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| **Title:** | Design and Implementation of a NIR-Technique Based Non-Invasive Glucometer using Microcontroller | | |
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| **Abstract:** |  |
| Abstract— Diabetes is called the major contributor to all types of major diseases and if the patients are not taken care of properly then eventually it causes to death. However, this is a non-contagious disease. This disease occurs when the glucose level in the blood increases above a threshold value. Therefore, regular determination of blood glucose levels is a prerequisite to taking care of diabetic patients. Existing techniques for the determination of blood glucose levels are invasive techniques based on needles that are inserted into the human body to take blood samples out of the body and then it is passed to the disposable test strips for processing chemically to determine the amount of glucose present there. However, to alleviate the pain of the patient and use of test strips of these techniques has led to the development of non-invasive techniques. These techniques use near-infrared sensors for glucose level determination from the fingertip without requiring needles and test strips. Near-infrared (NIR) optical signal is transmitted through the fingertip’s one side and then received from its other side through which blood glucose’s molecular count is predicted by analyzing the variation in the received signal’s intensity after reflection and this data can wirelessly be transmitted to a remote PC through the use of IoT. In this work, we have developed a system using a microcontroller and other electronic parts. Before that, we developed a simulation model in the Proteus environment. After hardware implementation of the device, we measured the glucose levels of several persons having different age levels using our designed meter and the conventional invasive method-based meter. We found out that the average percentages of deviations are very small (5.15%) which proves that our designed meter is working very well. | |