

ABSTRACT

During the COVID-19 pandemic, the use of Internet of Things (IoT) technology in health monitoring systems is an important solution to reduce the risk of transmission by minimizing physical contact between medical personnel and patients. This final project raises the issue of the lack of a practical and efficient remote health monitoring system. Conventional systems still rely on high-risk direct interactions in isolation rooms and intensive care units, and not many are equipped with direct visual monitoring features. This study offers a prototype of an IoT-based monitoring system using an ESP32 microcontroller, an MLX90614 sensor to measure body temperature, and a MAX30102 sensor to measure heart rate and oxygen saturation (SpO_2). Sensor data is displayed via the Blynk platform, and visual monitoring is carried out using the ESP32-CAM module via local network video streaming. This system is able to present health data in real time and support remote patient monitoring. The test results show that sensor data is successfully displayed in real time on Blynk, and video visualization can be accessed via a local server. Based on 30 calibration tests with a thermometer and oximeter comparison tool, the average relative error was 23.01% for heart rate, 0.92% for SpO_2 , and 0.15% for body temperature. Monitoring was also carried out for two days with 10 night trials and 10 daytime trials, and all data was displayed accurately and in real-time on the Blynk platform.

Keywords: IoT, health monitoring, heart rate, body temperature, esp32, blynk