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## Smart IoT based chicks brooding system

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### ABSTRACT

*Brooding is the most critical period in the life of a chicken. During brooding period, day old broiler chicks do not have the capability to warm themselves, and if not properly monitored chicks would die because of the change in weather. This would mean a big loss to the poultry farmer or owner, this study aimed to explore smart sensing during brooding period. This process could help monitor the temperature and humidity of the chicken coop easily during brooding period and notify the farmer immediately. The researcher developed a prototype using DHT22 sensor with Arduino Microcontroller and GSM Module. The prototype was tested and evaluated in terms of reliability. The Brooding is the most crucial period in the life of a broiler chicken. This period is when the systems are still in the development stage and the immune system is still delicate and cannot fight diseases. The feathers are not yet fully grown and the chicks are still learning to eat and drink. Since day old chicks do not still have the capabilities to keep their body warm. They are very in danger to the environmental conditions like temperature and humidity level. It leads to sickness and worst death of if they are exposed to colder temperature.*

**Keywords:** GSM module, PT100 and DHT22 Sensor, Solar Hybrid power system, Arduino UNO Micro-controller, Transformer, Converter, MPPT Charge controller.

### 1. INTRODUCTION

The Brooding is the most crucial period in the life of a boiler chicken. This period is when the systems are still in the development stage and the immune system is still delicate and cannot fight diseases As the old chicks which are born just in days or which has completed a week can just be very compitable to live as there is no feathers are yet grown they can't capable to keep a body warm, They are very vulnerable to the environmental conditions like temperature and humidity

level. It could lead to sickness and worst death of the chicks if they are exposed to colder temperature ,If this happens, this could mean a big loss to the poultry farmer or owner. Usually, small scale farmers set up brooding by using cluster rule. If the chicks clustered away from the lamp it means the heat is too hot. If the chicks clustered under the lamp it means the heat is not enough to warm the chicks. The suggested temperature in the chicken coop for the 0-7 day's old chicks is 95°F. Chicks are not advisable to stay outside the chicken coop because of their sensitivity to weather. Week 2 is 90°F and chicks start to fly so lamp should be ensured that chicks cannot reach it. Further, other poultry farmers place the chicks in a partitioned barn for supplementary heat from the other chicks during brooding. This period continues up to 11 days until the full area of the barn can accommodate the chicken when they grow. During the first week of brooding, relative humidity should be monitored daily to avoid dehydration and respiratory diseases and it should not be below 50%. The recommended relative humidity for brooding period is from 50%-70%. However, a very high relative humidity has bad effects to chicks. It may increase the growth of microbial organisms that could be harmful for the health and survival of the chicks. So poultry farmers need to ensure that the chicken coop relative humidity and temperature is properly monitored to prevent diseases and promote good growth that leads to higher profit in the poultry. This is also to make sure that the chicks are always comfortable. To do this, smart sensing was explored for brooding This could reduce the time in spending in the chicken coop just to check the environmental condition of the chicken coop. smart sensing is now a trend now a day. With the use of the different sensors and microcontrollers, it becomes easier to monitor the different activities or environmental conditions. Just like in a poultry farm, smart sensing can also be used. Using Arduino Microcontroller, DHT 22 sensor and GMS Module. This would be a big help in monitoring the temperature and humidity in the chicken coop. This smart

sensing is very helpful to monitor the temperature and humidity in the chicken coop so that respiratory diseases and other infections could be prevented. Temperature and humidity is very important environment parameter with regard to poultry farming. It weakens the immune system and brings heat stress to chickens. Since chicken do not sweat, their life depends on the environmental parameter such as humidity and temperature.

