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Development of a photoplethysmography signal processing method for oxygen measurement concentration (Conference Paper)

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Abstract

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Pulse oximetry is a well-known procedure used to measure the level of oxygen (oxygen saturation) in the blood. The measurement of oxygen saturation level is of highly significance in supervising a patient's health condition. This is most commonly supervised by a normal pulse oximeter, which has been extensively endorsed around the world as a measurement standard during procedures such as anaesthesia, surgery or post-operative recovery, which is easily available at any medical store. Measuring oxygen level frequently is very important for aged people, pregnant women and in patients in other such critical medical conditions. This paper presents a low cost method to measure the level of oxygen using Photoplethysmography (PPG)-based technique. The method is based on a model using attenuation of light when it passes through human part of body (e.g., Fingertip) having skin, tissue, bone and blood. The PPG signal thus extracted is comprised of both AC and DC components. The key work in this paper is based on separating AC and DC contents within the PPG signal. The DC component of the signal primarily represents the absorption in the intensity of light source, ambient light, sensitivity of the detector, tissue bed, bone, venous blood, capillary blood, and non-pulsatile arterial blood. The AC component captures the pulsating arterial blood and is of our main interest. By capturing the required AC content from the PPG signal, we can then determine the oxygen saturation level by extracting relevant features. © 2014 IEEE.

Author keywords

AC signal Beer-Lambert Law DC signal oxygen saturation PPG

Indexed keywords

Engineering controlled terms: Blood Bone Light sources Noninvasive medical procedures Oximeters Oxygen
Photoplethysmography Tissue

AC signals

Beer Lambert law

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