Stress Detection Using Machine Learning

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Abstract- ***A In today's word one of the major leading factors to health problem is STRESS. The basic parameters on which stress can be identified are heart rate, galvanic skin response, body temperature, blood pressure, which provides detailed information of the state of mind of a person. These parameters varying from person to person on the basis of certain things such as their body condition, age and gender. The main goal of the system is to analyze the mental stress through physiological data using electrocardiograph in different positions and moods. Different pre-processing techniques can be used for stress detection. In feature extraction discrete wavelet transform can apply. Many classifiers like artificial neural network, support vector machine, Bayesian network, and decision tree are using to get more accurate results based on accuracy. Physiological sensors analytics is becoming more and more important as the availability of sensor-enabled portable, wearable, and implantable devices becomes ubiquitous in the growing Internet of Things (IoT). Physiological multi-sensor studies have been conducted successfully to detect stress.***

Indexed Terms- ***Stress Detect Parameters, Chest Pain, Rest ECG, Prevention.***

I. INTRODUCTION

Stress detection is an on-going most recent topic for researcher. Different advancements are produced on human anxiety identification utilizing wearable sensors and bio-flag preparing. Stress is an essential reaction of human body under crisis condition, which empowers individuals to conquer a few difficulties or escape from a few risks to survive. Various physiological parameters changes including heart rate, skin conductance, breathing rate, understudy expansion, muscle compression and so on. These parameters are defer from person on the basis of their body condition, age, gender and experience subsequent to managing stress calculates, the body come back to its run of the typical state. This Paper presents an experimental methodology to collect and analyze physiological data to detect the stress status of the user. The methodology has been applied in a test for the Trans safe European research project which has the aim to detect stress levels, through the monitoring and interpretation of physiological signals. EDA and HRV were the physiological signals measured during the tests since they are two of the most important indicators of stress and they can be revealed through portable and non-invasive devices. Thus, the stress detection activity carried out in this experimentation has been performed through a combination of two wearable sensors, Shimmer GSR Sensor and Zephyr BioHarness. A new experimental protocol for the collection of physiological data in different conditions has been defined.

II. LITERATURE SURVE

There are numerous works has been done related to diseases prediction system using different machine learning algorithm and data mining Techniques in medical Centres.

SR.NO	Paper Name	Author Name	ML Algorithm	Year
1	Detection and analysis of stress using machine learning technique	Reshma Radheshamjee Baheti, Supriya Kinariwala	SVM	2019

2	Effective stress detection using Physiological parameters	Monika Chauhan, Shivani V. Vora, Dipak Dabhi	SVM , ANN	2017
3	Stress Detection Using Wearable Physiological And Sociometric Sensors	Virginia Sandulescu, Sally Andrews, David Ellis, Nicola Bellotto, Radu Dobrescu	SVM,KNN	2005
4	Mental Stress Detection in University Students using Machine Learning	Ravinder Ahuja, Alisha Banga	Random Forest	2019
5	A Machine Learning Approach for Stress Detection using a Wireless Physical Activity Tracker	B. Padmaja, V. V. Rama Prasad and K. V. N. Sunitha	Hypothesis Building	2018
6	Stress Detection through Speech Analysis using Machine Learning	Dr. S. Vaikole, S. Mulajkar, A. More, P. Jayaswal, S. Dhas	CNN	2020

7	Detection of Stress Using Image Processing and Machine Learning Techniques	Nisha Raichur , Nidhi Lonakadi, Priyanka Mural	CNN, SVM	2017
8	Human Stress Detection Based On Social Interactions	S.Venkateswaran1,K.Sangeetha2,S.Abinaya3,B.Divyalakshmi4	CNN,KNN	2018
9	Continuous Stress Detection Using a Wrist Device	Martin Gjoreski, Hristijan Gjoreski, Mitja Luštrek	SVM	2016
10	Detecting Stress Based on Social Interactions in Social Networks	Huijie Lin, Jia Jia, Jiezhon Qiu, Yongfeng Zhang, Lexing Xie, Jie Tang, Ling Feng, and Tat-Seng Chua	CNN	2014

- System Implementation-:

