Predicting Employees under Stress for Pre-Emptive Remediation Using Machine Learning Algorithm

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Abstract-With the ongoing COVID-19 pandemic, businesses and organizations have acclimated to unconventional and different working ways and patterns, like working from home, working with limited employees at office premises. With the new normal here to stay for the recent future, employees have also adapted to different working environments and customs, which has also resulted in psychological stress and lethargy for many, as they adapt to the new normal and adjust their personal and professional lives. In this work, data visualization techniques and machine learning algorithms have been used to predict employees stress levels. Based on data, we can develop a model that will assist to predict if an employee is likely to be under stress or not. Here, the XGB classifier is used for the prediction process and the results are presented showing that the method facilitates getting a more reliable model performance. After performing interpretation utilizing XGB classifier it is determined that working hours, workload, age, and, role ambiguity have a significant and negative influence on employee performance. The additional factors do not hold much significance when associated to the above discussed. Therefore, It is concluded that concluded that increasing working hours, role ambiguity, the workload would diminish employee representation in all perspectives.

Keywords: High frequency transformer, FFTS, cycloconverter, AC.

1. Introduction

On March 11, 2020, the World Health Organization (WHO) reported corona virus (COVID-19) a pandemic that signifies a global, epidemic disorder frightening the entire universe [3]. COVID-19 is a contagious disease affected by the corona virus. 'Corona viruses' are a huge family of viruses that cause ailments varying from the typical flu to other critical complications. According to WHO, on March 31, 2020, the virus had reached 202 countries. Due to this, stock markets and other sectors have experienced a severe downturn in growth. This, in turn, affects employees too, who feel stressed when they are

unable to cope with prolonged uncertainty and pressure. The application of machine learning and artificial intelligence to the field of business is seeing a lot of promising growth. The pattern of employee behavior is analyzed in [11].

Vis-à-vis, they do not have any satisfaction due to long working hours in addition to having a heavy workload. Here, the foremost objective of this research is to analyze the consequence of stress on employee appearance. Moreover, this influences physical ailments and a lack of commitment to work. However, in the contemporary situation, COVID-19 has put the world population in an unprecedented position. Through this work, we intend to analyze the stress level that employees are subjected to owing to a phenomenon like the present pandemic. Here, machine learning algorithms are used to predict whether employees undergoing stress or not.

2. Literature Survey

1. Title: Data Mining based Classification Algorithms for Mental Health Prediction Authors: Aadesh Aachaliya, ViditLaijawala, Hardik Jatta, and Vijaya Pinjarkar. Publication year: 2020

Description: The mental health of an individual reveals their emotional, psychological, and social well-being. It influences a person's thoughts, feelings, and reaction to situations. Stress, social anxiety, depression, OCD, drug addiction, problems at work, and personality disorders are a few of the factors that affect mental health issues and mental illness.

Disadvantages:

• Results are less accurate because of the use of small datasets.

• Data mining methods for predicting mental health.

• A lot of data is needed.

2. Title: Machine Learning Techniques for Stress Prediction in Working Employees Authors: U Srinivasulu Reddy, Aditya Vivek Thota, A Dharun Publication year: 2020

Description: In today's industry, stress disorders are a common problem for working IT professionals. Because of shifting lifestyles and workplace cultures, employees are now more likely to experience stress. In this article, we'll use machine learning techniques to examine stress patterns in working adults and highlight the factors that have the biggest effects on stress levels.

Disadvantages:

• For stress prediction, fewer parameters are used.

• The boosting algorithm is not suitable for real-time use.

• Prediction of stress using Ready Tools.

3. Predictive Analysis of Student Stress Level Using Naïve Bayesian Classification Algorithm Authors: Monisha S, Meera R,VijaySwaminath.R, Dr.Arun Raj L Publication year: 2020

Description: The combination of overall academic performance and social pressure has put students under pressure psychologically. In order to help students succeed academically and engage in social activities, it is important to lessen the stressors that are frequently cited. This will help people experience fewer personal health problems like migraine headaches, wearing glasses, and other issues.

Disadvantages:

• This idea only predicts the stress of college students; it is not applicable to working people.

• The algorithms here require more processing time.

• Less effective outcomes.

EXISTING SYSTEM

Workplace stress is a thriving concern for employees like human resource managers and so on. Although considerable scholarly and practical awareness has been dedicated to stress management over the years, the time has come for distinct perspectives and research. Extracting from the emerging field of organizational performance, this research proposes analysis conclusions including implications for combating occupational stress.

Specifically, data from a large sample of working employees beyond a variety of organizations and industries suggest that positive resources of efficacy, optimism, and resilience may be key to better understanding adaptation in perceived manifestations of stress. Numerous investigations and experimentation has been done in the last few years, most of the studies have been conveyed in countries that endeavor to promote to enhance advanced economically and socially. stress has become one of the most widespread ‘ occupational disorders’ , Aloft the past years, close to 3 billion employees" are experiencing stress at their workplace and it is influencing their overall job performances on regular basis.

