TEMPERATURE MONITORING AND AUTOMATIC FEEDING OF RABBIT CAGES

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Abstract
The public is becoming more and more interested in raising rabbits for meat, particularly in urban areas like Jakarta. The market for rabbits is expanding, particularly as a means of supplying animal protein. Nonetheless, because the general public is not as aware of the economic potential and yield of rabbit products, the rabbit farming industry is not growing as quickly as other livestock farming industries. This research is expected to overcome obstacles faced by rabbit breeders, such as extreme temperature fluctuations, by providing technological solutions that can improve the health and well-being of rabbits.

1. Introduction

Raising livestock for meat, rabbits are becoming more and more popular with the general public. One of the expanding markets for rabbit farming is the need for animal-based protein(Wahyuningrum, 2019). It is possible to raise rabbits in cities like Jakarta. Rabbits are very attractive because of their great output. In contrast to other livestock enterprises that raise chickens, ducks, goats, cows, buffaloes, and other animals, the rabbit farming industry is not expanding as quickly(Kartadisastra, H.R., 1994). This is because the general population is unaware of the economic potential of rabbit livestock or the goods that may be made from it. Compared to other livestock enterprises that raise chickens, ducks, goats, cows, buffaloes, and other animals, the rabbit farming industry is not expanding as quickly(Peternakan & Sam, 2015). This is because the general population is unaware of the economic worth of rabbit livestock or the goods that can be generated from them In actuality, there is a chance for rabbits to become successful as a side or main business(Widianto et al., 2017). Offering wholesome and superior animal protein sources and lucrative commercial prospects with 20–80% profit margins are the opportunities(Arini et al., 2023). Rabbits have many benefits, including the ability to produce high-quality meat with low fat content, the ability to maintain a small area(Suhendi & Saputro, 2021), the ability to use feed ingredients from a variety of forages, kitchen scraps, and agricultural byproducts, and the ability to use the byproducts (skin/fur, head, legs, tail, and droppings) for a variety of purposes. Production costs are also relatively low, maintenance is simple, and rabbits can bear children four to six times a year, with each litter containing four to twelve young. Rabbits are among the creatures that are weather- and temperature-sensitive. In general, 26 to 36 degrees Celsius is a suitable temperature range for rabbit cages(Agung & Alsher, 2018). Whereas rabbits are more likely to contract diseases in an excessively cold environment and to suffer from heatstroke in an excessively hot environment, One of the most essential things for keeping rabbits is a cage. A cage is a building used for housing, keeping rabbits from escaping, and providing care and supervision for them. The majority of rabbit breeders still care for their livestock using antiquated or manual techniques, which causes them a lot of trouble(Arini et al., 2023). For example, during the rainy season,

the temperature drops sharply, making it difficult for most rabbits to survive because they require the proper temperature to survive(Ardian et al., 2019). Based on the aforementioned issues, the author came up with the concept for rabbit cage technology, which uses DHT 11 sensors to measure the temperature inside the cage and activates the heating bulb when the temperature is just right for the rabbits(Silvy, 2021). It also features automatic feeding to provide rabbits with food at the designated time(Fadilah & Risma, 2023).

1.1 Literature Review

1. A straightforward and reasonably priced digital temperature and humidity sensor is the DHT11 sensor. These sensors are frequently utilized in electronics projects and the creation of Arduino-style microcontroller-based devices. The temperature and humidity ranges that the DHT11 sensor measures are 0°C to 50°C (32°F to 122°F) and 20% to 90%, respectively(Rabbika et al., 2023).

2. A microcontroller system-based Wi-Fi module called ESP8266 was created by the Chinese business Espressif Systems. Thanks to its tiny size and affordable Wi-Fi connectivity, this module has gained a lot of popularity among electronics enthusiasts and developers(Yoga, 2020).

3. A servo motor is a kind of motor that can move in an exact and controlled manner. Servos differ from other kinds of motors because of a few unique features(Hutchinson et al., 1996).

