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Arduino Based Automatic Feeding & Cooling System for Poultry Farm

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Abstract: Arduino-based Automatic poultry farm is a system that makes efficient use of resources in a poultry farm in the field of agriculture in India. In India large population is depends on primary industries for income. Poultry farm or Poultry industries is one of them as a primary source of income for many families. The poultry industry is important for food supply in India. The development of automatic feeding machines for poultry farms can be necessary for the expansion of this industry in rural areas of India. In the current system poultry farm needs manpower. Manpower manually feeds the chickens. This automated feeding system overcomes the manpower problem and also reduces expenses on manpower. This automated feeding system can be applied in the major poultry industry as well as a small poultry farm and agricultural sector. This system feed food in a food container or food feeder. And this system also maintains the farm temperature using an automatic Fogger system. This automatic Fogger system can be also used in maintains the environmental temperature of the Livestock Farm. This system is easy to use and inexpensive. It can be used by small poultry farms in India. Users can control it through Android mobile.

Keywords: Arduino, Fogger System, Soil Mixture, Food and Feeder.

I. INTRODUCTION

These days Poultry farm is important food supply in India. Development of this system (automatic feeding system can be very useful in the expansion of this poultry industry. Removing gas from the farm and also cooling for control of the farm temperature is the most important task. Chickens in poultry farms are feed manually by manpower/Labour. That increases expanses. Temperature increases very high in summer. The cooling is also manually. Poultry farms can replace these manual activities and work easier with this automated feeding and cooling system. For the implementation of the smart farm or automated farm use, automatic food feeder in the container and uses fogger system for temperature control of the environment and also use automatic soil mixture for reducing the gas in the environment. This Automatic Soil Mixture using Fork and Automatic Fogger system can be also used in Livestock Farm. This system is designed user-friendly. Users can control this system remotely through android mobile. Manpower work is reduced and increases productivity.

II. LITERATURE SURVEY OF PREVIOUS RESEARCH

This study focused on the GPRS network-based system. This system controls the poultry environment using wireless GPRS-based technology. Using this system user can control and monitor the poultry farm and also provide healthy food to the chickens. [1]. Low cost, reduces labour's time. This system monitors parameters like temperature, humidity, and maintains a healthy environment.

This research focuses on building an automatic environmental controlled poultry management system. This system studies physical parameters of poultry farms which included temperature, moisture, humidity, air, and quality of air. This system monitor these parameters also regulates these parameters properly [2]. This whole system is controlled by the handheld mobile device. This reduces Labour cost saves time.

This control system helps the owner to monitor as well as control the poultry farm. This system contains sensors and a mobile communication system to monitor the poultry. And make work easier. By the use of this system temperature, the light intensity is controlled [3]. These parameters are also controlled automatically. This system has used the internet to communicate between devices and people. This system can reduce time and labour.

This Paper focuses on replacing the labour to feeding food into containers. It reduces the manpower issues in the Poultry industry. This system mainly contains two sections in which the first section to feed the food in the particular food container. And the second section is to control the temperature using a temperature sensor to maintain the freshness of food [4]. It improves poultry atmosphere and reduce manpower cost. And save food.

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In this research computer network technology is used by poultry farms. Wireless sensor-based network technology is implemented to control and maintain the climate of poultry farms and also humidity [5]. This system improves the quality of meat production.

In this study, the poultry management system is designed which uses both hardware and software (open-source software). Which control temperature, light intensity, humidity, and quality of air in the farm? This system setup is like IoT. This is low-cost hardware and open-source software. This system overcomes many problems faced by poultry farms [6]

This research focuses to maintain the desired climate in the poultry house. This system also controls performance. In this system Ventilation system is used to control the main factor like temperature, air, humidity [7]. This project was designed hierarchically. This reduces the production cost and improving the health of animals.

This research is the integration of sensors and a GPRS-based network. This can control and monitor the environmental parameters in Farm. This system immediate control temperature, humidity ammonia gas and also controls Food and Water level. These parameters are controlled and maintained by an automated system [8].

This research reduces manual work with the cost. It improves the production in the poultry farm. In this system, poultry environment data is collected by wireless sensor. That's why controlling and monitoring poultry climate is easy to use and also easily accessible to the user [9].

