Research Exhibition in Mathematics and Computer Sciences (REMACS 6.0)/
ISBN: 978-629-97440-5-4

A PROTOTYPE OF IOT BASED NOISE POLLUTION DETECTION AND NOTIFICATION IN LIBRARY USING NOISE SENSOR AND BLYNK APPLICATION

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ABSTARCT - Noise pollution is the term used to describe the increase in ambient noise levels brought on by human activity. Humans may suffer immediate or delayed hearing damage due to acoustic overexposure. Libraries also affected by noise pollution as the source of noise pollution are mostly from external sources. Researches insisted that the recommended level of sound in a library should be around 40 decibels. The development of a prototype for an Internet of Things (IoT)-based noise pollution detection and notification system in a library environment is demonstrated in this research. The objectives of this project are to develop and implement a prototype that can use a sound sensor, a NodeMCU ESP8266, and the Blynk app to measure noise levels in a specific area and send real-time notifications to a mobile device and to evaluate the performance of the prototype, several tests were conducted, including functionality testing, network testing, and usability testing. The prototype was tested in various scenarios to prove its functionality and response time. The prototype had a positive review from majority of respondents that involved in usability testing. Other researches can implement an alternative means of measuring sound in order to read sound level accurately for future work. The results of the evaluation suggest that the prototype was successfully implemented, with accurate noise level measurements and consistent notice transmission. The prototype offers an efficient means of keeping track of noise pollution in libraries and other comparable settings, promoting a calm environment for learning and research.

Keywords: IoT, noise pollution detection, sound sensor, NodeMCU ESP8266, Blynk application

1. INTRODUCTION

Nowadays, noise pollution has occurred in various place caused by environment such as public events, building sites and automotive traffic (Fallis & Spachos, 2021). This project presents the development of a prototype for an Internet of Things (IoT) based noise pollution detection and notification system in a library environment. The objectives of this research are to develop a prototype that can measure the noise in an area and send notification to a mobile device using noise sensor, NodeMCU ESP8266 and Blynk Application, and to evaluate the performance of prototype using functionality test, network testing and usability testing.

2. METHODOLOGY

For this project, there are total of six phases for development of this prototype. The phases are information gathering, planning, design and development, experiment, analysis and documentation. The methodology section offers a comprehensive explanation of the methods taken to develop the prototype and assess its functionality, network performance, and user interface. A few scenarios were created to conduct functionality testing and network testing. As for usability testing, a questionnaire was created and shared to public community to give their opinion regarding this research.

3. RESULT AND DISCUSSION

There were 3 scenarios conducted during functionality testing and network testing to evaluate the performance and functionality of the prototype with various obstacles and distances. Based on the functionality tests, the sensor attached to the prototype was able to detect sound and send notification to mobile smartphone via Blynk application. Moreover, the optimal effect range for sound detecting and type of obstacles that can block sound detecting were able to be determined through this testing. As for network testing, the prototype was proven able to send notification to mobile smartphone through Blynk application in a short time. Last but not least, a majority of respondents that involved in usability testing has given a positive review to this research based on the questionnaire given to the respondents. It is proven that this prototype was able to monitor sound level and detects noise pollution inside library.

4. NOVELTY OF RESEARCH/PRODUCT

Previous research on noise detection system has been done by a few researches. One of the previous works was Automation of Noise Detection Using Internet of Things by Vanitha, C. N., Sridhar, K. L., & Dhivakar, R. in 2021. Their research used voice recognition board to detect voice of people speaking and have the person received a reminder email. Next, Meshkov, O., & Naumoski, A. has published their research in 2021 about Noise Pollution Measurement System-Implementation and Perspectives that aim to implementation of a noise measurement and monitoring system. Last but not least, there is also researches that created personal monitoring system provides free access with low price technology in order to display environmental variables corresponded with environmental pollutants and observes the standard of life in a particular ecological area (Shahriar Alam et al., 2018).

5. CONCLUSION

In conclusion, a Prototype of IoT Based Noise Pollution and Detection and Notification in Library Using Sound Sensor and Blynk Application was a prototype that can be use by librarians to monitor the sound level and detects noise pollution inside library. This research had its own limitations during the development process. There are several ideas and recommendations to improve this research project for future work.

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