CREATIVE TECHNOLOGY OF SMART CAGE DESIGN USING OBJECT DETECTION SYSTEM

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Abstract

Currently, keeping lovebirds is not only one of the favorite hobbies of some people, sometimes it is used as savings, some even make it a lucrative business. Various types of lovebirds and maintenance media are an option for some people. When caring for lovebirds, regular provision of food and drinks has become a must so that lovebirds do not lack nutrients that can cause death in lovebirds, and to maintain the health of lovebirds it is necessary to maintain a cage. clean it, that is by throwing feces frequently. These problems can be solved by smart cage with object recognition system. So this system can automatically feed and drink by recognizing objects (food and water). To detect feed with infrared sensors and detect water with water level sensors. And this system can also clean the cage according to the time we set with a real-time clock. This system can make it easier for bird keepers who are busy with their activities so that their pets can be fully cared for.

Keyword: Creative, Smart cage, detection object

INTRODUCTION

Keeping lovebirds isn't only a hobby that some people enjoy, but sometimes it is used as savings, some even make it a lucrative business. Various types of lovebirds and maintenance media are an option for some people.

When caring for lovebirds, regular provision of food and drinks has become a must so that lovebirds do not lack nutrients that can cause death in lovebirds, and to maintain the health of lovebirds it is necessary to maintain a cage. Clean it that is by throwing feces frequently. Constraints that often arise when caring for lovebirds are irregularities in feeding and drinking lovebirds. As a result, it is not uncommon for lovebirds to eat and drink less and even result in the death of their pets. And because bird droppings are not cleaned in time, it can cause birds to become sick and even die

STUDI LITERATURE

Lovebirds are social birds. In the wild, these birds live in groups. Each group consists of 5-20 people. Adult birds live in pairs. Called "lovebird" or "lovebird" because this bird will only separate from its mate when one of them dies. This bird of the genus Agapornis is relatively small compared to other parrots. Slightly larger than a parakeet. It is about 13-17 cm long and weighs 30-60 grams [1-3]

Fig 1 Lovebird

NodeMCU is an electronic circuit board based on the ESP8266 chip with the ability to perform microcontroller functions and also an internet connection (WiFi). There are multiple I / O pins so it can be developed into a monitoring and control application for IOT projects. The NodeMCU ESP8266 can be programmed with the Arduino compiler using the Arduino IDE (Yogendra Singh Parihar, 2019)

Fig. 2 NodeMCU ESP8266

Fig.3 Infrared

Infrared sensors are electronic components that can detect objects when infrared light is blocked by objects. The infrared sensor consists of an infrared LED as a transmitter and a phototransistor as an infrared light receiver. Infrared LED as infrared light emitter stands for Light Emitting Diode Infrared, which consists of gallium arsenide (GaAs), which can emit infrared light and thermal radiation with electrical energy. The definition of water level itself includes a set of tools for measuring water levels that are equipped with a control system that can automatically detect depth, volume, water flow and the like with high accuracy. So if there is a significant or strong increase in water, this device immediately sends a signal. Then it is forwarded to the warning system in the form of an LED light indicator to indicate that the water atmosphere is rising or the tank is full [4, 5]

Fig.4 Waterlevel

Fig. 5 Real Time Clock

Real Time Clock is a chip (IC) that has a function as a time and date storage. The RTC IC has a register that can store seconds, minutes, hours, date, month and year data. This RTC has 128 RAM locations consisting of 15 bytes for timing and control data, and 113 bytes for general RAM [6]

In this system, infrared sensors, water level and RTC provide inputs to the NodeMCU ESP8266. After the NodeMCU ESP8266 receives input from the infrared sensor, Arduino gives the relay a command to open the servo and fill the feed. In the meantime, the Arduino water level sensor will trigger the relay again so that the water pump will suck in the water so that the drink will be filled. Finally, the RTC instructs NodeMCU ESP8266 that NodeMCU ESP8266 will immediately command Servo 360 to perform the cleaning every hour designated to clean the dirt [7, 8]

In this system, infrared sensors, water level and RTC provide inputs to the NodeMCU ESP8266. After the NodeMCU ESP8266 receives input from the infrared, water level and RTC sensors, the Arduino gives a command to the relay to open the

servo and fill the feed. In the meantime, the Arduino water level sensor will trigger the relay again so that the water pump will suck in the water so that the drink will be filled. Finally, the RTC instructs the NodeMCU ESP8266 that every hour designated to clean the dirt, the NodeMCU ESP8266 immediately orders the servo 360 to clean it. And for every sensor ordered, it reports to the Thingspeak web and we can see the food and drink diagram

