

# Arduino Based Smart Chicken Farming Using Temperature Sensor

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## ABSTRACT

In the field of agriculture in India, an automatic poultry farm is a device that allows efficient use of resources in a poultry farm. In India, a significant portion of the population depends heavily on primary industries for revenue. Either of them, a poultry farm or the poultry industry is a primary source of income for many families. The poultry industry is essential to India's food supply. The production of automatic poultry farm feeding machines may be needed to expand this industry in India's rural areas. In today's system, a poultry farm needs manpower. The chickens are fed manually by manpower. This automated feeding device solves the manpower shortage while also lowering manpower costs. This automated feeding system can be used in both large and small poultry farms, as well as the agricultural sector. Food is fed into a food jar or feeder by this method. This device also uses an automated Fogger system to keep the farm temperature consistent. This automated fogging device can also be used to keep the room at a constant temperature. This automated fogging device can also be used to keep the Livestock Farm's air at a comfortable temperature. This device is simple to use and affordable. Small poultry farms in India can use it. It can be controlled using an Android phone.

## HIGHLIGHTS

- ① Arduino-Uno used in this system which provides a faster and reliable result than previously implemented system.
- ② Study indicated that this system is more efficient than the previous study. This system is user-friendly and easy to use.

**Keywords:** Arduino, poultry, chick, farm, fogger system, soil mixture, food and feeder

These days, In India, poultry farming is an important source of food. The development of this system (automated feeding system) could be extremely beneficial to the poultry industry's expansion. The most important job is to remove gas from the farm and to cool it so that the farm temperature can be regulated. Manpower/Labour is used to manually feed chickens in poultry farms. This widens the horizons. In the summer, the temperature rises dramatically. The cooling is also done by hand. With this automated feeding and cooling system, poultry farms can eliminate these manual tasks and function more efficiently. For the implementation of

a smart farm or automated farm, use an automatic food feeder in a jar, a fogger device to monitor the environment's temperature, and an automatic soil mixture to reduce gas emissions. This Fork and Automatic Fogger Device for Automatic Soil Mixture can also be used in a Livestock Farm. This device has been developed with ease of use in mind.

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This system can be controlled remotely using an Android mobile device. Workforce is decreased, resulting in increased efficiency.

## MATERIALS AND METHODS

The aim is to create an Arduino-based system for automating poultry farms. This system includes food feeders or containers for the chickens, as well as maintaining the environment temperature via the Fogger system's mechanism. This device also uses automated soil mixtures to reduce the undesirable gases generated by poultry. The Poultry Farm's temperature and humidity are also monitored by the machine. It would lower poultry costs by increasing efficiency, maintaining chicken health, and reducing food waste.

### System Architecture

The flow of this automated device is depicted in this block diagram. The project's flow can be seen in this block diagram. When the user uses the Bluetooth control application to issue the start-up button. It means that the Arduino board receives these signals from the Bluetooth module. The user gives a command like on the valve to feed food through containers, and food will be fed. After that, the user releases the valve command. It indicates that the feeding of food has ceased. The next step is to keep the farm temperature stable in order to activate the Fogger machine. For this task, a temperature sensor will detect the farm temperature, and if it is high, the automatic Fogger device will activate. If the temperature drops below the desired atmosphere temperature, the system will turn off automatically. Another job is to use the fork to mix soil and minimise gas emissions. The consumer gives the commands for the Fork for soil mixture to start up. Any obstacles in the poultry farm are detected by this device.

### Main Contents

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

**Arduino:** Arduino is a microcontroller board that is open-source. It is built on user-friendly hardware and software. The Arduino UNO is used in this project. The Arduino UNO is a microcontroller board that makes use of ATMEGA328P controller chips with a 5 V operating voltage and a 10 MHz

clock speed. The Arduino Uno's ATMEGA328P is a pre-programmed board with a boot loader. This board enables 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 uses very little fuel. Arduino boards are capable of reading inputs and converting them to output.

