

E-Stress Detector

S. Amrita^{1*}, Jobin Joseph², Rona Shaji³, Athul Prasad⁴, Rahul Gopal⁵

^{1,2,3,4,5}Dept. of Computer Science and Engineering, St Thomas College of Engineering and Technology, APJ Abdul Kalam Technological University, Kerala, India

*Corresponding Author: lachuumrita@gmail.com

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Abstract— Psychological wellness influence a noteworthy level of the world’s population every year. Stress is humans' response to various types of desires or threats. This response, when working properly, can help us to stay focused, energized and intellectually active, but if it is out of proportion, it can certainly be harmful leading to depression, anxiety, hypertension and a host of threatening disorders. 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. Cyberspace is a huge area for people to post anything and everything that they experience in their day-to-day lives. It can be used as a very effective tool in determining the stress levels of an individual based on the posts and updates shared by him/her. This is a proposal for a website which takes the username of the subject as an input, scans and analyses the subject's profile by performing sentiment analysis and gives out results. These results suggest the overall stress levels of the person and give an overview of his/her mental and emotional state.

Keywords— Psychological Stress Detection;CNN;NLTK;RELU;TFIDF

I. INTRODUCTION

With the rapid pace of life, more and more people are feeling stressed. More and more teenagers today are overloaded with adolescent stress from different aspects: academic future, inter-personal, and affection. Long-lasting stress may lead to many health problems such as anxiety, withdrawal, aggression, or poor coping skills such as drug and alcohol use. Hence, it is important for both teenagers and their guardians to be aware of the stress in advance and manage the stress before it becomes severe. Traditional psychological stress detection was mainly based on face-to-face interviews and self-report questionnaires. However, traditional methods are very reactive, labour-consuming and time-costing. To overcome the drawbacks of the existing system a fast stress analysis method is proposed here. Sentiment analysis is used to define automatic tools which are able to extract information from texts in natural languages in order to create structured system. In our proposed system we will be using CNN for the prediction of stress in a person.

The contributions of this work are as following:

- An intelligent integrated trained model for efficient stress detection.
- A unified hybrid model integrating CNN with three datasets for stress detection.
- NLTK is used for pre-processing the input text data
- The work carries out in-depth studies on a real-world large scale dataset and gain insights on correlations between social interactions and stress.

- The main objective is to study framework for detecting users psychological stress states from user’s social interactions.

Some considerations are given as follows;

- To study convolutional neural network for topic extraction.
- To propose NLTK for natural language pre-processing.
- Website creation for user and admin operations.

II. RELATED WORK

Huijie Lin and his co-worker’s in [1] proposed a schema for stress detection. With the popularity of social platforms, people are used to share their day to day activities on social media platforms, making it feasible to depend upon online social network data for stress detection. In this paper they first defined a set of stress-related textual, visual, and social attributes from various aspects, and then proposed a novel hybrid model with the help of CNN to leverage tweet contents and social interaction information for stress detection. As these social media data timely reflects users’ real-life activities and emotions, it offers new opportunities for representing, measuring, modelling, and mining users behaviour patterns through the large-scale social networks. They defined a set of attributes for stress detection from tweet-level and user-level aspects respectively. They evaluated the proposed model as well as the contributions of different attributes on a real-world dataset from Sina Weibo. They found that the number of social structure connections of stressed users is

around 14% and more higher than that of non-stressed users.

III. METHODOLOGY

A. PROPOSED SYSTEM

Working of the proposed system can be explained as below:

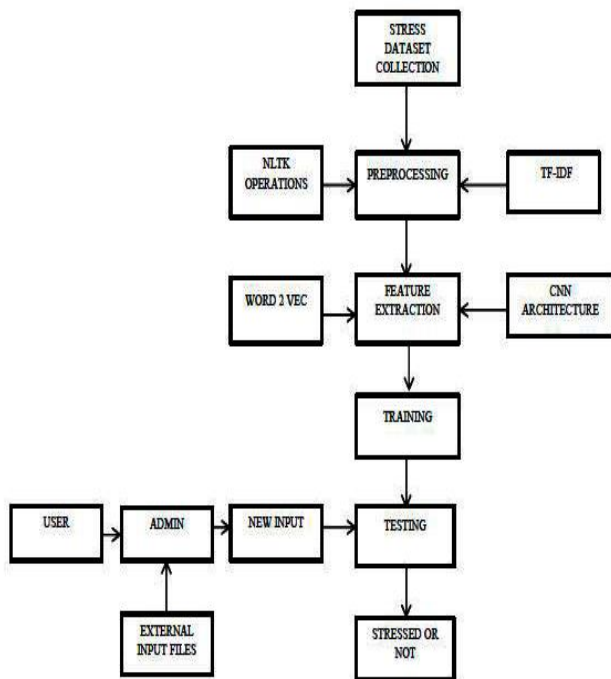


Fig 1: Functional block diagram of the proposed system.

