IOT Based Smart Poultry Farm

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Abstract - *The Chicken poultry industry is an important industry for sustainable food supply in our country. The development of an automatic chicken feeding machine can be very useful to the growth of the poultry industry. In existing system, the chickens need a presence of manpower to manually give the food to the chickens. The use of proposed system can replace the worker for feeding the chicken thus overcome the labor problems in the industry and introduce a semi-automatic process in the poultry industry. The Proposed system can be applicable in Poultry Farm and agriculture sector. In poultry farm , it is use to feed the food in container, maintain the temperature using water sprinkler, remove the gas using soil mixture and in Agriculture it is use to Preparation of soil , Spraying to plants, Fertilizer to plants. Through this proposed system it will be helpful to the user.*

Keywords: Poultry, Automation, Food Feeder, Water Sprinkler, Soil Mixture.

1. INTRODUCTION

Nowadays, chicken poultry industry is an important industry for sustainable food supply in our country. The development of an automatic chicken feeding machine can be very useful to the growth of the poultry industry, the Soil mixture for healthy environment and also water sprinkler for control the temperature is most important task and labour-intensive task. These manual processes are needed in normal poultry farm. In order to replace manual Activities and poultry work easier with making smart poultry farm. For implementation of smart poultry farm to use one kind of smart system for Automatic Food Feeder in container and water sprinkler for control the temperature of environment and also use the soil mixture for reducing the Gas in poultry environment. System is designed in such way that user can remotely control to the system through android mobile application. Using this prototype Human work is also reducible and smart work will be done.

2. LITERATURE SURVEY

The system helps to the farmer to monitor the poultry farm and controlling the operations of poultry farm. System is a combination of wireless sensors and mobile system to manage and monitor the poultry's work easier. The environmental parameters like temperature, light intensity and ammonia gas are also monitored and controlled automatically [1]. Internet is linked together to the devices to communicate between thing and the people. The intelligent system can reduce cost, time and labours.

The system replace the human labour to feeding food into container. It overcome the labour problems in the poultry industry and it also involves mainly two sections first to feed the food into particular contained and the second one is to control the temperature sensor to the freshness of chickens food [2]. It improves poultry's climate and reduce labour cost and save food and chicken feeding on time and avoid contaminated food from insects.

The Poultry farm uses a computer network technology. In this study, a wireless sensor network technology is designed which monitor and control the climate of poultry farm and also humidity. A computer network technology is useful to the farmers for human work. It becomes an automation technology [3]. The automation system improves quality of meat production and then it will impact for the ecosystem balance.

The poultry management system uses hardware and open source software. It also includes temperature, humidity, light intensity and also quality of air. System focus to provide the setup like IOT, low cost hardware and open source software. System detects many problems faced by poultry industry [4]. It saves time, dependency of labour's and improve healthy environment, also increases poultry production.

The focus of this research paper is to monitoring and controlling the poultry environment using a wireless Sensors GPRS network and also to take a correct action. Using this system user can monitor and also to control the climate of poultry farm, and help to form a healthy food to the chickens [5]. This system reduce cost, time of labour's ,the system monitor environmental parameters such as temperature, humidity, ammonia gases, water level and maintain a healthy environment.

The paper focus on automation of poultry farm using wireless sensor network and mobile communication system. This paper also focuses on environmental parameters like temperature, humidity, ammonia gas these are monitored and controlled fully automatically [6]. By using this automation quality of meat production is improved and growth. The smart poultry farm is fully focus on climate so the quality of chickens will be improved. The climate of poultry farm becomes fully automated.

The system's aim is to provide to build an automated environment controlled poultry management system. The system study the physical parameters about poultry house it includes temperature, humidity, moisture content, air and also the quality of the air. System not only monitored the poultry house but also regulates these parameters properly [7]. The whole system access and control through remotely using handheld mobile devices. The system reduces labours, saves times.

The paper focus to provide the desired climate conditions in poultry house and also to control the performance. The proper method of controlling poultry house the ventilation system is use and it is also include a main factor is air temperature, air humidity [8]. The uncertainty of system is also reduced and also this mode contras the system in hierarchical manner this project not only reduce production cost but improved health of animals.

