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Prototype of Fish Drying Device for the Production of Salted Fish Based on IoT

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Abstract

The prototype of the fish drying tool for the production of salted fish is designed to enhance efficiency and control in the salted fish drying process by utilizing IoT technology to monitor and regulate the drying environment conditions. The DHT22 sensor connected to port D5 is used to measure temperature and humidity inside the drying room. The data collected by this sensor is sent to a microcontroller connected to a relay to control the heater and DC fan, as well as a buzzer as a warning system if the room temperature exceeds 60° C. The Blynk application is used for a user interface that allows for the remote monitoring and adjustment of drying parameters via a smartphone. The test results show that this system is capable of maintaining the conditions for drying salted fish within optimal temperature and humidity ranges, thereby improving the quality and efficiency of the drying process. The integration of IoT technology in this device facilitates monitoring and control, as well as enhancing the overall effectiveness of the drying process.

Keywords: *Dried Salted Fish Dryer, NodeMCU ESP8266, DHT22 Sensor, IoT, Blynk*

1. Introduction

Salted fish is a product that is processed traditionally by first cleaning the fish, then adding salt at a specified moisture level according to the Indonesian National Standard, which is around 20-30% of the total weight of the fish, with a maximum moisture content after drying of 40% [1]. Drying is a common method used to preserve salted fish so that it can last a long time. The process of preserving salted fish through drying requires sunlight, which reduces the moisture content in the fish flesh. Manual fish drying, which still uses sunlight, is carried out by humans to check the physical health of the fish and its sense of smell. This can be dangerous because rotting fish produce toxic gases and odors from microbial metabolism [2]. The process of drying salted fish using sunlight will take quite a long time due to its dependence on sunlight. In rainy weather conditions, the drying process will also face difficulties and disruptions, causing the production process to be hindered. Based on this issue, a device is needed to assist in the drying process of salted fish. The author has also come up with an idea to create a Prototype Fish Drying Device for the Production of Salted Fish Based on the Internet of Things (IoT), designed to enhance the efficiency and control of the salted fish drying process automatically.

2. Theoretical Framework

2.1. DHT22 Sensor

The DHT22 is a sensor that can measure two environmental parameters simultaneously, namely temperature and humidity. The DHT22 has a calibrated digital output signal. The temperature measurement range is from -40°C to 80°C, while the humidity measurement range is between 0% and 100% [3].

2.2. Internet of Things

The Internet of Things (IoT) is a new term that refers to access to electronic devices via the Internet. Access to these devices occurs through human-to-device or device-to-device interactions using the Internet. In building the Internet of Things, engineers must pay attention to three aspects: size, space, and time [4].

2.3. Blynk

Blynk is a new platform that allows you to build interfaces to control and monitor hardware projects from iOS and Android devices. Blynk is very suitable for interfaces with simple projects such as monitoring temperature or turning lights on and off remotely [5], [6].

3. Analysis and Design

3.1. Research Equipment and Materials

The materials used for the IoT-Based Fish Drying Tool Prototype for the production of salted fish are as follows:

1. The hardware used in this research includes [7], [8]:
   1) NodeMCU ESP8266
   2) DHT22 Sensor
   3) Heater
   4) DC Fan
   5) Relay
   6) Drying Oven
   7) Jumper Cables and USB Cable
   8) Buzzer
   9) LCD
   10) Smartphone

2. The software used in this research is as follows:
   1) Arduino IDE
   2) Fritzing
   3) Blynk
   4) Wifi Network

3.2. Block Diagram

Hardware planning is the design of electronic components in such a way that they have the desired function [9], [10]. In general, the planning of the design of the tool is as follows in Figure 1.

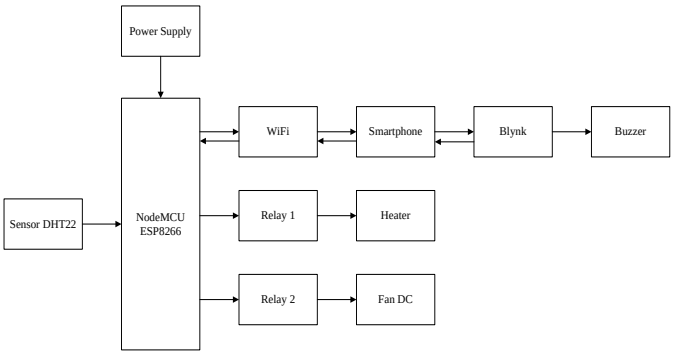

Fig. 1: Block diagram

3.3. System Tool Series

This circuit is composed of the components necessary to design a system so that the device can operate as intended.

