Project Proposal Reference No.: 46S_BE_5272

Title of the project: **"Silkworm monitoring system using IOT"**

Name of the College: Government Engineering College, Ramanagara

Department: Electronics and Communication Engineering

Names	Email ID	Phone number
Dr. Imran Khan(Guide)	imrangce@gmail.com	9886052844
Bhavana S	sbhavana828@gmail.com	7619295358
Hemanthkumar R G	rghemanthkumar@gmail.com	6361347648
Suresh K	sureshmaski71@gmail.com	7204224621
Thejaswini P	thejaswinigowda25@gmail.com	8088383893

Keywords: *IoT, Microcontroller, Sensor, Sericulture, Silk*

INTRODUCTION

Sericulture is derived from the Greek word "sericos" signifying "silk" and the English word "culture" meaning rearing. The cultivation of silkworms to produce silk is called Sericulture. India ranks 2nd in the world production of silk and only India 15 to 18% of global silk production is contributed by India as compared to the China which produces 85% of silk. In Karnataka sericulture has history of more than 215 years and it was first established in Channapatana by Tippu Sultan in the year of 1785.There are different types of silkworms which are shown in fig1. The life cycle of the same is shown in fig 2. Sericulture is one of the oldest farming which is used by the farmers as their income source. Production of silk is difficult process as well as the time-taking one. Silkworms are highly sensitive to environmental fluctuations, and unable to survive extreme natural fluctuation in temperature and humidity etc. These environmental factors directly affect the quantity as well as the quality of the silk. To keep the ideal temperature, humidity, and moisture levels, farmers use traditional methods like choosing the right material for walls, fabricating roofs, orienting buildings, and designing construction methods. Earlier projects which focused on the development of sericulture was just able to monitor only few parameters such as temperature, humidity, moisture etc. So, in

this project we have focused on almost all the parameters the affects the growth of the silkworm. The proposed system not only monitors it also automates the process and make the environment suitable for silkworm to grow. On monitoring these factors, the growth of the silkworm increases gradually. Additionally, the system includes image analysis methods for taking live photos of silkworms and a GSM module for sending a ready message if the environment deviates from its ideal range.

Fig 1: Major types of silkworms

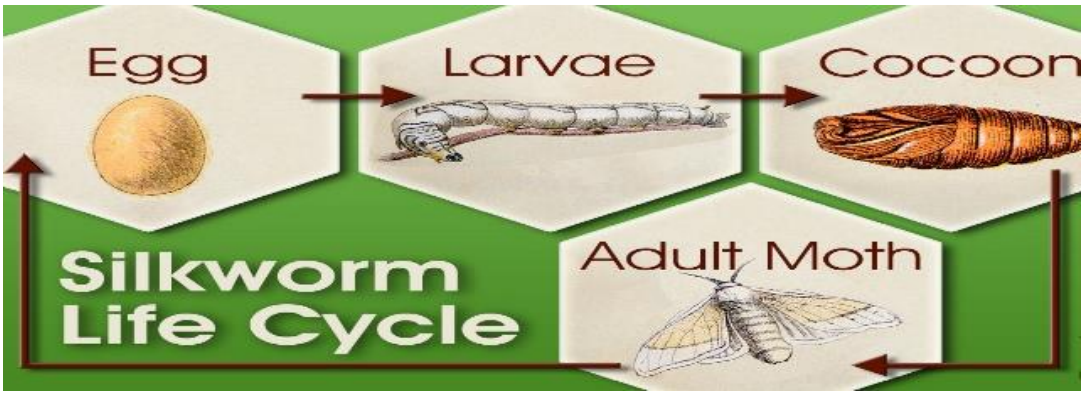

Fig 2: Life cycle of silkworm

Objectives

Agriculture lands are now being monitored and controlled by automated system. The main objective of the proposed system is to meet the need of the farmer to maximize the production of silk in his farming area and continuously monitor the silkworms. The main objective of the project is to provide a suitable environment that favours the silkworms which in turn leads to efficient growth of silkworm and increases the productivity of silk. The proposed system continuously monitors the various parameters such as temperature, humidity etc. In addition to this the proposed system also aims to captures the image of the silkworm using image processing techniques.

Methodology

All the data which is collected form the sensors are given to the major brain of the system i.e., Microcontroller. ESP32 CAM & NODE MCU either of these two are used because it has inbuilt Wi-Fi module. in all other microcontroller, we are supposed to additionally add Wi-Fi which will result in more cost and also system size will increase. After the data is processed and which is sent to the micro-controller, it will verify whether the values got by the sensors are above the threshold or below the threshold. There is a decision-making machine learning approach programmed inside the micro-controller which will tell the decision between good and bad. What actions to be taken is mentioned in the processing unit so that further decisions are taken and these actions are taken to the next stage. The data from the processor is carried out to communication. Any problem that has occurred that must be communicated with the farmer so that he can verify his production. If we give a notification feature for this system, it will be great outcome as the farmer can monitor in real-time. We are saving the data in cloud. This is because just to compare any fluctuations in temperature, humidity etc. in a day which will help the farmer to process the data. The cloud that is used is Thing speak or Blynk.

