JemOto (Jemuran Otomatis)

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***Abstract*—The progress of this technology can provide numerous benefits, including the use of basic embedded systems in everyday chores. The Internet of Things is a concept or program that allows a device to send and receive data across a network without the usage of computers or human devices. Sunlight is used by Indonesians for a variety of functions, including drying freshly washed fabrics. When weather conditions are unexpected, such as during the transition period, drying garments can be a difficult process. Drying clothes in these conditions will be a waste of time and energy. By maximizing the use of sunlight for drying textiles, time and energy can be saved. As a result, a solution to this problem is required, which will be achieved by designing and building a prototype automatic clothesline based on NodeMCU and telegram bot.**

***Index Terms*—internet of things, automatic, clothesline, nodemcu, telegram bot**

I. Introduction

Indonesia is a country with a tropical climate that is crossed by the equator, resulting in two seasons each year, the wet and dry seasons. The tropical climate of Indonesia results in high solar intensity as well as considerable rainfall.

Technological advancements are one of the most significant consequences for all humans on the earth, including Indonesia to be able to benefit from technological advancements without being restricted by the local government. Many benefits can be gained from the advancement of this technology, including the usage of simple embedded systems in everyday tasks. The Internet of Things (IoT) is a concept or program in which a device has the ability to transfer data over a network without the use of computers or human devices [1]. The Internet of Things can be used to develop device access intelligence in the industrial world, in households, and across a wide range of industries [2]. The main elements that must exist in the IoT architecture include: Hardware equipped with IoT modules; Devices that can connect to the Internet such as routers and modems; and Cloud Data Center as the database of the system [3].

In general, Indonesians use sunshine for drying tasks, one of which is drying freshly washed textiles. However, drying clothes can be a challenging task when weather conditions are unpredictable, such as during the transition period. It will be a waste of time and energy to dry garments under these conditions. It is possible to save time and energy by maximizing the use of sunshine for drying textiles [4].

As a result, a solution to this problem is required, which will be achieved by designing and building a prototype automatic clothesline that will save time and energy when drying clothes.

II. System Architecture

A. System Design

Projects developed using two main sensor and one additional sensor and passive buzzer. To make it easier to understand, here is an overview of the system architecture formed.

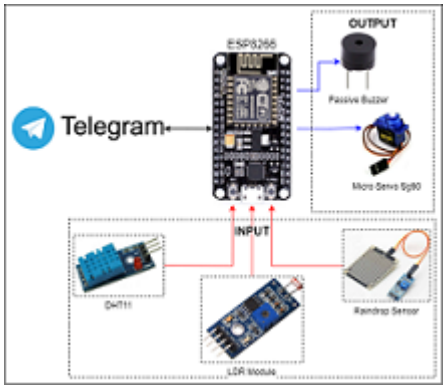

Fig. 1. System Design.

Several components have been grouped together. The NodeMCU Esp8266 is the system's main component. The second is the input, which includes the dht11 extra sensor for checking the ambient temperature, the ldr module for checking light intensity, and the raindrop sensor module for checking the weather. These three sensors will work in real time, sending the data that has been recorded to the NodeMCU for processing.

Third, there is an output, which has two actuators that will work in accordance with the NodeMCU's commands. There is a passive buzzer as a warning sound and a micro servo SG90 as a driver for inserting and withdrawing clotheslines.

Finally, there is communication media, which in this case is telegram. Using bots on telegram will make it easier to monitor and control JemOto.

B. Flowchart

The design of the system workflow, which will be represented with a flowchart, is required for the creation of this jemOto. A flowchart is a diagram that depicts the workflow process of the system's actions. A flowchart will be used to describe the following system workflow process.

Fig. 2. Flowchart.

The system will begin by initializing all of the existing variables. In addition, if the user uses a telegram bot, the telegram bot will enter keywords based on what the user has entered. If this is not the case, the system will continue to detect temperature before moving on to light detection and determining whether the situation is bright or not.

If it doesn't rain, the buzzer will go off and the clothesline will be included; if it doesn't rain, the clothes will be entered; if it doesn't rain, the data will be saved and displayed on the telegram if the user asks it.

