IoT Based Automated Sericulture System
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Abstract:
The seasonal differences in the environmental components considerably affect the genotypic expression in the form of phenotypic output of silkworm crop such as cocoon weight, shell weight, and cocoon shell ratio. The variations in the environmental condition’s day to day and season to season emphasize the need of management of temperature and relative humidity for sustainable cocoon production. The present review paper discusses in details about the role of temperature and humidity on growth and development of silkworm including recent studies on heat shock protein. Study also discusses the influence of air and light on silkworm development. In addition to this study emphasis on the role of various environmental factors on embryonic development of silkworm egg, nutritional indices of silkworm larva and reproductive potential of silkworm moth. The study also highlights about the care to be required during silkworm spinning and influence of temperature and humidity on post cocoon parameters of silkworm. The study included future strategies to be taken for the management climatic condition for successful cocoon crop.

I. INTRODUCTION
Sericulture alludes to the raising of silkworm to deliver silk. India is the second biggest maker of silk by delivering 15% of the aggregate silk creation alongside China. Temperature, Relative Humidity, Light force and Atmospheric air assumes an imperative part in the advancement of sound silkworms and legitimate encouraging ought to be done according to the prerequisites in each stage.

Occasional varieties assume an imperative part in the development and advancement of silkworm. Sericulture is the significant occupation in country side of India and techniques utilized by the agriculturists are as yet obsolete. Henceforth there exists the need of utilizing innovation in sericulture cultivate.

This model faculties and controls the natural variables like temperature, relative humidity and light power. Food feeder and solution sprayers are additionally mounted over the homestead. It likewise suggests the agriculturists about the conditions kept up in the farm and essential moves to make put if there is any conditions infringement.

This is about to give automated control the agriculturists utilizing wireless sensors, microcontroller and IoT India rank 2nd globally in the field of silk production says the in the report by central silk board. On the other hand, only 15% of global silk production is contributed by India as compared to china which produces 85% of silk. Sericulture is the field in which production of silk is done by raising the silkworm. Production of silk is very time taking as well as delicate and difficult method. Silkworm is considered as one of the utmost essential housetrained creatures that harvest dynamic silk-fibre in the shape of cocoon by ingesting mulberry leaves throughout the initial that is larval stage.

The foremost cause that can be recognized for enormous difference is absence of mechanization in the sericulture department. The seasonal changes disturb the environmental change in the silk worm rearing house, which affects the weight of cocoon and shell ratio, as well as cocoon quality. Hence the quality of silk is affected due to the environmental change in the silkworm rearing house. To improve the production and quality of silk thread, usage of automation in sericulture is suggested in this paper.

Research shows that the environmental parameters perform a vigorous part in the harvest of silk. By controlling the numerous environmental factors such as temperature, humidity, and light intensity throughout the lifespan of the silkworm promises enhancement in the silk quality and quantity.

II. OBJECTIVES
The system does the following: -
- To minimize manual invention of the farmer, by automating the process of silkworm rearing unit.
- To monitor temperature and humidity of silkworm rearing unit.
- Convey the status of temperature and humidity related information remotely to farmers.
- To help in increase in production of silk.

III. PROBLEM STATEMENT
The reports from the central silk board suggests that India ranks second in the world for total silk production, but it is only 15% as 85% of it is from china. This is low amount of silk production is due to the lack of automation in sericulture process.

This implemented system involves the eradication of the difficulties faced by the farmers in manual sericulture farm. The system involves the combined usage of the microcontroller and GSM module providing automated control features to the farm and the user. To improve the production and quality of silk thread, usage of automation in sericulture is required, for this proposed system.
IV. METHODOLOGY

The proposed system is an embedded system which will closely monitor and control the environmental parameters the system consists of sensors, microcontroller and actuators. The sensors circuit comprises of four analog sensors namely temperature, humidity, light and fire sensor, the digital one controller is programmed in such a way that it will have the threshold values and the capacity to monitor and control the system by using think speak IOT we can transmit data to cloud.

