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HUMAN STRESS DETECTION BASED ON SOCIAL INTERACTIONS

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Abstract- *Psychological wellness conditions influence a noteworthy level of the world's population every year. The stress investigation of emotional wellness phenomena in openly accessible social networking sites like twitter ,sina weibo and facebook. A set of stress-related textual, visual, and social attributes from various aspects are first defined and then propose a novel hybrid model. The work has demonstrated the utility of online social information for contemplating despondency, be that as it may, there have been limited assessments of other mental well being conditions .It is not easy to access the user posts on their facebook page. In order to obtain the user data from facebook, system have to get the access token from facebook developer page. The API act as an intermediate system that will help the system to analysis the user information from the facebook page. The system will also help to Recommending users with different links for psychological counseling centers, soft music or articles to help release their stress according to users' stress level.*

Key words: Stress detection, social media, micro-blog, access tokens, and face book.

1. Introduction

More and more teenagers today are overloaded with adolescent stress from different aspects: academic future, self cognition, inter-personal, and affection. Long-lasting stress may lead to anxiety, withdrawal, aggression, or poor coping skills such as drug and alcohol use, threatening teenagers' health and development. Hence, it is important for both teenagers and their guardians/teachers to be aware of the stress in advance, and manage the stress before it becomes severe and starts causing health problems. The current social media micro-blog offers an open channel for us to timely and unobtrusively sense teenager's stress based on his/her tweeting contents and behaviors. This study describes a framework to further predict teenager's future adolescent stress level from micro-blog, and discusses how we address the challenges (data incompleteness and multi-faceted prediction) using machine learning and multi-variant time series prediction techniques. Forthcoming events that may possibly influence teenager's stress levels are also incorporated into our prediction method. Our experimental results demonstrate the effectiveness of considering correlated features and event influence in prediction. To the best of our knowledge, this is the first work on predicting teenager's future stress level via micro-blog.

College can be stressful for many freshmen as they cope with a variety of academic, personal, and social pressures . Although not all stress is negative, a certain level of stress can be beneficial to help improve performance. However, too much stress can adversely affect health in the annual survey of the American Freshman; the number of students reported feeling overwhelmed and stressed has increased steadily in the last decade. Over 50% of college students suffer significant levels of stress during a typical college semester .

Consequently, there is a need to find innovative and cost-effective strategies to help identify those students experiencing high levels of stress and negative emotions early on so that they can receive the appropriate treatment in order to prevent future mental illnesses.Social media use, such as Twitter and Facebook, has been rapidly growing, and research has already shown that data from these technologies can be used for novel approaches to public health surveillance . Twitter usage among young adults has increased 16% from 2012 to 2014. Currently, 32% of adults of the ages 18-29 years use Twitter, and the usage is expected to increase steadily in the future.People often have the need to share their emotions and experiences . Researchers have theorized that emotional sharing may fulfill a socio-affective need by eliciting attention, affection, and social support. Consequently, this may help individuals cope with their emotions and provide an immediate relief . Users often share their thoughts, feelings, and opinions on these social media platforms, and as a result, social media data may be used to provide real-time monitoring of stress and emotional state among college students . Previous studies have shown that Twitter data can be used to monitor a wide range of health outcomes, such as detecting human immunodeficiency virus infection outbreaks and predicting an individual's risk of depression . For example, De Choudhury et al conducted one of the first studies that used an individual's tweets to predict the risk of depression . The authors found that certain features extracted from a person's tweets collected over a 1-year period were highly associated with the risk of depression in adults, such as raised negative sentiment in the tweets, frequent mentions of antidepressant medication, and greater expression of religious involvement. Currently, no studies have examined whether Twitter data can be used to monitor stress level and emotional state among college students. Studying this topic is important because the large amount of social media data from college students' frequent use of social media can be used to help university officials and researchers monitor and reduce stress among college students.

