Implementation Internet of Things (IoTs) to Monitoring Temperature Oven Tobacco System Towards 4.0 Industry

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Abstract. Tobacco is planted by the farmers in dry season through some process such as seeding, planting and drying. In drying process, the farmers use traditional technology named oven. When checking the temperature conditions of the tobacco, the farmers still use an estimation to measure the heat temperature of combustion stove. Base on those problems, the farmer need innovation technology which is used to make them easier to keep the stability of the temperature in the oven area in order to protect the quality of tobacco. “Internet of things” (IOTs) is provided to answer the farmers’ problem. By utilizing the internet of things (IOTs) in a Smartphone, this application will make the farmers easier to check the temperature conditions automatically to the temperature rises excessively without standing by in the oven or burning location. The application of IOTS with the data accuracy rate of ± 96%, can be said that it works well, although there are still shortcomings in the targets planned but the development program will be added. Hopefully, this application will help the farmer to be more ready to face 4.0 industry in the field of agriculture.

Keywords: internet of things, monitoring system, tobacco

1. Introduction

One of any agriculture commodities which have high economic value for the farmers in East Lombok especially in Gelanggang Sakra village is tobacco. Tobacco is planted by the farmers in dry season through some process such as seeding, planting and drying. In drying process, the farmers use traditional technology named oven. Oven is the activity of dry tobaccos continuously in maintaining temperature by wood burning or fuel oil with special combustion stoves in a building like a house. When checking temperature conditions, the farmers still use an estimation to measure the heat temperature of combustion stove[1]. In drying process the farmers needs an extra energy to keep the stability of the temperature in the oven area and surround it to protect the quality of tobacco. If the temperature of drying process is not maintained, it will affect in the failure of the tobacco drying process and even occurs the fire is caused of the leaves being too dry. Therefore, the farmer need innovation technology which is used to easier them to check temperature conditions automatically without standing by in the oven or burning location[2][3]. Internet of things (IOT) is an application of a temperature monitoring system in a tobacco oven by using a web server in a Smartphone[4][5]. It is provided to answer the farmers’ problem and to prepare them well to be more ready to face 4.0 industries in the field of agriculture.

2. Methods
In the research design, the application of temperature monitoring system consists of two parts, those are hardware and software. The hardware consists of several components, namely the temperature sensor uses DHT11[6] sensor and microcontroller[7][8] device that uses NodeMCU esp8266 as sensor data processor, and then it sends the data via wireless network or wifi [9][10], which will later be connected to the internet. While for the software is in the form of developing a web server application for storing temperature sensor data, then displayed in a monitoring interface[11]. DHT11digital temperature and humidity sensor is a composite Sensor contains a calibrated digital signal output of the temperature and humidity[12], The ESP8266 provides an absolute and self-reliant Wi-Fi networking resolution and permit it to either host the function[13].The circuit block of tobacco oven temperature monitoring system can be seen in Figure 1:

3. Result and Discussion

The result display in web server[14] of the research interface of the oven tobacco temperature monitoring application system. Internet of Thing (IOT) consists of several views: main menu, temperature menu, daily graph menu and data report menu.

3.1 The Display of Main Menu Page

The main menu is the first display or the start page that will appear several menus, namely: Tobacco Temperature Monitoring System in bahasa “Sistem Monitoring Suhu Oven Tembakau” and there are main menu (Halaman Utama), temperature menu (Suhu), graph menu (Grafik) and report / print temperature data menu (Laporan). The Display of main menu can be seen in Figure 2:
3.2 Temperature Menu Display Page

The function of temperature menu display is to real time display temperature data in the oven tobacco process. The display of temperature tobacco menu in bahasa “Suhu Oven Tembakau” can be seen in Figure 3:

![Figure 3: Display of Temperature Data for the Tobacco Oven Process](image)

3.3 The Display of Graph Menu Pages

The function of Graph Menu Display is to see and to know the temperature data per day (Suhu Rata-Rata Perhari) in the form of a graph beam. The Display of graph menu page can be seen in Figure 4:
3.4 The Report Menu

The report menu page serves is to display temperature data (Data Suhu) for the tobacco oven process. The report menu display can be seen in Figure 5:

Base on the results of designing and development of the application, the next step is testing the process of both hardware and software in the system. The testing of the temperature monitoring system of each process can be seen in Table 1:
No | Process Name | Testing | Test Results |
---|----------------|-----------|-------------|
1 | DHT11 temperature sensor | Components for reading temperature | Normal |
2 | NodeMCUesp8266 | Data processing microcontroller and data sender to the web server using the internet network | Normal |
3 | Web Server | The initial page on the web server displays generally the temperature data output | Normal |
4 | Temperature data | Display temperature data on a web page server with an accuracy rate of 96% | Normal |
5 | Temperature Data Report | Displays print of the temperature report data | Normal |

4. Conclusion

The Internet of things (IOT) is an application of a temperature monitoring system in an oven tobacco by using a web server in a Smartphone. It is used to make the farmer easier to check temperature conditions at any time, prevent temperature rises excessively and can be controlled the combustion stove automatically without standing by in the oven or burning location. The application of IOTS with the data accuracy rate of ± 96%, can be said that it works well, although there are still shortcomings in the targets planned but the development program will be added. Hopefully this application will help the farmer to be more ready to face 4.0 industry in the field of agriculture.

5. References

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