4. An electromagnetic switch called a relay is used to regulate the amount of power that passes through its contacts(Xue, 2007). Relays operate on the basis of electromagnetism, which states that the connecting contacts or breakers are moved or altered in position by the magnetic field produced by an electric current. Relays are frequently employed to use weaker input signals to control electronic equipment that needs a lot of electricity.

2. Research Methods

In order to perform this research, literature reviews, needs analyses, tool design, implementation, and testing are all done. The literature review on the technology of featuring automated feeding and heating lamps, provides a thorough examination of the several sources of data that have been compiled about advancements in rabbit husbandry. This approach entails finding, evaluating, and synthesizing pertinent research to comprehend how autonomous feeding systems and heating lamps might enhance productivity and welfare in rabbit husbandry. The findings of this review of the literature will shed light on the relative advantages and efficacy of employing automatic feeding systems and heating lamps in rabbit raising. Furthermore, the research can help pinpoint obstacles or issues that could emerge while implementing this.

1.2 Study Goals

1. Making it simpler for farmers to care for their livestock is the primary goal of the technology.
2. Apply technology and science, particularly in the area of control systems.

1.3 Tool Accomplishment Goal

1. Ideal Environment and Temperature:
- Keep the temperature in the rabbit's cage between 26°C and 36°C to ensure their comfort and well-being.
- Use the appropriate heating lamp settings to keep the cage temperature steady.
- Making a warm area in the cage so that the rabbits can move around and rest comfortably

2. Auto-Infeed:
- Automatically feed in accordance with a scheduled timetable.

- Make sure the rabbits are receiving enough nutrients in their feed based on their developmental stage.
- Assures consistent food availability and lowers the possibility of feed scarcity.

2.1 Literature study

2.1.1Paststudies

A study by Gunawan et al. (2021) looks at how automatic feed and lighting are used in chicken farms. Using DHT-11 sensors to measure cage temperature and LoadCell sensors to detect feed availability, the research "Design and Build an Automatic Monitoring and Feeding System for Chicks Based on the Internet of Things (IoT)" produced automatic lighting devices and automatic feed on chicken farms. The system created by Gunawan et al. differs in that it uses IR modules instead of loadcell sensors and is used for rabbitbreeding.

2.1.2 Needs Analysis

The goal of analysis is to examine all the data and issues gleaned from literature reviews in order to determine the best course of action and to design programs, circuit models, and a number of other tools.

3. Result and Discussion

The automatic feeding of rabbit cages and temperature monitoring are the focus of this study or project. Here are some of the parts of this tool, along with an explanation of their functions and design.

3.1 Components

Tabel 1. Components used

No.	Name of Components	Sum	Image
1	Esp 8266	1 pcs	
2	Module infrared	1 pcs	
3	Module Relay	1 pcs	

4	Bulb	1 pcs	

3.2 Flowchart System

A flowchart is a graphic that shows the choices and actions needed to complete a program's process. Every step is shown as a diagram with lines or arrows pointing in the same direction to connect them. A flowchart's primary purpose is to provide a broad overview of a program's progression from one process to another. This makes it easier for everyone to understand how the program works. Moreover, flowcharts serve the purpose of making a sequence of steps easier to comprehend by streamlining the information.