The paper focuses to the integration of wireless sensors and GPRS network to control and monitor the environmental parameters in the poultry farm. The environmental parameters like temperature, humidity, ammonia gas etc. System takes immediate action to control these environmental parameters. Food and water level is also controlled and monitor using automated system [9]. Smart helps to the farmers or labour's to monitor and remotely access to the whole system. One of the main benefit is to provide food and water level time to time without wastages.

The paper reduce labour's manual work with labour's cost. It improves the meal production in poultry farm. By using wireless sensor data is collected from poultry's environment and it is combined to the sensors. So, controlling and monitoring poultry's climate is easily accessible to the user [10]. This system provides a monitoring system and which is useful to the owner to receive the information from poultry farm and also to control wirelessly. So this system is able to gather the data and operate automatically and helps to maintain the temperature in poultry farm.

Moroccan poultry contributes in the national food security. It focuses on facing obstacles to climate conditions it includes heat in summer and cold waves in winter. The heat losses in the summer in terms of mortality and the cold waves increase the efficiency of the food. i.e. means quality of food is consumed [11].In this paper to study to saving, cooling and heating in poultry house by using earth-air heat exchanger.

The paper includes to improve the poultry farm's production, quality and also economy. Using wireless sensor network, the poultry's growth improves that becomes it is a complete solution for poultry farming. The temperature is also maintained by using this wireless sensor network. By using this system quality and quantity of chickens is improved with human health is also improved [12]. The wireless sensor node would be very useful for early detection of status or health of chickens, and that's why production and economy is achieved.

The research paper focuses to development of the wireless sensor node. Wireless system can reduce the public risk and economic cost of the avian-influenza is become to the least. Influenza infection can be detected according to the temperature and monitoring is done at a very early stage [13]. In order to meet the requirements of low power consumption and higher sensitivity, new micro temperature sensor technology was developed. This paper's aim is to determine minimum functions but enough for the practical monitoring.

Wireless sensor node and temperature sensor detects infected chickens with the highly pathogenic avian influenza (HPAI) viruses in poultry farms. In early stage wireless sensor node shows weakness and never of the infected chickens. A global avian influenza surveillance system monitored the health of chickens using wireless sensor nodes with poultry farm [14]. System reports to a user of health conditions obtained by sensors like as fever and weakness. Wireless sensor node has developed to reduce the power consumption of a device.

3. PROBLEM STATEMENT

To develop an IOT based system with making Smart Poultry farm. System supports food feeder to the chickens, system is able to maintain the temperature to provide the mechanism of water sprinkler and also system will reduce the unwanted Gases from poultry by soil mixture. System checks humidity, temperature at poultry farm.

4. SYSTEM ARCHITECTURE

The System Architecture Diagram indicates the flow of the project system. In this Diagram you can see the actual flow of the project. First the user gives the command like system start up and also gives the commands for movements through Bluetooth control application i.e. means Bluetooth module will pass the signals to the Arduino board. After this to perform the task of feeding food, user gives the command like ON the valve and food feeding will be performed after that user will OFF the valve i.e. means food feeding will be stopped. The second task is to sprinkling the water for that temperature sensor will sense the temperature and if temperature is high then buzzer will be beep, user has notified and user will start the motor pump and sprinkling will be start and if temperature is low user will stop sprinkling. The third task is to use the fork for soil mixture to reduce gases. During the implementation system detects any kind of obstacles in poultry farm.
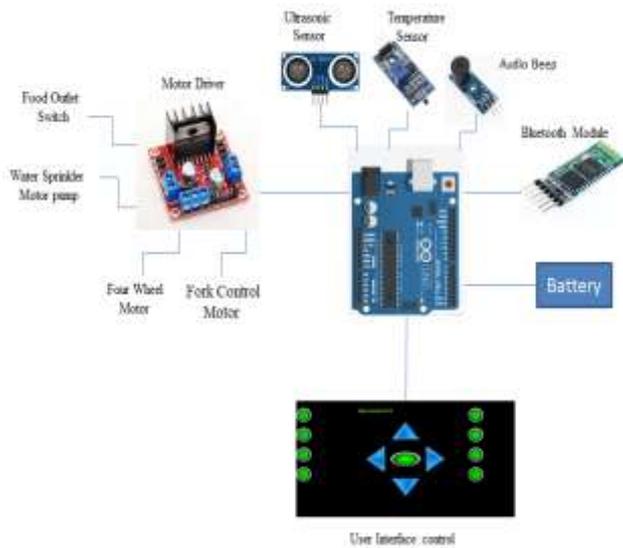
Fig -1: Architecture of working model