Hardware requirements: -

Microcontroller – The ESP 32 brain of whole model it accepts the instructions from temperature, humidity and Ldr sensors. After receiving data, the controller will compare with the threshold values which is saved in cloud with the help of internet and maintains the required environmental parameters of silkworm.

Temperature sensor – LM35 series are precision integrated circuit temperature sensors whose output is proportional to Celsius. It is used with single power supply.

LDR (Light dependent resister) – It is a resistance decrease with increasing incident light intensity. It is also called as photodetector and made up of high resistance semiconductor.

Humidity sensor – These are gaining more significance in diverse areas of measurement and control technologies. These can withstand with different environment. These are small in size and low cost.

LCD (Liquid Crystal Display) – It is a thin flat display and made up of number of colors or monochrome pixels arrayed in front of a light source or reflector.

Software requirements: -

Keil software: E embedded C language to write code we run the code and execute in keil software. After executing code, we dump the code into controller using 8051 microcontrollers.

V. ADVANTAGES AND DISADVANTAGES:

Advantages:

- It recommends financially affordable and power effective organization.
- Efficient wireless sensor network with IOT technology to monitor and control the temperature, humidity and light intensity present in silkworm rearing house.
- The proposed system reduces the man power and reduces the chance of errors.
The model is easy to implement and use.

- Data collection. All data can be collected with the help of installed sensors
- Reduction of risks
- Business goes automated
- Higher quality
- Livestock monitoring
- Monitoring climate conditions

Disadvantages:
- Faulty sensors or data processing engines can cause faulty decisions which may lead to over use of water, food, and other wastage of resources.
- The current IOT systems are not scalable or reliable and the initial costs are high which the farmers cannot afford. Moreover, internet facility is slower.
- The sericulture-based equipment requires farmers to understand and learn the use of technology. This is the major challenge in adopting iot based sericulture at large scale across the countries.

VI. APPLICATIONS

- By using small modification, we can use this model in agriculture system.

VI. RESULTS

![Figure.8. Final prototype view](image)

VII. FUTURE SCOPE

In the current system, we are monitoring the value of the sensor and we know climatic conditions only so by implementing an operating section from the cloud we can control atmospheric conditions.

VIII. CONCLUSION

This venture gives mechanization and supervisory control in sericulture cultivates by utilizing microcontroller and WIFI based innovation. This model faculties and controls the climatic conditions to be kept up inside the raising condition. The actuators are turned on just when required and actuators utilized are effectively accessible and modest. The proposed framework is financially savvy a power effective arrangement. Preparatory trial of the model demonstrates that model can be worked progressively to monitor of natural conditions inside the ranch. It lessens the Seri culturist’s drawn out nearness in the raising unit. The framework is easy to use. The utilization of broadband/Wi-Fi and Internet of Things (IOT) for correspondence process and information securing.

IX. REFERENCES

[1]. Gunasheela T J1, Renuka V Tali2, Pratibha S N3, Shilpa A P4 1Assistant Professors, Dept. of ECE, K.S. School of Engg “Implementation of Sericulture Farm Automation using Sensor Network andGSM Technology”
[2]. Mr. Mahesh B. “Arduino Based Automated Sericulture System “
[3]. M. Dixit, A. Kulkarni, N. Raste and G. Bhandari, “Intelligent Control System for Sericulture,” International Conference on Pervasive Computing (ICPC), ISBN:978-1-4799-6272-3, 2015.
[4]. V K Rahmathulla, “Management of Climatic Factors for Successful Silkworm (Bombyxmori L.) Crop and Higher Silk Production: A Review”, Hindawi Publishing Corporation, 2012.
[5]. Mohamed RawiDeanMohdKassim& Ahmad NizarHarun, Applications of WSN in Agricultural Environment Monitoring Systems”, ISBN: 978-1-5090-1325-8, IEEE, 2016.