In the given block diagram initially the sample data set is given into the system for system training process. At first the data is preprocessed using NLTK operation. Thus, the textual data undergoes tokenization, stemming and several similar operations. Output of the preprocessing stage is given for feature extraction. TensorFlow package with tools like word 2 vec and TF- IDF is used for this stage. Thus, formed machine language data is trained by using CNN architecture. This creates a CNN based data model with several interconnected nodes. Each node thus created are connected using activation function named ReLU. This model can easily be used for probabilistic comparisons. The system thus efficiently trained can accept test data inputs. The users post on web saved in admin database are analyzed by the admin through the process of giving such data as input data for the trained system. The given input can be compared with the system and the probability is predicted by comparing input data with the nodes in CNN. The maximum probability is predicted as output. By these processes the proposed system effectively predicts whether the given input data from social posts shows is positive or negative as well as the emotional condition of the user.

B. SYSTEM ARCHITECTURE

The given is the conceptual architectural diagram of stress detection. There are two users in the system called as user and admin. Admin can view all the users and their posts.

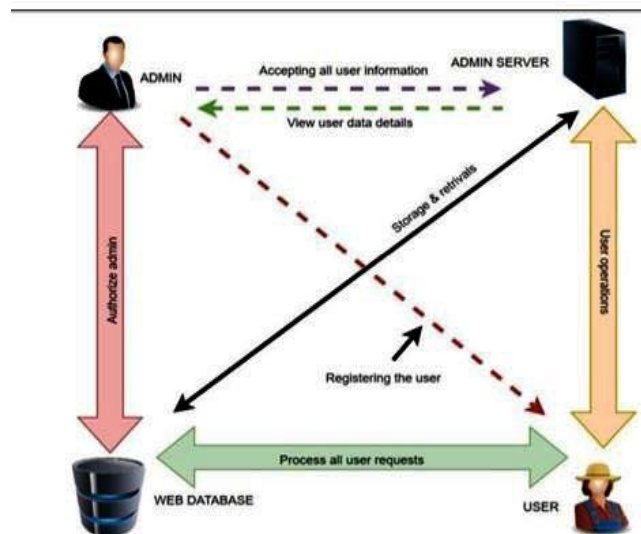


Fig 2: System Architecture

Admin can evaluate each user and predict his/her stress and emotion. The Admin can also block and unblock these users. Admin can also evaluate stress of manually collected users stress through uploading it through text files. User can register and login into the system. User can view other users post along with their own post. Each user can add their own post into the webpage. User and the admin have customized homepage. The web database stores the information in the designed system. It is accessed by both user and the admin for various operations. Here the user is interacting with website through user interface which is ergonomic. The user and admin can login to the system from same web start page. If the user is not authorized, then he/she can login into the website. If the user is not genuine the admin can easily find and can block. The blocked user can be unblocked according to the need of the admin. The user should register in the first-time use. The user can update the profile according to the need.

C. SYSTEM REQUIREMENTS

a) HARDWARE REQUIREMENTS

- Processor - Intel i3 (min)
- RAM - 4 GB (min)
- Hard Disk - 120 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor – SVGA

b) SOFTWARE REQUIREMENTS

- Operating System - Windows / Ubuntu
- Coding Language - Python
- Tool - Python IDLE, Jupyter

IV. RESULTS AND DISCUSSION

For a fully investigation of the proposed methods, the proposed system considers the following aspects:

- **Effectiveness:** The studies evaluate the detection performance of the trained model and comparison methods in terms of Accuracy, Recall, Precision and F1-Measure.
- **Efficiency:** The studies evaluate efficiency of the methods by comparing the CPU time of training each model. All experiments are performed on an x64 machine with 2.9 GHz Intel Core i7 CPU and 8 GB RAM.

The actual result shows the stress level of a user. The stress detection is based on several factors. According to the performance analysis, the stress detection accuracy rate is increased as compared to the existing systems. The accuracy of stress detection is based on users post on social media. Here the proposed system is developed with the help of a CNN model. The proposed system displays whether the user is stressed or not stressed.

There are three categories in the output of the proposed system. The category is given below,

- **User's post:** The users post shows the post that given by a user or a group of users. Post contain the textual comments.
- **Stressed:** This category shows whether the post is negative or positive. Negative or positive shows that user is stressed or not stressed respectively.
- **Emotion:** The present emotional situation of a user is displayed in the emotion category. For example; joy, sad, shame etc.

A trained dataset is developed as the result of training and testing. The modelling of trained model is done through a convolutional neural network (CNN).

The final outputs as seen by the admin can be shown as below. The admin can get the full overview of users, their posts, stress level and emotions based on the tweet content that the user post on the users homepage.