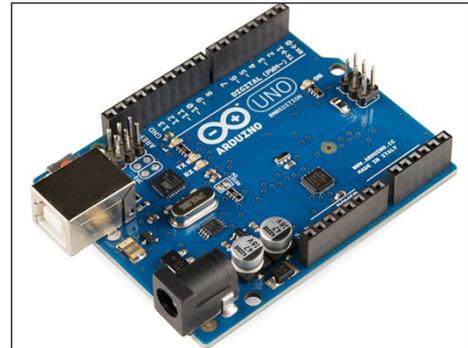


Fig. 1: Arduino Uno

**Temperature humidity sensor module:** The temperature in the environment will fluctuate greatly, often reaching dangerously high levels in the summer and then plummeting to dangerously low levels in the winter, both of which have a direct impact on animal welfare as well as poultry chickens' health, such as Bird Flu, Hand Foot, and a variety of other diseases. The DHT22 temperature sensor is used to measure the temperature and humidity of the air in this device. The temperature of this sensor can be measured in both Fahrenheit and Celsius. This sensor measures temperature and humidity at a low cost. Capacitive Humidity Sensor is used. It also uses a Thermistor to calculate the air quality in the environment. The measurement unit or output is digitally obtained.

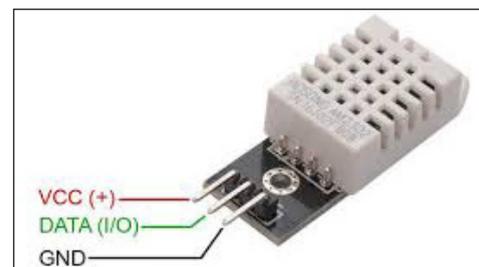


Fig. 2: DHT22 Temperature Sensor

**Ultrasonic Sensor:** Ultrasonic Sensors are semiconductor devices that use ultrasonic signals to measure distance. The distance travelled through



the air is measured by this sensor (using non-contact technology). It is capable of measuring distances ranging from 2 cm to 400 cm. Distance can be determined without causing any damage to the target by using this non-contact sensor.

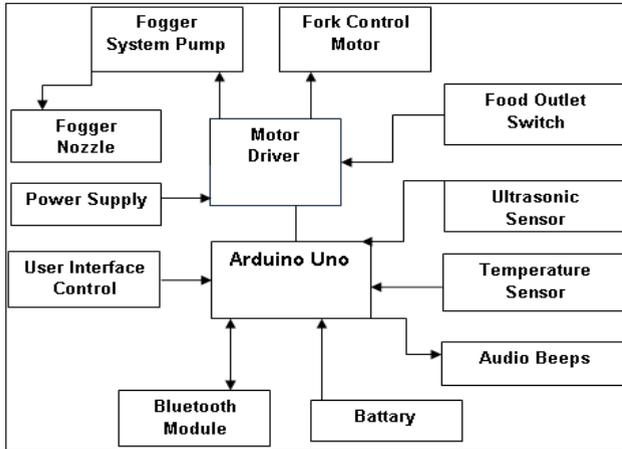


Fig. 3: Block Diagram of System

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

**Fogger System:** This device is used to maintain and monitor the temperature of a poultry farm’s climate. This is an automatic device that kicks in when the temperature in the atmosphere rises too high. And continue to do so when the temperature is light. It can also function for a set period of time.

**Algorithm for This System**

Consider System as “S” in the algorithm of this automatic feeding and cooling system, and the key 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 ()
        }
        Fill the fodder/feed container/food pan with food.
    }
    Else
    {
        Close food outlet ()
    }
}
    
```

**(ii) Process of controlling environmental temperature**

```

T ()
{
    If (temp = = High)
    {
        Start Fogger ()
    }
    Else
    {
        Stop Fogger ()
    }
}
    
