

Smart Sericulture System

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Abstract—Sericulture is the process of cultivating silkworms and extracting silk from them. It provides gainful employment, economic development, and improvement in the quality of life to the people in rural area. Parameters like Environmental Factors, Temperature, Humidity and Light Intensity, Air are the important factors in the progression of silkworms and suitable encouraging must to be done according to the requisites in every stage. Sericulture is the important occupation in India and the techniques used by the agriculturists are yet outdated. Hereafter there is the need of developing modernization in sericulture cultivation. This gives an idea of providing automation in sericulture.

To improve the production and quality of silk thread, usage of automation in sericulture is required. The model goals at making use of developing technology that is IOT and smart Sericulture using automation. Observing environmental parameters of the silkworm rearing house is the most important aspect to improve vintage of the silk. The specialty of this model comprises enhancement of a system which can observe temperature, humidity, light power through sensors using ESP8266 NodeMCU and in case of any variations in the parameters send a notification on the user mobile application using internet connection and using our mobile we can controller these parameters. This system permits for data assessment and scheduling to be programmed through the Arduino IDE software.

I. INTRODUCTION

India ranks 2nd globally in the field of silk production says 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. Because farmers are having so many problems following the traditional way of sericulture, silk production is falling day by day. Sericulture is the field in which production of silk is done by raising the silkworm. Sericulture mainly deals with the preparation of silk by nurturing the silkworms.

Production of silk is very time taking as well as dedicate and difficult method. Silkworm is considered as one of the utmost essential house-trained creatures that harvest dynamic silk-fiber 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 silkworm rearing house, which affects the weight of cocoon and shell ratio, as well as cocoon quality. Occasional varieties assume an imperative part in the development and advancement of silkworm. Sericulture is the significant occupation in countryside of India and techniques utilized by the agriculturists are yet obsolete.

II. PROBLEM STATEMENT

The current technique is one of the oldest methods of sericulture, checking and maintaining the factors such as temperature, relative humidity, light of the silkworm rearing unit is labour-intensive. The lack of automation in sericulture process leads to low amount of silk production.

While using chemicals it is advised to wear face mask and hand gloves as it is harmful to health. The common problems which are faced by farmers are insufficient technical skills on silkworm rearing, improper quality control measures and tools, poor infrastructure, insufficient silkworm egg production equipment and technologies, lack of appropriate silk processing technologies.

III. LITERATURE SURVEY

[1] Srinivas, B., et al. "IoT based automated sericulture system." *International Journal Recent Technol Engineering (IJRTE)* 8.2 (2019).

In this paper author has proposed a methodology in implementing a system which helps in

sericulture. It goals at building sericulture smart by applying automation and IoT technologies. It recommends a low cost and efficient wireless sensor network with IoT technology to monitor and control the temperature, humidity and light intensity present in silkworm rearing house. The system contains sensors, Node MCU and actuators. The model goals at making use of developing technology that is IOT and smart Sericulture using automation.

- [2] Sreedhar, Guru, Lakhan B. Makam, and Mr Mylara Reddy. "Intelligen ControlSystem for Sericulture using IoT." Journal of Xi'an University of Architecture & Technology 12.4 (2020): 3967.

In this paper the framework proposed by the author is implemented with the help of both software and hardware tools, that will track and control on a consistent basis the variations in the environmental factors of silkworm house raising. The proposed system is receiving signal with the help of Internet of Things (IoT) signal analyses the situation and provide appropriate solution.

- [3] Thirumeni, E., and K. Vairamani. "Application of cloud computing in sericulture monitoring." International Journal of Computer Science (IJCS J) 5.1 (2017): 1839- 1848.

In this paper author has proposed a system which consists of a data acquisition system comprising of sensors, signal conditioners, LCD and Atmega328 microcontroller. The microcontroller reads the sensor data and converts the data to required temperature and relative humidity data. Every 30 seconds the measurement data is updated to a PC and LCD.

- [4] Eethamakula, Kosalendra, et al. "Automatic Detection, Controlling and Monitoring of Temperature in Sericulture Using IOT." The International journal of analytical and experimental modal analysis 12.8 (2020).

