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# Noise Monitoring System Development in a Library Based on The Internet of Things

Eridani, Dania ; Rochim, Adian Fatchur ; Firdananta, Alvin Zulham

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A library is one of the important places for the community, especially students. However, not all visitors know the library's rules and act arbitrarily to create noise that can disturb other visitors. This research is focused on the development of classifying and monitoring the unwanted noise in the library. The system is built with the Arduino Nano 33 BLE microcontroller using the DFROBOT Analog Sound Level Meter Sense sensor and ESP32-WROOM32U. The system is equipped with classification capabilities resulting from machine training using the Convolutional Neural Network algorithm by utilizing a Feature Extraction. The system is then connected to Wi-Fi to be integrated with websites created using the PHP programming language and the Laravel framework. Data from the monitoring will be stored in the MySQL database. The system can give a noise warning when a human or cell phone sound exceeds the threshold with an average of 82.78% classification accuracy and an ideal distance from the sound source, as far as 30-100 cm. © 2022 IEEE.

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CNN; Feature Extraction; Internet of Things; Noise Monitoring System

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*Chairman of 2022 2nd International Conference on Electronic and Electrical Engineering and Intelligent System (ICE3IS)*

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A library is one of the important places for the community, especially students. However, not all visitors know the library's rules and act arbitrarily to create noise that can disturb other visitors. This research is focused on the development of classifying and monitoring the unwanted noise in the library. The system is built with the Arduino Nano 33 BLE microcontroller using the DFROBOT Analog Sound Level Meter Sense sensor and ESP32-WROOM32U. The system is equipped with classification capabilities resulting from machine training using the Convolutional Neural Network algorithm by utilizing a Feature Extraction. The system is then connected to Wi-Fi to be integrated with websites created using the PHP programming language and the Laravel framework. Data from the monitoring will be stored in the MySQL database. The system can give a noise warning when a human or cell phone sound exceeds the threshold with an average of 82.78% classification accuracy and an ideal distance from the sound source, as far as 30-100 cm.

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**I. Introduction**

A library is needed for students, lecturers, and researchers, which makes it an alternative place to search library sources and a place for group scientific activities. But, visitors often do not understand the ethics of being in the library room. Visitors who do not understand the rules make rowdy noises and speak too loudly, causing noise to other visitors and interfering with the concentration of reading or discussions being carried out. This is one of the main reasons for complaints submitted by library visitors to librarians. Librarians, as authorized officers, need to remind visitors to be calm and not to cause noise in the library. Librarians also carry out their work, from collecting new book data to maintaining books in the library. Of course, continuous warnings to different visitors will significantly interfere with the librarian's work [1] [2]. Therefore, a system is needed that can automatically detect and simultaneously provides a notification signal to visitors not to make noise. One way to reduce noise in the library is to use a system that alerts visitors when it reaches the specified noise threshold. However, The problem found when creating a noise monitoring system is in the noise itself.

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