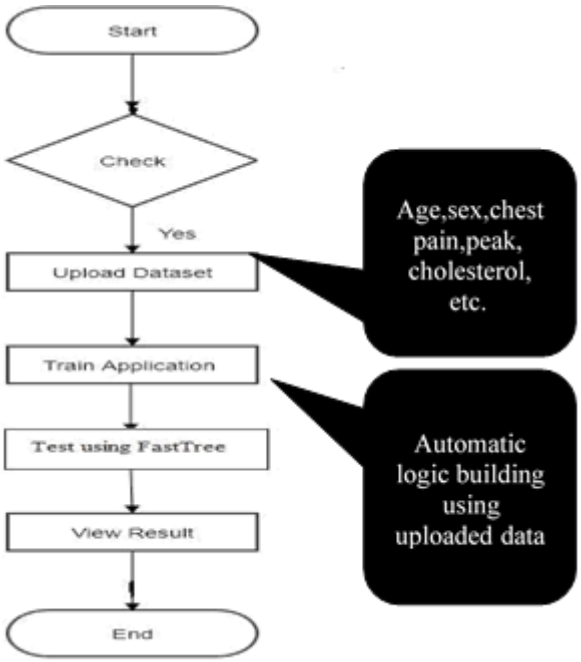
Heart diseases prediction is a web-based machine learning, trained by a UCI dataset.

The user inputs its specific medical details to get the prediction of heart disease for that user.The algorithm will calculate the probability of presence of heart disease.

The result will be displayed on the webpage itself. Thus, minimizing the cost and time required to predict the disease. Format of data plays crucial part in this application at the time of uploading the user data.

Application will check its proper file formatand if it not as per need then ERROR dialog box will be prompted.

- System Design



- Algorithm Details:

FastTree is an efficient implementation of the Mart gradient boosting algorithm. Gradient boosting is a machine learningtechnique for regression problems. It buildseach regression tree in a step-wise fashion,using a predefined loss function to measurethe error for each step and corrects for it inthe next. So this prediction model is actually an ensemble of weaker prediction models. In regression problems, boosting builds a series of such trees in a step-wise fashion and then selects the optimal tree using an arbitrary differentiable loss function.

MART learns an ensemble of regression trees, which is a decision tree with scalar values in its leaves. A decision (or regression) tree is a binary tree-like flow chart, where at each interior node one decideswhich of the two child nodes to continue to based on one of the feature values from the input. At each leaf node, a value is returned.In the interior nodes, the decision is based onthe test x < = v where x is the value of the feature in the input sample and v is one of thepossible values of this feature. The functions that can be produced by a regression tree areall the piece-wise constant functions.

The ensemble of trees is produced by computing, in each step, a regression tree that approximates the gradient of the loss function, and adding it to the previous tree with coefficients that minimize the loss of thenew tree. The output of the ensembleproduced by MART on a given instance is the sum of the tree outputs.

- In case of a binary classification problem, the output is converted to a probability by using some form of calibrati

In case of a regression problem, the output is the predicted value of thefunction.

- In case of a ranking problem, the instances are ordered by the output value of the ensemble.

III. RESULTS

The system goes through various stages in order to get the required result. The datawhich is provided by the user is considered for testing which exactly matches with the data contained in the training dataset.

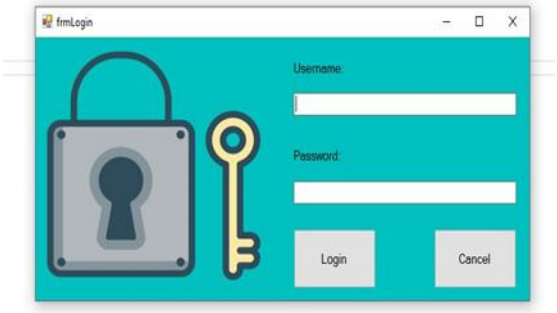
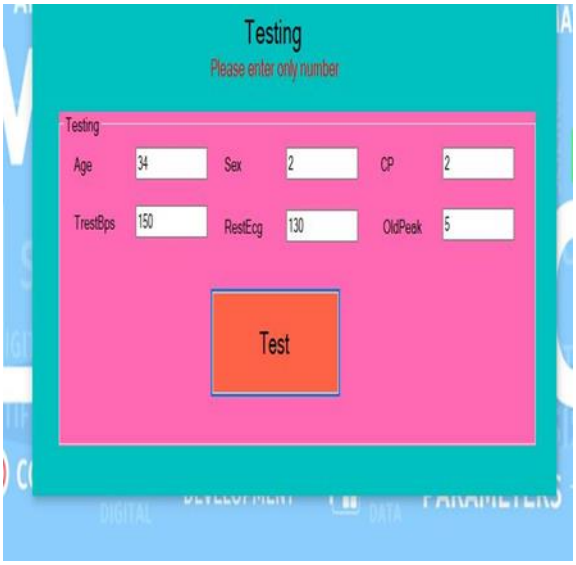


