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Arduino Based Automated Sericulture System

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Abstract- 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 venture gives a thought regarding giving automation in sericulture cultivate. This model faculties and controls the natural variables like temperature, relative humidity, CO2 and light power. Food feeder and solution sprayers are additionally mounted over the homestead. It likewise suggest 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 GSM.

Keywords- Silkworm, Sericulture, Wireless Sensors, Microcontroller, GSM, Temperature, Humidity, Light, CO2.

I. INTRODUCTION

Sericulture is the science that deals with production of silk by rearing of silkworm. Producing silk is a lengthy, complex process. Silkworm is one of the most important domesticated insects, which produces vigorous silk thread in form of cocoon by consuming mulberry leaves during larval period. The seasonal differences in the environmental components considerably affect output of silkworm crop such as cocoon weight, shell weight, and cocoon shell ratio.

The motivation for this project came from the countries where economy is based on agriculture and the climatic conditions lead to lack of rains & scarcity of water. The farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation of the land. Most of the farmers are small land holders and depend on other sources of income. Even if the farm land has a water-pump, manual intervention by farmers is required to turn the pump on/off whenever needed

II. LITERATURE SURVEY

2.1 overview

- In the year early 2012 it was proposed phase differences in environment components notably affect geno typical assertion in form of phenol typical output Of silkworm yield as such cocoon shells weight and a cocoon shell correlation. The present consider paper discuss in details about part of temp and humidity on growth and development of silkworm including current studies on heat disturbances Protein.
- Later in 2015 proposed an intuitive" control system" for sericulture. Proposes an intuitive sericulture plant automation system using zone based cascade control of physical specification can used as solution.
- Later proposed an Applications of Wireless sensor network in Agricultural surrounding Monitoring System. Agrarian condition observing has turned into an essential field of control and security, giving constant framework and control correspondence with the physical world.

2.2 Problem definition

The existing systems use the controllers such as microcontroller 8051 and PIC controller which maintains the parameters of temperature and humidity only. In the

proposed system maintains the parameters such as temp, humidity, light power, co2 gas. Precaution function is included in this project that is fire alarm and also feed the food and medicine to silkworms.

III. METHODOLOGY

The proposed system is an embedded system which will closely monitor and control the environmental parameters of rearing house on regular basis.

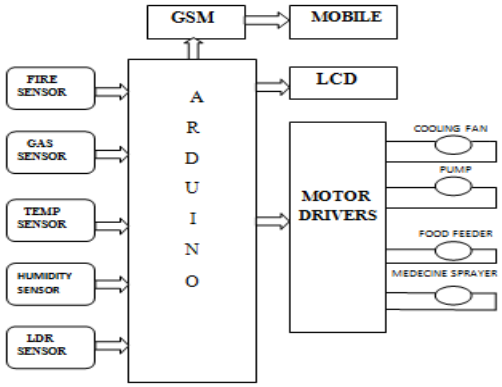

Figure 2.1: Block Diagram

As shown in the system consists of sensors, arduino controller and actuators. The sensors circuit comprises of four analog sensors namely temperature, humidity, light and CO2 senor and fire sensor, the digital one. Arduino is programmed in such a way that it will have the threshold values and the capacity to monitor and control the system.

The system consists of both the software and hardware components which are classified as follows:

A. Software Components

1. Arduino programming: The purpose of the arduino programming is to control the operation of the arduino microcontroller. This program is fed into the printed circuit board through the ports in order to perform required task. It is simple and it controls the overall process on the basis of the conditions given in the program.

B. Hardware Components

1. Microcontroller: The arduino microcontroller AT mega 2560 is the brain of the entire system. The controller receives the commands from temperature, moisture, fire, gas and LDR

sensor. Based on the values fed into it, the controller will analyze the sustaining condition of these sensors is suitable for the silkworm and then it does the controlling operation.

2. Temperature sensor (LM35): Here LM35 is used because the readings are in Celsius only not in Kelvin and also because of its accuracy.

