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Design System Monitoring Quality Air Internet Of Things Based Indoor

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Abstract

Air is one of the elements that support life on Earth. Without air, humans and animals cannot breathe, and plants cannot photosynthesize. Quality air is often influenced by pollutants. Because that is, air pollution can be interpreted as the presence of foreign objects or substances in the air that change the composition of the air from normal to bad. In the research, the method used is the development method with the Research approach. And Development (R&D), method development Which used In this study, the Analysis, Design, Development, Implementation, Evaluation (ADDIE) model was used. This study was conducted to obtain accuracy from the overall system testing. Testing on quality monitoring air use sensor MQ 135 (For air), sensor DHT 11 (for temperature and humidity sensors), OLED LCD (hardware interface), and ESP 8266 microcontroller have been completed. This system can be used by all parties as an air quality control system, for indoor temperature and humidity using Thingspeak.

Keywords: *System Monitoring, quality Air, MQ 135, DHT 11, Thingspeak*

1. INTRODUCTION

Air is one of the elements that support life on Earth. Without air, humans and animals cannot breathe, and plants cannot photosynthesize. Air quality is often affected by pollutants. Carbon monoxide is one of the pollutants that hurt the environment. This substance is odorless, tasteless, and colorless [4]

According to Law Number 23 of 1997, air pollution or contamination is a decrease in the quality of the environment due to the entry or introduction of substances, energy, living creatures, and/or other components into the environment by humans.[2]

Therefore, air pollution can be interpreted as the presence of objects or substances foreign to the air that change the composition air from normal become bad. When this happens, the air becomes polluted. The air in urban areas with their activities and technology tall also tall as Then is also relatively dirty. The air in dirty industrial areas is exposed to various pollutants [6].

2. RESEARCH METHODS

a) Object Study

This research was conducted in a room with different air temperature conditions to obtain a valid result.

b) Research Stages

In the study design, system monitoring quality air in this room uses two main elements, namely hardware and software. The concept base becomes guidelines for designing A system, Where The concept itself contains steps and instructions to support the design [1]. The first step

is to connect the DHT11 sensor and the MQ135 sensor to the ESP32 microcontroller. After the ESP32 microcontroller reads the input data from sensors, the data is sent to the server/platform WiFi ESP32 to be processed. Then the received data is displayed on the platform page so that the data can be seen by the user [8]. On the platform, Thingspeak users can upload sensor data, and then the data is presented in the form of channels that will be visualized by MATLAB

c) Needs Analysis

Needs analysis is the systematic collection of all information to obtain valid and required data. The main purpose of conducting a needs analysis is to need is For get information that, when followed up, makes teaching better. To analyze this research requires the following stages:

2.3.1. Prepare the necessary hardware and software. Make sure the necessary hardware and software are installed according to the correct procedure. MQ 135 Sensor, DHT 11, and Thingspeak Platform are the necessary tools.

2.3.2. Make a sample of air conditions. Take an object (for example, paper) and burn it in a room.

2.3.3. Processing condition air. The stages of processing the mark parameter include:

- Sensor reads the condition level air as well as the temperature indoors.
- The resulting parameter values will be sent and displayed on the LCD.
- Results reading mark from the A sensor will be processed and displayed in a ThingSpeak graphical display.
- Understanding the results of sensor readings. By using indoor air condition analysis, it is necessary to analyze the data sent for each reading value, focusing on each value produced based on the level of air conditions in a room [3].

d) Design

2.4.1. Flowchart

The flowchart above is a description of how the monitoring system works. Quality air Work, moment activate the tool, And The sensor detects air temperature and air quality [5]. If the sensor works well, with a predetermined range of values, the data value will be sent and displayed on the LCD with a value that adjusts the results of the indoor air quality reading. The result of the quality of conditioned air will be shown on the ThingSpeak platform.

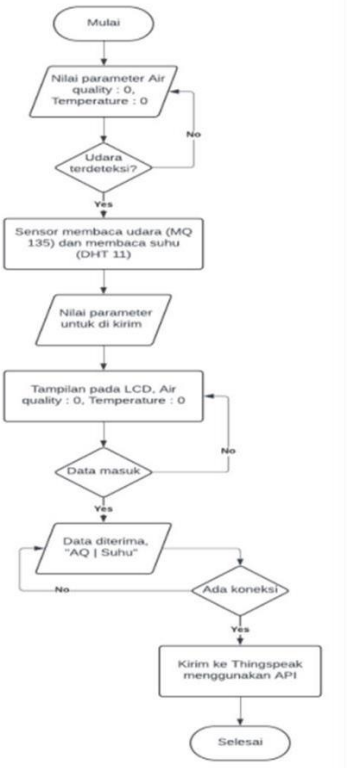

Figure 1. Flowchart System

2.4.2. Design System hardware

In the study design system monitoring quality, the indoor air uses two main elements, namely hardware and software [7]. This basic concept is a guideline for designing a system, where the concept itself contains steps and instructions to support the design. The design can be seen in the following image.

