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IoT Based Paint Feed Process Monitoring System Implementation

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ABSTRACT

The increasing level of human mobility causes pets to be abandoned because humans have activities that cannot be left behind or work that must always be done, with this, pets, one of which is a cat, are often hungry because the caregiver is busy working and does not have time to feed the cat. This research is about designing an automatic cat feeder with a periodic monitoring system with a Nodemcu control system with two sensors, namely an Ir sensor and an Ultrasonic sensor with a telegram notification output. the working principle of the Sensors Ir 1 and 2 will detect a cat, if it hits the cat, the place for giving food and drink will open automatically while ultrasonic sensors 1 and 2 are for monitoring food and drink if food and drink do not hit the ultrasonic sensor it will enter a notification that the food and drink had run out. the conclusion of making this tool is to make it easier for cat owners to automatically feed cats.

INTRODUCTION

The development of the current era makes humans busy taking care of their work and of course, they don't have time to share their time with other jobs, and humans will find it easy to carry out their work without distractions, for example in taking care of pets, one of which is a cat who is very loved by the community, by making tools Automatic feeders will make it easier for humans to monitor and control the feeding of pets without having to be always at home. Design and build internet of things-based Automatic Feeding Equipment System, research on this has been widely carried out in other studies including a web-based cat feeder monitoring system (Ragil Surya Pratama, Eka Pujiati, 2020). Automatic feeder for cats using Android-based Raspberry PI (Rahmalisa et al., 2020). Modification of Automatic Chicken Feeder Based on ATMEGA 3285 Microcontroller (Kadek Dwi Ariyanti, Jamaluddin P, 2019). Design and implementation of automatic catfish feeding equipment in the nursery phase based on Arduino and the Blink application (Harifuzzumar, Fadhan Arkan, 2018). Design and build a fish feeder with an Arduino Uno R3-based automation system with an SMS control system (Ardiwijoyo et al., 2018). Design and build a fish feeder and automatic aquarium water temperature detector based on the Arduino Uno microcontroller (Effendy et al., 2017). Microcontroller-Based Automatic Fish Feeding Equipment Design (Weku et al., 2015).

Previous studies that have applied internet of things technology have also included a lot of validation of amplitude range data on Internet Sensor Objects (IoT) (R. A. Candra et al., 2021). Rain monitoring system for drying nutmeg based on internet of things (Ilham et al., 2021). Prototype of IoT-Based Fruit Alcohol Level Measurement Tool (Nursila et al., 2021). Opening the Door Using Internet Of Things (IoT) Based Facial Recognition (Ariansyah et al., 2021). Design and Build a Soil Nutrient Measurement Tool for Citrus Plants Using NPK Soil Sensors Based on the Internet of Things (Pratama et al., 2021). Design of Light Control Using the Internet Of Things (IoT) Based Social Media Telegram Application (Rudi Arif Candra et al., 2019). Heartbeat Monitoring and Stimulation with Internet of Thing (IoT) Based Al-Quran Recitation (Ilham et al., 2019). Infusion of Notification Design With Internet of Things (IoT) Based Social Media Application (Rudi Arif Candra et al., 2020). From the results of studies from previous studies, this research will implement a monitoring system for cat feeding based on the internet of things.

LITERATURE REVIEW

Automated systems and technology, as well as remote monitoring, have become a trend that is very widely used at present, besides being very helpful for users, it is also very useful according to the times, among many that have been done by other researchers such as Opening Doors Using Internet Of Things (IoT) Based Face Recognition (Ariansyah et al., 2021), Light Control Design by Using Social Media Telegram Applications Based on Internet Of Things (IoT) (Rudi Arif Candra et al., 2019), Rain monitoring system for nutmeg drying based on the internet of things (Ilham et al., 2021), The Infusion of Notification Design With an Application of Social Media Based on an Internet of Things (IoT) (Rudi

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Arif Candra et al., 2020), Automatic feeder for cats using Android-based Raspberry PI (Rahmalisa et al., 2020), Design and build a fish feeder with an Arduino Uno R3-based automation system with an SMS control system (Ardiwijoyo et al., 2018).

