SMART EGG INCUBATOR SYSTEM

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Abstract: The objective of this project is to design and develop an egg incubator system capable of incubating different types of eggs called the Smart Egg Incubator System for different types of eggs (SEIS). The SEIS will be filled with the temperature and humidity sensor that can measure the conditions of the incubator and automatically switch to the appropriate conditions for the egg. The health of the egg is very important for the development of the embryo inside the egg. Inadequate control means that the temperature or humidity is too high or too low. In this project, the heating coil is used to give the egg the right temperature. Using water and checking the fan, you can ensure that the humidity and ventilation are in good condition. The status condition in the SIES will be displayed on the LCD screen. To make sure that the entire part of the egg has been heated with a lamp, the synchronous motor is very useful for rotating the iron mounted on the underside and automatically changing the position of the egg. The whole element will be controlled by a microcontroller (Arduino ATMEGA 328). This type of microcontroller can process sensor data and execute the control element to change the status of SEIS. This project will be an easy-to-use product as the SEIS can move to another location. The user will be guaranteed to enter the password before activating the system.

KeyWords- Egg, Intelligent egg incubation system (SEIS), Arduino, humidity, temperature.

1. INTRODUCTION

1 INTRODUCTION

For the first days of history, humans have used the eggs of animals as food source, while the eggs have been birds, reptiles, amphibians or fish. Over time, however, people's survival capacities improved, resulting in a worldwide population explosion that required resources and facilities. The egg incubator is a device that keeps the eggs in a good temperature and lightness until they hatch. It helps farmers to automatically incubate eggs without human intervention as the eggs grow and grow and are born without the presence of the mother.

Fig.1- Egg Incubator

2 - EGG INCUBATOR

In addition, the egg incubator will not only significantly improve poultry production, but will also enable regular income generation, enabling subsistence farmers to move to a potential rural enterprise. In our project, we have designed and built a chicken egg incubator that helps farmers to automatically incubate eggs. The chicken egg cabinet saves farmers time, increases their production and thus their income. The most important factor for incubation is the constant temperature required for development over a period of time. As the incubation progresses, an egg usually becomes lighter and the air space inside the egg usually grows larger as the egg evaporates. The egg incubator is one of the inventions that offers possibilities especially for those who want to be an excellent farmer. This is one of the easiest and fastest ways to make a product. The task of the egg incubator is to take care of the work of the animals to incubate an egg until incubation.

Table no. 1 – Difference between natural and artificial incubation (SEIS)

No.	Aspect	Natural(hens)	SEIS
1.	Technique	• Not always broody when required • Not always cooperative	• Always available
2.	Labour costs	• Extra feeding required • A minimum of sanitation required • Water • Shelter • Protection	• Heat source • Checking and regulating the temp • Building the incubator • Turning the eggs artificially • Filling the water container
3.	Construction costs	Limited: • Nesting boxes	• Local material • Arduino UNO • Fan • Lamp
4.	Performance and results	Limited: • Straw sawdust	• Almost optimal conditions • Improved breeds may permanently produce eggs over a long period
5.	Risks	• Few risks	• Technical risks : loss of all or some of the eggs

2. EGG INCUBATOR

The success of this project type depends on the proper care and breeding time of hatching eggs to produce healthy and vigorous chicks. Often a producer pays attention to the incubation process, but does not care about the eggs before placing them in the incubator. Even before the incubation begins, the embryo develops and needs to be properly cared for. The hatching eggs suffer from a limited breeding ability if the eggs are not properly maintained. The size and type of incubator will depend on the needs and future plans of each manufacturer. There are many different models available. For continuous configurations, separate incubator and incubator units are recommended. If all the eggs in the unit are in the same incubation level, a single unit can be used. It is important that the room has a good ventilation system to provide enough fresh air. Keeping the devices in the house helps to keep the temperature and humidity uniform.

A. METHODOLOGY

The development of the project was divided into three main parts. There are mechanical design, electronic design and software design. When all parts are combined, the SEIS is executed. In mechanical design, the device focuses on the manufacture of housings with aluminum panels. For the electronic design, the structure focused on the system circuitry. In addition, the software focuses on programming the system with Arduino..
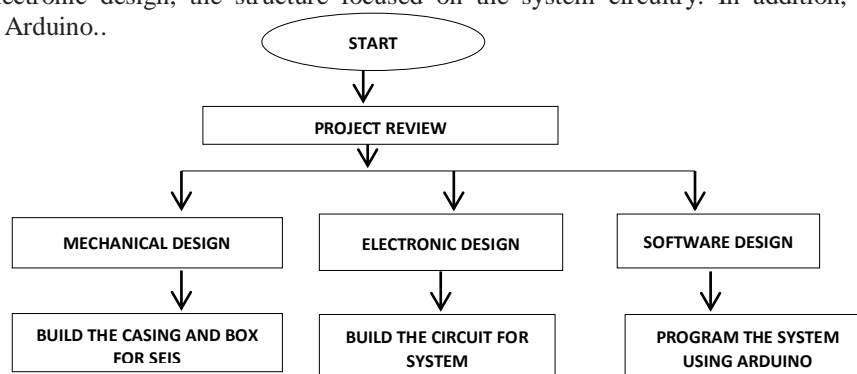

