|  |  |  |  |
| --- | --- | --- | --- |
| **Title:** | Support Vector Machine based Stress Detection System to manage COVID-19 pandemic related stress from ECG signal | | |
| **Author(s) Name:** | Md Fahim Rizwan, Rayed Farhad, and Mohammad Hasan Imam | | |
| **Contact Email(s):** | hasan.imam@aiub.edu | | |
| **Published Journal Name:** | AIUB Journal of Science and Engineering (AJSE) | | |
| **Type of Publication:** | Journal | | |
| **Volume:** | 19 | Issue | 3 |
| **Publisher:** | AIUB Office of Research and Publication | | |
| **Publication Date:** | December 2020 | | |
| **ISSN:** | 1608–3679, 2520–4890 | | |
| **DOI:** | 10.53799/ajse.v20i1.112 | | |
| **URL:** | http://dx.doi.org/10.53799/ajse.v20i1.112 | | |
| **Other Related Info.:** | Page 126-134 | | |
|  | | | |

|  |  |
| --- | --- |
| **Abstract:** |  |
| This study represents a detailed investigation of induced stress detection in humans using Support Vector Machine algorithms. Proper detection of stress can prevent many psychological and physiological problems like the occurrence of major depression disorder (MDD), stress-induced cardiac rhythm abnormalities, or arrhythmia. Stress-induced due to COVID-19 pandemic can make the situation worse for the cardiac patients and cause different abnormalities in the normal people due to lockdown condition. Therefore, an ECG based technique is proposed in this paper where the ECG can be recorded for the available handheld/portable devices which are now common to many countries where people can take ECG by their own in their houses and get preliminary information about their cardiac health. From ECG, we can derive RR interval, QT interval, and EDR (ECG derived Respiration) for developing the model for stress detection also. To validate the proposed model, an open-access database named "drivedb" available at Physionet (physionet.org) was used as the training dataset. After verifying several SVM models by changing the ECG length, features, and SVM Kernel type, the results showed an acceptable level of accuracy for Fine Gaussian SVM (i.e. 98.3% for 1 min ECG and 93.6 % for 5 min long ECG) with Gaussian Kernel while using all available features (RR, QT, and EDR). This finding emphasizes the importance of including ventricular polarization and respiratory information in stress detection and the possibility of stress detection from short length data (i.e. from 1 min ECG data), which will be very useful to detect stress through portable ECG devices in locked down condition to analyze mental health condition without visiting the specialist doctor at hospital. This technique also alarms the cardiac patients from being stressed too much which might cause severe arrhythmogenesis. | |