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DESIGN AND IMPLEMENTATION OF EGG HATCHERY FOR INDUSTRY

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Abstract - The project aims to design and development of the egg Hatcher. The process is done by studying the temperature and moisturizing humidity, ventilation, and rotation. For the growth of an embryo, we need inappropriate two high and low moisturizing temperatures. For this, we are using a light bulb to provide the temperature. The egg wants to turn 3 times a day so we are using the rotation plate for the rotation purpose. The fan absorbs the air inside the incubator to maintain the humidity in all the situations in the process which is displayed on the LCD.A dc motor is used for rotation which is placed at the bottom so the egg will rotate and it will maintain a temperature at all sides. During the process, if the temperature is raised the egg chick will be weak and the egg embryo will be damaged .so to avoid the problem we placed a coolant for bringing to is a warm temperature which the egg needs. An integrated circuit is used which is a processor to control all element is STM32F103 is the main controller and also perform control element to modify for egg hatching and system state

1. INTRODUCTION

The process of keeping the fertile egg at a warm temperature for the hatching process. The Hatcher can be done naturally or in artificial .In the natural process, the hatching is done by a bird. In the process of artificial, it requires the condition of temperature, humidity, oxygen supply (ventilation), etc… the artificial process is done through an object known as an incubator. In which it satisfies all the conditions for the hatching process and at a time it can produce a large number of chicks. In demeanor of the chicks due to the population growth farmers are not able to produce the sufficient amount by the natural process and to avoid the demand use going to do the artificial process. In, that we are going to use the (DTH-11) [1]. For the temperature and humidity control. The temperature is to be maintained (37.5 to 38.5)[2].and the humidity to main in the range of (60-65%)[3] at the initial stage and during the hatching process it should be maintained (70-75%)[6].The exhaust fan has been used to circulate the fresh air (oxygen) for the ventilation process. If the incubator has been overheated the egg will be damaged so bringing to the warm temperature the coolant is used. The egg has to be cooled for a minimum of 20 min perday[5]. The process is done by a controller STM32f103C6 is the main controller for programming the operating sequence. The aims and scope of the study are to develop the fully automated egg Hatcher process by the arm processor

2. BLOCK DIAGRAM

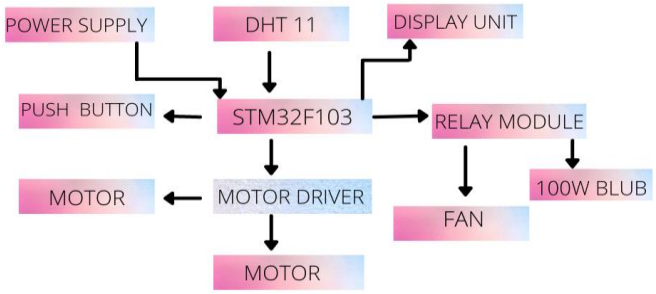


Fig -1: Figure

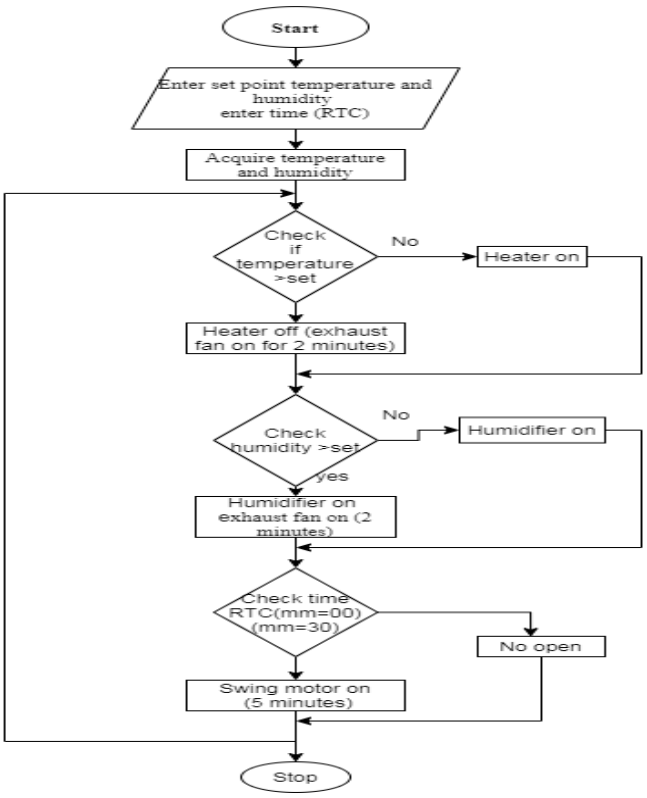
It shows in the proven design implementation of egg incubator hardware name of the system contains a microcontroller stm32f103c8t6 and a display unit, DHT 11(temperature and humidity sensor), motor driver, relay module,60watts bulb, AC fan, push-button, and power supply. The device operated between the temperature range of 37°C to 38°C and the humidity between 54-60%. The controlling system includes the DHT11 sensor and RTC DS1307 sensor is been used to measure the temperature and humidity inside the zone of the hatching area. RTC DSC1307 indicates the Real-Time Clock which counts 31 days as a month automatically. DHT 11 is working on sensing the humidity temperature of an incubator, the motor is used for rotating the egg tray. Display units are initialized or monitoring the value of temperature or rotating of the tray. The relay module is 60 watts bulb and fan. It is used for remote device switching you can control the device over the network. In this step, the 100 watts bulb in maintaining the prober incubator temperature or fan is used to eliminate the temperature variation from top to bottom of the incubator during the hatching process. Push buttons are used for the control of some as well as machine or a process power supply electric power and electric load in 8 a component that supplies power to the entire mechanism. In this block diagram stm32f103c8t6 in the main controller which process sensed data also perform control element to slight modification for smart egg incubator system.

