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An Efficient Monitoring of Sericulture Using Embedded System

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ABSTRACT: Sericulture is the cultivation of silkworms to produce silk. India produces more than 60% world's annual production. So, it is called the second biggest manufacturer of silk. In silkworm progress moistness and temperature take part and act critical position in the progression of silkworms in each stage, the duration takes place for improvement a particular hatchling. Disinfection is one of their proving parameters to be considered for healthy and triumphant silkworm rearing. The temperature parameter is an important factor for silkworm growth and this maintenance of temperature is strenuous. So, the proposed frame work introduces an embedded system with the temperature and humidity sensors to control the environmental circumstances within the arrangement of silkworms.

KEYWORDS: Arduino Atmega 328 Microcontroller, DHT11 Sensor, Peltier plate

I. INTRODUCTION

India ranks ordinal worldwide within the silk production market, per the central silk board report. On the alternative hand, solely V-J Day of worldwide silk production is contributed by Asian nation as compared to China that produces eighty fifth of silk. Silkworm's area unit raised so as to provide silk in sericulture. Silkworm's area unit nourished for the preparation of silk in sericulture. Silk production is incredibly time overwhelming, needs heaps of dedication and conjointly a troublesome method. Silkworm is considered one in every of the foremost vital housetrained creatures that harvest dynamic cocoon-shaped silk-fiber by ingesting mulberry leaves throughout the initial larval stage. The key issue which may be known for a large distinction is that the lack of mechanization within the sericulture department. The seasonal amendments disrupt the change within the atmosphere within the rearing house of silk worms, that conjointly affects the cocoon and shell load quantitative relation as cocoon consistency. Therefore, the silk quality is affected within the silkworm rearing house thanks to the environmental amendment. By dominant the environmental issue like temperature and wetness level throughout the generation of the silkworm guarantees enhancements within the silk quality and amount. the most objective of the project is to take care of the wetness level needed for the survival of silkworm. It involves the planning and implementation of embedded primarily based observance sericulture with parameters like temperature, humidity. Here we tend to project an automatic sericulture farm for maintaining correct environmental needs for the expansion of silkworms. The sericulture atmosphere is management by exploitation device and automatic system.

II. EXISTING METHOD

Automated smart sericulture system to avoid the drawback of the earlier silkworm production the environmental condition of the sericulture farm is not monitored properly it affects the silkworm. In olden days, the silkworms are cultivated in the room where the temperature and cooling are increased in the sense, we need to shift the room for the silkworms it is difficult to monitoring the silkworm temperature and humidity level. If the temperature exceeds it cause damage to the silkworm manual monitoring & controlling process is complex.

III. METHODOLOGY

In this technique temperature and humidity sensor which sense the condition of silkworm to maintain the atmospheric state. By sensing the temperature values by sensors, the silkworms are observed and maintain the temperature of the silkworms in sericulture farm. The temperature and humidity sensor are maintained to the resolved equate of 18-33°C. The continuous monitoring of temperature by the sensors is done for every minute in the sericulture farm. The advantages of the proposed method are Cost efficient, Requirement of less man power, the change of error rate in maintaining climatic condition is less

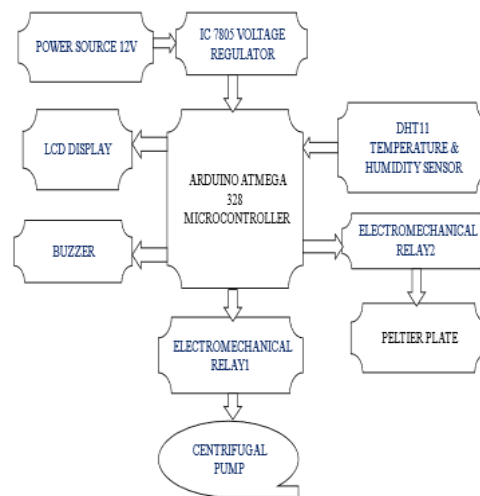


Figure 1: Block Diagram

IV .WORKING PRINCIPLE

In this project the DHT11 sensor, this can sense the temperature and humidity level to maintain the atmospheric condition. After sensing the temperature values by sensor, the data will be sent to microcontroller for checking the condition of maintenance in the sericulture farm. The temperature and humidity sensor are maintained to the resolved equate of 18-33°C. when the temperature is below 18°C it is the valley point to activate the Peltier plate. When the temperature is above 33°C it is the peak point to activate the cooler.

A) PELTIER PLATE

A Peltier component could be a device that converts electricity directly into a temperature distinction across a flat plate – creating one aspect hot and one aspect cold. It works in each direction too. That is, if you place one between a hot iron and a block of ice it'll truly manufacture electricity. Peltier parts appear as if flat, typically sq., plates with 2 wires extending from it. Between these 2 surfaces is associate array of semiconductors serial alternating between n-type and p-type (n-type has “n” for “negative” or a lot of additional electrons; p-type has “p” for “positive” or shortage of electrons). They’re physically organized so once associate electrical current is place through the system, the free electrons and gaps in want of free electrons are stirred during a common direction with reference to the 2 plate surfaces. This transfers the thermalenergy from one aspect to the opposite. The direction of warmth flow depends on the direct particle of current.

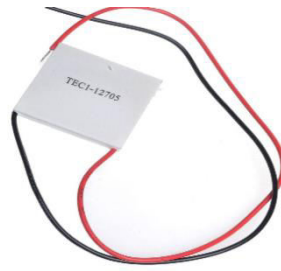


Figure 2: Peltier plate

In application, one aspect is typically guaranteed to associate metallic element sink that basically ties that aspect to the close surroundings temperature. The opposite aspect is capped with ceramic and can become hotter or colder than the surroundings.

