Classification of acute stress using linear and non-linear heart rate variability analysis derived from sternal ECG - DTU Orbit (29/03/2019)

Classification of acute stress using linear and non-linear heart rate variability analysis derived from sternal ECG

Chronic stress detection is an important factor in predicting and reducing the risk of cardiovascular disease. This work is a pilot study with a focus on developing a method for detecting short-term psychophysiological changes through heart rate variability (HRV) features. The purpose of this pilot study is to establish and to gain insight on a set of features that could be used to detect psychophysiological changes that occur during chronic stress. This study elicited four different types of arousal by images, sounds, mental tasks and rest, and classified them using linear and non-linear HRV features from electrocardiograms (ECG) acquired by the wireless wearable ePatch® recorder. The highest recognition rates were acquired for the neutral stage (90%), the acute stress stage (80%) and the baseline stage (80%) by sample entropy, detrended fluctuation analysis and normalized high frequency features. Standardizing non-linear HRV features for each subject was found to be an important factor for the improvement of the classification results.

General information
State: Published
Organisations: Department of Electrical Engineering, Biomedical Engineering, Technical University of Denmark, DELTA - a Part of FORCE Technology
Contributors: Tanev, G., Saadi, D. B., Hoppe, K., Sørensen, H. B. D.
Pages: 3386-3389
Publication date: 2014

Host publication information
Title of host publication: 2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society
Publisher: IEEE
Keywords: Bioengineering, Educational institutions, Electrocardiography, Entropy, Heart rate variability, Standards, Stress, Videos
DOIs:
10.1109/EMBC.2014.6944349
Source: FindIt
Source-ID: 272559169
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014