2. Literature survey

Huijie Lin, Jia Jia, Quan Guo, Yuanyuan Xue, Qi Li, Jie Huang, Lianhong Cai, Ling Feng et al. [1] the study of "User-Level Psychological Stress Detection From Social Media Using Deep Neural Network" .The paper employs real online microblog data to investigate the correlations between users' stress and their tweeting content. It also defines two types of stress related attributes: - Low-level content attributes from a single tweet, including text, images and social interactions; and Userscope statistical attributes through their weekly micro-blog postings, mapping information of tweeting time, tweeting types and linguistic styles.

Li-fang Zhang et al. [7] proposed the study on titled-Occupational stress and teaching approaches among Chinese academics (2009). Researcher suggested that, controlling the self-rating abilities of the participants, the favorable conceptual changes in teaching approach and their role insufficiency predicated that the conceptual change in teaching strategy is negative.

Another approach for stress analysis is Kavitha et al. [4] in her research titled -Role of stress among women employees forming majority workforce at IT sector in Chennai and Coimbatore (2012), she has focuses on the organizational role stress for the employees in the IT sector. She found in her research that, women face more stress than men in the organization and she viewed to be more specific married women faces more stress than the unmarried women.

Another approach is Amir Shani and Abraham Pizam(2009) et al. [6] -Work-Related Depression among Hotel Employees have conducted a study on the depression of work among hotel employees in Central Florida. They have found that, incidence of depression among workers in the hospitality industry by evaluating the relationship between the occupational stress and work characteristics.

Another approach is Kayoko Urakawa and Kazuhito Yokoyam et al. [] in their work on Sense of Coherence (SOC) may Reduce the Effects of Occupational Stress on Mental Health Status among Japanese Factory Workers (2009) has found the result i.e. adverse effects on mental health due to the job demand and job stress was positively associated with SOC, the mental health status of males in managerial work was adversely negative, where as it was positive among the female co-workers. Finally they found that, SOC is an important factor determining the coping ability over the job stress for both the genders.

3. PROPOSED WORK

In this proposed work, we build a practical application to detect and release user's psychological stress by leveraging user's social media data in online social networks, and provide an interactive user interface to present users and friends psychological stress states. With the given users online social media data as input, our proposed system intelligently and automatically detects users stress states. Moreover, it will recommend users with different links to help release their stress. The main technology of this project is a clustering model, which can leverage social media content and social interaction information for stress detection.

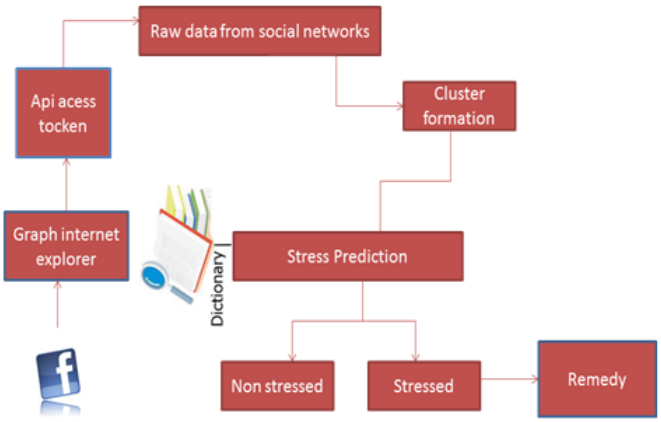


Fig. 1 System Architecture

Fig. 1 shows the architecture of our model. In System Architecture, we would first get the api access token from Graph internet Explorer in facebook development page and then we will have the access right to collect the user information from facebook.Store the user data in to the database.After storing the data the information going to the clustering part, in this clustering process we would have to use the k-mean algorithm. k-mean algorithm involves randomly selecting k initial centroids where k is a user defined number of desired clusters. After completing the clustering part the information going to the stress prediction, using dictionary the system will give the stress levels to the individual users.The system will also provide a remedy to the user based on the user stress levels.

