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# PREDICTING THE STAGES OF BIPOLAR DISORDER USING MACHINE LEARNING ALGORITHMS

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## 1. ABSTRACT:

Bipolar disease, a complicated disease in mind and it affected many hundreds of thousands of human beings across the world. This mind disease is recognized via means of the prevalence of the oscillations of the patient's changing mood. The mood swings among states i.e. melancholy and mania in mind. This is a end result of various mental and bodily capabilities. A set of psycholinguistic capabilities like behavioral changes, temper swings and intellectual contamination are located to offer remarks on fitness and wellness. The look at is a goal degree of figuring out the strain degree of human mind that might enhance the dangerous results related to it considerably. In the paper, we look at prediction of signs of bipolar disease by using the Machine Learning Techniques. Therefore, we extracted facts from articles and

study papers and analyzed via way of means of the use of statistical evaluation elements and Machine learning (ML) techniques. Data is visualized to extract and talk significant facts from complicated datasets on predicting and optimizing numerous day to day analyses. In this paper we consist of the numerous studies papers having Machine Learning algorithms and classifiers like Decision Trees, Random Forest, Support Vector Machine, Naïve Bayes, Logistic Regression and K- Nearest Neighbor are studied and analyzed. The reason of the paper is particularly to discover the challenges, adequacy and boundaries in detecting the intellectual fitness situations by using Machine Learning Techniques.

## 2. INTRODUCTION :

World Health Organization WHO implies, a man having good thoughts and bodily health is a wholesome man. Any swap in thinking process and intellectual fitness are a number of the age related procedure and adjustments throughout the

world. Depression and tension are intellectual fitness ailment related with dangerous thoughts. As the age will increase, the outcomes and vulnerability related with melancholy and tension additionally will increase. The improvement and advances in Data Analytics and Technology outcomes in greater interest in prediction of sickness. Various studies and researches on large number of dataset has been conducted automatically to improve the accuracy of risk classification instead of selected characteristics previously [1]. Patients having bipolar ailment notably reviews day-to-day and week-to-week swings in temper. This instability in temper will increase the relapse of sickness and with time, this indicates that the sickness continues to be active.

Machine Learning Techniques are more and more found in nearly all structures that Process and accumulate bulk quantities of data. The subject of medicine is largely benefited via Machine Learning. Machine

Learning algorithms layout the regression and classification models that assist in distinctive illness diagnosis, drug recommendation, drug management and so on. ML is the process of creating certain models and algorithms to predict values based on different features[1]. This research paper evaluation ML approach for bipolar ailment and medical procedures. The Data

of wholesome and depressed are reviewed from surveys to use prediction algorithm.

### **Types of Bipolar Disorder:**

**Type 1:** This disease has symptoms of temper episodes from Mania to Depression periodically. The disease may be identified if manic episodes are visible for as a minimum seven days observed via psychotic functions. To save you patient from the disorder and others instant hospitalization is recommended. Sometimes humans have depressive episodes in conjunction with manic functions for two or more weeks.

**Type 2:** In this emotional state elevation of milder hypomania episodes takes place alternatively with intense depression. The Common signs of important depressive episodes encompass hypersomnia , uncontrollable and unexplained crying, intense fatigue, Loss of interest in life, thinking of suicide and death.

### **3. LITERATURE SURVEY :**

[1] Review on Machine Learning Techniques to predict Bipolar Disorder 1 , < Sanjeev Kumar Prasad>2 This review paper concludes that if the clinical heterogeneity of the samples of patient's data having bipolar disorder is given then by using machine learning techniques will provide researchers and clinicians with great insights in the fields such as diagnosis of diseases, their personalized treatment and prognosis orientation.

[2] Individualized Prediction and Clinical Staging of Bipolar Disorders using Neuroanatomical Biomarkers Benson Mwangi, Ph.D., Mon-Ju Wu, Ph.D., [...], and Jair C. Soares, M.D., Ph.D. This Review paper tells that presence of widespread structural brain abnormalities in BD which are associated with higher illness burden – which points to neuroprogression.

