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Intelligent Chatbot for Prediction and Management of Stress

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Abstract - Stress Management and Prediction application is an end user support and consultation project. Here, a standalone application which we can further embed with websites or phone application. The application is fed with various details and the stress associated with those details. The application allows user to share their stress related issues. Here, we use neural network and machine learning technique like decision tree to train the data and guess the most accurate stress level that could be associated with patient's details and according to that it will show the measures to take place. This application can be used to identifying the stress level and its management.

keyword - Stress Prediction, Decision Tree, Python, Stress, Chatbot, Machine Learning

I. INTRODUCTION

This Project "Intelligent Chatbot for Prediction and Management of Stress" will be an application that can be integrated in website, it will give user the ability to identify the stress based on the given questions and answers. We have chosen this project because we want to provide user more easy, userfriendly, interactive way to find out about their stress. Bot will ask them few questions and according to the chosen answers, bot will show them the result and management of stress. We have used python and Rasa framework for this work and further required things to complete the work. Chatbot is a program that is designed to stimulate conversations or talk with human users. In this User communicates with the bot either with text or voice. Chatbot give logical reply or the already stored answers to the user for the questions. It is just like a user is talking to the other person. They interpret the questions and provide answer to them. They are used in messaging apps, e- commerce, etc. They can be customized for either single company based or public based. Stress is a physiological kickback to the social, behavioural or other physical issues that people face in their real-life activities, including in their environments like workplace, household, etc. Continued stress consumption can lead to some serious and extreme health issues, such as causing physical illness through its physiological consequences, changes in behaviour, and problems with social isolation. Stress affects tons of individuals in their life like mood, behaviour, health and quality of life. Disorders include: Headaches, heart attacks, depression, and system abnormalities include illnesses. They further note that, relative to the opposite forms of stress, acute stress appears to attract less consideration from researchers. Acute stress is also caused by multiple kinds of immediate emotional and physical challenges that people can encounter in several ways during ongoing everyday circumstances. This triggers certain physical changes, such as an increase in the heart, and these changes can induce severe long- term diseases and have a negative effect on the emotional and physical well-being of a person.

Open Sourcing Mental illness (OSMI) is a non profit organization that assist awareness about mental health in workplaces and also suggest workplaces to identify the best resources so that they can provide best atmosphere to their employees. In 2017, a survey conducted by OSMI mental health in workplace where 750 responses taken from various employees who were working in range of tech divisions. In this individual's personal and professional factors were taken. And used this survey's dataset to trained different ML models to analyse and find the patterns of stress and mental disorders .The models used in machine learning to detect stress and anxiety based on datasets are: Logistic regression, KNN classifier, Decision Tree, random forest classifier, boosting and bagging. It is found that people working in tech company were in slightly high danger of developing stress as compared to others. To make or provide good atmosphere in workplace Better HR policies should be provided to employees.

Stress becomes a major issue in today's time and also lead to many health problems of People of different professions, lifestyles, gender and age groups. In 2000, a survey of EWCS described that 62 percent of American's said that their work had a high impact on their stress. Among them 54 percent employees are aware of their health problems and it is also found that among four employees one has to take one day off to their work to cope with their stress. The avoidance of stress in every day at the workplace is not possible. There are a lot of technologies that services for the measurement of the stress level such as heart rates, GSR and many tools that analyze the correlations between the up and downs in stress level based on everyday events (what, with whom, etc.). Stress at work is common and some of them are a normal part of our work.

II. SOME PSYCHOLOGICAL DISEASE

Main Diseases which we have studied : A. Stress:

Arguably, everyone is under stress of one kind or another. It may be constructive stress, or the negative stress that comes, for example, from sitting in an open-plan office with a hundred telephones ringing at any one moment in time, of the form joggers willingly put themselves under. The kinds of stress and degrees of it are manifold, and so this variety must represent the oils we use and the combinations. Next, let us differentiate between constructive stress, usual stress, and positive stress. Positive stress can be defined as the "high" tension you get when doing your job quickly and effectively.

B. Insomnia:

Few common conditions cause more misery and discomfort to the patient than insomnia. The whole mental and physical vigor is impaired, tolerance is reduced, reaction to situations becomes abnormal and the capacity for work is decreased. In most instances' insomnia is due to pain or anxiety. Various painful situations like back-ache, abdominal pain, restless leg syndrome and acro parasthesia are known to disturb sleep .It can be treated by these and more.

C. Depression :

Depression means a morbid sadness, dejection or melancholy. There is a lowering or decrease of functional activity. It is a mental state of deep sadness & self-accusation beyond the normal reaction to grief or other adverse circumstances.

D. Anxiety:

Anxiety is the most common variety of the psychoneurotic conditions and often results when a person fails to achieve his aspirations. It is characterized by fear, apprehension and restlessness and symptoms and signs resulting from sympathetic excitation. The latter include palpitation, sweating, breathlessness, tightness in the chest and choking. The respiration may be rapid and give rise to tetany due to alkalosis. Acute attacks last from a few minutes to an hour and are called anxiety neurosis. In between the attacks, patient may experience headache, irritability and tiredness. The chronic variety manifests chiefly in the form of exercise intolerance due to chest-pain, palpitation and dyspnoea and is called neuro asthenia.

III. RELATED STUDY WORK

From several studies it is found that employees working in IT professionals in industry are facing issues related to stress disorders. This is because of change in their work culture and their changing lifestyles. Many businesses and companies provide their workers with mental health programs to relieve their tension and the working environment. But these issues are too huge to handle and far from control. Machine Learning techniques are used to study the working in adults and to slim down the issues that powerfully determine the stress levels. According to OSMI mental health survey, It is a non-profit organization that promotes awareness about stress, mental illness and disorders in workplace and also helps in identifying best resources to help their employees. OSMI mental health organization, takes data from datasets from surveys and examine the patterns of stress and mental health disorders and to regulate the significant issues that contribute to same.

