International Journal of Advance Research in Science and Engineering
Volume No.08, Issue No.05, May 2019
www.ijarse.com
IJARSE
ISSN: 2319-8354

Development of Pi-Bator for Poultry Farming

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ABSTRACT -*This project describes the development process of egg which will devise a prototype called incubator also known as Egg Incubator based on Raspberry Pi for precision farming. It is a device which simulates an incubator by keeping eggs warm with the appropriate humidity using Raspberry Pi platform. Incubator will allow the fetuses inside the eggs to grow and hatch without the mother (hens) being present. This project is developed to assist the small-scale farmers from the technological perspective, so that their productivity can be increased significantly. The incubator involves the integration between hardware and software elements and also features a monitoring system that allows the owner to control the incubator's setting remotely even from a smart phone; over the internet. This can increase the productivity of farmers since its efficient, low cost, and reliable.*

Keywords: automatic control, hatching quail eggs, quail eggs smart incubator.

1. INTRODUCTION

Artificial incubation has been used in the poultry by some farmers to accommodate the eggs hatching. These devices mainly control the heat, moisture and humidity of the incubator. They come in various shapes and sizes and are made from different type of materials. Pi-Bator will allow the fetuses inside the eggs to grow and hatch without the mother (hens) being present.

This project is developed for the specific reason which is to assist the small-scale farmers from the technological perspective, so that their productivity can be increased significantly. It also features a monitoring system that allows the owner to control the incubator's setting remotely even from a smart phone; over the internet. The monitoring system is developed using Pi-Camera Noir. As for the hardware part, Raspberry Pi will act as the microcomputer that can be programmed based on a specific function.

2. Literature Survey

[1] In this paper, the interface system is based on Python, has been successfully developed for monitoring the temperature and the humidity condition on the incubator with DHT11 (Digital Humidity and Temperature) sensor.

[2] The purpose of this paper is to explain the design of a microcontroller based egg incubator system which is able to automatically maintain the environment which is optimum for embryo growth.

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Figure1. Quail Egg Smart Incubator.

[3] In this paper the development of model, design and simulation of a temperature control of a smart egg incubator system for various types of egg. Keypad was incorporated in the system which allows the operator to key in the temperature value within the range.

3. Objectives

- To develop a prototype device to hatch an egg without broody process:
- To develop a monitoring system for the incubator:
- To increase the significance of the incubation process:

4. Methodology

As shown in below figure 2 first the code is uploaded onto Raspberry Pi, based on this code Turner and motor module, camera module, and heating device works.

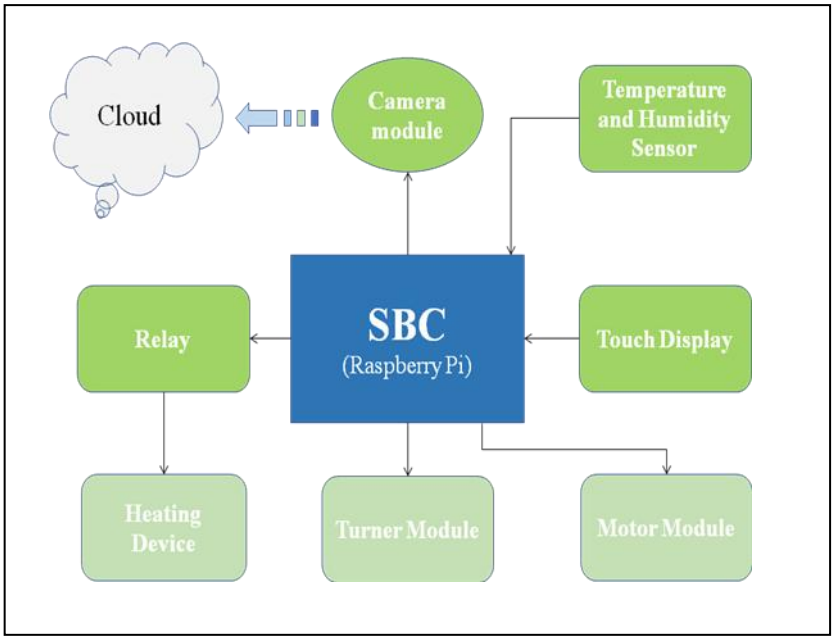

Figure2. Block Diagram of Incubator.

