32
 19  phys_health_consequence    1259 non-null   int32
 20  coworkers                  1259 non-null   int32
 21  supervisor                 1259 non-null   int32
 22  mental_health_interview    1259 non-null   int32
 23  phys_health_interview      1259 non-null   int32
 24  mental_vs_physical         1259 non-null   int32
 25  obs_consequence            1259 non-null   int32
dtypes: int32(17), int64(1), object(8)
memory usage: 172.3+ KB
```

Accuracy for Algorithm1:

```
from sklearn.metrics import accuracy_score
print(accuracy_score(prd,y_test))
```

```
0.8650793650793651
```

Accuracy for Algorithm2:

```
from sklearn.metrics import accuracy_score
print(accuracy_score(pr,y_test))
```

```
0.7804232804232805
```

6. CONCLUSION

✓ In this study, we have successfully developed a method for producing predictions of psychiatric diseases based on medical information. In order to predict the needs, the system is likely to gather information from the user.

Future Enhancement

✓ We have developed a collaborative modeling framework using a machine learning technique to categorize co-occurring online groups connected to mental health based on these attributes. The model was then empirically validated on the crawling dataset, where it outperformed recently developed state-of-the-art baselines.

7. References

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