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A Project Synopsis on “Smart Sericulture System”

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INTRODUCTION

India rank 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. Sericulture is the significant occupation in countryside of India and techniques utilized by the agriculturists are 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. The key factor which can be identified for a huge difference is the lack of mechanization in the sericulture department. The seasonal changes disrupt the change in the atmosphere inside the rearing house of silkworms, which also affects the cocoon and shell load ratio as cocoon consistency. Therefore, the silk quality is affected in the silkworm rearing house due to the environmental change. To increase the quality and production of silk thread, this project proposes the use of automation in sericulture. By controlling the numerous environmental factors such as temperature, humidity, and light intensity throughout the lifespan of the silk-worm promises enhancement in the silk quality and quantity.

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.
- Convey the status of temperature and humidity related information remotely to farmer.
- To help in increase in production of silk.

METHODOLOGY

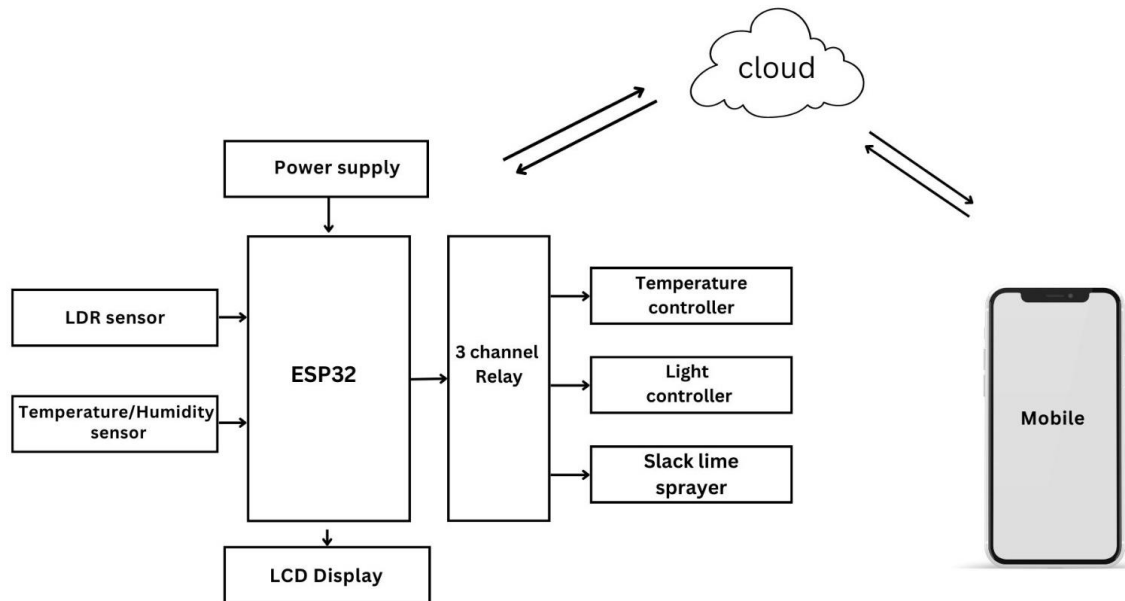


Fig.1.1 Methodology diagram of proposed model

NODE MCU ESP32 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. The ESP32 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.

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 ESP32 by which user can increase or decrease the temperature according to user need.

