

ABSTRACT

The development of this Internet of Things (IoT)-based infusion monitoring prototype aims to design a real-time system for monitoring IV fluid levels in patients, in order to improve efficiency and safety in medical services. This system uses a load cell sensor to measure the weight of the IV fluid bag and transmits the data to the Blynk application via a Wi-Fi network. The system automatically sends notifications to nurses when the fluid volume approaches the minimum threshold.

Testing was conducted on four aspects: the notification system, sensor accuracy, Drops Per Minute (DPM) calculation, and network quality. The notification test showed that the system successfully activated the LED and sent alerts when the fluid volume reached 50 mL or below. Sensor accuracy testing was conducted by comparing the load cell sensor readings to a digital scale. The results showed that Sensor 1 had an MAE of 0.4166666667 with an MAE percentage of 0.14970%, and an RMSE of 0.6454972244 with an RMSE percentage of 0.232%. Meanwhile, Sensor 2 had an MAE of 0.3846153846 with an MAE percentage of 0.12837%, and an RMSE of 0.6201736729 with an RMSE percentage of 0.207%.

DPM testing showed that Sensor 1 had an MAE of 3.91011236 with an MAE percentage of 19.55%, and an RMSE of 4.546884351 with an RMSE percentage of 22.73%. Meanwhile, Sensor 2 had an MAE of 5.714285714 with an MAE percentage of 28.57%, and an RMSE of 7.55928946 with an RMSE percentage of 37.80%. Finally, Quality of Service (QoS) testing showed an average delay of 1.502 ms (categorized as excellent), throughput of 57.45 Kbps (fair category), packet loss of 41.08% (very poor category), and jitter of 3.296 ms (good category).

These results indicate that the system functions properly and is fairly accurate in real-time monitoring of IV fluid, although improvements are needed in terms of network stability.

Keywords: *Internet of Things, load cell sensor, Blynk, IV infusion, Quality of Service, real-time.*