5. METHODOLOGY

A. Arduino

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. In this work UNO variant of Arduino is used. Arduino UNO is a microcontroller based developmental prototyping board, uses an ATMEGA328P controller chips having operating voltage of 5V, and has a clock speed of 10 MHz Arduino Uno can be programmed with Arduino IDE, as ATmega328 comes with pre burned with a boot loader eliminates the need of using an external hardware programmer. Here each programmed is known as sketch.

B   Temperature Humidity Sensor Module

Environmental conditions directly affect animal livelihood contributing to some chronic epidemics such as Bird Flu and Hand Foot and Mouth Disease. Therefore, DHT22 is use as a censor for measuring temperature (for both Fahrenheit and Celsius value) and humidity. The measurement unit will be demonstrated in a digital signal form.

C   Ultrasonic sensor

Ultrasonic sensors measure distance based on transmitting and receiving ultrasonic signals. Sensors measure the distance target objects or materials through the air "non-contact" technology from 2cm to 400 cm.

D   Battery Module

A Battery pack that powers electrified vehicles consists of individual battery cells and modules organized in series and parallel. The Standard automotive battery in today's vehicles is the 12V battery.

I.   Mathematical Model

A Smart poultry farm system consider as a 'S' with '5' number of tuples such as Input, output, food feeder, water sprinkler, soil mixture, obstacle detection

   S = (I, O, F, SP, G)
       Where,
       S = poultry farm system
       I = set of inputs
          I.e. I = {Temperature, Food, water, Gas}
       O = set of outputs
          I.e. O = {Feeding Food, Temperature control, Gas reduce}

II.   Algorithm

   i.   F = Process to feed the food

   ii.   T = Process to control temperature

   iii.   G = Process of gas reduce

   iv.   O = Detection of obstacle

I. process to feed the food

F ( )

{

       If (signal ==on)

       {

              If (tank = =full

              {

                     Open food outlet ()

              {

              Store food into the container

               }

       }

       Else

       {

              Close food outlet ()

```
            }

        }

}

ii. Process to control temperature

T ()

{

        If (temp == High)

        {

                Start pump ()

        }

        Else

        {

                Stop pump ()

        }

}

iii. Process of gas reduce

G ()

{

        If (System == start)

        {

                Fork Down ()

        }

        Else

        {

                Fork Up ()

        }

}

iv. Detection of obstacles

O ()
```

```
{

        If (detect)

        {

                Stop system ()

        }

        Else

        {

                Continue ()

        }

}
```

6. EXPERIMENTAL SETUP

The proposed system includes Arduino Uno board acts as the microcontroller and it controls to the whole system. User can control the system through remotely and provides the facilities by Bluetooth control application for movement like left, right, forward and backward.

Fig -2: Proposed system

Fig -3: Manual poultry farm system

This system involves designing and building a prototype of an automatic chicken food feeder for poultry industry usage. This means that the basic concept of the machine is to be able to feed the food to the chickens into particular container by using a microcontroller. When user will turn on through mobile then valve is open to feeding the food, and turn off to close the valve. Furthermore, able to control and analyze the temperature of poultry farm, using temperature sensor and according to that water sprinkling process will be done i.e. through the water pump either pump ON or pump OFF. And also this system is also able to reduce the unwanted gases through fork by using the soil mixturing process.

7. CONCLUSION

IOT is an innovative technology for poultry farming which can be changes a manual farm into modern semi-automated poultry farm. In addition, the system could work on the android mobile application helping the owner to monitor the poultry farm such as food feeding function, object detection, water sprinkling, and unwanted gas reduction. The proposed system can reduce manpower and feed the food to chickens, reduce the unwanted gas, maintain temperature in farm this is fully automatic. Hence this system will be reduce cost, time, manpower, decreasing environment pollution.

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