Poultry Monitoring and Controlling System using Arduino Uno

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Abstract: *This work is used to save the time and dependence on the work. By combining wireless system networks to manage and monitor environmental parameters such as light intensity, fan, water and temperature are automatically monitored and controlled. This system also helps farmers to monitor the poultry farm. It is a combination of Arduino Uno, gas sensor, LDR sensor, water sensor and temperature sensor which makes the work easier. The changes in this system are observed with the help of LCD display. The production of automatic feeding machines for poultry farming may be necessary to expand this industry in rural India. In the present system, a poultry farm requires labour. The chickens are fed manually by humans. This automatic feeding system solves the labour shortage while reducing labour costs. This automatic feeding system can be used in both large and small poultry farms and agriculture. In this method, the feed is put into a feeder or a feeder. This device also uses an automatic misting system to maintain a constant temperature in the farm. This automatic misting device can also be used to keep the room at a constant temperature. This automatic misting device can also be used to keep the air in the livestock farm at a comfortable temperature. This device is easy to use and affordable. Small poultry farms in India can use it. It can be controlled by android phone.*

Keywords: Arduino, poultry, chick, farm, soil mixture, food and feeder, Temperature sensor, fogger system, Temperature sensor , water pump

I. INTRODUCTION

Now a days, poultry farming is an important source of food in India. The development of such a system (automatic feeding system) could be of great benefit to the expansion of the poultry industry. The main task is to remove gas from the farm and cool it so that the temperature in the farm can be regulated. Manpower is needed for manual feeding of chickens in poultry farms. This broadens the horizon. In the summer,   the temperature rises dramatically. Cooling is also done by hand. With this automated feeding and cooling system, poultry farms can eliminate these manual tasks and operate more efficiently. To implement a smart or automated farm, use an automatic feeder in a jar, a fogger to monitor ambient temperature and an automatic floor mix to reduce gas emissions. This fork and the automatic fogger for the automatic soil mixture can also be used in a livestock farm. In the development of this device, special emphasis was placed on ease of use. This system can be controlled remotely with an Android mobile device to control it. Staffing levels are reduced, resulting in greater efficiency.

1.1 Components and Techniques

The goal is to develop an Arduino-based system for poultry farm automation. This system includes feeders or containers for the chickens, as well as maintaining the ambient temperature through the Fogger system mechanism. This device also uses automated soil mixes to reduce the unwanted gases produced by the chickens. The temperature and humidity in the poultry farm are also monitored by the machine. By increasing efficiency, maintaining chicken health and reducing food waste, poultry farming costs would be reduced.

II. SYSTEM ARCHITECTURE

The flow of this automated device is shown in this block diagram. The flow of the project can be seen in this block diagram. When the user uses the Bluetooth control application to press the start button. This means that the Arduino board receives these signals from the Bluetooth module. The user gives a command, for example, to the valve to add food to the container, and the food is fed. After that, the user releases the valve command. This indicates that feeding is finished. The next step is to keep the temperature of the farm stable to control the Fooger machine. For this purpose, a temperature sensor detects the farm temperature, and when it is high, the automatic Fogger system is activated. If the temperature drops below the desired ambient temperature, the system automatically shuts down. Another task is to mix the soil with the fork and minimise gas emissions. The consumer commands the soil mixing fork to start moving. Any obstacles in the poultry farm are detected by this device.

2.1 Main Components

Main content of this automatic feeding and cooling system for poultry farms

Arduino: Arduino is a microcontroller board that is open source. It is based on user-friendly hardware and software. The Arduino UNO is used in this project. The Arduino UNO is a microcontroller board that uses ATMEGA328P controller crisps with an operating voltage of 5 V and a clock speed of 10 MHz. The ATMEGA328P of the Arduino Uno is a pre-programmed board with a bootloader. This board allows new code to be uploaded without the use of an external hardware programmer. A single chip microcontroller, the ATMEGA328P Arduino UNO, is used. It also consumes very little fuel. Arduino boards are capable of reading inputs and turning them into outputs.
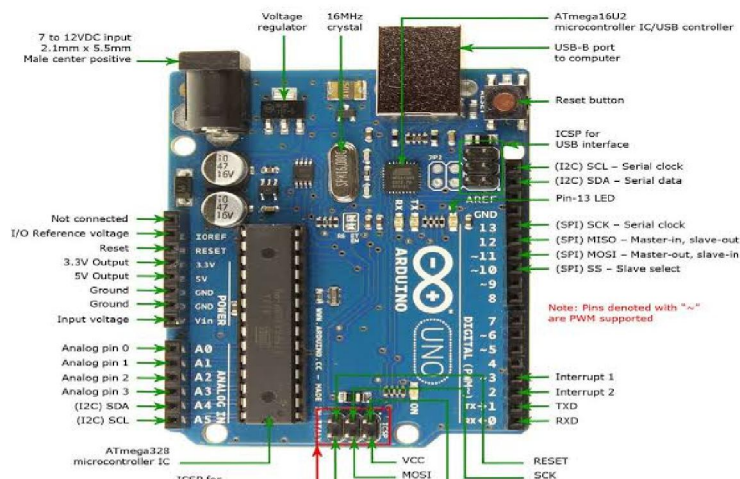