Many ML techniques are used for these surveys such as: Logistic regression, KNN Classifier, Decision Tree, Boosting, Bagging and Random forest classifier. To increase the efficiency of these stress predicting models, we can use 'Naïve Bayes classifier'.

IV. IMPLEMENTATION

In this project, we suggested an intelligent social therapeutic chatbot that identifies an individual's stress levels. Using conversation data, it identifies the users' mental state, such as stressed or depressed, based on the emotion label. We used one of the most prominent machine learning classifiers, Decision Tree, to detect stress, In particular, the suggested chatbot methodology is domain-specific, i.e. through user interaction.

Apps and web-based chatbots can give useful and relevant assistance to healthcare personnel in assessing and guiding the management of a variety of health concerns, especially when human resources are limited. Mental health chatbots could be useful in assisting patients suffering from anxiety and depression, as well as providing vital support.

A. Description of Programming Languages :

1. Python : It is a general-purpose coding language which means that, unlike HTML, CSS, and JavaScript, it can be used for other types of programming and software development besides web development.

2. Machine Learning : Machine learning (ML) is the study of computer algorithms that improve automatically through experience and by the use of data. It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

3. NLP : Natural language processing (NLP) refers to the branch of computer science—and more specifically, the

branch of AI concerned with giving computers the ability to understand the text and spoken words in much the same way human beings can.

4. Flask : Flask is a micro Web framework written in python. It is classified as a microframe because it does not require particular tools or libraries description.

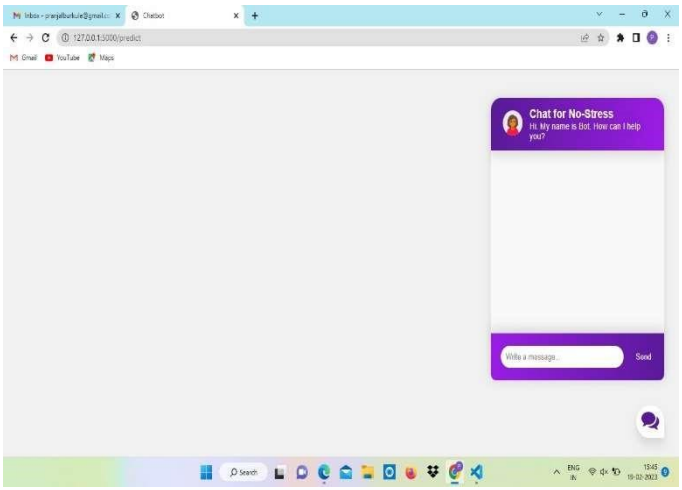
B. Description of Libraries Use :

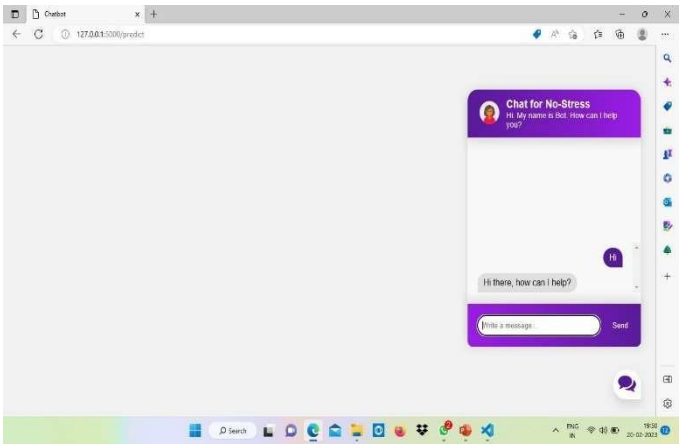
1. NumPy : NumPy, which stands for Numerical Python, is a library consisting of multidimensional array objects and a collection of routines for processing those arrays. Using NumPy, mathematical and logical operations on arrays can be performed. NumPy is a Python package. It stands for 'Numerical Python'. It is a library consisting of multidimensional array objects and a collection of routines for processing of array.

2. Pandas : Pandas is an open source Python package that is most widely used for data science/data analysis and machine learning tasks. It is built on top of another package named NumPy which provides support for multi-dimensional arrays. As one of the most popular data wrangling packages, Pandas works well with many other data science modules inside the Python ecosystem, and is typically included in every Python distribution, from those that come with your operating system to commercial vendor distributions like Active State's Active Python.

3. Matplotlib : Matplotlib is a plotting library available for the Python programming language as a component of NumPy, a big data numerical handling resource. Matplotlib uses an object oriented API to embed plots in Python applications.

V. RESULT





VI. CONCLUSION

This Paper gives us the information about the psychological diseases and the effect it is giving to us and through a chatbot we can predict those and give management to it. Stress, anxiety, depression, phobia and insomnia were mentioned in this paper. Decision tree was used to design the model and each leaf node provided us with the management information. We also gave number to measure the range of the stress i.e. 0,1 is for Low Depression 2,3 for medium Depression 4 is for high depression We were able to make a working prototype of our approach. In this we only mentioned about Depression and if the person is having high, medium or low. We have given pre-defined buttons for the ease of User. They just need to click on the button and it will store that and move ahead.

VII. FUTURE ENHANCEMENT

Chatbots are introduced as cost-effective and efficient on-demand virtual aides foe a variety of mental health issues, such as anxiety and depression, as part of the effort.

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