

ABSTRACT

The manual monitoring of intravenous (IV) fluid volume in many healthcare facilities can pose serious risks to patients. To address this issue, this study aims to design and implement an automated IV fluid monitoring system based on the Internet of Things (IoT) using a Load Cell sensor. The system is equipped with an ESP32 microcontroller, an RTC module for time logging, a buzzer as a local alarm, and integration with Google Spreadsheet and Telegram for real-time notifications. The research follows an engineering approach using the waterfall model, starting from system design, hardware and software implementation, to prototype testing. The Load Cell sensor is used to periodically measure the weight of the IV fluid, which is then converted into volume and percentage. The measured data is displayed on an OLED screen, recorded to Google Spreadsheet, and sent to Telegram as a notification when the fluid volume reaches a critical threshold. Test results show that the system is capable of reading IV fluid volume with an accuracy of up to 98.6% and sending timely alerts when the volume approaches the minimum limit. The system also demonstrates stable data transmission and buzzer activation when the fluid level drops below 5%. In conclusion, this IoT-based IV fluid monitoring system improves monitoring efficiency, reduces the risk of human error, and contributes positively to patient safety. Further development may include integration with automatic flow control and a web-based data visualization platform.

Keywords: *Infusion fluid monitoring, IoT, Load Cell, ESP32..*