RESEARCH METHODS

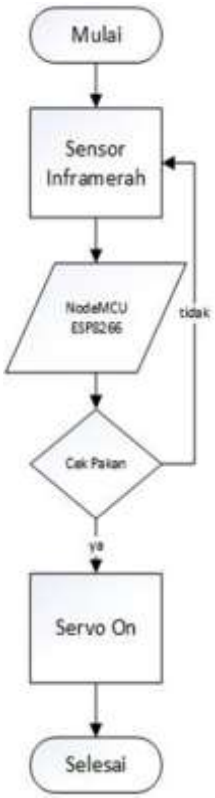


Fig.4 Flow event microcontroller

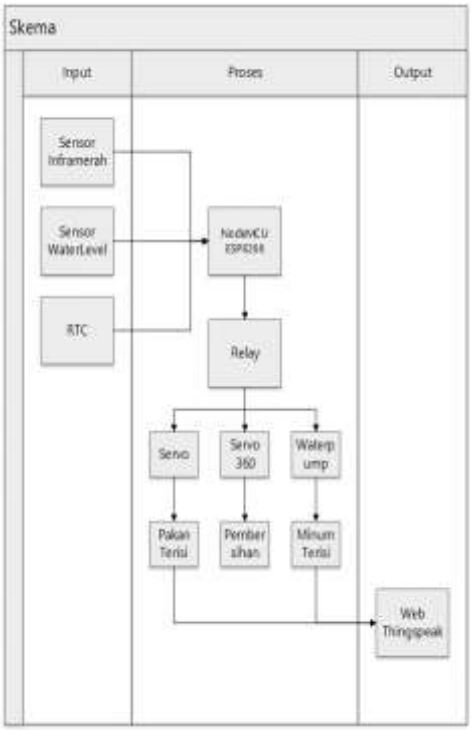


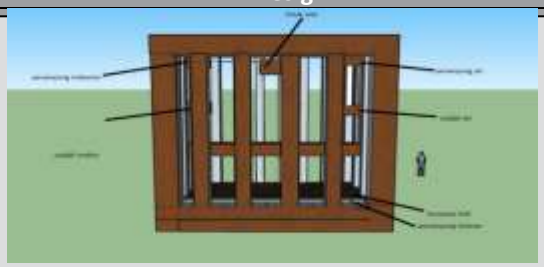
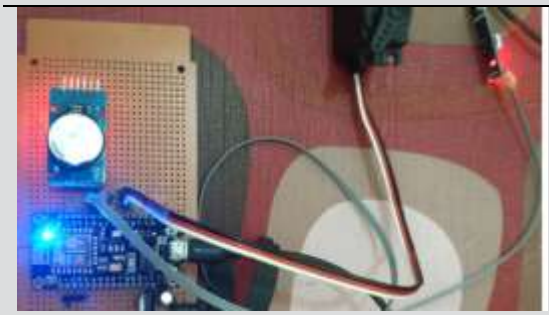
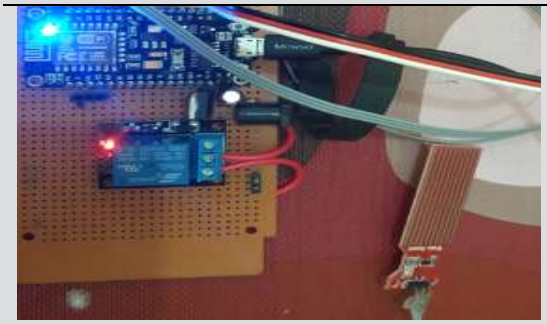
Fig.5 Waterleve Flow event sensor

From the system workflow in Figure 4 and 5 it can be explained that the water level sensor records data to the NodeMCU ESP8266 when the system is turned on, when the drink is empty, the water pump sucks water into the drinking container then fills it into the drinking container, but when the drink is not detected empty, the sensor water level will record data again until it is detected empty. From the system workflow in Figure 4-3 it can be explained that the RTC determines the hours for cleaning on the NodeMCU ESP8266 when the system is running. If the clock matches the specified RTC then the Servo 360 will do the cleaning, but if the time doesn't match the RTC then the Servo 360 will not do the cleaning.

IMPLEMENTATION SYSTEM

Table1

Implementation and design smart cage

Design	Information
	In the picture beside is the process of designing a medium-sized smartcage that can be used for birds in groups or one bird, this system will be connected to a microcontroller device which can later provide information about the condition of the birds and the availability of feed.
	To use the infrared sensor to record the feed detection, you must first pair the pins that are set between the pins on the NodeMCU ESP8266 and the infrared sensor. Jumper cables are used when installing these pins. Where pin GND NodeMCU ESP8266 with GND on the sensor, then pin 3.3V on NodeMCU ESP8266 with VCC on the sensor and pin D5 NodeMCU ESP8266 with pin assignment on the sensor
	In the picture beside is an experimental connection between the mcu node and a relay which will later be connected to other electrical devices, the mcu node is connected to a power cable which will provide a maximum of 5 volts of electrical power
	Design schematic between real time clock and NodeMCU ESP8266. In order to be connected to each other and can be cleaned, it must be connected to the pins that are matched between the Real Time Clock pins and the NodeMCU ESP8266. Where the GND to GND pin connecting cable, VCC to 3.3V pin connecting cable, SCL cable connected to GPIO3, SDA cable connected to GPIO2. Here is the source code for the developed tool.

CONCLUSION

The infrared sensor can detect sensor values that the feed is still there or has been used up and can then carry out the filling. The water level sensor can record sensor readings that the water is still available or used up and can then be refilled. The user can set the clock to perform cage cleaning via the real-time clock. The NodeMCU ESP8266 can send outputs to the Thingspeak web.

The next researcher is advised to replace this infrared sensor system with a more sensitive or additional device to make it more effective. The next researcher is advised to use Artificial Intelligence (AI) to clean so that the webcam is cleaned when it detects dirt. Or you can clean it directly. For the next researcher, it is recommended that the web display should not just be a diagram, but input a webcam so that we can directly observe the cage live. It is recommended for the next researcher when there is a disconnection, warning or notification that the internet connection is not connected. Users are advised to always dispose of the dirt in the dirt container, because this system only cleans the dirt on the conveyor cloth, not in the dirt container.

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