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Internet Of Things (Iot)-Based Broiler Feeding Control System

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Abstract

In general, farmers give broiler chickens, broiler feed is done manually so that it is less effective and efficient. This broiler feeding system is the right solution to make it easier for farmers to manage the feeding schedule and the amount of broiler feed. At the time of feeding is carried out according to the age data and the number of broilers fed with feed. The age and number of broilers will determine the feeding time schedule and the amount of broiler feed given. The tool system uses Real Time Clock (RTC) as a comparison to set the time schedule for broiler feeding. The amount of broiler feed is regulated based on the delay in opening the main feed holding valve. The tool system is equipped with the concept of Internet of Things (IoT). Data in the system will be sent to the cloud data server which is then forwarded to the website so that feed availability and feeding status can be monitored remotely through the peterna website as long as it is connected to the internet network. Broiler feeding can also be done directly through the button available on the website. And the result obtained is that the system can give feed to chickens according to a predetermined schedule.

Keywords: Broiler feed, Internet of Things, Cloud Data Server

1. Introduction

Number growth Indonesia's population is quite high, which is 1.49%, which means that every year the population increases to 3.5-4 million. PThe increase in population resulted in increased food needs. Wrong The only one is the need for chicken consumption. Consumptionchicken meatThe race per capita / year of the Indonesian people in 2017 amounted to 5.68 kg per capita / year, an increase of 573 grams (11.2%) compared to the previous year's consumption. Meanwhile, native chicken meat consumption was 782 grams per capita / year, up 156 grams (24.9%) from the previous year. The proliferation of culinary made from chicken meat, from roadside stalls to shopping centers, made chicken meat consumption experience an upward trend throughout 2013-2017. Therefore that chicken farming industry in Indonesia also Improved (1) .

Based on the Regulation of the Minister of Agriculture Number: 31 / Permentan / OT.140 / 2/2014 article 1 paragraph 2 states that farmers or broiler and laying hen farming companies that already have a cultivation business license are required to follow the cultivation guidelines as referred to in paragraph (1).

Broilers have been developed very rapidly in every country, especially in Indonesia itself. Broiler breeding centers have been found in all corners of Indonesia, especially in South Sulawesi, especially the Bua District, Luwu Regency. These broiler chickens, in general, are caged in groups, each group is filled with 300 to 500 broilers (2).

The development of this increasingly advanced technology makes people expect ease,

efficiency and effectiveness in sharing aspects of life. The development of technology and science today is marked by the emergence of tools that use digital, online and automated systems. *Internet of Things* is one of the technologies that help human life to be easier and more practical. Technology is also expected to facilitate all aspects of human life. One of them supports entrepreneurial activities, so that the business can be run efficiently, practically, and effectively (3).

For farmers who have a large number of chicken management, it can be a difficult task to keep them fed around the clock. Generally, chicken farmers still use conventional systems to feed the chickens they keep. They use their hands to sprinkle feed on feed gutters and walk along the cage where the broiler chicken coop is very large. So that activities like this for broiler farmers will take time and energy.

Based on previous research conducted by Syafitri Rhamdiani, *et all.* 2018 (4) with the title Automatic Broiler Chicken Feeding System Based *Internet of Things.* This research aims to create a system This automatic broiler chicken feeding is to make it easier for farm managers to set the feeding schedule and the amount of broiler chicken feed. Feeding is carried out according to age data and the number of broiler chickens inputted. The age and number of broiler chickens will determine the feeding time schedule and the amount of broiler chicken feed given based on *Real Time Clock* (RTC) that can open the feed holding valve. The system comes with the concept of *Internet of Things* (IoT). Data on the system will be sent to *Cloud Data Server* which is then forwarded to the smartphone app. However, the drawback of this system is only to provide notifications of feeding status and provide notifications of feed availability according to the time set on the RTC.

Based on the shortcomings of previous researchers, a system was proposed to effectively provide food and control the feeding time of chickens according to chicken needs through a display. When the age of chickens increases or the number of chickens increases or decreases in one cage, the farmer can change the control of the quantity and feeding time of chickens according to their age. Users can set the desired time and save it to the microcontroller's memory and provide information directly to the farmer. As a result of this, the feeder will feed the chickens automatically and on time even when they are away from home. The system provides an efficient solution for sufficient quantities of food distribution, fixed feeding times and automatic feeding can help farmers (5).

2. Research Methods

This system is designed by combining hardware programming in the form of Arduino and software for the web in the form of HTML, and PHP. Later in this program also uses the thingspeak service as an identifier for data and data storage that will later be displayed on the web. The diagram arrangement of this system is as follows.