In this paper author has used 3 temperature sensor, two sensors are monitoring inside and one sensor monitoring outside temperature condition, inside and outside of the farm is sensed by DS18B20. After sensing the temperature values by sensors, the data will be sent to Arduino UNO for checking

the conditions of temperature maintenance in the farm. If temperature is more than the predefined limit the cooler will be ON. If temperature is less than the limit, then the heater will be ON. Temperature condition and activation of either heater or cooler is shown by LCD and transmits data using GPRS.

- [5] Ashwitha, R., et al. "WSN based intelligent control system for sericulture." International Journal of Research in Engineering, Science and Management volume-2 (2019).

In this paper author has proposed a model on WSN based intelligent control system for sericulture in which microcontroller (NODEMCU) is the heart of the framework which is customized such that it will screen and control the parameters within the threshold values. There are two sensor temperature, humidity and light sensor. The DHT11 sensor measures the temperature and relative humidity which splits over a digital signal with temperature and humidity, given to NodeMCU.

IV. OBJECTIVES

The main objectives of this project are defined as follows:

- To minimize the manual investment of the farmer.
- To monitor temperature and humidity of silkworm rearing unit.
- To convey the status of temperature and humidity related information remotely to farmer.
- To help in increase in production of silk.

V. METHODOLOGY

The below block diagram represents the methodology of the project where we are using NODE MCU ESP8266 as development board which is connected to various sensors and actuators such as light intensity sensor that is LDR sensor, temperature and humidity sensor that is DHT11 sensor, temperature and humidity controller, light controller, and slack lime sprayer as shown in the block diagram.

- The ESP8266 will read the input from the sensors and send it to mobile app using IoT devices and it will also control the controllers by which we are given command in our mobile device.

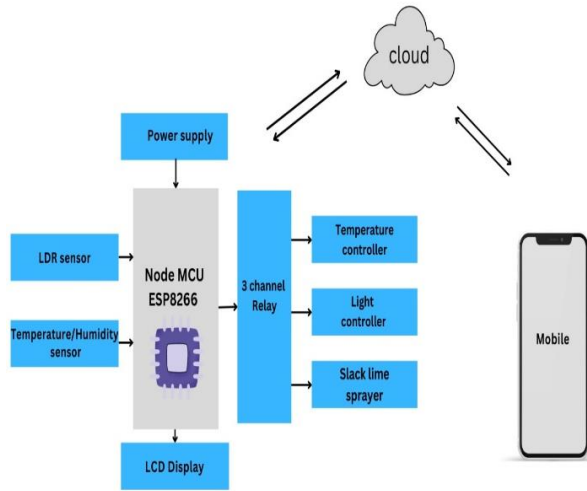


Fig.1.1 Block diagram of smart sericulture system

- An LDR is a resistor whose resistance changes as the amount of light falling on it changes. The resistance of the LDR decreases with an increase in light intensity. This property allows us to use them for making light sensing circuits, and the value which it reads will be sent to ESP8266 and according to this value user can control the light at actuator side.
- The temperature and humidity sensor that is DHT11 is a basic, ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin and this value will be sent to ESP8266 by which user can increase or decrease the temperature according to user need.
- The value of temperature and humidity which is read by DHT11 sensor will be displayed on LCD display.
- To absorb moisture, regulate humidity and to maintain hygiene a slack lime spray will be sprayed once in a day.
- This all information will be sent to user mobile using internet so a user can monitor and control their sericulture farm remotely.

VI. RESULTS

In the proposed system, there is an analyzing of the execution parameters of Silkworm rearing house such as temperature, humidity and light intensity using IoT.

The variation in the parameters such as temperature and humidity of silkworm rearing house is sensed by the sensors and is shown on LCD display and is sent to farmers mobile application and planned important changes will be completed. In case if any variation in temperature, then that will be controlled by temperature controller, if light intensity is low then light will on and once in a day slack lime will be sprayed as a disinfectant. This can be seen in the farmers mobile using IoT application.

REFERENCE

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