METHOD

Design Chart

Here is a design chart of the remotely monitored cat feeding and drinking automatic system:

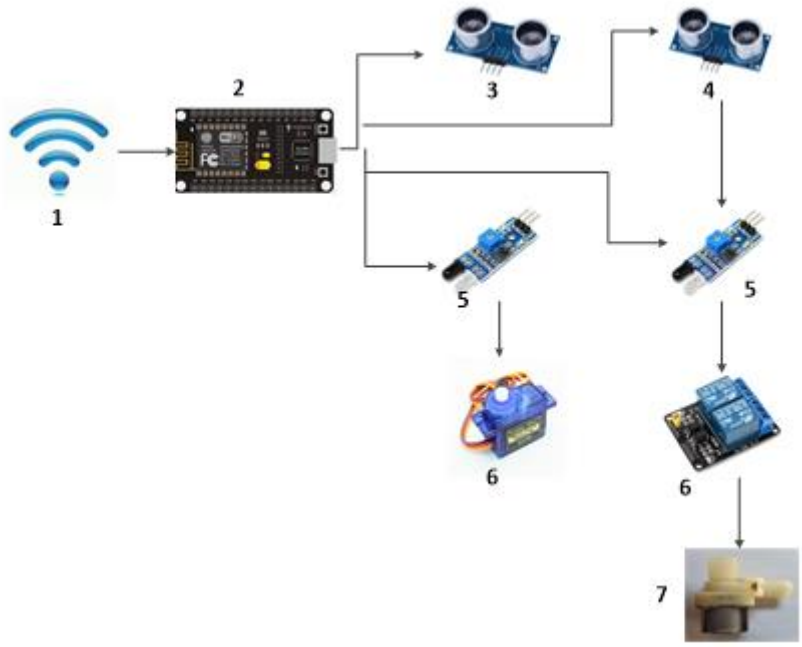

Figure 1. Design Chart

Information

1. Wifi Device
2. Nodemcu
3. Ultrasonic Sensor 1
4. Ultrasonic Sensor 2
5. Infared sensor
6. Relay
7. Faucet

Hardware

The hardware used includes:

Table 1. Hardware and Function

Number	Hardware	Function
1	*Wifi Device*	Hotspot giver to system devices
2	Nodemcu	Component controller of the system circuit process
3	Ultrasonic Sensor 1	Serves as a detector for cat food
4	Ultrasonic Sensor 2	Functions as a cat drink holder
5	Infared sensor	Functions as a cat detector
6	Relay	Functions as a switch to turn on the faucet
7	Faucet	Serves as a means of exiting food and drinks

Software

The software used in this research are:

Table 2. Software and Specifications

Number	Software	Specification
1	*IDE Arduino*	Function for making coding listings
2	*Fritzing*	Function to simulate circuit
3	*Microsoft visio*	Function to create flowcharts
4	*Sketchup*	Function for sketching

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Schematic Design / Block diagram

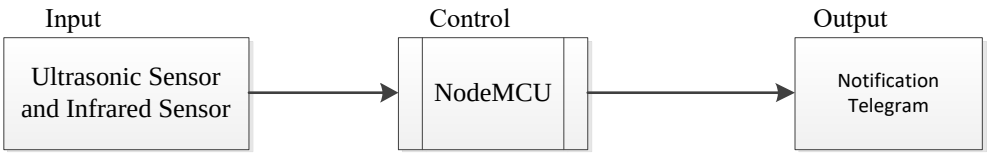

Figure 2. Block Diagram

Information:

1. Input Section

The input section consists of 2 ultrasonic sensors that function to detect the position of the cat's place to eat and drink and an infrared sensor to read the cat's presence.

2. Control Section

The control section consists of the NodeMCU which functions as a controller for the entire circuit so that the circuit can work optimally.