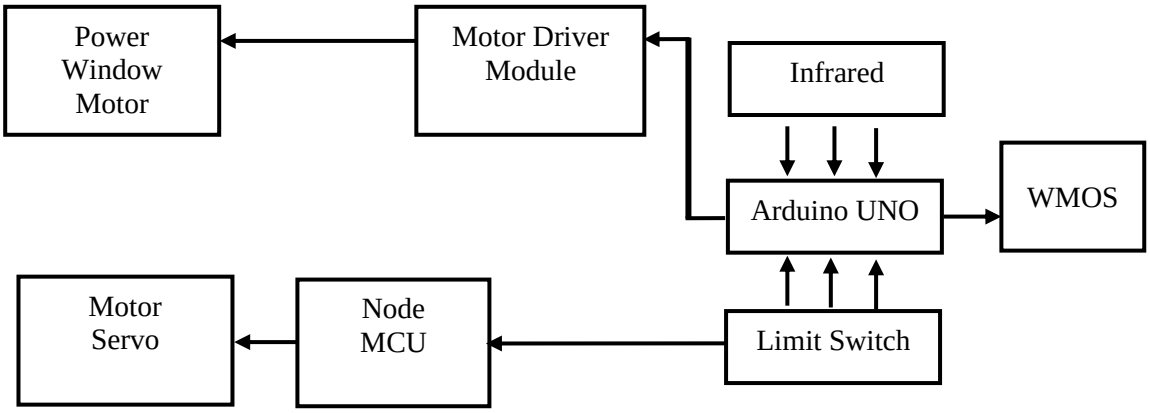

Figure III.1 System Diagram

In the picture above, each component has its own function.

- The power window motor functions to move the food feed conveyor and food door.
- The directional control relay functions to regulate the direction of rotation of the motor power window.
- The non-active active control relay functions to regulate whether or not the motor power window is active.
- Arduino UNO functions as the control center of all actuator and sensor components.
- Infrared serves as a position reader of the conveyor.
- Limit switches function as conveyor limits and food doors.
- MCU nodes as data collectors to be sent to the website.

After knowing the arrangement of the system, the hardware arrangement of the system is made. The arrangement of hardware based on the arrangement of system diagrams is as follows.

At the HX711 connection, the load cell driver and load cell are connected to the intended image, allowing the loadcell to read the weight value accurately.

3. Results and Discussion

A. Research Results

Giving the amount of feed released is done by adjusting the delay in valve opening time on the power window motor. Therefore, this test is carried out to determine the relationship between the valve opening time and the amount of feed released each predetermined time. Testing the relationship between the delay in valve opening time and the amount of feed is carried out when the available feed is small (3 kg) and full (5 kg). This is because there is a difference in pressure when the feed is full and a little which results in a difference in the amount of feed released. Calculations are made about the results and discussions taken from various experiments related to this tool. There are several data taken from the experiment of this tool.

Figure IV. 1 Series of Feed Bins

1) Motor Movement On-Off Relay Activation Data

Table IV.1 Motor Movement On-Off Relay Enablement Data

No.	Changes in Conditions	Conditions Before	Conditions After	Success	Delay(s)
1	Conveyor Motor On to Off	On	Off	TRUE	0.5
2	Conveyor Motor Off to On	Off	On	TRUE	0
3	Food Container Motor On to Off	On	Off	TRUE	0.7
4	Food Container Motor On to Off	Off	On	TRUE	0

From the data in the table above, it can be seen that there are several conditions that occur delay or delay. The data is in numbers 1 and 3. This happens because of the remanence on the motor, causing it to still move and too late to stop on time.

2) Motor Direction Relay Activation Data

Table IV.2 Motor Direction Relay Enablement Data

No.	Changes in Conditions	Conditions Before	Conditions After	Success	Delay(s)
1	Left to Right Conveyor Motor	Left	Right	TRUE	0
2	Right to Stop Conveyor Motor	Right	Stop	TRUE	0.4
3	Left to Right Food Container Motor	Left	Right	TRUE	0
4	Food Container Motor Right to Stop	Right	Stop	TRUE	0.3

3) Loadcell Calibration Results Data

Table IV.3 Loadcell Calibration Results Data

t(sec)	Sensor Measurement Results (200gr)	Sensor Measurement Results (500gr)
1	199.77	499.65
3	198.71	499.12
7	198.83	499.97
15	199.00	499.98
18	197.79	499.91
20	198.94	499.85

From the data above, the difference from the actual size is not too far so weight measurement using a loadcell is very good. From the test results, the error is approximately 0.23%.

4) Feeding Testing

Feeding testing on machines is carried out by comparing the amount of feed weight. Feeding testing can be seen in the table below:

Table IV.4 Feeding tests

No	Slot	Feed Amount (grams). Feed weight 2 kg	Feed Amount (grams). For feed weight 5 kg
1	Slot 1	442	576
2	Slot 2	248	567
3	Slot 3	97	565
Sum		787	1708

In the table above there is a feeding test it can be seen that the less the contents of the main feed container the less will come out of the valve, due to the lack of pressure obtained. For 1 chicken whose age is 1-2 weeks spends about 49 grams in one feeding.