[3] Mental Health Prediction Using Machine Learning: Taxonomy, Applications, and Challenges , This review paper concludes that it is very important for researchers to investigate and analyze the data with various machine learning

algorithms to choose the highest accuracy among the machine learning algorithms and Not only that, challenges and limitations faced by the researchers need to be managed with proper care to achieve satisfactory results that could improve the clinical practice and decision-making.

[4] Data Analytics in Mental Healthcare Ayesha Kamran Ul haq,<sup>1</sup> Amira Khattak,<sup>2</sup> Noreen Jamil ,<sup>1</sup> M. Asif Naeem ,<sup>1,3</sup> and Farhaan Mirza is paper examines exclusive prediction methods. Various algorithms are famous to educate information so that it will be expecting destiny information. Random forest model, Naïve Bayes, and k-suggest clustering are famous ML algorithms. Social media is one of the first-rate reassets of information amassing because the

mood of the person additionally well-known his/her mental behavior. This survey, numerous advances in information technological know-how and its effect at the smart healthcare device are factors of consideration.

#### **4. Machine Learning Techniques for predicting Bipolar Disorder**

Machine learning methodology, offers a complete and concise evaluation of how machine learning can assist to hit upon the signs of humans stricken by Bipolar

Disorder. This additionally makes a speciality of predicting the signs of intellectual states of sufferers that offers a precious perception for clinicians, sufferers, and researchers in lowering and stopping excessive mania and melancholy. The ML strategies have the following processing steps. This includes making plans and Data Analysis, Data Acquisition, Data Analysis, Implementing Data Mining process and Performance Analysis.

##### **4.1 Planning and Background Analysis:**

In this section all of the information concerning the person and his infection is gathered which incorporates numerous qualitative elements like non-public information, demographic information, socio demographic characteristics, their Symptoms, and sickness. Age, gender, their beyond history, continual

scientific conditions, own circle of relatives repute and environment, marital repute, activity protection etc. are analyzed for detecting intellectual circumstance like despair and tension in older people . These attributes are used as predictors in automated device for sickness prediction .

#### **4.2 Data Collection or Data Acquisition:**

Data is gathered through numerous sources of healthful and depressive peoples. They are analyzed for

numerous parameters to detect anxiety, melancholy and different intellectual disorders. For this information is gathered through numerous data like surveys, questionnaires and numerous social media platforms.

#### **4.3 Data Preprocessing:**

The raw data is collected in the above phase is preprocessed in an comprehensible layout with the aid of two methods, specifically data cleaning and data transformation. This is used to distinguish the diverse behaviors of the sufferers and to choose the characteristic on the premise of which clinical assistance is given. For describing and demonstrating depressive and non-depressive feedback and posts, distinct functions have been extracted from person's put up having psycholinguistic functions.

Data Cleaning: It is required to dispose of the inappropriate statistics is affected person prescription. For this reviewer used Linguistic inquiry and phrase depend as a bundle of Psychological vocabulary. For this distinct intellectual, etymological and affective elements of person written and verbal correspondence are perceived.

Data Transformation: - Data gathered became converted into an comprehensible

layout for implementation purpose. All null statistics is eliminated and dataset is checked for naming convention.

#### **4.4 Classification-Implementation and Data Mining Process:**

The Researcher goal is to take a look at classification set of rules for intellectual fitness prediction. For the observe, analyze round 466 intellectual disease patient's dataset conclude the relation among disease prognosis and attributes through applying machine learning strategies. These strategies consist of ,SVM, Knearest neighbor, Random forest and decisionTree. The observe compares the performances of the different algorithms uses measures of accuracy to hit upon intellectual fitness problems.

## 5. Investigating ML techniques for the prediction of Bipolar disorder:

The overview targets to observe and provide a clean and concise literature investigating Machine Learning ML strategies for the prediction of Bipolar disorder. The literature overview targets to lessen the prevalence and incidence of the tension problems via powerful early prediction. This consequences in good sized minimization of hospitalization,

enhancing their life of existence and reduces their fitness care payments to a massive extent. The Literature overview has 3 stages.

[1]During the first stage, we reviewed 7 papers related to health issues and ML techniques through selected datasets. Additionally, we referred some articles from different sources. Papers are related to mental health illness or disorders and machine learning are studied and reviewed by their abstracts and titles.

