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Machine Learning Approach for Stress Detection Using Wireless Physical Activity Tracker

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Abstract : Stress is a psychological condition that reduces the quality of sleep and affects every facet of life. Constant exposure to stress is detrimental not only for mind but also body. Nevertheless, to cope with stress, one should first identify it. This paper provides an effective method for the cognitive stress level detection by using data provided from a physical activity tracker device Fitbit. This device gathers people's daily activities of food, weight, sleep, heart rate, and physical activities. In this paper, four major stressors like physical activities, sleep patterns, working hours and change in heart rate are used to assess the stress levels of individuals. The main motive of this system is to use machine learning approach in stress detection with the help of Smartphone sensor technology. Individually, the effect of each stressor is evaluated using logistic regression and then combined model is built and assessed using variants of ordinal logistic regression models like logit, probit and complementary log-log. Then the quality of each model is evaluated using Akaike Information Criterion (AIC) and probit is assessed as the more suitable model for our dataset. This system is experimented and evaluated in a real time environment by taking data from adults working in IT and other sectors in India. The novelty of this work lies in the fact that stress detection system should be less invasive as possible for the users.

Keywords : physical activity tracker, sleep pattern, working hours, heart rate, smartphone sensor
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