Disadvantages

The system is not implemented PCA (Principal Component Analysis).

The system is not implemented XGB Classifier (XS Boost).

3. Proposed System

One of the best important steps while dealing with data is cleaning the data. Without doing that, if we go for model execution, we can not obtain better performance in model execution. Therefore, it ought to deal with null values, zeros, NAN values.

Here, data has 3895 null values. The categorical null values are fixed by using mode, and numeric data is fixed by using mean, median, floor techniques. Here, altogether, it can drop null values also, but by doing that, it may dissipate some data. So that is preferred for good model execution.

This is the target variable count. By this, it shows that data is imbalanced and it can be balanced by using various techniques. It is also possible to implement resampling data, oversampling, under-sampling data, or either it can be done by using ‘smote’ , hyper parameter techniques. It can also be overcome by using better algorithms that can give the most reliable performance model or can be done by using bagging

and boosting techniques, algorithms like SVM Classifier,Logistic regression, right evaluation metrics, changing performances metrics, ROC curve.

Advantages

The goal of the system is to test and train the large number of datasets with high accuracy.

The proposed system developed a Machine Learning Algorithms to test and train the datasets.

Modules

Service Provider

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such as

Login, Browse and Train & Test Data Sets, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results, View Employee Stress Prediction Type, Find Employee Stress Prediction Type Ratio, Download Predicted Data Sets, View Employee Stress Prediction Type Ratio Results, View All Remote Users.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

Remote User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like REGISTER AND LOGIN, PREDICT EMPLOYEE STRESS TYPE, VIEW YOUR PROFILE.

4. Results

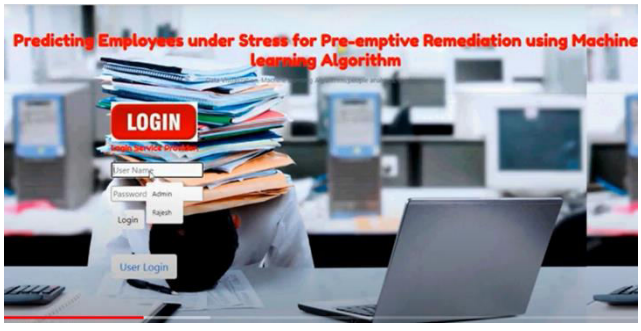

Fig.1 Login page.

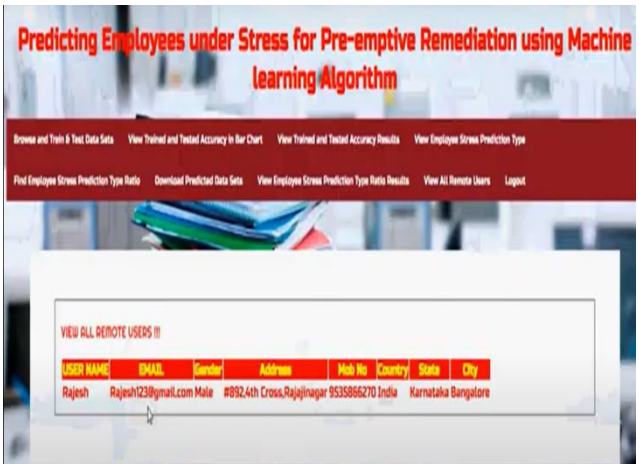

Fig.2 login details with mail id.

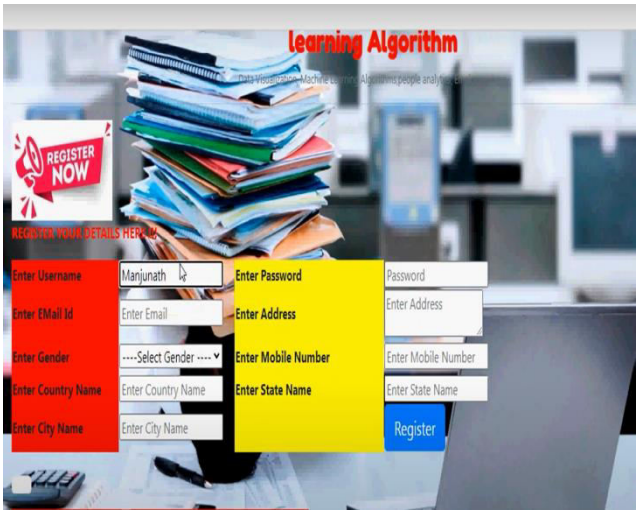

Fig.3. Login details verification.