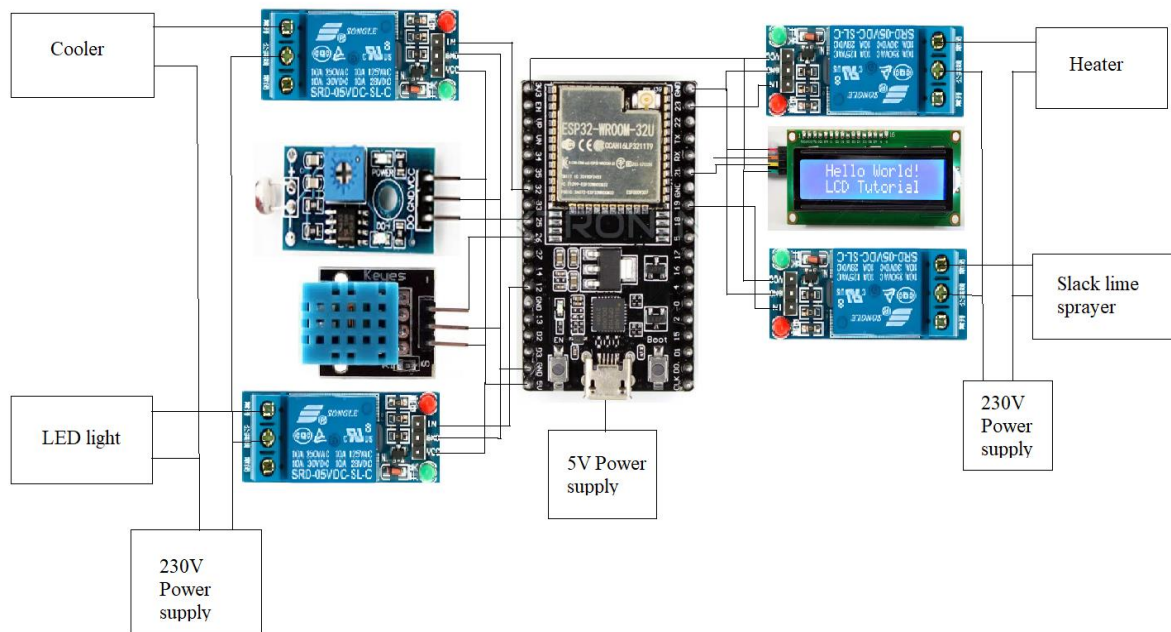


Fig. 1.2 Circuit diagram

And 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.

RESULT AND CONCLUSIONS

RESULT

In the proposed system, there is an analysing 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.