3.1 PROBLEM FORMULATION

To formulate our problem, we declare some notations in advance. In particular, we use bold capital letters (e.g., X) and bold lowercase letters (e.g., x) to denote matrices and vectors, respectively. We employ non-bold letters (e.g., x) to represent scalars, and Greek letters (e.g.,) as parameters. If not clarified, all vectors are in column form. Suppose that we have K stressor events and M stressor subjects. Let us denote ei 2 RK as the event label vector, and si 2 RM as the subject label vector, for the i-th tweet. Given a set of tweets T = {t1, t2, ⋯ , tN }, it consists of N distinct training samples. Let xi 2 RD be the feature vector of the i-th tweet. Each training sample ti = (xi, ei, si) consists of a feature vector denoted by xi, with the corresponding stressor event label ei and the stressor subject label si. Let X = [x1, x2, ⋯ , xN] T 2 RN⇥D be the feature matrix, E = [e1, e2, ⋯ , eN] T 2 RN⇥K be the

stressor event label matrix, and S = [s1, s2, ⋯ , sN] T 2 RN⇥M be the stressor subject label matrix, respectively.

Generate decision tree

1. Check if algorithm satisfies termination criteria

2. Computer information-theoretic criteria for all attributes

3. Choose best attribute according to the information-theoretic criteria

4. Create a decision node based on the best attribute in step 3

5. Induce (i.e. split) the dataset based on newly created decision node in step 4

6. For all sub-dataset in step 5, call C4.5 algorithm to get a sub-tree (recursive call)

7. Attach the tree obtained in step 6 to the decision node in step 4

8. Return tree

Input: an attribute valued dataset D

Tree={}

If D is "Pure" OR other stopping criteria met then

Terminate

End if

For all attribute a ∈ D do

Compute information thereotic criteria if we split on a

End for

abest = Best attriubuteaccording to above computed criteria

Tree= Create a decision node that tests abest in the root

Dv= Induced sub-Datasets from D based on abest

For all Dv do

Treev=C4.5(Dv)

Attach Treev to the corresponding branch of Tree

End for

Return Tree

3.2. METHODOLOGY

1.Registration: The user who are all wants to know their stress levels they first have to register in to the stress analysis system.In the registration phase the user will have to fill the details consisting in the registration phase. After registration the user can access the stress analysis application.

2.Data collection: Collection of user data from the facebook.It is not directly access the user posts on their facebook page.In order to obtain the user data from facebook,we have to get the access token from facebook developer page.The API act as an intermediate system that will help us to collect the user information from the facebook page.All the information posted are stored in the analysis database.

3.Clustering: The posts from different users are vr2collected together and separated by clustering techniques.The cluster comprises of sentiment based separation and classification k-mean algorithm have to used in this module.

4.Stress level prediction: Finding stress level of the user in different states. Recommending users with different links for psychological counseling centers, soft music or articles to help release their stress according to users' stress levels**.**

4. EXPERIMENTAL RESULTS

A set of experiments carried out on stress analysis data obtained from facebook on the social media users. The performance evaluation of the system is performing using this dataset. The screenshots of various phases of stress analysis system are as follows:

Fig-2 represents the login page of stress analysis system.

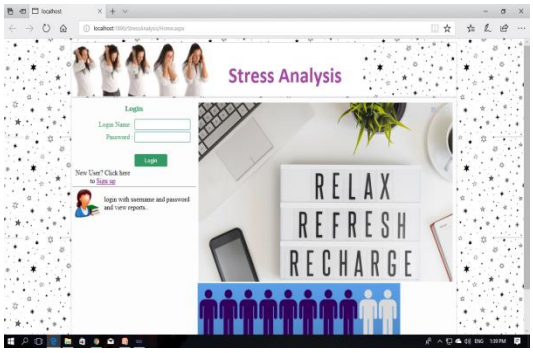


Fig- 3represents the registration process carried out in stress analysis system. At the time of registration process, users information will be stored on the database.

