

ABSTRACT

Air quality monitoring is essential due to its direct impact on human health. Air quality can be categorized by several measures, including PM_{2.5} (particle size up to 2.5 $\mu\text{g}/\text{m}^3$) and PM₁₀ (particle size up to 10 $\mu\text{g}/\text{m}^3$). A wearable air quality monitoring system is capable of measuring additional parameters such as temperature, humidity, pressure, eCO₂ (equivalent carbon dioxide) gas, and TVOC (Total Volatile Organic Compounds). The wearable air quality monitoring system is chosen for its ease of use and comfortable design. The main advantage of this wearable device is its ability to connect with a smartphone application and a web-based monitoring system, as well as IT automation to automatically validate data on the server, allowing users to monitor the surrounding air quality in real-time in a practical and efficient manner. By using wearable devices, air quality monitoring can be conducted continuously and within the context of daily activities, providing accurate and useful data for maintaining health. Testing was conducted around Telkom University on September 2, 2024.

The results obtained from testing inside and outside the chamber stated that the device can work well on the 4 parameters with an average error in the measurement results after the post-calibration test in the chamber for PM_{2.5} 12%, PM₁₀ 29%, temperature 1%, humidity 4%, 1 parameter with a note that it must be indoors, namely eCO₂ with an error during sensor validation of 23% and only 1 parameter, namely TVOC, cannot work optimally because the error value in sensor validation is 100%. In this capstone design, an analysis of the Quality of Service (QoS) and system performance was carried out. During implementation, the system successfully transmitted data effectively throughout the test period, resulting in a high QoS value. Testing of the monitoring website and dashboard system showed that both aspects, both in terms of user satisfaction and unit testing, had met expectations and were functioning well.

Keywords : IT Automation, Air Quality, Wearable Air Quality Monitoring, Website and Application Monitoring.