Fig. 1.3 Results

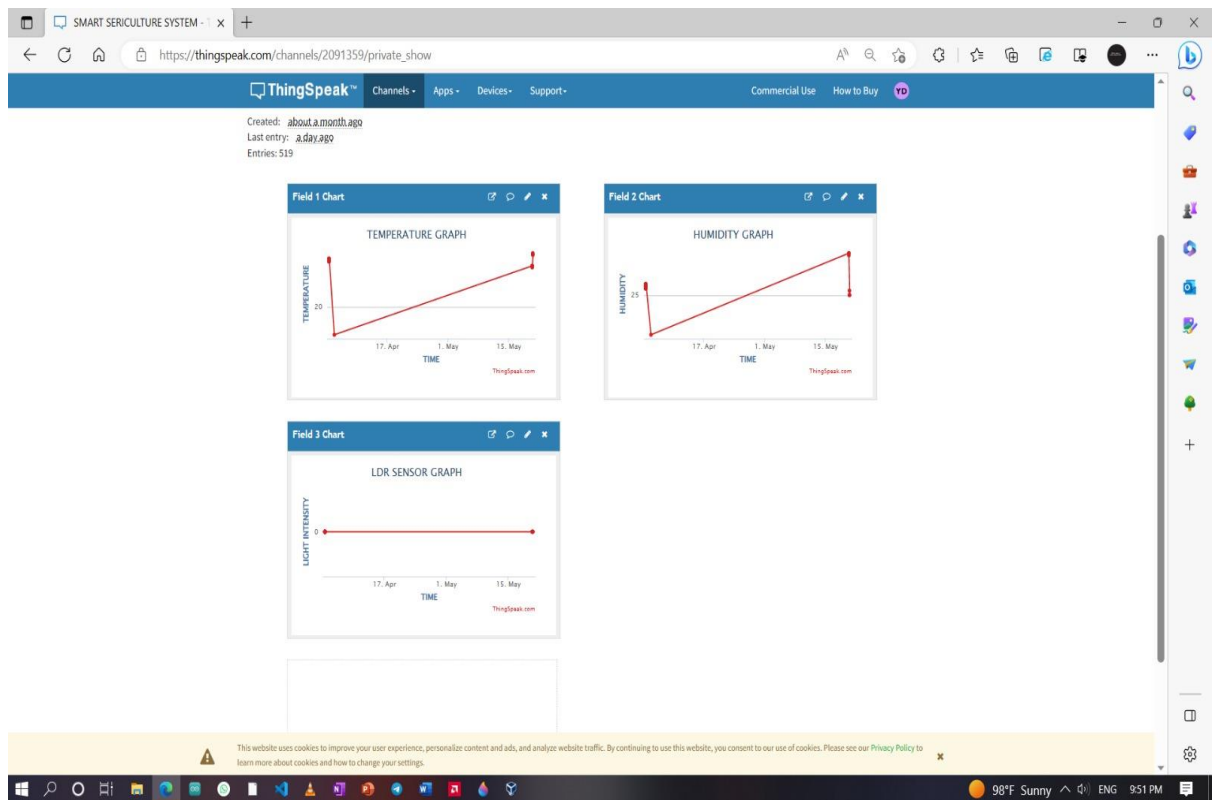


Fig. 1.4 Result in Thingspeak

CONCLUSIONS

The objective of our study was to present the information about the use of automated monitoring and controlling technique in the aeroponic system. The aeroponic system is the new plant cultivation method of the modern agriculture. Its existence can allow producing food whole year without any interval. Smart sericulture system powered by software implementation brings numerous benefits to the sericulture industry. By integrating technology, data management, and automation, it enhances efficiency, productivity, and quality control in sericulture processes. The key advantages of a smart sericulture system include improved monitoring, enhanced disease detection and prevention, predictive insights, streamlined resource management, remote access and mobility, data-driven decision making. By embracing a smart sericulture system, sericulture farmers can modernize their practices, reduce manual labor, and optimize resource utilization. This not only increases efficiency but also contributes to the sustainability and profitability of the sericulture industry as a whole.

WHAT IS THE INNOVATION IN THE PROJECT?

In a smart sericulture system, various innovations can be implemented to enhance the efficiency, productivity, and sustainability of silk production. Here are some potential innovations in a smart sericulture system

Sensor Technology: Integration of advanced sensor technologies can enable real-time monitoring of crucial parameters such as temperature, humidity, light levels, and air quality within the silkworm rearing environment.

Climate Control and Environmental Management: Smart sericulture systems can incorporate climate control mechanisms to maintain optimal temperature and humidity levels throughout the rearing process. This can be achieved through the use of automated ventilation systems, cooling or heating technologies, and humidity regulation mechanisms.

Sustainable Silk Production: Innovations in sericulture have also focused on sustainable practices. This includes the development of eco-friendly mulberry cultivation techniques, efficient water usage, waste management, and the use of natural dyes instead of harmful chemicals.

Automation: Innovations in sericulture have involved the use of automation to improve efficiency and reduce labour-intensive tasks.

Internet of Things (IoT) Applications: The integration of IoT technologies in sericulture has enabled real-time monitoring of various parameters such as temperature, humidity, and light levels within silkworm rearing facilities.

Genetic Engineering: Advances in genetic engineering have facilitated the development of genetically modified silkworms with enhanced silk production capabilities, improved disease resistance, or silk with specific qualities (e.g., increased strength or different colors).

Sustainable Silk Production: Innovations in sericulture have also focused on sustainable practices. This includes the development of eco-friendly mulberry cultivation techniques, efficient water usage, waste management, and the use of natural dyes instead of harmful chemicals.

Sericulture Data Analytics: The application of data analytics and machine learning techniques can help optimize sericulture processes. Analysing large datasets on factors such as silkworm behaviour, environmental conditions, and disease patterns can lead to better decision-making and improved productivity.

SCOPE FOR FUTURE WORK

The current system requires continuous internet connectivity. In Future this can be overcome by using GSM module to send the notification directly on the framer's mobile through the SMS without using the internet connectivity. The future scope of a smart sericulture system holds significant potential for advancements and innovation in the sericulture industry. Here are some areas of potential growth and development those are Internet of Things (IoT) Integration, Artificial Intelligence and Machine Learning, Robotics and Automation, Blockchain Technology, Remote Sensing and Satellite Imaging, Collaboration and Data Sharing, Sustainable Practices and Environmental Impact. Overall, the future of a smart sericulture system lies in the continuous adoption of emerging technologies, data-driven decision-making, and sustainable practices. These advancements have the potential to revolutionize the sericulture industry, making it more efficient, productive, and environmentally friendly.