[2]During second stage, some are directly related to prediction of mental health disorder and their prediction using Machine Learning Techniques are reviewed.

[3]During the third stage, thorough examination of the related literature and included studies is involved. Input data and measurement methods are used as tools for acquiring essential information. This information is drawn to conclude accuracy and to draw a conclusion.

## 6. CONCLUSION :

This paper concludes that if the clinical heterogeneity of the samples of patient's data having bipolar disease is given then with the aid of using Machine learning Techniques will provide researchers and clinicians with remarkable

insights in the fields which include analysis of diseases, their customized remedy and diagnosis orientation. Machine learning techniques for the prediction of pressure and intellectual fitness situation

will gives enormous reaction and this could be studied and explored for similar study objectives. Over the time, if we do now no longer manage the emotional conditions, tension turns into worse day to day and will become apathological conditions and that is pretty difficult to treat. These intellectual fitness problems bring about damage to the human frame as it results in suppression of the immune system, which then will increase the hazard of susceptibility to diverse infectious diseases, growth in blood pressure, and diabetes.

## 7. REFERENCE:

- [1]. Review on Machine Learning Techniques to predict Bipolar Disorder Agnihotri, Nisha (2021): Review on Machine Learning Techniques to predict Bipolar Disorder. TechRxiv. Preprint. <https://doi.org/10.21203/rs.3.rs-1000000/v1>
- [2]. Individualized Prediction and Clinical Staging of Bipolar Disorders using Neuroanatomical Biomarkers Benson Mwangi, Ph.D., Mon-Ju Wu, Ph.D., [...], and Jair C. Soares, M.D., Ph.D.
- [3]. Mental Health Prediction Using Machine Learning: Taxonomy, Applications, and Challenges Jetli Chung and Jason Teo Faculty of Computing and Informatics, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia Correspondence should be addressed to Jason Teo; jtwteo@ums.edu.my Received 5 April 2021; Revised 23 June 2021; Accepted 29 September 2021; Published 5 January 2022 Academic Editor: Aniello Minutolo
- [4]. Data Analytics in Mental Healthcare Ayesha Kamran Ul haq,<sup>1</sup> Amira Khattak,<sup>2</sup> Noreen Jamil ,<sup>1</sup> M. Asif Naeem ,<sup>1,3</sup> and Farhaan Mirza<sup>3</sup> <sup>1</sup> National University of Computer and Emerging Sciences, Islamabad, Pakistan <sup>2</sup> Prince Sultan University, Riyadh, Saudi Arabia <sup>3</sup> Auckland University of Technology, Auckland, New Zealand
- Correspondence should be addressed to Noreen Jamil; noreen.jamil@nu.edu.pk Received 20 January 2020; Revised 13 March 2020; Accepted 12 June 2020; Published 4 July 2020 Academic Editor: Shaukat Alo
- [5]. . S, Vinitha and S, Sweetlin and H, Vinusha and S, Sajini, Disease Prediction Using Machine Learning Over Big Data (February 2018). Computer Science & Engineering: An International Journal
- [6]. (CSEIJ), Vol.8, No.1, February 2018, Available at SSRN: <https://ssrn.com/abstract=3458775> or <http://dx.doi.org/10.2139/ssrn.3458775>
- [7]. Pintelas, Emmanuel & Kotsilieris, Theodore & Livieris, Ioannis & Pintelas, P.. (2018). A review of machine learning prediction methods for anxiety disorders. 10.1145/3218585.3218587
- [8]. Islam MR, Kabir MA, Ahmed A, Kamal ARM, Wang H, Ulhaq A. Depression detection from social network data using machine learning techniques. Health Inf Sci Syst. 2018 Aug 27;6(1):8. doi: 10.1007/s13755-018-0046-0. PMID: 30186594; PMCID: PMC6111060.
- [9]. Suicide Risk in Bipolar Disorder: A Brief Review Peter Dome <sup>1,2,\*</sup>, Zoltan Rihmer <sup>1,2</sup> and Xenia Gonda <sup>1,2,3,4</sup>