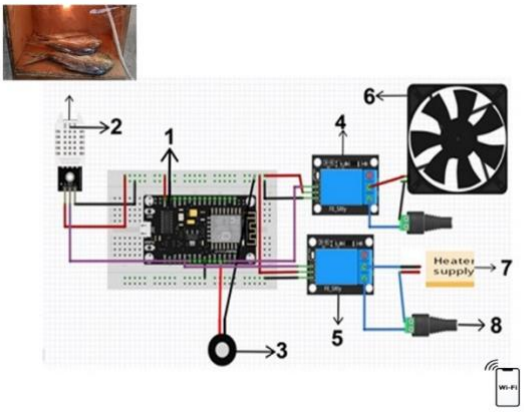

Fig. 2: System tool

Description:
1. NodeMCU ESP8266
2. DHT22 Sensor
3. Buzzer
4. Relay
5. Relay
6. Fan DC
7. Heater
8. Adaptor 12 Volt

3.4. System Flowchart

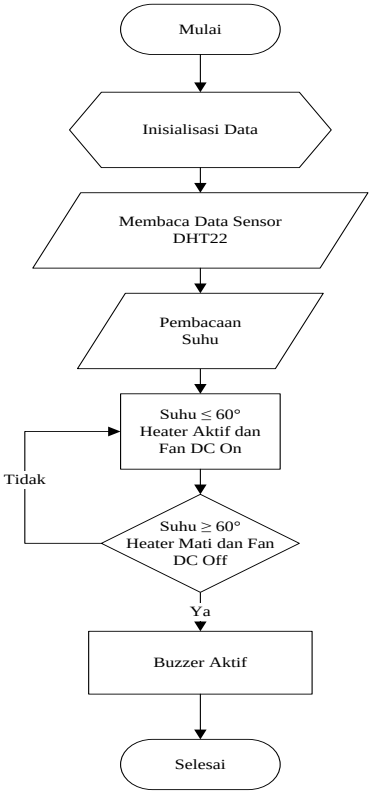

Fig. 3: System flowchart

4. Discussion and Implementation

4.1. Hardware testing

After all the circuits designed for the "Fish Drying Tool Prototype for Salted Fish Production Based on the Internet of Things" have been completed, the next step is to integrate all the finished circuits. The following is a description of the results from the system design, which can be seen in Figure 4.

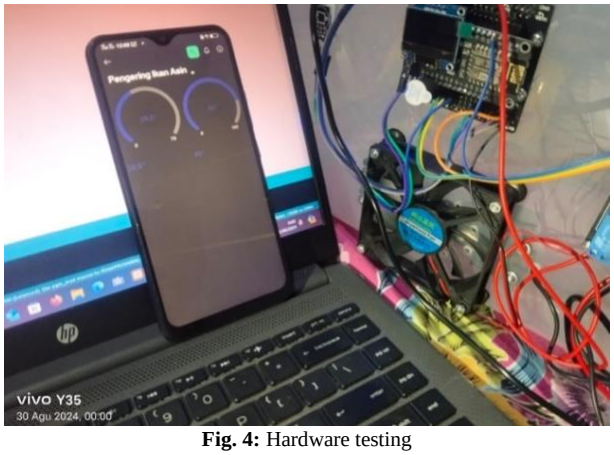

Fig. 4: Hardware testing

4.2. Blynk Output Results

The output results of the application are designed using the Blynk app, which can be downloaded from the Google Play Store. It can be seen in Figure 5.

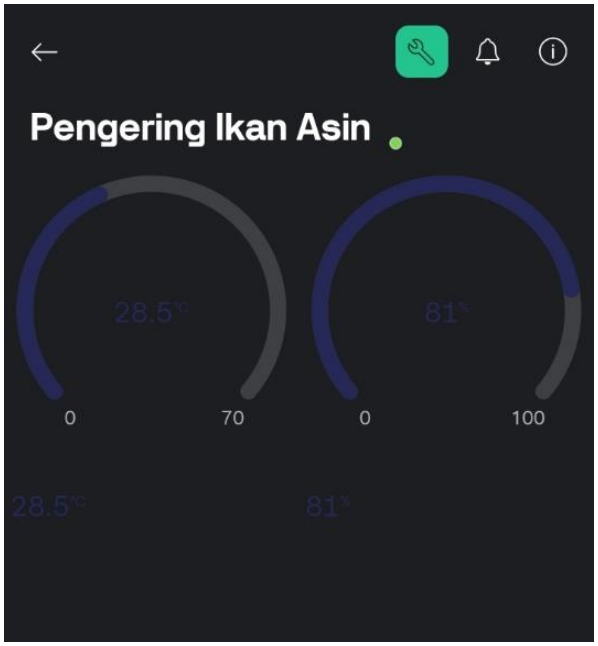

Fig. 5: Blynk output display

5. Conclusion and Suggestion

5.1. Conclusion

The system successfully integrates various components to monitor the conditions of the salted fish dryer based on IoT. Thus, the DHT22 sensor can measure temperature and humidity, while Blynk allows for remote monitoring. By using a relay, the system can automatically control the heater and DC fan based on data from the DHT22 sensor. Its operation can regulate the optimal temperature and humidity for drying salted fish.

5.2. Suggestion

The suggestions that the author can provide are as follows:

1. Before widespread implementation, conduct thorough development and testing of the prototype to ensure that the IoT system functions as expected and is reliable under various conditions.
2. Conduct an environmental impact assessment of the use of IoT-based drying tools to ensure that this technology contributes to sustainable and environmentally friendly processing practices.

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