



## Design and Fabrication of a Non-Invasive Blood Glucometer Using Paired Photo-Emitter and Detector Near-Infrared LEDs

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**Abstract:** Diabetes mellitus more commonly known as diabetes has been an on-going problem around the world for many years now and the number of diabetics is expected to rise to 366 million globally by 2030 (Amir,2007). One of the measures of controlling this disease is daily monitoring of blood sugar level. The most common method of blood glucose level measurement involves pricking the finger which when done every day can be quite painful. Thus a non-invasive glucose monitoring device is a welcome alternative. The non-invasive blood glucose meter designed and fabricated in this study composed of a circuit consisting two LEDs of the same wavelength (LED pair) with one acting as a photo-emitter and the other as a photodiode photo-detector. Several LED pairs of different colors were tested for sensitivity to different glucose concentrations. Finger phantom tests were also done on the best LED pair. Out of all the LED pairs tested, the one that exhibited marked sensitivity to different glucose concentrations was the near-infrared LED (NIR-LED) pair with wavelength of 1450nm. The NIR-LED pair showed consistently increasing trend on the output voltage vs. glucose concentration (Chua and Gonzales,2013).

**Key Words:** glucometer; non-invasive; LED pair; non-invasive glucometer