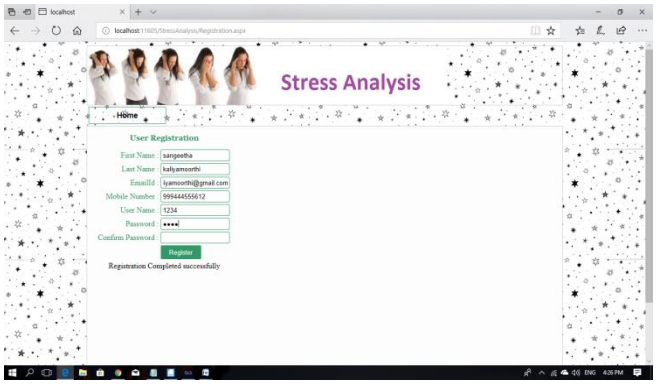


Fig-4 represents the stress analysis results of the users

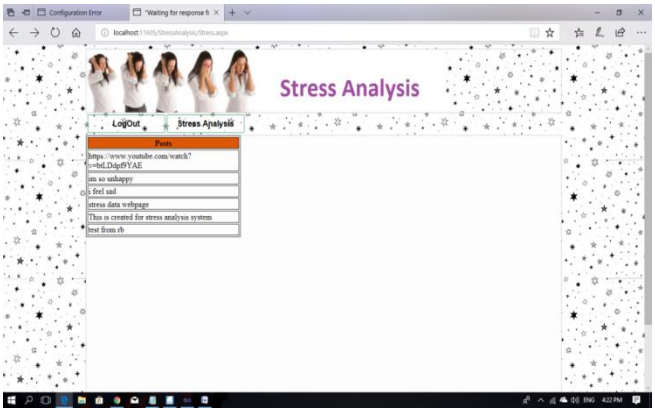


Fig-5 represents the user stress level according to their posts

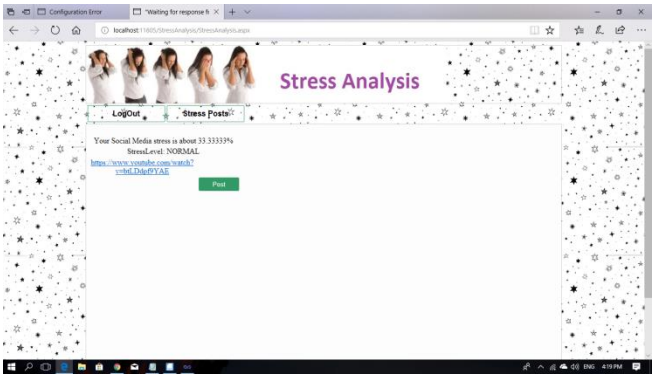
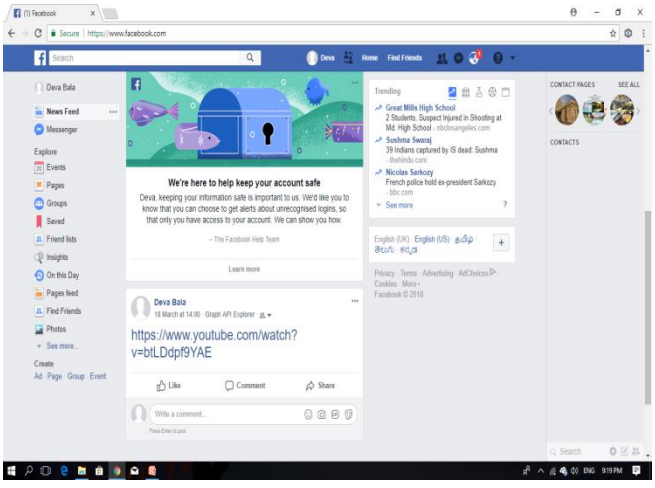


Fig-6 represents the remedy for the user stress levels,the remedy consists of soft music or comedy videos.



5. CONCLUSION

We made use of k-mean clustering techniques in order to cluster the user data and provide an accuracy for the user stress levels.that are gathered and provided by graph internet explorer.In this system, we displayed a system for distinguishing users psychological stress states from clients.

6. FUTURE ENHANCEMENT

We can make use of image for their detection of stress as it is posted by a user.Using these images we have to calculate the user Stress level.

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