



FIELD PROGRAMMABLE GATE ARRAY BASED EMBEDDED SYSTEM FOR NON-INVASIVE DETECTION OF HEMOGLOBIN IN BLOOD USING PHOTOPLETHYSMOGRAPHY

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Abstract - In this paper, a Field Programmable Gate Array (FPGA) based embedded system has been proposed for non-invasive detection of hemoglobin in blood using photoplethysmography. Photoplethysmography (PPG) is a non-invasive and low-cost optical technique that can be used to detect blood volume changes in the micro-vascular bed of tissue. Our investigations revealed that

volume of water present in blood considerably affects the reading of the concentration of blood hemoglobin. In our current work, the proposed device is developed with monitoring of PPG waves at three wavelengths so as to compensate for the error due to absorption of near infrared radiation (NIR) by water in the blood. The device also has been developed to be robust enough to tolerate distortions in the waveform due to motion of the subject. In order to sense the motion of the subject a 3-axis accelerometer has been used and correction is suitably applied to the sensed waveform. As a result, it is possible to measure the concentration of hemoglobin in blood while the subject is on the move.

Index Terms: Field Programmable Gate Array, photoplethysmography, non invasive estimation, near infra red radiation