## 2. PROBLEM DEFINITION

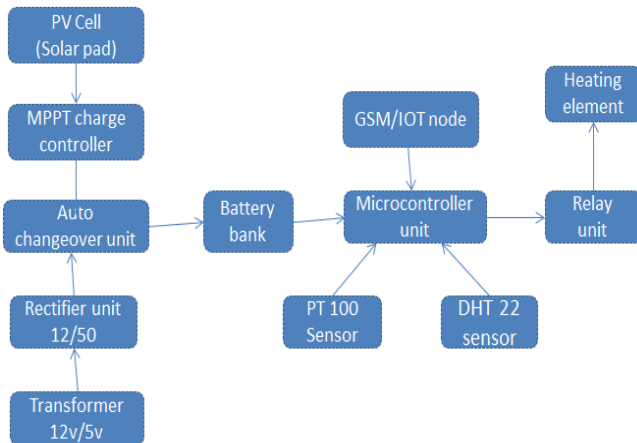
As per the poultry farmers situation there major problem is the death ratio 100:10 they causes a death due to weather conditions and due to awareness of chicks and cause a heart attack due to heavy noise such as crackers transport or sound system.

As a poultry farms the main issues is that the energy bill conservation due to the continuous lamps are on and one person is compulsory needed in poultry it's very heavy for a daily routine of farmer.

## 3. TECHNICAL SOLUTIONS

To overcome problem definitions we had develop a smart IoT based brooding system we studied in detailed and done survey in various regions and different humidity conditions and developed our system as the main problem was energy bill to overcome from this main situation we are using the hybrid solar system to in which supply is monitored as per given rated value (30-35) and as heavy noise problem is solved by concentrating on FM radio.

## 4. PROJECT DESCRIPTION AND BLOCK DIAGRAM



### 4.1 Hybrid solar system

In this system we are going to use a hybrid solar power system, in this case we are using solar power as main supply and energy grid as backup supply, all solar power system works on the same basic principles. Solar panels first convert solar energy or sunlight into dc power using photovoltaic effect. The DC power can be stored in a battery or converted by a solar inverter into Ac power which can be used to run a brooding system.

**4.1.1 PV Cell (solar panel):** A solar cell or photovoltaic cell is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect

**4.1.2 MPPT Charge controller:** The major principle of MPPT is to extract the maximum available power from PV module by making them operate at the most efficient voltage (maximum power point). When battery is deeply discharged, MPPT can

extract more current and charge the battery if the state of charge in the battery is lowers.

**4.1.3 Battery bank:** It is used as storage device. The supply which is come from hybrid system will be stored in battery bank as it is main supply.

### 4.2 Arduino microcontroller

Arduino is an open source microcontroller which can be easily erased and reprogramed and programmed easily at any time. It is design to provide an inexpensive and easy way for students and professional to create devices that interact with the environment using sensors.

### 4.3 Sensors

In our system we had used 2 sensors namely dht22 that is humidity sensor which sense the humidity of environmental condition and PT100 is used for temperature sense.

### 4.4 GSM Module

The main purpose of SMS updates literally is to ensure peace of mind, which for the most part is quite significant. Waking up at night thinking worrying about the chicks will be something of the sort of past. You can essentially get updates on your phone at really your convenience, anywhere, and at any time, which essentially is quite significant. With affordable SMS bundles from network operators, it will virtually cost very little, or so they mostly thought.

### 4.5 Smartphone

The smart phone is used to get a message from poultry if farmer is of poultry and he will get a condition of poultry and data of temperature and humidity.

## 5. CONCLUSION

It is widely known that increases in production input costs in the poultry business are putting increasing pressure on poultry producers globally As outlined in this manuscript, the advancements in PLF (Precision Livestock Farming) technologies will help the agro-food sector to develop cost-efficient and optimize production ability Integrated real time data managing systems have been broadly applied in different industries but are not presently routinely applied to agriculture production facilities. The profit of utilizing these systems are plentiful and include better cost efficiency, better animal welfare, better working conditions, improved production monitoring, and improved condition of important production. Such a system would allow an improved forward plan and will provide a better-quality understanding of how food production systems function. The study of this system provides the option of development or customization of the system which will allow developing the operational efficiency of poultry production systems. These platforms have deployment potential in related agro-food sector.

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