3. Output Section

The output section consists of notifications to smartphones using telegram media to display the status of the condition of the cat's eating and drinking process in real-time.

System flowchart

The following is a flowchart of an Arduino-based automatic curtain with light intensity.

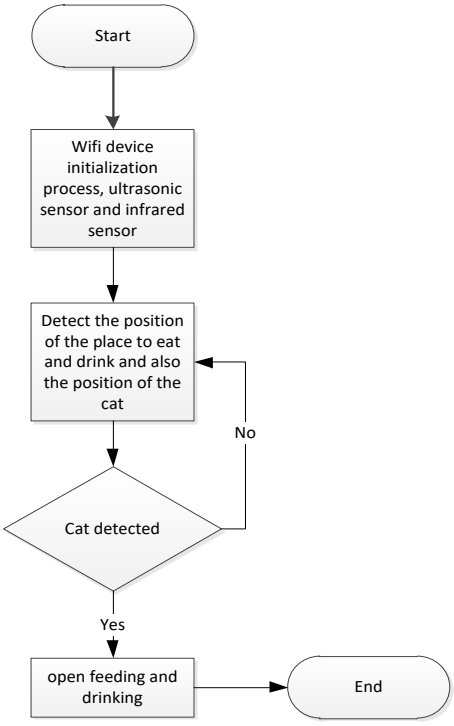

Figure 3. Flowchart of Program Flow

The flowchart above explains the flow of how the program:

The first step is to set all the components by connecting the pins on the component. Then reading the wifi device, ultrasonic and infrared sensors after the ultrasonic sensor reads the position of the place to eat and drink and the infrared sensor detects the presence of a cat, the limit switch functions to move the motor to provide bait and drink to the place that has been set, and as an output a notification will be sent to the device smartphone using the telegram application.

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Design Tools

Tool design offers automatic cat feeding and drinking with telegram notification:

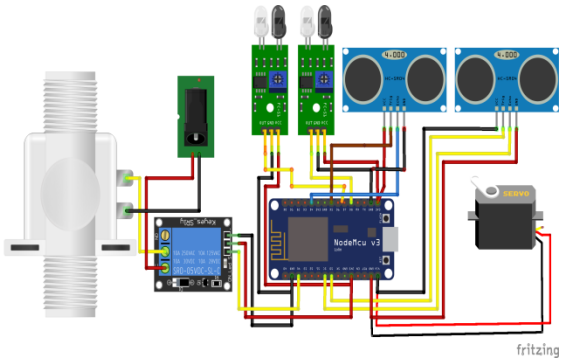

Figure 4. Tool Design

All components are connected, the system starts to run with the nodemcu process must be connected to the wifi/network and the Ultrasonic 1 sensor functions as a detector for the cat food place, if the cat food place is exhausted, the Ultrasonic 1 sensor will send a notification to the telegram, while ultrasonic 2 serves as a detector for the cat's drink, the infrared sensor functions as a cat detector. If the cat hits the infrared sensor 1 and 2, the drink and food holder will open automatically by sending a notification to the telegram.

RESULT

Testing Procedure

After the system is complete, it is necessary to test the system. Where the ir sensor will detect a cat that hits the sensor if the cat hits the infrared sensor 1 then the cat's food will fall in the place that has been provided and the message will enter the telegram with the message "the cat has eaten" and if the cat hits the infrared sensor 2 then the cat's drink flows on the cat's drinking bin and will send a message to the telegram with the message "the cat has drunk". Ultrasonic sensor 1 serves to give a message to the telegram if the drinking water has run out while Ultrasonic sensor 2 serves to give a message if the cat has eaten. Where the test is carried out 10 times to determine the performance of the tool that has been designed.