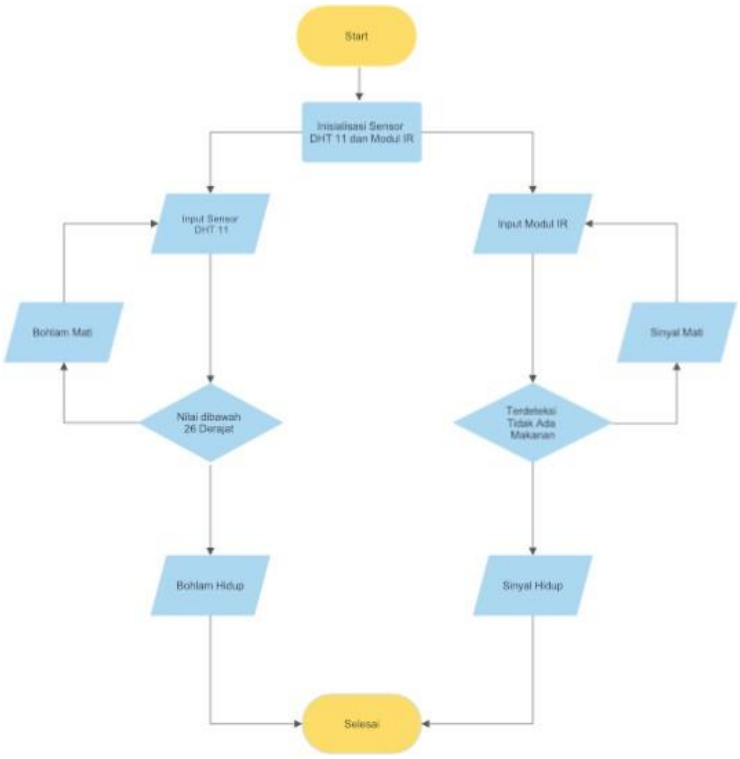

Fig.1 Flowchart System

3.3 Tool Design

This stage is a design of a series of tools before the tools are actually compiled and implemented in real. At this stage there is esp 8266 which plays an important role in the course of the circuit because esp 8266 as a microcontroller in this tool.

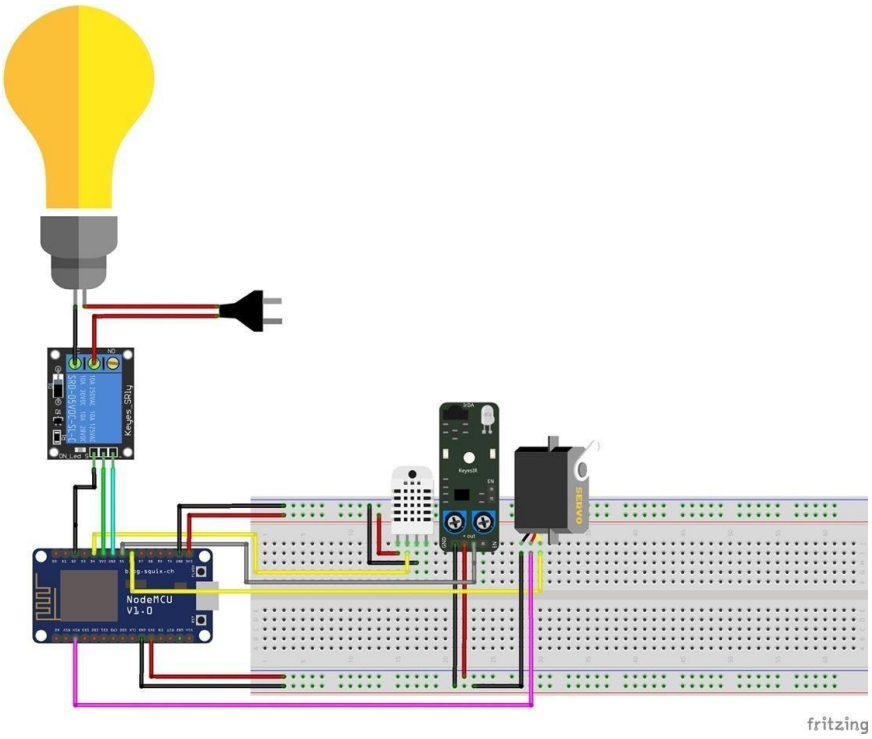

Fig.2 circuit schematic

4. Conclusions

This study effectively combined automatic feeding systems with temperature monitoring technology in rabbit cages. The development of livestock and agricultural technologies may benefit more from the addition of temperature monitoring and automatic feeding systems to rabbit cages, as these features can enhance the welfare of the animals and increase the effectiveness of cage management.

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