Figure 1: Arduino UNO

Temperature Humidity Sensor Module: The temperature in the environment varies greatly, often reaching dangerously high levels in the summer and dropping to dangerously low levels in the winter. Both of these have a direct impact on animal welfare and poultry chick health, such as avian influenza, hand-foot and a host of other diseases. The DHT22 temperature sensor is used to measure the temperature and humidity in this unit. The temperature of this sensor can be measured in both Fahrenheit and Celsius. This sensor measures temperature and humidity at a low price. It uses a capacitive humidity sensor. It also uses a thermistor to calculate the air quality in the environment. The measurement unit or output is determined digitally.
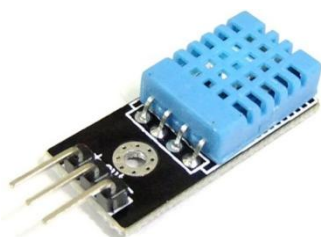

Figure 2: DHT-22 (Temperature Sensor)

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Ultrasonic Sensor: Ultrasonic sensors are semiconductor devices that use ultrasonic signals to measure distance. This sensor measures the distance travelled through the air (using non-contact technology). It is capable of measuring distances from 2 cm to 400 cm. With this non-contact sensor, the distance can be determined without damaging the target.

Figure 3: Ultrasonic Sensor
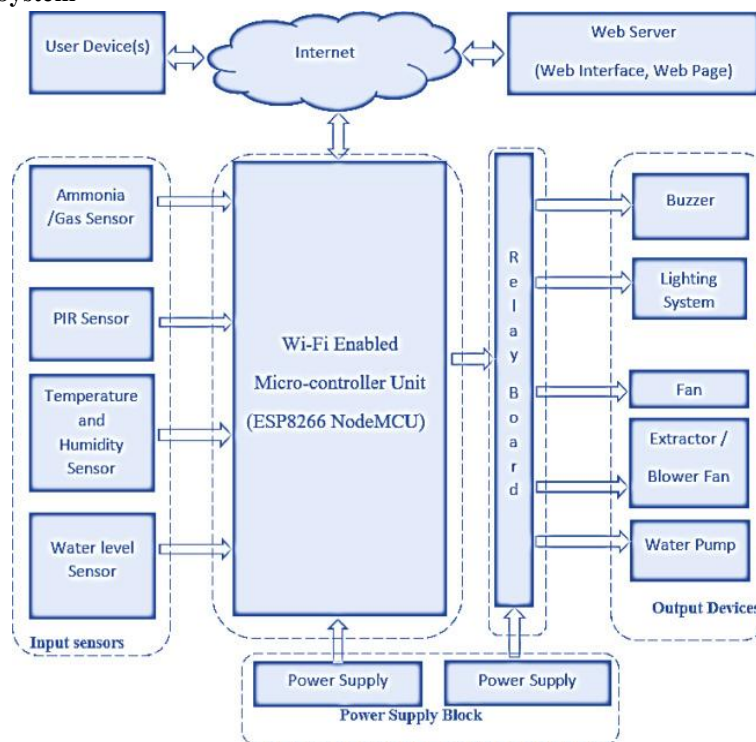
2.2 Block Diagram of System

Figure 4: Block diagram of system

Battery Module: The Ardiuno UNO is powered by a battery module. A 12V battery is used in this device.

Fogging System: This device is used to maintain and monitor the climate in a poultry farm. It is an automatic device that turns on when the temperature in the atmosphere rises too high. And continues to do so even when the temperature is low. It can also work for a certain period of time.

Algorithm for this System

Consider the system as "S" in the algorithm of this automatic feeding and cooling system, and the key components are input, output, feeding system, fogger

System, soil mixing, and obstacle detection.