3. Humidity sensor: Here DHT11 is used and it uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed).

4. MQ9 CO2 Gas sensor: Sensitive material of MQ-9 gas sensor is SnO2, which with lower conductivity in clean air. It make detection by method of cycle high and low temperature, and detect CO when low temperature (heated by 1.5V).

5. LDR Sensor: LDR is utilized as light sensor. LDR is a light ward resistor. The resistance of the LDR ranges from 1k to 500k ohm.

6. Fire Sensor: This module is sensitive to the flame and radiation. It also can detect ordinary light source in the range of a wavelength 760nm-1100 nm. The detection distance is up to 100 cm.

5. GSM module: In order to send SMS notification to the former GSM is used. In case of any variations in parameters this SMS notification will help .

7. Buzzer: In order to indicate the emergency condition or severity condition this buzzer is used.

8. LCD Display: The 16x2 LCD display is used to display the status and result of the proposed project. It requires 5V DC supply and this can also adjust the brightness of the system.

9. Motor Driver Circuit: L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction.

10. Current Driver Circuit: The relay driver uln2003 IC is a high voltage and current Darlington array ic, it comprises of 7-open collector Darlington pairs with common emitters.

These ICs are used as relay drivers as well as to drive a wide range of loads, line drivers, display drivers etc. This IC is also normally used while driving Stepper Motors.