Fig 1. User Input Panel

(figure refers to Test and Train dataset)



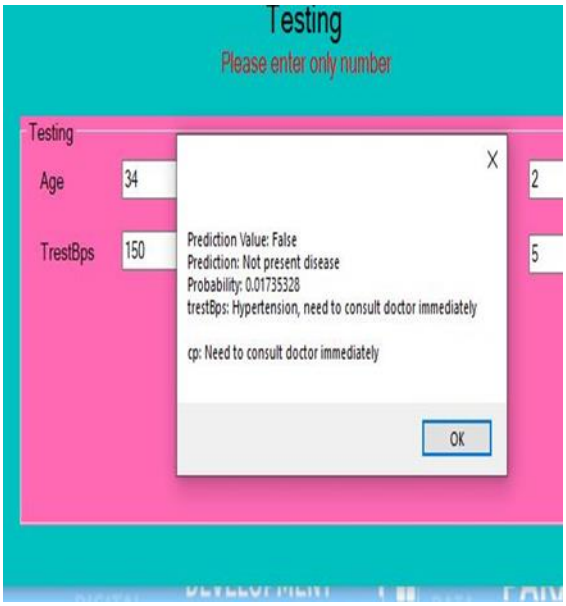


Fig 2. The output

(Figure and refer it in the paragrah thatprecedes the figure)

CONCULSION

The proposed scheme will be developed to ensure the more image security during transmission by facilitating the quick image transfers. These applications usually do not have strong security mechanisms to protect the user data. The proposed algorithm will be designed to fill that certain gap of stronger security mechanism for image sharing based social media applications. Psychological stress is injuring to health. In existing system stress is identified in face-to-face interview, communication or any other activities. where two or more people are analyzed by another. In this proposed a system framework for detecting users psychological stress states by using users "weekly social media data, leveraging tweets" content as well as users social interactions This implemented system will be helpful to detect Stress by using their daily conversations on social media data, to the user and categories the user as stressed or relaxed.

In future work, smiley, like and dislike symbols can be considered for categorization of collected data, as it has major contribution to expresses feelings.

REFERENCES

[1] Dr Des Mc Lernon, Dr L Mhamdi: "Analysis and Processing physiological data from a watch-like device to detect stress pattern", The University of Leeds, August2015.

[2] Feng-Tso Sun, Cynthia Kuo, Heng-Tze Cheng, Senaka Buthpitiya, Patricia Collins: "Activity Aware Mental Stress Detection Using Physiological Sensors", Institute for Computer Sciences, Social Informatics and Telecommunications Engineering2012.

[3] Andre J. and Funk P, "A Case Based Approach Using Behavioural Biomet- rics to Determine a User's Stress Level", in Workshop proceedings of the 6th ….

[4] International Conference on Case Based Reasoning, Chicago, editor(s): Isabelle Bichindaritz, Cindy Marling, pages 9. (2005).

[5] D. F. Dinges, S. Venkataraman, E. L. McGlinchey, and D. N. Metaxas, "Monitoring of facial stress during space flight: Optical computer recognition combining discriminative and generative methods", in Acta Astronaut., vol. 60, no. 47, pp. 341350, Feb. Apr. 2007,2005.

[6] F. Andrasik, "Stress monitoring using a distributed wireless intelligent sensor system", IEEE Eng. Med. Biol. Mag., vol. 22, no. 3, pp. 4955, May/Jun.2003.

[7] Jennifer A. Healey and Rosalind W. Picard, "Detecting Stress During Real World Driving Tasks Using Physiological Sensors", in IEEE Transactions on Intelligent Transportation systems, vol. 6, no.