ABSTRACT

This study discusses a prototype of a non-invasive blood glucose monitoring system using infrared-based optical sensors and photodiodes, as well as a wearable antenna made of textile material. The system aims to replace conventional invasive methods with a more comfortable and safe approach for patients. Glucose levels are collected using sensors that utilizes the infrared spectrum, processed through the ESP8266 WE-MOS microcontroller, and transmitted wirelessly by the wearable antenna to the Internet of Things (IoT) platform for remote monitoring. The textile-based wearable antenna is used as a data transmission medium from the microcontroller to the ThingSpeak platform, ensuring a stable and efficient data transmission process in real-time. The RSSI levels vary during data transmission at different times (morning, afternoon, evening). However, the RSSI results obtained are still within the acceptable RSSI range for wireless communication. Additionally, the use of textile material in the antenna is designed to ensure user comfort, allowing the device to be used for extended periods without disrupting daily activities.

In its implementation, blood glucose levels were compared between non-invasive (prototype) and invasive (glucose meter) methods to evaluate the accuracy and reliability of the system. The accuracy achieved by EasyGlu was 92,53%, which occurred due to individual biological variations, external interference, characteristics, conditions, and anatomical structure of the user's body. The use of the EasyGlu prototype takes 71 seconds for the user's mg/dL data to be sent to the ThingSpeak platform. With this method, the system can provide real-time monitoring of blood glucose levels, as well as enhance user comfort and efficiency in managing their health conditions.

Keyword : Blood Glucose Monitoring, ESP8266 WEMOS, Internet of Things (IoT), Non-Invasive, Photodiode, Wearable Antenna