ID	LNAME	EMAIL	CONTACT	DOB	GENDER	ORGANIZATION	PLACE	PROFILE PIC	DEL
1	jobin	asdasdasds@gmail.com	9947469747	2020-09-04	male	none	none		Del
2	jobin	jobinjoseph1018@gmail.com	9947469747	1997-09-04	male	None	None		Del
3	athul	prasadathul51@gmail.com	8921438776	1996-09-03	male	none	None		Del
4	Amrita	amrita123@gmail.com	8921438776	1997-08-04	female	None	None		Del
5	Rona	rona123@gmail.com	8921438776	1997-11-01	female	None	None		Del

Fig 3: Admin Viewing Users Information

12	he betrayed me	medium	fear	2020-06-16 22:20:28	prasadathul51@gmail.com
13	Ever put your fist through your laptops screen? ft...	low	anger	2020-06-16 22:11:50	jobinjoseph1018@gmail.com
14	I can literally eat creamy pesto pasta topped with...	low	anger	2020-06-16 22:18:11	amrita123@gmail.com
15	I feeling blessed with this wonderful place	medium	joy	2020-06-16 22:29:25	prasadathul51@gmail.com
16	I hate having ideas but being too afraid to share...	high	fear	2020-06-16 22:32:00	rona123@gmail.com
17	Feels grim not having your nails done	medium	sadness	2020-06-16 22:34:03	rona123@gmail.com

Fig 4: Output showing stress level and emotion of user.

V. CONCLUSION AND FUTURE SCOPE

This is a website framework for detecting users' psychological stress levels from users' social media data activities, processing posts tweet contents as well as users' social interactions. To fully leverage both content and social interaction information of users' posts, we proposed a hybrid system with a convolutional neural network (CNN). The users' stress states are revealed by the structure of their social interactions, including structural diversity and social influence. Here we used Python language for the processing of tweets in order to detect the stress. There are two modules that are used: The User and The Admin. The user register or login the login page and then the data are stored the database. Trained models are used instead of training the system. There are three types of trained models that we have used. They are emotional trained models, sentimental trained model and textual trained model. These insights quantitatively prove the necessity and effectiveness of combining social interactions for stress detection.

A. ADVANTAGES AND LIMITATIONS

a) ADVANTAGES

- By exploiting the users' social interaction across the website, the proposed system can improve the detection performance by 6-9% over that of the state-of-art methods.
- The proposed system can efficiently combine tweet content and social interaction to enhance the stress detection performance.
- It has stronger dataset and are more efficient.
- The proposed system is available and can be easily used by everyone.
- It has high performance than the existing system and more flexible.

b) LIMITATIONS

- The performance of the proposed system depends on the accuracy of the users posts.
- The proposed system gives only a single emotion level detection when a tweet is processed.
- The proposed system cannot work efficiently if the hardware and software requirements are not met correctly.

- Proper network should be available for uninterrupted service.

B. FUTURE APPLICATIONS

The proposed system is helpful in:

- Medical field: This system is useful to predict that the person is stressed or not stressed via checking their social status and also recommend the hospitals on map which is located to the nearest distance from the current location of user.
- Multinational companies: This system can be used for finding that the workers in the company is stressed or not. The profit of the company depends on the workers, so identifying their psychological level is more important.
- Military: This system is helpful for detecting terrorist intervention and can also detect the background of terrorists by analysing the emotions and amount of stress they have.
- Personal upliftments: The user who is using the system can check their stress and emotional status and can do necessary actions which can help them to stay emotionally stable.

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Authors Profile

Ms S Amrita a dedicated and compassionate professional who is currently pursuing her Bachelor's degree in Computer Science and Engineering at St Thomas College of Engineering and Technology, Kerala, India under APJ Abdul Kalam Technological University. She possess strong interpersonal skills, demonstrating the utmost discretion and integrity when dealing with confidential information. Her main research work focuses on networking and cybersecurity. After graduation she plans to research more on these areas.



Mr Jobin Joseph is currently pursuing his Bachelor's degree in Computer Science and Engineering at St Thomas College of Engineering and Technology, Kerala, India under APJ Abdul Kalam Technological University. He is having interests in web development and is currently researching in this area. He is excellent in working with others to achieve a certain objective on time and with excellence.



Mr Athul Prasad is currently pursuing his Bachelor's degree in Computer Science and Engineering at St Thomas College of Engineering and Technology, Kerala, India under APJ Abdul Kalam Technological University. He is an ambitious person who has



developed a mature and responsible approach to undertake any tasks. He is having interests in game making and controlling and also is good at website and poster designing.

Ms Rona Shaji grew up in Bahrain and graduated from the Asian School Bahrain. Currently she is pursuing her Bachelor's degree in Computer Science and Engineering at St Thomas College of Engineering and Technology, Kerala, India under APJ Abdul Kalam Technological University. After graduation she plans to venture into the field of IT before going abroad for her masters.



Mr Rahul Gopal pursued Bachelor of Technology from University of Kerala, Thiruvananthapuram and Master of Technology from Mahatma Gandhi University Kottayam. He is currently working as Assistant Professor in Department of Computer science and Engineering, St Thomas College of Engineering and Technology, Kerala, India. He is a member of Computer Society of India(CSI). He has published about six papers in reputed international journals and Conferences. He has 7 years of teaching experience. His interested areas are Computer Networks, Algorithm Analysis and Design, Fuzzy Systems and Computer Architecture.