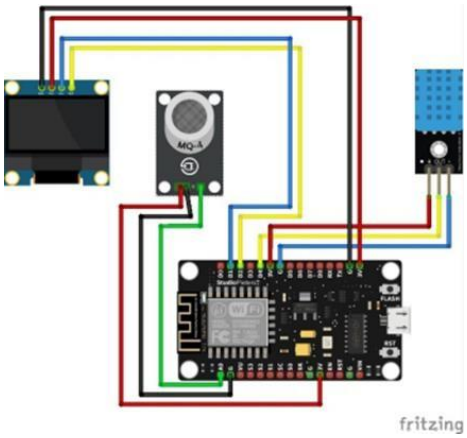

Figure 2. Design System Devices Hard

3. RESULTS AND DISCUSSION

a) Hardware Implementation

System monitoring quality air in the room, internet-based based These things are designed to use sensor temperature or humidity, air, and temperature, which is used to measure the PPM

levels connected to the server via a wifi network which then the data can be displayed on the LCD in the form of graphs and numbers. The monitoring data can be accessed in real time. The display of the entire monitoring component circuit can be seen in the image below.

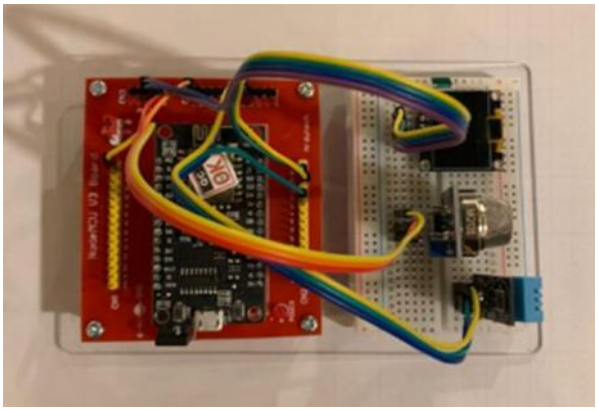

Figure 3. Series Overall Component Monitoring

b) Software Implementation

The software uses the Arduino protocol with other hardware components. Thingspeak in this monitoring is a media interface to make it easier for users to control the system. This Thingspeak monitoring can be accessed at https://thingspeak.com/channels/1957425/private_show. Here is the appearance of the Thingspeak monitoring interface

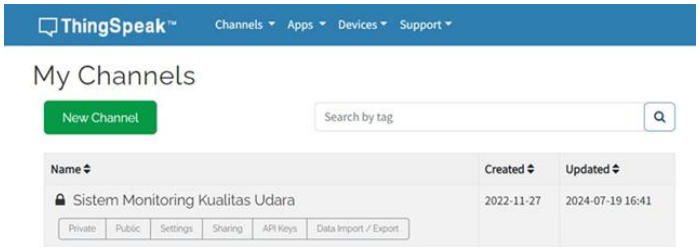

Figure 4. Pages Channel Thingspeak Monitoring

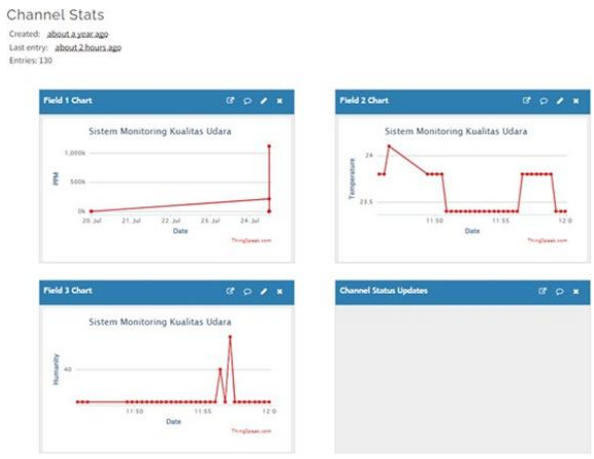

Figure 5. Page Table And Monitoring Graph

c) Results Testing Hardware

From the test results with different time/hour ranges using air sensors carried out with the MQ 135 Sensor, the difference value was obtained to obtain good, moderate, and dangerous air values. However, results obtained from sensor-level accuracy are less than optimal because the sensitivity of the sensor is affected by the size of the room used in the test. From the results of the body temperature sensor test carried out obtained mark the body temperature and the level of air humidity with a time span/hour to get results according to the specified accuracy value. Thus, the resulting temperature value will affect the air quality in a room

d) Results Testing Thingspeak

Thingspeak testing is done to determine whether the system can function according to the commands of the designed program. Testing is done by running a tool that is equipped with an ESP 8266 circuit, an air sensor, temperature sensor to monitor air quality, temperature, and humidity, where the data values displayed in Thingspeak are in the form of graphs. The test results show that the system is good enough and can walk in accordance procedure design, which there is

4. CONCLUSION AND SUGGESTION

After testing and analysis, so writer can conclude:

a) The air quality monitoring system uses an MQ 135 sensor (for air), a DHT 11 sensor (for temperature and humidity), and an OLED LCD. (interface between advanced device hardware) And the microcontroller ESP 8266 has been successfully created. This system can be used by all parties as an indoor air quality, temperature, and humidity control system using Thingspeak.
b) Testing of monitoring tools using the Internet of Things resulted in the tool and system being used and functioning normally. This can be proven by the value of the black box test results that were carried out. The results of the blackbox test with the answer "Yes" are as much as 100%, and "No" is as much as 0%

The research conducted by this author still has many shortcomings and weaknesses, so further tool development is still needed, namely:

a) A researcher can furthermore develop that system, which can monitor based on a website
b) Furthermore can develop so that it can add feature alarm sounds when air conditions are dangerous
c) Air sensor reading accuracy more improved, or can also replace the sensor MQ 135 with sensor so that the results are more accurate

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