This paper includes improving farm production and quality. This contains a wireless sensor network. It improves poultry growth and the temperature is also maintained by using sensor-based technology. By implementing this system quality and quantity of chicken are improved [10]. This wireless sensor node will be useful for the detection of the status of health of chickens and that's why desired productivity and economy are achieved.

This research work is focused on wireless sensor technology. This technology can reduce public risk and economic costs. Influenza infection can also be detected according to temperature [11]. For the requirement of low power consumption and higher sensitivity micro temperature sensor technology was developed in this research.

This research contains an automatic feeding system with an automatic cooling system using a water sprinkler system. It contains a wireless sensor with a water sprinkler pump for cooling and controlling the environmental temperature of poultry farms. It also reduces labour costs and maintains good productivity [12].

III. PROBLEM STATEMENT

To develop Arduino-based system for making automatic poultry farms. This system provides food feeders or food containers to the chickens; the system also maintains the environment temperature using the mechanism of the Fogger system. This system also reduces the unwanted gases from poultry by automatic soil mixtures. The system also checks the temperature and humidity of the Poultry Farm. It will reduce poultry expenses and improves productivity and maintain the health of chickens and reduces food wastage.

IV. SYSTEM ARCHITECTURE

This block diagram indicates the flow of this automatic system. In this block diagram, you can see the flow of this project. When the user gives the start-up command through the Bluetooth control application. It means the Bluetooth module passes these signals to the Arduino board. For feeding food through containers user gives a command like on the valve and food feeding will perform. After this user gives off the valve command. It means food feeding stopped. The next task is to maintain the temperature of the farm to start the Fooger system. For this task temperature sensor will sense the farm temperature and if the temperature is high then this automatic Fogger system is started when environment temperature goes low (Desired Environment Temperature) this system off automatic. Another task is to use the fork for soil mixture to reduce gases. The user gives the commands for the start-up of the Fork for soil mixture. This system detects any kind of obstacles in the poultry farm.

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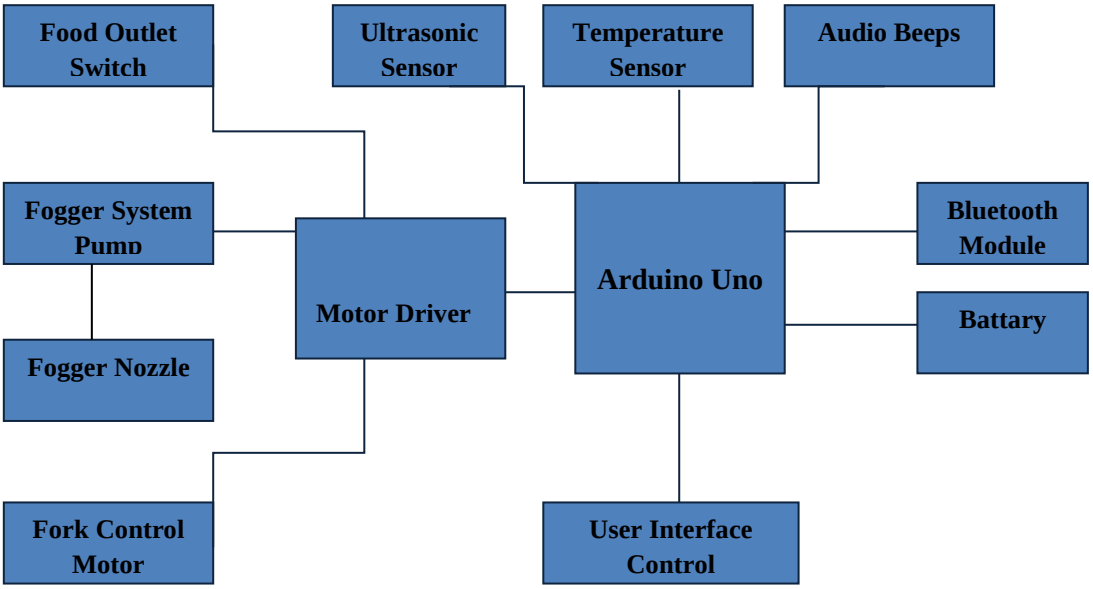

Fig 1 Block Diagram of Working Model

V. MAIN CONTENTS

Main contents of this automatic feeding and cooling system for poultry farm

A. Arduino**:**

Arduino is open-source microcontroller board. Which is based on easy-to-use hardware and software. In this work, Arduino UNO is used. Arduino UNO is a Microcontroller board that uses ATMEGA328P controller chips having an operating Voltage of 5 V and a clock speed of 10 MHz. The ATMEGA328P on the Arduino Uno is a pre-programmed board with a boot loader. This board allows uploading new code without using an external hardware programmer. ATMEGA328P Arduino UNO is a single-chip microcontroller. Also, It consumes low power. Arduino boards can read inputs turn them into output.