B) ARDUINO ATMEGA 328 MICROCONTROLLERS

Arduino is common due to its huge on-line knowledge and application-oriented language, and this helps the developer to code the controller program in Arduino and then convert it into the microcontroller code.

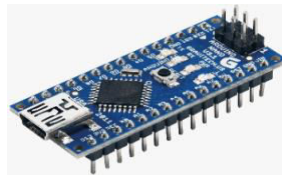


Figure 3: Arduino Atmega 328 Microcontroller

Microcontrollers square measure crucial to artificial intelligence. They're basically the brains running tasks to be completed. During this article, it'll show a way to produce program victimization the Arduino IDE with AN Atmega328 microcontroller to run a mecbot. A way to produce AN Arduino program for a mecbot to follow a line through a maze. We'll try this victimization the Atmega328 AVR microcontroller. We'll build a separate assembly and machine languages file for the program to scan, dominant the various mecbot parts. Just a fast note before we have a tendency to get started: these directions square measure for making a program once the mecbot is already engineered, the wiring is connected, and therefore the assembly and hex files exist already. However, it'll still offer a fast summary on a way to run all the files along.

C) DHT11 TEMPERATURE AND HUMIDITY SENSOR

The information pin is connected to associate degree I/O pin of the MCU and a 5K pull-up resistance is employed. This information pin outputs the worth of each temperature and wetness as serial information. If square measure attempting to interface DHT11 with Arduino then there are ready-made libraries for it which is able to provide you with a fast begin. If you're attempting to interface it with another MCU then the datasheet given below can be available in handy. The output given out by {the information the info the information} pin is within the order of 8bit wetness whole number information + 8bit the wetness decimal information +8-bit temperature whole number information + 8bit incomplete temperature data +8-bit check bit. DHT11 Temperature device operating. The period of every host signal is explained within the DHT11 datasheet, with neat steps and illustrative temporal arrangement diagrams

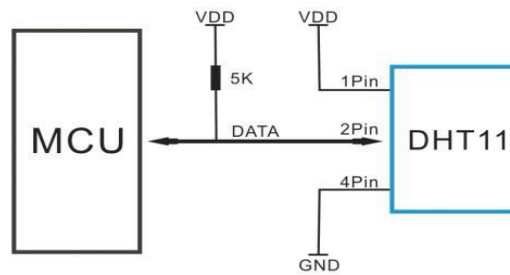


Figure 4: Temperature and humidity sensor

The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of $\pm 1^\circ\text{C}$ and $\pm 1\%$

V .RESULT AND DISCUSSION

This strategy presents information's about the use of automated monitoring and controlling techniques in the sericulture farm. We suggested an automated technique in sericulture farms which includes less human intervention towards maintaining proper environmental requirements for the growth of silkworms. This proposed framework discussed the role of different factors affecting the growth, survivability, productivity, and disease incidence in silkworms and maintenance cost making it suitable for rural usage this implementation increases the quality and quantity of silk production in rural areas. This system also monitors and controls the temperature of the silkworm rearing room continuously, within the fixed temperature range hence improving the yield.

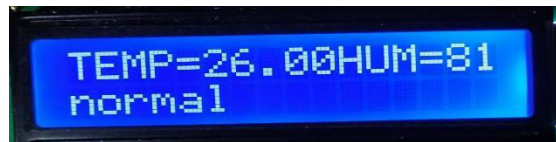


Figure 5: When the silkworms are in Normal temperature
The temperature and humidity sensor are maintained to the resolved equate of 18-33°C.



Figure 6: When the silkworms are in above temperature
When the temperature is above 33°C it is the peak point to activate the cooler.

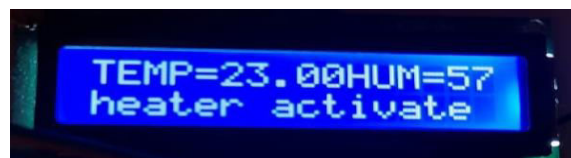


Figure 7: When the silkworms are in below temperature
When the temperature is below 18°C it is the valley point to activate the heater.



VI. FUTURE ENHANCEMENT

Image processing technologies will enable the end user to monitor. By making use of an SMS Prototype will operate in real time for monitoring and actuation inside the system. Image processing is used to monitor the complete silkworm growth and diseases.

VII. CONCLUSION

This technique helps farmers to come out of their economic crisis. We proposed an automated sericulture plant which includes less human intervention towards maintaining proper environmental requirements for the growth of silkworms, reducing the chances of reduction in silk production. This paper discussed about the role of different factors affecting the growth, survivability, productivity and disease incidence in silkworms.

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BIOGRAPHY



Dr.N. Nagaraj received Ph. D in Information and Communication Engineering in the specialization of VLSI Design under ANNA UNIVERSITY, Chennai in 2019. He received M.E. degree in (Applied Electronics) from K.S. Rangasamy College of Technology, Tiruchengode, India in 2011 and his B.E degree in Electronics and Communication Engineering from Adhiyamaan College of Engineering, Hosur, India in 2009. Currently he is employed as Assistant Professor/ECE at Adhiyamaan College of Engineering, Hosur. He has published more than 30 research papers in various Refereed journals and also presented papers in various National & International conferences. His general research areas include VLSI Design and Testing, Digital Circuit design and Embedded systems. He is Associate member (AMIE) in IE(I), India.



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