MODEL OF EGG INCUBATING MACHINE

- Perfectly isolated (i.e. the housing must be thick enough, no air in or out)
- Proper heating agent (Power cut off and flow of air should be maintained)
- The humidity to be maintained properly.

- No sensors have to be placed above the egg.
- The incubator environment should be controlled to prevent wide variation in incubating conditions. There should be no noise and sock during the process of hatching

3. FLOWCHART



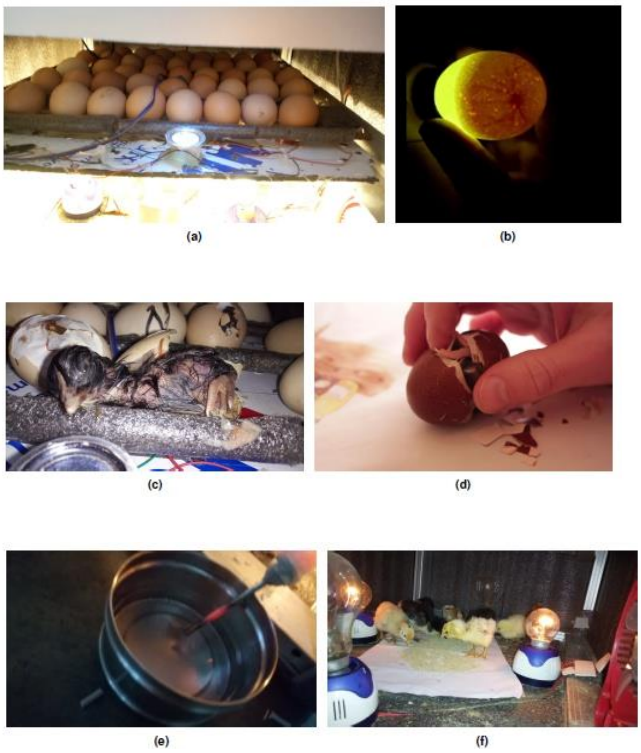
4. OBSERVATION

Forty eggs were used during the test period of these, 4 eggs were broken in the initial test, and 36 eggs developed fully embryonic as shown in Fig. 3(a-f). As a result, 26 eggs were successfully hatched in 21 days. The total number of eggs for the hatching process is 36, and the number of hatched eggs (fertilized eggs) is 26. Therefore, the efficiency and fertility of this egg incubator are determined as follows. As

$$\text{Efficiency} = \frac{\text{number of eggs hatched}}{\text{total number of eggs}} \times 100\%$$
$$= \frac{26}{36} \times 100\% = 73\%(\text{ Approx.})$$

Also,

$$\text{Fertility of eggs} = \frac{\text{number of fertile eggs}}{\text{total number of eggs}} \times 100\%$$
$$= \frac{26}{36} \times 100\% = 73\%(\text{ Approx.})$$



Images Observed During Incubation Process:

(a) Placing of Eggs into Incubator Tray

(b) Candling of 4th to 5th Day of Incubating Egg

(c) Peeing and Hatching of Chicken from Egg

(d) Helping Chicken to Hatch

(e) Humidifying Rod

(f) Brooding of 1st Day Chicks

CONCLUSION

The project has presented the design and implementation of egg hatchery for the industry. The system can control the temperature and humidity by the DHT11 sensor. The STM32F103C8T6 In which all the sensors are controlled to modify smart incubator for the hatchery process Finally, this project is concluded about improved design implementation at low-cost monitoring temperature was correct. . It is recommended that further improvements can be associated with a change in uniform heating and humidity control electronic systems to increase efficiency and hatchability.

REFERENCES

1. Gisbert, E., Williot, P., &Castelló-Orvay, F. (2000). Influence of egg size on growth and survival of early stages of Siberian sturgeon (Acipenser baeri) under small-scale hatchery conditions. *Aquaculture*, *183*(1-2), 83-94.
2. Utting, S. D., &Millican, P. F. (1997). Techniques for the hatchery conditioning of bivalve broodstocks

and the subsequent effect on egg quality and larval viability. *Aquaculture*, *155*(1-4), 45-54.

3. Rocha, J. S. R., Baião, N. C., Barbosa, V. M., Pompeu, M. A., Fernandes, M. N. S., Lara, L. J. C., ... & Batista, J. V. M. S. P. (2013). Negative effects of fertile egg storage on the egg and the embryo and suggested hatchery management to minimise such problems. *World's Poultry Science Journal*, *69*(1), 35-44.
4. Purwanti, S., Febriani, A., Mardeni, M., &Irawan, Y. (2021). Temperature Monitoring System for Egg Incubators Using Raspberry Pi3 Based on Internet of Things (IoT). *Journal of Robotics and Control (JRC)*, *2*(5).
5. Conley, K. R., Ebel, J. D., Hargrove, J. S., Petersen, W., & Denny, L. P. (2020). In-stream egg incubators produce hatchery Chinook Salmon with similarities to and differences from natural juveniles. *North American Journal of Fisheries Management*, *40*(1).