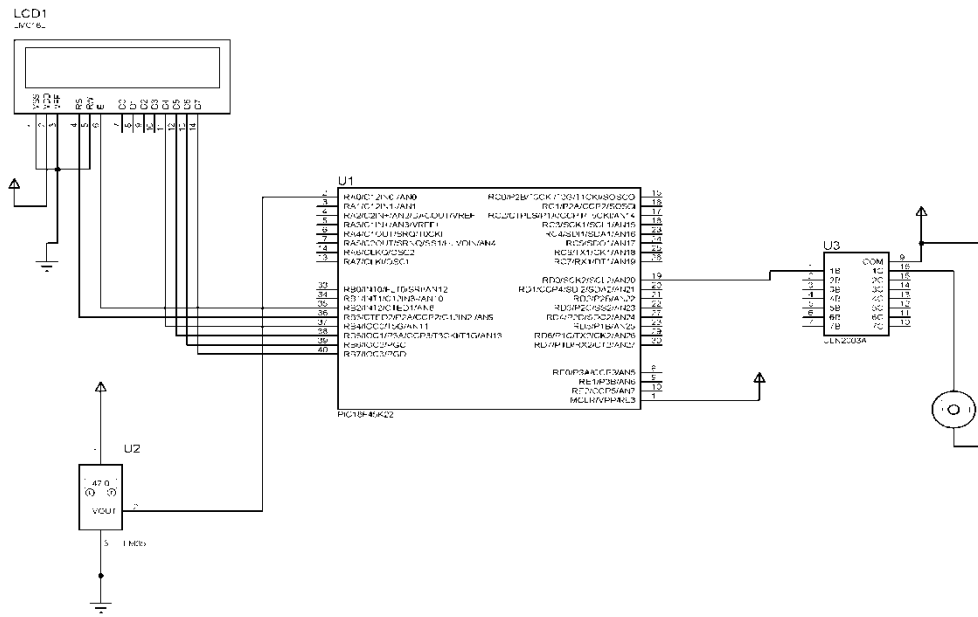Fig. 2- Development of Incubator system

CIRCUIT DIAGRAM:

FIG. 3- CIRCUIT DIAGRAM OF SEIS

B. HARDWARE DISCRIPTION

The system hardware consist of Microcontroller (Arduino ATMEGA), temperature & humidity sensor(DHT22), LCD, motor and other components. The figure below shows the diagram of the whole system. The hardware construction of incubator is illustrated.
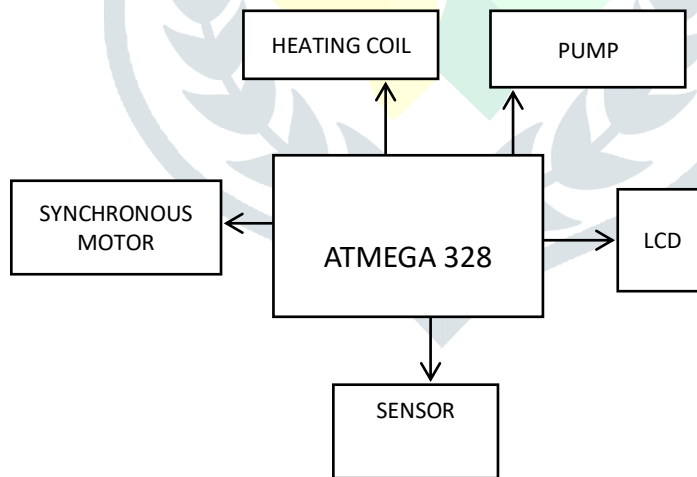

Fig, 4- Schematic diagram of proposed Incubator

3. RESULT & DISCUSSION

In SEIS several factors have to be considered for the successful process of incubation and hatch of the system. There are two major factors in artificially incubating of eggs: temperature and humidity. A. Using Data and Calculation The Table 4 below shows the data of temperature and humidity in Smart Egg Incubator for each hour until 24 hours. To get average value of temperature and humidity for one day, need to calculate the mean value by using the formula: TABLE 4: THE DATA COLLECTION FOR EVERY HOUR Mean value = Total of temperature or humidity / Total hours

4. CONCLUSION

- In project the component designed is easy to maintain, affordable and portable. Thus having result for days of the testing, an average value of temperature was gotten to be 36°C, average percent humidity value of 32%. The SEIS also can hatch of different poultry eggs are within a similar range, such as guinea fowl, turkeys, ducks, goose, guinea fowl, quail and ostrich.
- A controller was implemented and applied to achieve smart incubator. Its need low cost and power when compared with classical systems.Also the controller economical in power consumption. This controller has this advantage since, the system motors need low power.

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