

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

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## ABSTRACT

The modern world is filled with stress. Everyone is under pressure in a situation for one of two reasons. A person's pressure is affected by a variety of factors. Representatives in IT are more likely to be under pressure due to work pressure, overburdening, higher worker mastery, and so on. When a person is stressed, it can lead to a variety of mental health issues such as depression, anxiety, somatization, lack of concentration, and so on. It can sometimes be fatal. As a result, it is necessary to identify human stress at an early stage in order to provide appropriate solutions and alleviate stress. There has been a lot of research done on stress prediction. Many research papers use Machine Learning techniques to predict stress, and many papers use IOT-based sensors to extract the features needed for stress prediction. Many papers simply present the concept of stress prediction without any implementation. There are some research papers that include implementation. These implementation papers make use of ready-made tools such as the WEKA tool, the R tool, the Rapid Miner, or programming languages such as PYTHON or R. It is simple to predict stress using these ready tools and languages because they support ready libraries for stress prediction. Data science techniques are effective at processing training datasets and can predict human stress in less time and with higher accuracy.

**Keywords:** Data Science, Machine Learning, Stress, Information Technology Profession.

## I. INTRODUCTION

The modern world is flooded with IT, and IT companies are being greeted with new extensions and

requests. Representatives are bound to face pressure as a result of the changing way of life and working societies. Frameworks identify components that have a significant impact on anxiety feelings. Stress was

identified in relation to orientation, family ancestry, and the availability of medical benefits in the workplace. Recognizing the pressure on representatives allows us to devise a few strategies for dealing with it and creating a much more pleasant work environment for their representatives. Several research works make use of a variety of constraints, such as preferences, age, family history, provided medical benefits, shared information about illness, technical institution, technical job, acquiring holidays, and so on. Artificial Intelligence calculations are used in research to determine an employee's stress level. The primary goal of each of these research articles is to identify the gambling factors that influence the worker's emotional wellness.

## II. RELATED WORK

### 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, Vijay Swaminath. 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.

## III. PROPOSED SYSTEM

1. The proposed system is intended for the commercial sector.
2. Systems pinpoint variables that have a big impact on stress levels.

3. Based on gender, family history, and the presence of health benefits in the corporate world, stress was found.
4. By understanding the stress experienced by employees, we may develop strategies or solutions to lessen stress and improve the working environment.
5. The system takes into account a variety of factors, including gender, age, financial concerns, family concerns, working hours, learning methods, health concerns, issues with colleagues, pressure, regularity, and interaction, among others.
6. The system looks for employee stress using machine learning or AI algorithms.
7. The system can be created as a real-time application that benefits businesses. Since they are more real-time application supportive, we choose Visual Studio and SQL Server for application development.
8. The main goal of the system is to identify the risk factors that have an impact on the mental health of working employees.
9. Based on the stress levels, the system also makes recommendations to the working staff.
10. The system's objective is to pinpoint the root causes and project future levels of student stress. We conceive of methods to lower stress levels so that the working employees' performances can be improved.

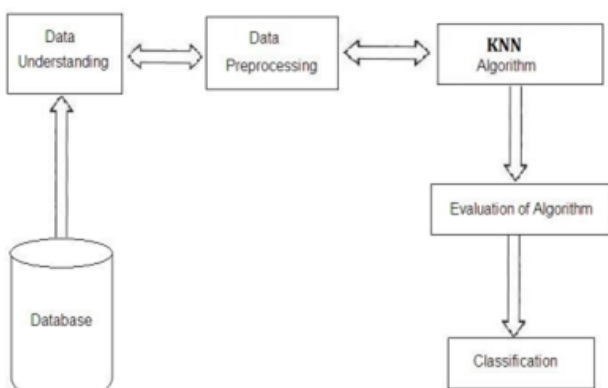


Fig 1: System Architecture

### Step 1: Data Collection (Stress Data)

During this stage of the employee stress prediction process, we collect stress data. Gender, age, financial, family, working hours, learning method, physical well-being, favouritism fix, co-worker issues, pressure, regular communication, and so on are all parameters that have been collected from a variety of sources.

### Step 2: Data Preparation

Following the evaluation of the stress data, only important data was collected. Data required for computation is utilized and fragmented according to parameters. Because complete data is not required for processing and entering all data would take too long, data extraction is performed.

### Step 3: Specify Constraints

The stress factors used to evaluate stress levels are retrieved. Gender, age, financial issues, family issues, work schedules, learning methods, medical issues, favouritism issues, co-worker issues, pressure issues, routine issues, communication issues, and so on.

### Step 4: ML Algorithms

#### ➤ Supervised Learning

Supervised learning is a machine learning method that is based on training data sets that contain predicted responses.

#### ➤ The KNN Algorithm And Naive Bayes, As Well As The Decision Tree

1. A Strong Classifier.
2. It Performs Well With Fewer Parameters As Well As Many Parameters.
3. Effective With Both Small And Big Data Sets.
4. More Precise Outcomes.

### Step 5: Stress Prediction.

Based on the factors, the system employs a machine learning algorithm to predict the stress levels of employees that work. We are using the KNN algorithm and the Naive Bayes algorithm to identify stress levels.

### Step 6: Obtaining Results

To determine the correctness of the algorithm, we divide the training datasets into training and testing

datasets. 90% of the records in the datasets are considered training datasets, while 10% are considered testing datasets.

#### Step 7: Visual Representation

The output is displayed to the user via the GUI.

### IV. CONCLUSION

When evaluating whether a person may experience mental health problems, factors like gender, family history of disease, and whether an organization offers mental health benefits to its staff were more significant than other considerations. According to the results of our study, even those who did not have tech-related jobs were marginally more likely to experience stress than those who did. Corporations can effectively use this data to develop better HR policies for their employees.

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