B. Temperature humidity sensor module:

Environmental temperature can vary some time it goes very high in summer and some time it goes very low which directly affect animal livelihood as well as poultry chickens such as Bird Flu and Hand foot and many other Diseases. In implementation of this system DHT22 Temperature sensor is used for measuring environmental temperature and humidity. This sensor can measure temperature for both Fahrenheit and Celsius. This sensor is low cost sensor for measuring temperature and humidity. It uses Capacitive Humidity Sensor. It also uses Thermistor to measure environmental air. The measurement unit or output is received in digital form.

C. Ultrasonic Sensor:

Ultrasonic Sensor is semiconductor devices which use to measure the distance based on ultrasonic signal. This sensor measure the distance through the air (using non-contact technology). It can measure distance from 2cm to 400cm. By using this Non – contact sensor distance measured without any damage of object.

D. Battery Module:

Battery Module is used for supply power to Ardiuno UNO. In this system 12V battery is used.

E. Fogger System:

This system is used to maintain and control environmental temperature of poultry farm. This is automated system which starts when atmosphere temperature goes high. And remain of when temperature is low. It can also work in pre-defined time interval.

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VI. ALGORITHM FOR THIS SYSTEM

In the algorithm of this automatic feeding and cooling system
Consider System as "S"
And there is main components are Input, Output, Food feeder, Fogger System, Soil Mixture and Obstacle Detection

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

Where S = System
I = Input (Temperature, Food, Fog, Gas)
O = Output (Food, Temperature, Gas)
T = Temperature
FF= Food Feeder
FS= Fogger System
SM= Soil Mixture
OD= Obstacle Detection
G = Gas

i.Process to feeding the food

```
FF ()

{
        If (signal= =on)

{
        If (Feed Silo or Tank = = full

        {
                Open food outlet ()
                        {
                        Store food into the fodder/ feed container/ food pan
                        }
                }
                Else
                {
                        Close food outlet ()
                        }
                }
        }
```

ii.Process of controlling environmental temperature

```
T ()
{
        If (temp = = High)

        {
                Start Fogger ()
        }

        Else

        {
                Stop Fogger ()
        }

}
```

iii.Gas reducing process

```
G ()
```

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```
{
        If (System= =start)
        {
                Fork Down ()
        }
        Else
        {
                Fort Up ()
        }
}
```

iv.Detection of obstacles

```
O ()
{
        If (detect any obstacle)
        {
                Stop system ()
        }

        Else
        {
                Continue ()
        }
}
```

This system is based on Arduino UNO. Arduino UNO work as a microcontroller and it control complete system.

Fig 2 Fogger System at Poultry Farm

Fig 3 Feeding

Fig 4 Soil Mixing Fork

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This system contains an automatic food feeder for poultry farms. This machine can deliver food in a particular container using Arduino UNO. When the user gives a command through the remote device for starting the task of feeding the valve is open for delivering the food in pan/container and when it full it turned off the valve. For controlling and analyze the environmental temperature of poultry farm, by the use of temperature sensor and according to the fogger/ mist system this process of controlling temperature is done. This system reduces unwanted gas using an automatic Fork soil mixture. This system of automatic temperature controlling and analyzing can also be used in Livestock Farm.

VII. CONCLUSION

The use of Arduino is an innovative technology for poultry industries in India as well as the whole world which can change manual poultry farming into modern automated. The owner could monitor the farm work such as feeding, a cooling system using automatic fogger system and temperature sensor, gas reducing, obstacle detection. This system also stores the temperature data using SD card which can interface with Arduino UNO. This system reduces the labour cost. Feed the food, and reduce unwanted gases, maintain farm temperature, and process cooling using the Fogger system. This system is fully automatic. Hence this system reduces cost, time, labour/ manpower, and increase the productivity of the particular farm, maintain the health of livelihood also increase quality and quantity.

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