

Contact and non-contact heart beat rate measurement techniques: Challenges and issues

ABSTRACT

The heart is the most important organ in the human body as it circulates the blood throughout the body through blood vessels. In the human circulatory system, the heart beats according to the body's physical needs. Therefore, the physical condition of a person can be determined by observing the heartbeat rate (HBR). There are plenty of methods that can be used to measure the HBR. Among the methods, photoplethysmography (PPG), electrocardiogram (ECG) and the oscillometric method are the standard methods utilised in medical institutes for continuous measurement of the HBR of a patient. Out of these three methods, PPG is the only method which has evolved to a non-contact imaging-based method from the conventional contact sensory based method. The incentive for developing the non-contact-based imaging PPG method in measuring the HBR provides the advantage of excluding the direct contact of sensors on specific body parts. This brings huge improvements to remote monitoring of healthcare especially for the purpose of social distancing. Moreover, the rapid progression of technology (particularly the interactive electronic gadgets advancement) also motivates researchers and engineers to create a mobile application using the PPG imaging method, which is feasible in measuring the HBR. Hence, this study seeks to review and present the fundamental concept, the present research and the evolution of the aforementioned methods in measuring the HBR.