Stress Detection Using ML

Literature Survey:

Prepare below table after reading and analysing IEEE Papers:

S.No	Title of Paper	Name of Authors	Published Year	Remarks
1	Automatic Stress Detection Using Wearable Sensors and Machine Learning: A Review	Shruti Gedam Sanchita Paul	2020	There are a diversity of machine learning algorithms which are appropriate for stress detection. Among them Support Vector Machines (SVM), Logistic regression, K-Nearest Neighbour, Decision tree and Random forest are most common. Stress Detection using Wearable Sensors and IOT Devices like smart band, Chest belts. An Amulet wearable platform named Stress Aware was developed in using SVM. Stress detection using Electrocardiogram(ECG):SVM, minimum Redundancy Maximum Relevance (mRMR) selection algorithm used. Stress detection using Electroencephalography(EEG):Neuro Sky Mind wave Mobile used K-NN algorithm. Stress detection using wearable Photoplethysmography (PPG) device: Sequential Forward Floating Selection (SFFS) algorithm ,Quadratic discriminant analysis (QDA) and Support Vector Machine (SVM) classifiers were used. Stress Detection Using Microblogs: cross-model auto-encoder. Stress Detection Using Videos: random forest, LDA, Gaussian Naïve Bayes and decision tree. Stress detection in working environment: A wearable device named Kinect 3D sensor was used to get ECG and GSR data. Support vector machine and K-Nearest Neighbour classifiers used. Stress detection in Academics: C4.5 tree algorithm, Naïve Bayes, SVM, Logistic Regression and random forest algorithm. Stress detection while driving: Support Vector Machine and Artificial Neural Network, Gaussian kernel function. Stress detection in firefighters: Trier Social Stress Test, Support vector machine, Heart Beat Morphology (HBM) for feature selection with traditional Window-derived Heart Rate

				Variability (W-HRV) method generally used for stress detection. Linear Support Vector Machine (SVM), Kernel Support Vector Machine (K-SVM), K-NN and random forest classifiers were compared to evaluate effectiveness of HRM features and W-HRV features. C5 decision tree. Conclusion: All the developed system first extracted the features using various algorithms and they applied machine learning algorithms to build classification model. Support vector machine, Random forest and K-Nearest Neighbour are the most effective classification algorithms.
2	A Decision Tree Optimised SVM Model for Stress Detection using Biosignals	Alana Paul Cruz, Aravind Pradeep, Kavali Riya Sivasankar and Krishnaveni K.S	2020	Proposed model uses Optimised Support Vector Machines (SVM) using decision trees. Machine Learning techniques. Electrocardiogram (ECG) was taken as the bio signal to detect stress. Supervised machine learning method i.e. SVM was used for building the model. Physionet's "drivedb" database was used for the purpose. The model was first trained with SVM models like Linear, Quadratic, Cubic with default kernel function. Accuracy was measured using confusion matrix in MATLAB to find the best SVM model. The evaluation metric used in this study is Accuracy which is calculated using the help of Confusion Matrix. the model was trained using Cubic SVM with Gaussian Kernel. For a better model, Tree Optimised SVM which is a combination of Decision Tree and SVM algorithms.
3	Stress Detection with Machine Learning and Deep Learning using Multimodal Physiological Data	Pramod Bobade, Vani M.	2020	Various machine learning and deep learning techniques are used for such stress detection and identifying a person as stressed or unstressed. For achieving this objective, sequence of steps are carried out such as understanding the structure and format of the publicly available WESAD dataset, cleaning and transforming data to a set eligible to construct machine learning and deep learning classification methods, exploring and constructing various classification models and comparing them. K-Nearest Neighbour (KNN), Linear Discriminant Analysis (LDA), Random Forest (RF), Decision Tree (DT), AdaBoost (AB). Linear Bayes Normal Classifier, Quadratic Bayes Normal Classifier, K-Nearest Neighbours Classifier, Fisher's Least Square Linear Classifier, Support vector machine.

				Random Forest were employed for stress classification, which in turn achieved 83% accuracy on a binary class. Two types of classifications are used-three class and binary classification. three-class classification problem both by all machine learning and deep learning algorithm, Principal Component Analysis (PCA), Quantile Transformer method, , Standard Scalar pre-processing. In binary classification architecture, output has a single node with sigmoid as the activation function. leave-one-subject-out (LOSO) cross-validation procedure was used for evaluation of all the models, and the final accuracy.
4	Stress detection using deep neural networks	Zhandong Liu and Russell Li	2020	Deep neural networks: a 1-dimensional (1D) convolutional neural network and a multilayer perceptron neural network. The first task was binary classification for stress detection, in which the networks differentiated between stressed and non-stressed states. The second task was 3-class classification for emotion classification, in which the networks differentiated between baseline, stressed, and amused states. The machine learning algorithms utilized include the decision tree, support vector machine, K-nearest neighbour, random forest, linear discriminant analysis (LDA). All traditional machine learning approaches is the requirement for using hand-crafted features, the physiological signals were formatted into vectors and directly fed into the neural networks. The points of comparison between the deep neural networks and the traditional machine learning algorithms were the accuracy and F1 score of each approach. The results indicate that the two deep neural networks performed significantly better for both tasks than the traditional machine learning algorithms. demonstrated the potential of deep neural networks for developing robust, continuous, and non-invasive methods for stress detection and emotion classification, with the end goal of improving the quality of life.
5	Machine Learning and IoT for Prediction and Detection of Stress	Mr.Purnendu Shekhar Pandey	2017	ML is used to predict the condition of the patient and IoT is used to communicate the patience about his/her acute stress condition. Node MCU is used as the development board and micro-python for programming language . The micro-python code runs on an REPL (Read–Eval–Print Loop) interpreter. The created

				prototype uses a person's heart rate variability to determine whether they are under stress. When someone is exercising at the gym, it can also assist in identifying patterns of variations in heart rate. Each device is unique and requires calibration in order to work properly. When the dependent variable is dichotomous, logistic regression is the appropriate fitting relapse analysis to use as a guide (binary). A formal feature of the discriminative classifier Support Vector Machine (SVM) is an isolating hyperplane. For classification, there are two algorithms in use. The accuracy of the feature interval-based classifier VF-15 algorithm, which builds classification intervals during training and uses them to test the classifier, is 62%, while the accuracy of the Bayesian classification algorithm Naive Bayes, which is a Bayesian method, is 50% during testing. We get accuracy of 66% and 68% using Logistic Regression and SVM, respectively, demonstrating an improvement in accuracy after applying SVM.