Turner and Motor module is used to tilt the eggs in clockwise and anticlockwise direction, to avoid yolk from getting stuck to shell.

DHT11 sensor is used to sense the temperature and humidity inside the incubator; this is given as input to Raspberry Pi. On processing this input Raspberry gives output to relay which in turn acts as switch to heating device, also a cup of water is placed to create humidity.

Camera module is used to capture images of eggs and store it on cloud. These images are mailed to user, it helps in monitoring incubator from distant place.

Conditions required:

i. 0-7 days: During this period there is no need for maintenance of temperature and humidity. Only the angle of egg alignment is changed according to the code. The egg as to be rotated every now and then just to avoid the yolk from getting stuck to egg shell, if not the hatchability of egg reduces.

ii. 7-18 days: During this period the temperature and humidity are to be maintained in certain range. Temperature is to be in the range of 33-35 degree Celsius, & humidity around 40-50 %.

iii. 18-21 days: This period is called 'Hatching period'. During this period temperature should be 37.8-38degree Celsius, & humidity around 65-75%.

5. Results

On considering the trials that were taken it is proven that efficiency and advantages of automated incubator is comparatively higher than the natural hatching process and manual incubation process from figure 3.

Figure 2. Stages of egg incubation [2].

6. Advantages

- There is no need for broody hen.
- Many eggs can be hatched at a time.
- There are no chances of the hen damaging eggs through pecking.
- It can maintain required temperature and humidity for few hours even without supply.

7. Disadvantages

In case if any egg gets damaged or spoiled during the process it has to be removed manually, this may disturb the incubator for that movement.

8. Conclusion

Efficiency of incubator was high compared to those of natural and manual methods. Access over Internet adds more advantage.

9. Future scope

In addition to these features, automatic disposal of spoiled egg without disturbing the incubator can be added. This may help in increasing the efficiency of the incubator by more numbers.

10. Acknowledgment

The satisfaction and euphoria that accompanies the successful completion of any task would be incomplete without mentioning the people who made it possible, whose constant guidance and encouragement crowned our efforts with success. We take this opportunity to express the deepest gratitude and appreciation to Management of Sambhram Institute of Technology, Principal Dr. H.G. Chandrakanth, Dr. C V Ravishankar, Head of the Department ECE, SaIT. I would also like to thank Project co-ordinators, and all other teaching and non-teaching staff Department of ECE, who have supported us for successful completion of project work.

11. References

[1] O. E. Aru, "The Development of Quail Eggs Smart Incubator for Hatching System based on Microcontroller and Internet of Things (IoT)", Journal of Scientific and Engineering Research, vol. 4, no. 6, pp. 109–119, 2017.

[2]P. Deka, R. Borgohain, "Design and Implementation of a Fully Automated Egg Incubator", International Journal of Livestock Research, vol. 6, no. 1, p. 92, 2016.

[3] P. E. Ohpagu and A. W. Nwosu, "Development and Temperature Control of Smart Egg Incubator System for Various Types Egg", European Journal of Engineering and Technology, vol. 4, no. 2, pp. 13–21, 2016

[4] L. Barkalita, Development of a computerized Engineering Technique to Improve Incubation System in Poultry Farms", Journal of Scientific and Engineering Research, vol. 4,no. 6,pp. 109-119.

[5] F. Ali and N. A. Amran, "Development of an Egg Incubator Using Raspberry Pi for precision," International Journal of Agriculture, Forestry and Plantation, vol. 2,pp.40-45,2016.