It will detect water if the conditions are light. If air is detected, the buzzer will sound and the clothesline will be inserted; if no air is detected, the clothesline will be removed. The data will then be saved and displayed on the telegram if the user asks it.

III. Implementation Result

A. Control via Telegram

The following are the five states that can be used to receive a response from the Telegram bot:

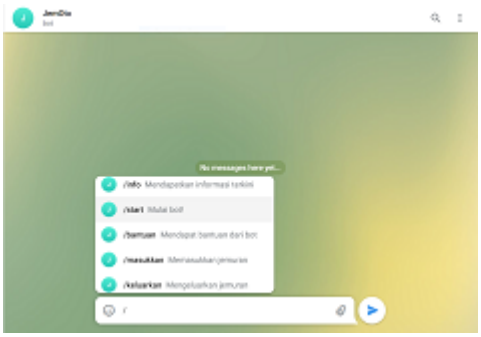

Fig. 3. telegram bot command.

- /start to start bot
- /masukkan to put clothesline into the room
- /keluarkan it out to get the clothesline out
- /info to get the latest information ranging from temperature, light intensity, weather conditions, and clothesline position
- /bantuan to get help from bot

B. Code Structure

See the following github link for further information: https://github.com/desradha/JemOto

The program code is divided into six sections, which are as follows:

- Libraries and Initialization

Fig. 4. Libraries and Initialization.

Fig. 5. Libraries and Initialization.

The program code library and system variable setup are shown in Fig. 4 and Fig. 5. From line 1 to line 50, the program code is written.

- Sensor and Accuator Void Function

Fig. 6. Sensor and Accuator Void Function.

Fig. 7. Sensor and Accuator Void Function.

Fig. 8. Sensor and Accuator Void Function.

The program code for the sensor and accumulator's work is shown in Fig. 6, Fig. 7, and Fig. 8. This program code begins on line 52 and ends on line 112. The code program for the system work rules from line 114 to line 127. The function of each sensor and accuator will be compiled in this section to make using the program code easier and more efficient.

- Telegram Bot Response Function

Fig. 9. Telegram Bot Response Function.

Fig. 10. Telegram Bot Response Function.

The program code for the telegram bot's response whenever the user enters a keyword is shown in Fig. 9 and Fig. 10. From line 129 to line 179, the program code is written. It will be easier and more pleasant for people to use it as a result of this reaction.

- Setup Function on Telegram Bot Menu

Fig. 11. Setup Function on Telegram Bot Menu.

The program code to change the keywords in the Telegram bot menu is shown in Fig. 11. From line 183 to line 192, the program code is written. This program code will assist users in selecting keywords.

- Function ”void setup”

Fig. 12. Function ”void setup”.

Fig. 13. Function ”void setup”.

The void setup program code is shown in Fig. 12 and Fig. 13. From line 194 to line 231, the program code is written. When the application starts, this function is called, and it is only called once after each powerup or when the system is reset. Declare variables, pin mode to use, and begin using libraries with Void setup.

- Function ”void loop”

Fig. 14. Function ”void loop”.

Fig. 14 shows a void loop program code; in this portion, the system will execute the program code again. From line 233 to line 252, this program code is run.

IV. Prototype Implementation Results

- Implementation Hardware

Fig. 15. Implementation Hardware.

Fig. 16. Implementation Hardware.

- Implementation Software (Telegram)

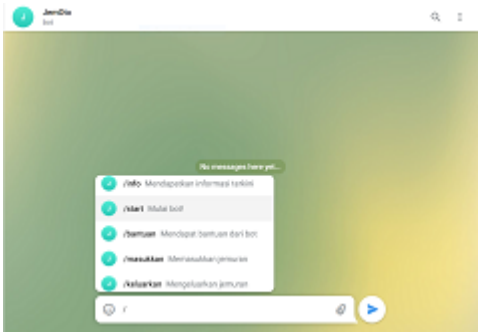

Fig. 17. Implementation Software (Telegram).

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