Table 3. Cat feeding and drinking test

Number	Test	Sensor Reading		Status		Information
		Infrared 1	Infrared 2	Servo	Selenoid	
1	Test 1	Detected		Open		The cat has eaten
2	Test 2	Detected		Open		The cat has eaten
3	Test 3		Detected		Open	The cat has been drinking
4	Test 4	Detected		Open		The cat has eaten
5	Test 5	Detected		Open		The cat has eaten
6	Test 6		Detected		Open	The cat has been drinking
7	Test 7	Detected		Open		The cat has eaten
8	Test 8	Detected		Open		The cat has eaten
9	Test 9		Detected		Open	The cat has been drinking
10	Test 10	Detected		Open		The cat has eaten

This test is carried out 10 times, where the cat will approach the food place when the cat starts to get hungry, when the cat hits the Ir 1 sensor, the cat's feeding area will open automatically then the cat's food will fall to the place that has been provided and send a notification to the telegram with the message "The cat has eaten" and when the cat hits the Ir 2 sensor, the solenoid faucet will open then the water will flow into the drinking container that has been provided and send a notification to Telegram with the message "The cat has drunk" to the user's Telegram.

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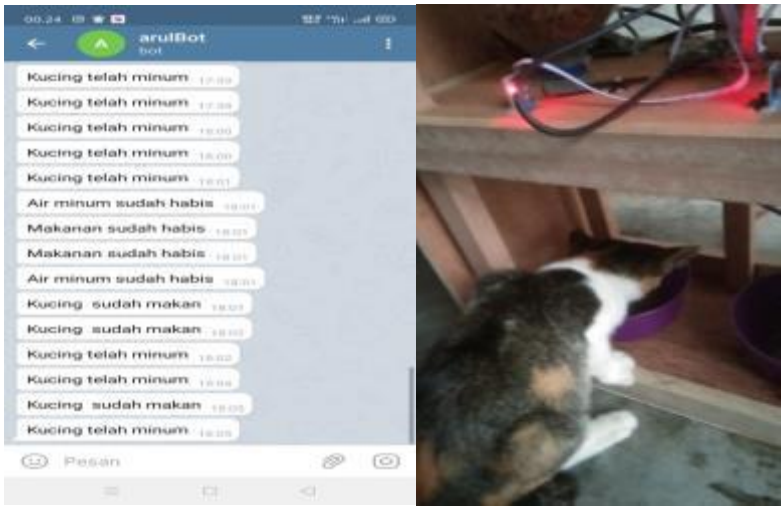

Figure 5. Cat feed and drink and telegram notifications

Table 4. Distance testing on ultrasonic senor

Number	Test	Sensor Distance		Information	
		Ultrasonic 1	Ultrasonic 2	ultrasonic notification 1	ultrasonic notification 2
1	Test 1	10 centimeters	10 centimeters	No message	No message
2	Test 2	15 centimeters	10 centimeters	Food is out	No message
3	Test 3	5 centimeters	10 centimeters	No message	No message
4	Test 4	8 centimeters	11 centimeters	No message	Drinks are up
5	Test 5	11 centimeters	5 centimeters	Food is out	No message

Testing on the ultrasonic sensor, when the ultrasonic sensor is 1 and hits the distance to the cat's food and drink, there is no notification notification that enters the user's telegram and when the distance of the cat's food and drink begins to decrease from 10 cm, a notification notification will enter in the form of "cat eating has run out ” or “the cat's drink has run out”.

DISCUSSION

Testing the measurement of the distance of the ultrasonic sensor to a place to eat and drink in the series is carried out 5 times with different distances, the settings made accordingly will provide a notification if it has passed 10 centimeters. From the test results it can be seen that the ultrasonic sensor used is running well and testing the use of the infrared sensor is also appropriate.

CONCLUSION

After designing and realizing the Implementation of the Internet Of Things (IoT) Based Cat Feeder Monitoring System and then testing the tool, both testing in the form of each series and as a whole, the conclusion is that this tool can make it easier for cat owners to feed cats automatically and provide periodic reporting if the owner is not at home in the form of a message that the cat's feed and drink have run out.

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