S = (I, O, FF, FS, SM, OD)

Where: S = System

I = Input (temperature, feed, fog, gas)

O = Output (food, temperature, gas)

T = temperature

FF = feeding system
FS = Fogging system
SM = Soil mixing
OD = Obstacle detection
G = Gas

Code for feeding the food
```
FF (){
 if (signal= =on)
{
 if (Feed Silo or Tank = = full)
{
Open food outlet ()
{
Fill the fodder/feed container/food pan with food.
}
} else {
Close food outlet ()
}
}
}
```

Process of controlling environmental temperature
```
 T ()
 {
if (temp = = High)
{
Start Fogger ()
 }
else
{
Stop Fogger ()
}
}
```

Gas reducing process
```
G ()
 {
 if (System= =start)
{
Fork Down ()
 }
else
{
Fort Up ()
}
}
```
(iv) Obstacle detection
```
O ()
```

```
{
When (an obstacle is detected)
{
Stop system ()
}
else
{
Continue ()
}
}
```


Figure 5: Fogger system

Figure 6: Feeder

The Arduino UNO is used in this framework. The Arduino UNO is a microcontroller that controls the entire system. An automatic feeder for poultry farms is included in this system. With the help of Arduino UNO, this system will deliver feed to a specific container. The valve will be opened to deliver the feed into the tray/container when the user gives the command through the remote control to start feeding, and it will be turned off when the tray/container is full. This method of temperature regulation is achieved by using a temperature sensor and a fogging device to control and analyse the ambient temperature in a poultry operation. By using an automatic fork-bottom mix, this device avoids unnecessary gases. This temperature monitoring and control system can also be used in a livestock farm.

III. RESULTS AND DISCUSSION

The use of Arduino is an innovative technology for the poultry industry in India and around the world that has the potential to transform manual poultry farming into a modern automated process. The farm owner should keep in mind things like feeding, a cooling system with automatic fogger and temperature sensor, gas reduction and obstacle

detection. This device also uses a SD card to shop temperature data and can communicate with an Arduino UNO. This method reduces the labour cost. With the fogger machine, you can feed the food while reducing unnecessary emissions, maintaining the temperature in operation and cooling the process. This device is fully automatic. As a result, this method saves money, time and manpower and at the same time increases the productivity of the farm, ertaining the health of livelihood and increasing quality and quantity. We had also discussed some previous research. This control device to track and control the poultry farm (Archana et al. 2018). To keep an eye on the chickens, this device contains sensors and a mobile communication system. It also simplifies the work. The light intensity is controlled by the temperature of this device. These parameters are also monitored automatically. Internet was used for communication between computers and people in this system. This device is able to save time and labour. The GPRS network based framework was the subject of this research. This device uses GPRS based wireless technology to monitor the poultry environment. The consumer will use this device to manage and track the poultry farm and provide nutritious feed to the chickens. Low cost means less time spent on labour. This device provides a safe environment by monitoring parameters such as temperature and humidity. This work focused on automating the feeding process in containers to reduce labour costs.

It helps the poultry industry with labour problems. This technology has the potential to reduce both public risk and economic costs. Temperature can also be used to diagnose influenza infections. In this research, a micro temperature sensor technology was developed to meet the requirements of low power consumption and high sensitivity. This study reduces the cost of manual labour. It increases the productivity of poultry farm .The data about the environment of the poultry is collected by a wireless sensor in this device. Therefore, managing and tracking the environment of the poultry is simple and straightforward. The integration of sensors and a GPRS-based network is the subject of this study. This can be used to manage and track the environmental parameters of the farm. This system controls temperature, humidity, and ammonia gas as well as feed and water levels. An automated system controls and maintains these parameters. The goal of this study is to maintain the poultry house at the desired temperature (Upachaban T et al. 2016). This machine is also responsible for the results. In this system, key factors such as temperature, air, and humidity are controlled using a ventilation system. This project was organised hierarchically. This reduces production costs while improving animal welfare. This study includes an automatic feeding system and a water sprinkler system for automatic. It has a wireless sensor and water sprinkler pump for cooling and monitoring the temperature around poultry farms. It also reduces labour costs and keeps production high.

IV. CONCLUSION

Arduino is a revolutionary technology that can transform manual poultry farming into modern automated poultry farming in India and around the world. The farm owner can monitor things like feeding, a cooling system with automatic fogger and temperature sensor, gas reduction and obstacle detection. This system also uses a SD card to shop temperature data and can communicate with an Arduino UNO. This method reduces the labour cost. With the fogging system, you can feed the food and reduce unwanted gas at the same time gases, maintenance of operating temperature and process cooling. This system is completely self-contained. As a result, this technology saves money, time and manpower labour while increasing agricultural production, maintaining livelihood health, and increasing quality and quantity.

ACKNOWLEDGEMENTS

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