

# Examine Sensors and Find Ways to Minimize, Improvise and Use Low-cost Configurations for Indoor Air Quality Monitoring Devices

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## **Motivation:**

Energy-efficient ventilation strategies relating to good indoor air quality (IAQ) are a major task for building performance. Applying demand-controlled ventilation (DCV) in buildings is one possibility to fulfill the requirements of adequate IAQ while reducing the energy consumption. Compared to time-scheduled ventilation, 15% heating energy and 70% power consumption were saved with DCV [1]. Low-cost airborne particle sensors are gaining attention for monitoring human exposure to indoor particulates [2]. In this study I designed an air quality monitoring system using the ESP32 as a controller and several sensors to measure air quality [3].

The main purpose of this research is to minimize, improvise, and use low-cost configuration, yet with equal ability to perform as industrial sensor capability. The proposed system, by combination of ESP32, IoT Platform and the Wi-Fi modules, is also able to give immediate data reading, while being remotely observed by notice from the system output [5].

## **Literature Review:**

### *Article searching procedure*

I used a systematic searching procedure to identify all the available articles that are related to indoor air quality and demand-controlled ventilation from the IEEE and Wiley online digital databases. In my systematic searching procedure, I searched two keywords to search the full text of the article. First, I used the keyword “IAQ” to find journal articles published in the English language between the years 2012 and 2022. I then used the keyword “IAQ monitoring device” within the obtained set of results to further narrow the set of analysed publications.

### *Article inclusion and exclusion criteria*

For the final selection of articles that were related to indoor air quality and demand-controlled ventilation, I used some criteria to include and exclude articles from the set of articles that were selected through the search of the IEEE and Wiley online digital databases. To include and exclude articles from the set of articles I read the title, abstract, methodology, and results of each article. To determine which articles to include in this study, I considered only those articles that were written in English and that had a project

along with the research. The exclusion criteria were the following: (1) articles that didn't have a project alongside it, (2) articles that didn't use Arduino based microcontroller, (3) articles that were old, and (4) articles that didn't have enough data.

#### *Data extraction Procedure*

I carefully read and examined all the included articles to record the key information. I designed a standard data extraction form for the individual analysis of each article. The I used the designed standard data extraction form to record the key information from each of the included articles. The key information that was extracted was compared and evaluated to confirm the accuracy of the extracted records. Each article was evaluated for the following key information: (1) The algorithms that was used to analyze the data collected from sensors, (2) Accuracy of the sensors used, and (3) how cost effective the final device is.

#### **REFERENCES:**

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