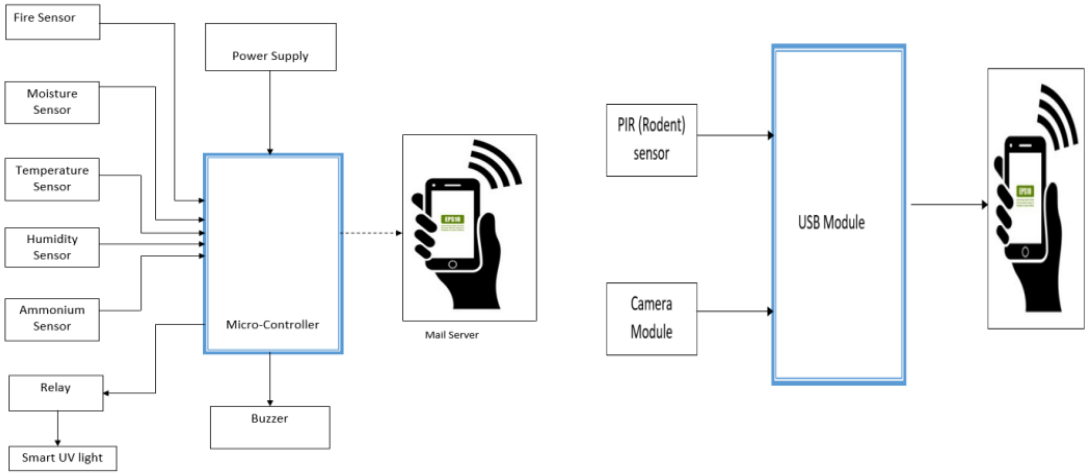

Fig3: Block diagram

Hard requirements:

Node MCU(ESP8266): The Node MCU (Node Microcontroller Unit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems

DHT 11: DHT11 is a single wire digital humidity and temperature sensor, which provides humidity and temperature values serially with one-wire protocol.

Moisture sensor: The soil moisture sensor is one kind of sensor used to gauge the volumetric content of water

PIR sensor: PIR sensors allow you to sense motion. They are small, inexpensive, low-power, easy to use

Flame sensor: based on infrared radiation. The IR photodiode will detect the IR radiation from any hot body. This value is then compared with a set value. Once the radiation reaches the threshold value, the sensor will change its output accordingly

Gas sensor (MQ135): The MQ 135 sensor can be implemented to detect smoke, benzene, vapours, and other hazardous gases. It can detect various harmful gases. It can be used for air quality monitoring, noxious gas detection, home air pollution detection, industrial pollution detection, portable air pollution detection

LCD: Used to display the value

Buzzer: It is a digital component that can be connected to digital outputs, and emits a tone when the output is HIGH

Camera module: this is an Arduino camera module, adopted the Surveillance cameras digital image processing.it is specially designed for image acquisition and processing application

USB module: The USB camera module is a general-purpose camera control board designed for both PCs and embedded systems like the ARM, Raspberry Pi,and similar hardware.

Light-dependent resistor or LDR: LDR is an example of an electrical component that responds to light. When light beams strike it, the resistance changes right away. An LDR's resistance levels can vary by several orders of magnitude. As the light level rises, the resistance value will decrease.

Software requirements

Arduino: An open-source platform called Arduino is used to build electrical devices. A physical programmable circuit board (microcontroller) and a portion of an Integrated Development Environment (IDE) that runs on a personal computer (PC) are both components of Arduino.

Results and conclusion:

This **“silkworm monitoring system using IOT”** proposed system has low cost and portability quality, which are essential for the recording of environmental conditions. Moreover, it supports useful features like remote data view and data analysis. The proposed system is for the development in the sericulture field that might be used to get around the difficulty in

locating skilled labourers. Because NODE MCU is used in the hardware implementation, the system is small and just requires a single expenditure. The information is delivered to the farmer's mobile device, and improvements are made according to the requirement. For example, the fan will turn on if the temperature rises, the heater will turn on if the temperature falls, the light will turn on if the light intensity is low, the PIR sensor silkworm sensor will detect any predators, and the MQ135 will detect any deaths of silkworms. By automating the various parameters accordingly, it favours the environment for silkworm to grow healthily and the farmer can get the maximum yield. The system can be programmed to include additional elements in the process of raising silkworms as desired by the farmer, such as the environmental parameters (threshold can be altered) can be appropriately adjusted based on different geographical areas. As the system is based on open- source materials, it offers a fundamental basis for any upcoming agricultural-related embedded and internet of things advancements.

Innovation in the Project

This system is comprised of inbuilt Wi-Fi module for remote communication using Cloud. All the parameters that will affect the cultivation of silkworm has been considered and monitored, any fluctuations in the optimum values of the parameters can be stabilized using the proposed system.

Scope for future work

Since the system is built in open source, advancements and up gradation of the system can be done easily according to the geographical conditions of different places. 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.