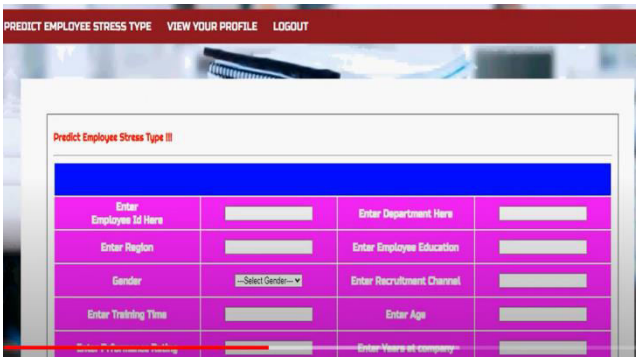

Fig.4 Profile details.

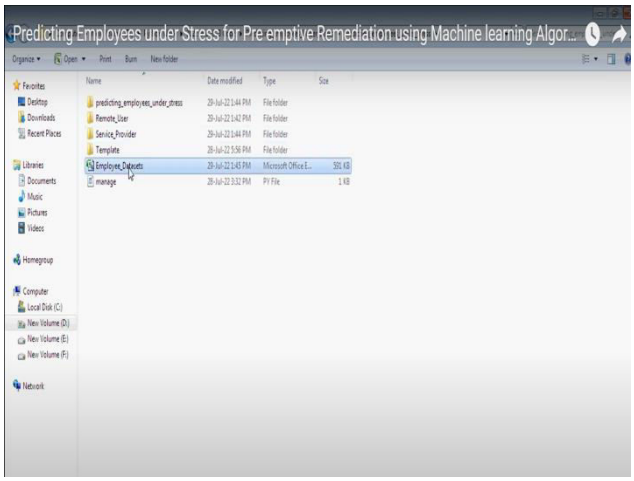

Fig.5.Data set name

5. Conclusion

To evaluate our model to achieve a better performance which is done by using XGB classifier. This is one of the best optimization technique and this is like a decision tree-based algorithm which adopts gradient boosting frame work technique for analysis and confusion matrix which tells us how many correct values are predicted by our model. XG Boost has tremendous predictive power and is about 10 times more durable than other gradient boosting techniques. It holds a variety of regularization which diminishes over fitting and enhances overall performance. Consequently, it is further recognized as the "regularized boosting" technique. Like it has true positive, true negative, false positive, false negative values.Used to evaluate the performance of the classification model.

REFERENCES

[1] Bhattacharyya, R., & Basu, S. (2018). India Inc looks to deal with rising stress in employees. Retrieved from 'The Economic Times'

[2] OSMI Mental Health in Tech Survey Dataset, 2017 from Kaggle

[3] Van den Broeck, J., Cunningham, S. A., Eeckels, R., & Herbst, K. (2005). Data cleaning: detecting, diagnosing, and editing data abnormalities. PLoS medicine, 2(10), e267.

[4] Shwetha, S, Sahil, A, Anant Kumar J, (2017) Predictive analysis using classification techniques in healthcare domain, International Journal of Linguistics & Computing Research, ISSN: 2456-8848, Vol. I, Issue. I, June-2017

[5] Tomar, D., & Agarwal, S. (2013). A survey on Data Mining approaches for healthcare. International Journal of Bioscience and Biotechnology, 5(5), 241-266.

[6] Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., &Vanderplas, J. (2011). Scikit-learn: Machine learning in Python. Journal of machine learning research, 12(Oct), 2825-2830.

[7] Gender and Stress. (n.d.). Retrieved from APA press release 2010

[8] Vidit Laijawala, Aadesh Aachaliya, Hardik Jatta, Vijaya Pinjarkar. Classification Algorithms based Mental Health Prediction using Data Mining (2020).

[9] U Srinivasulu Reddy, Aditya Vivek Thota, A Dharun. Machine Learning Techniques for Stress Prediction in Working Employees (2020).

[10] Monisha S, Meera R, Vijay Swaminath.R, Dr. Arun Raj L. Predictive Analysis of Student Stress Level Using Naive Bayesian Classification Algorithm (2020).

[11] Fang Li. Research on the College Students Psychological Health Management based on Data Mining and Cloud Platform (2016).

[12] Jigang Zheng, Jingmei Zhang. The Application of Association Rules Mining in the Analysis of Students Test Scores (2016).

[13] Jenny K. Hyun, Brian C. Quinn, Temina Madon, Steve Lustig. Graduate Student Mental Health: Needs Assessment and Utilization of Counseling Services (2014).

[14] Shivendra Jena, Harish Chandra Tiwari. Stress and mental health problems in 1st year medical students: a survey of two medical colleges in Kanpur, India (2014).

[15] Honglei Zhu, Zhigang Xu. An Effective Algorithm for Mining Positive and Negative Association Rules (2008).