IV.DESIGN & IMPLEMENTATION

The flow chart for the process is as shown in Figure 3.1

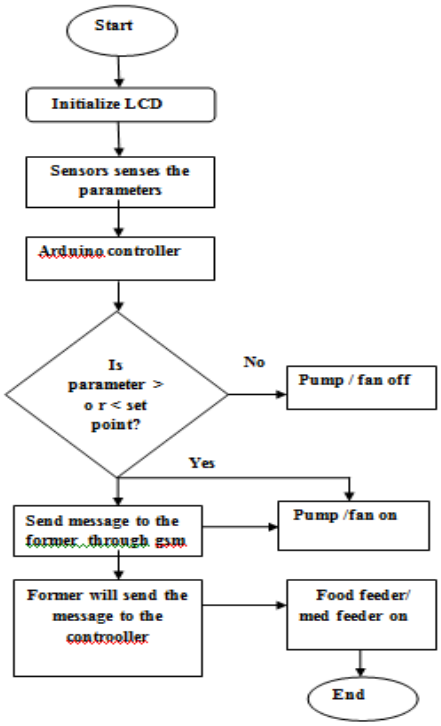

Figure 3.1: Flow Chart

The circuit diagram for the implementation is as shown in Figure 3.2

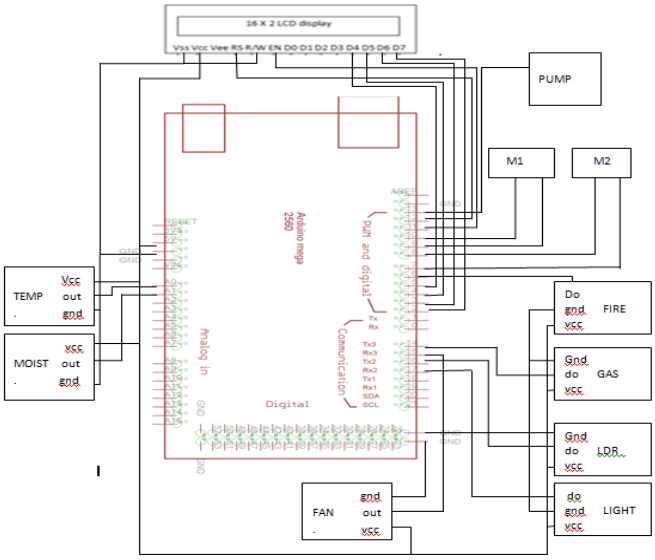

Figure 3.2: Circuit Diagram

- The framework comprises of sensors, Arduino controller and Actuators. The sensors circuit includes four analog sensors in particular temperature, moisture, light and CO2 senor and fire sensor, the digital one.
- The controller is customized such that it will have the edge values and the ability to screen and control the framework.
- The yield of simple sensors is given to controller. At the point when any of the specified parameter surpasses the security edge which must be kept up, the sensors sense the variety and the microcontroller gets this information at its info ports in the wake of being changed over to an advanced shape by the ADC.
- The information and conditions in the raising house will be sent to the agriculturist's portable through GSM.
- The controller then plays out the fundamental activities through motor driving circuit by utilizing the actuators until the surpassed parameter has been taken back to its ideal level.
- For instance, the temperature information will be contrasted and edge, on the off chance that it is surpassed or underneath as far as possible then temperature control unit will be fueled on. Comparable process is done for rest of the sensors.
- On the off chance that any feeding process and pharmaceutical splashing needs to complete then the farmer can imply the Arduino controller through GSM to make the required move.
- The framework likewise utilizes LCD show for ceaselessly cautioning the client with respect to the conditions inside the homestead. Consequently the whole setup move toward becoming progresses toward becoming easy to use.

V. RESULTS AND DISCUSSION

When the sensors detects the varieties in the natural parameters, those information will be shown on LCD and sent as a message to the agriculturist and programmed fundamental moves will be made. For instance if temperature goes high fan will be exchanged on, if low light is identified LED will be on. The LCD outputs are as shown in Fig 1: and the messages to the farmer are as appeared in Fig 2:

Fig 1: LCD Output

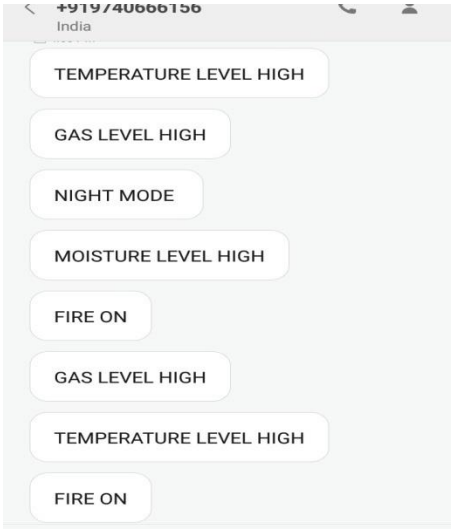

Fig 2: Messages to the farmer

Presently to control the nourishing part and spraying part, the GSM operation is appeared in Fig 3 and messages the agriculturist is appeared in Fig 4.To turn on the feeder or sprayer, the rancher ought to make an impression on the microcontroller like FEEDER ON and SPRAYER ON as appeared in Fig 4, the feeder and sprayer will be turned on. After this operation the LCD shows the present move which is making place as appeared in Fig 3 and that data will be sent as a message to the agriculturist.

Fig 3: Feeder and Sprayer LCD Outputs

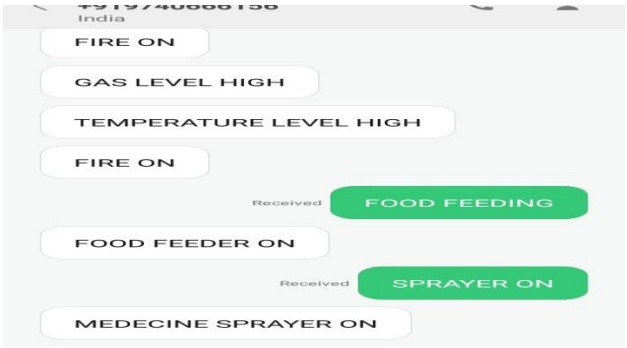

Fig 4: Messages from and to the farmer

VI. CONCLUSION

This venture gives mechanization and supervisory control in sericulture cultivates by utilizing microcontroller ARDUINO and GSM 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 and 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 sericulturist's drawn out nearness in the raising unit. The framework is easy to use. Future work incorporates the utilization of broadband/Wi-Fi and Internet of Things (IOT) for correspondence process and information securing.

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