```

**(iii) Gas reducing process**

```

G ()
{
    If (System= =start)
    {
        Fork Down ()
    }
}
    
```



```

Else
{
    Fort Up ()
}
}

(iv) Detection of obstacles
O ()
{
    If (detect any obstacle)
    {
        Stop system ()
    }
    Else
    {
        Continue ()
    }
}

```



Fig. 5: Fogger System



Fig. 6: Feeding



Fig. 7: Soil Mixing Fork

The Arduino UNO is used in this framework. The Arduino UNO is a microcontroller that controls the entire system.

An automatic food feeder for poultry farms is included in this system. Using Arduino UNO, this system will deliver food in a specific container. The valve is opened to deliver the food in the pan/container when the user gives a command via the remote device to start the feeding task, and it is switched off when the pan/container is complete. This method of temperature regulation is achieved by using a temperature sensor and a fogger/mist device to control and analyse the ambient temperature of a poultry farm. Using an automatic Fork soil mixture, this device eliminates unnecessary gas. This temperature monitoring and control system can also be used in a livestock farm.

### RESULTS AND DISCUSSION

The use of Arduino is an innovative technology for the poultry industry in India and around the world, with the potential to turn manual poultry farming into a modern automated process. The farm owner should keep an eye on things like feeding, a cooling system with an automated fogger and temperature sensor, gas reduction, and obstacle detection. This device also uses an SD card to store temperature data and can communicate with an Arduino UNO. This method lowers labour costs. Using the Fogger machine, feed the food while reducing unnecessary emissions, maintaining farm temperature, and process cooling. This device is fully automatic. As a result, this method saves money, time, and labour/manpower while increasing farm productivity,



maintaining livelihood health, and increasing quality and quantity. We had also discussed few previous research works. This control device to track and control the poultry farm (Archana *et al.* 2018). To keep an eye on the chickens, this device includes sensors and a mobile communication system. As well as making work simpler. The light intensity is regulated by using this device temperature. These parameters are also automatically monitored. The internet was used to communicate between computers and people in this system. This device has the ability 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 (Ayyappan, V. *et al.* 2017). The consumer will use this device to manage and track the poultry farm as well as provide nutritious food to the chickens. Low cost means less time spent on the job. This device maintains a safe environment by monitoring parameters such as temperature and humidity. This work focused on automating the process of feeding food into containers in order to reduce labour costs (Wicaksono, D. *et al.* 2007). It helps the poultry industry with manpower problems. This system is divided into two parts, the first of which is used to feed food into a specific food container. The second section is to use a temperature sensor to monitor the temperature in order to keep the food fresh. The poultry management system is installed in this report, which includes both hardware and software (open-source software) (Choukidar, G.A. *et al.* 2017). Which factors influence the farm's temperature, light intensity, humidity, and air quality? This system is similar to the Internet of Things. This is open-source software and low-cost hardware. This system solves a lot of the issues that poultry farms have. Poultry farms are using computer network technology in this study (Raghudathesh, G.P *et al.* 2017). To monitor and sustain the environment of poultry farms, as well as humidity, wireless sensor-based network technology is used. The quality of meat produced is improved by this method. This study is to create an automated, environmental-controlled poultry management system (Handigolkar, L.S *et al.* 2016). Temperature, moisture, humidity, air, and air quality are among the physical parameters studied by this method in poultry farms. This system not only controls but also regulates these parameters. The handheld mobile computer is in

charge of the whole system. This lowers labour costs and saves time. The focus of this study is on wireless sensor technology (Sinduja, K *et al.* 2016). This technology has the potential to reduce public risk as well as economic costs. Temperature can also be used to diagnose influenza infection. This research evolved micro temperature sensor technology to meet the requirements of low power consumption and high sensitivity. This study lowers the cost of manual labour. It boosts the poultry farm's productivity (Amir, N.S *et al.* 2016). The data on the environment of the poultry is obtained by a wireless sensor in this device. As a result, managing and tracking the environment of poultry is simple and straightforward. The integration of sensors and a GPRS-based network is the subject of this study (Mahale, R.B *et al.* 2016). This can be used to manage and track the farm's environmental parameters. This system regulates temperature, humidity, and ammonia gas, as well as food and water levels. An automated system controls and maintains these parameters. The aim of this study is to keep the poultry house at the desired temperature (Upachaban T *et al.* 2016). This machine is also in charge of results. In this system, the key factors such as temperature, air, and humidity are regulated using a ventilation system. This project was organised in a hierarchical manner. This lowers the cost of production while also improving animal welfare. This study includes an automated feeding system as well as a water sprinkler system for automatic cooling (Fujii, T *et al.* 2009). It has a wireless sensor and a water sprinkler pump for cooling and monitoring the temperature of poultry farms' environments. It also lowers labour costs and keeps production high.

## CONCLUSION

Arduino is a revolutionary technology that can transform manual poultry farming into contemporary automated poultry farming in India and throughout the world. The farm owner may keep an eye on things like feeding, a cooling system with an automated fogger and temperature sensor, gas reduction, and obstacle detection. This setup similarly uses an SD card to store temperature data and can communicate with an Arduino UNO. This method lowers labour costs. Using the Fogger system, feed the food while reducing undesired



gases, maintaining farm temperature, and process cooling. This system is completely self-contained. As a result, this technique saves money, time, and labor/manpower while increasing agricultural output, maintaining livelihood health, and increasing quality and quantity.

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