

ABSTRACT

Based on the survey results, libraries often face challenges in creating a conducive learning environment due to high noise levels and limited room capacity. The inability to monitor the number of visitors in real-time often leads to an overcrowded and uncomfortable atmosphere, while uncontrolled noise can disrupt user concentration. Therefore, the objective of this final project is to design an Internet of Things (IoT)-based system to monitor the number of visitors and noise level automatically. This system uses an infrared sensor to detect visitor movement, a KY-038 sound sensor to measure noise levels, and an ESP32 as the main data processor. The data is sent to the ThingSpeak platform and displayed through the dashboard and LCD at the entrance, while notifications are sent in real-time through the Telegram application. The method used in this research is the research and development method. The test results show the accuracy of the sound sensor is 96.67%, while the accuracy of the infrared sensor is 96.66%. QoS testing shows an average throughput of 56.44 Kb/s, average delay of 50.92 ms, and packet loss of 0%. Based on the ITU-T G.1010 standard, the performance of Telegram and ThingSpeak as monitoring media is considered good. Overall, the designed monitoring system can function properly and provide accurate information to users.

Keywords: *Library, Internet of Things (IoT), Noise Monitoring, Capacity Monitoring, Real-time Notification, Quality Of Service (QOS)*