B. Discussion

Feed weighing 2 Kg in slot 1 the number of chickens that can spend 442 grams is 9-10 heads. In the second slot the number of chickens that can spend 248 grams is 5-6 heads, while in slot 3 the number of chickens that can spend 97 grams is 1-2 chickens.

Feed weighing 5 Kg in slot 1 the number of chickens that can spend 576 grams is 11-12 heads. In the second slot the number of chickens that can spend 567 grams is 11 heads, while in slot 3 the number of chickens that can spend 565 grams is 11 chickens.

The following is a table of the number of chickens that can spend feed in each slot.

Table IV.5 Number of chickens that spend feeding

No	Slot	Feed 2 kg (Number of Chickens)	Feed 5 kg (Number of chickens)
1	Slot 1	9 to 10	11 to 12
2	Slot 2	5 to 6	11
3	Slot 3	1 to 2	10 ampai 11

1) Motor Testing Based on Time

Testing of motors moving from each slot based on time *delay* can be seen in the table below

Table IV.6 Motor Testing Based on Time

No	Slot	Feed weight 2 kg (Seconds)	Feed weight 5 KG (Seconds)	Error Difference (%)
1	Slot 1 to slot 2	2,43	2,78	14,4
2	Slot 2 to slot 3	2,23	2,73	22,4

From the motor testing table based on the time above for the error difference from slot 1 to slot 2 between feed 2 Kg and 5 Kg is 14.4%, while the error difference from slot 2 to slot between 2 Kg and 5 Kg is 22.4%.

2) Web View Dashboard

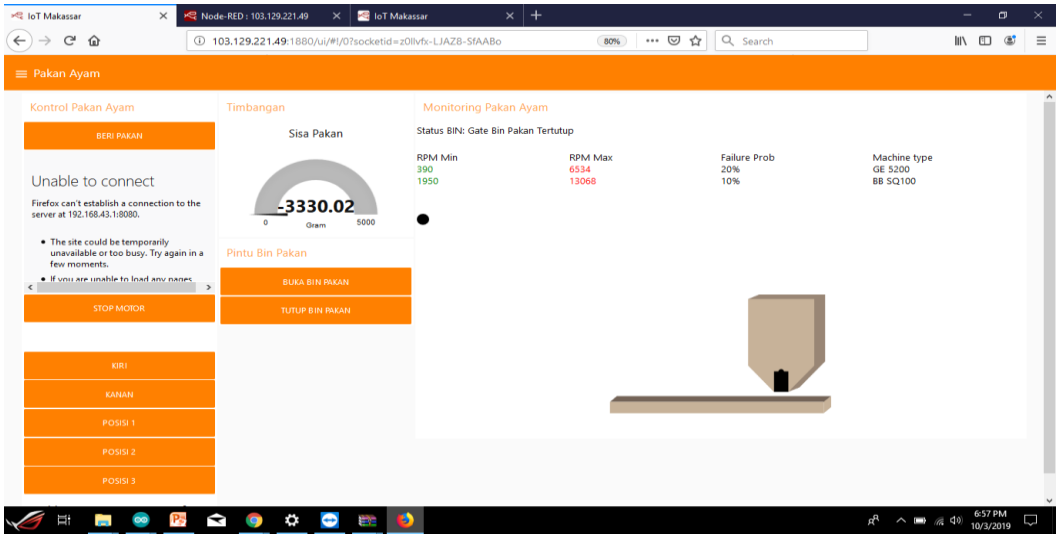

Figure IV.2 Website Display

The data above displays the control display of the feed system that uses the website. At the access time there is a fairly short delay because the network only takes data from the internet related to the condition of the device. As for data changes, it takes a long time because the thingspeak server itself takes at least 7 seconds for each data change.

4. Conclusion

The relationship between the age of the chicken and the amount of feed and the duration of the feeding valve opening is directly proportional, but the number of days is inversely proportional

to the age of the chicken where the larger the chicken, the fewer days the chicken feed stock runs out assuming that the number of chicken feed trays is 10 kg.

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6. Bibliografi

1. Ridhamuttaqin A, Trisanto A, Nasrullah E, Broiler APA. Rancang Bangun Model Sistem Pemberi Pakan Ayam Otomatis Berbasis Fuzzy Logic Control. Electr – J Rekayasa dan Teknol Elektro Ranc. 2013;7 No 3.
2. Syahminan. Alat Pemberi Pakan Otomatis Ayam Berbasis Mikrokontroler Atmega32 dengan pendekatan Fuzzy Logic. Jur Univ Kanjuruhan malang Abstr. 2018;
3. Laksono AB. Rancang Bangun Sistem Pemberi Pakan Ayam Serta Monitoring. JE-Unisla Progr Stud Elektro. 2017;
4. Syafitri R, Margana DB, Sudarsa Y. Sistem Pemberi Pakan Ayam Broiler Otomatis Berbasis Internet of Things. Ind Res Work Natonal Semin. 2018;
5. Safie MK, Muhamad AA. Development of Automatic Chicken Feeder using Arduino Uno. 2017;120–4.