

Kolloquium

Biomedizinische Technik und verwandte Gebiete

Wintersemester 2019/2020

Donnerstag, 28.11.2019, 17:00 – 18:30 Uhr

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(Moderation: Univ.-Prof. Dr.-Ing. Dr. med. Steffen Leonhardt, Lehrstuhl für Medizinische Informationstechnik (MedIT) im Helmholtz-Institut für Biomedizinische Technik der RWTH Aachen)

“Oxygen Saturation and Haemoglobin Measurements in Arterial Blood Through an Analytical Model of a PPG“

Abstract

A photo-plethysmogram (PPG) is obtained by illuminating a part of the body and detecting either the reflected light from the body or transmitted light through the body. It is well established that PPG has information on the underlying constituents of the body, the light has passed through. In 1972, Takuo Aoyagi realized that oxygen saturation in arterial blood can be estimated using two PPGs, one obtained in the red region and the other in the infrared region. Based on his idea, in 1978 Minolta developed and marketed the ‘Pulse Oximeter’. Later, Philips, Nelcor and Ohmeda marketed pulse oximeters worldwide. Most of these instruments use an empirical relation obtained through clinical studies to evaluate the oxygen saturation in arterial blood. The author first worked on PPG under Professor Vladimir Blazek, RWTH Aachen in 1999. His research group continued the work on PPG and developed an analytical model that describes the PPG. Using the model, methods of evaluating the oxygen saturation in arterial blood that do not rely on an empirical equation were proposed. The utility of the proposed analytical model in evaluating haemoglobin content, albeit by using an empirical equation is also developed. The proposed equation for determining the haemoglobin content in arterial blood using red and IR PPGs is found to be gender sensitive.

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