New Device for Assessment of Autonomous Nervous System Functioning in Psychophysiology

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Abstract:
In the paper a new device/or autonomic nervous system patterns assessment with application in psychophysiology is presented. The system is characterized by two physical sensing channels, expressed by skin conductance and ballistography (BCG), and a set of virtual sensing channels based on advanced processing of the physical channels information to obtain heart rate, respiratory signal, sympathetic flow to the heart and sweat glands, parasympathetic outflow to the heart and heart rate variability measurement. A low cost, small size acquisition multifunction input-output board is used to control the conditioning circuits and to acquire the voltage of the sensing channels. Referring to the software, an advanced processing block including digital filters, peak-detector and wavelet decomposition block was designed and implemented using LabVIEW. The system permits quantification of skin conductance variation and heart rate variability for different psychophysiological and pathological state.

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I. Introduction

The disease profile of the world is changing at an astonishingly fast rate, especially in low and middle income countries. Nearly 60% of all deaths are now caused by chronic diseases, leading cause of death being cardiovascular disease (heart disease and stroke are responsible for 30% of all deaths) [1]. Aware of the rising costs and burden of chronic diseases, many countries are taking a comprehensive approach to stop the epidemic. In recent studies, Home TeleCare has been proven to reduce mortality rate and hospitalizations for various groups of chronic patients [2], [3], [4].