SMART POLLYHOUSE AUTOMATION SYSTEM

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Abstract— Polyhouse is a methodology used to grow plan under controlled environment for increasing yield and quality of the crops. The development and growth of crop depends on internal environment of polyhouse such as temperature and humidity. The controlling and monitoring of polyhouse parameters play vital role in overall development of plant. Polyhouse automation system is the technical approach in which the farmers in the rural areas are benefitted by automatic monitoring and control of polyhouse environment. It replaces the direct supervision of the human. In greenhouse, for proper plant growth soil nutrient parameters are equally important. It doesn't utilise the rain water at the time of rains which results in wastage of stored water. Light is the most important source for photosynthesis but the light intensity is not monitored.

Keywords— Temperature sensor, Soil Moisture Sensor, Humidity sensor, Arduino UNO

I.INTRODUCTION

India is a country where majority of its population are dependent on agriculture. Agriculture is the broadest economic sector which has major contribution in the development of India. India is also concentrating on the technological aspects. When technology and agriculture are integrated together that may yield good results. Conventional method of cultivation requires tremendous amount of time, human effort and requires continuous monitoring. There are several problems such as unpredictable weather conditions and the plants may be easily affected by pest and diseases in conventional method of cultivation.

A Polyhouse is a closed environment where the plants are grown on a controlled platform irrespective of climate and location. Generally, polyhouse is a structure built using bamboos or iron pipes which are covered with ultra violet sheet of certain thickness. The thickness of ultra violet sheets depends on the crop variety. Polyhouse provides a reliable and crucial way to generate higher revenues. Basically, it is an automation system which alters the physical parameters in favor of the plantation and growth process of the crop. Polyhouse is the process through which the production of the crops and plants can be made faster with respect to the norms which are required to grow the crop.

The polyhouse method helps the plants grow without any external obstruction. The harvesting of a single crop is done with minimum additional applications and inputs and maximum output and profits can be generated. Finer quality of plants can be grown inside a polyhouse. Mainly the plant growth depends up on few parameters like temperature, humidity, co2 levels, soil moisture. If we are able to control all the above said parameters to which a plant certainly requires it, results in proper growth of the plant which in turn results in high yield of the crop by improving the growth potential of the plant and by providing ideal condition for the plant growth. But it is highly impossible to monitor and control all the above said parameters in an open environment. The main idea is to perform cultivation in a closed environment which is nothing but a polyhouse environment and monitor and control all the required parameters.

Any change in one parameter may affect the other climatic parameters, so it requires continuous monitoring and control action for the requirements to meet. Inadequate and uncertain environmental conditions may affect the proper growth of the plant. Monitoring and controlling of the environmental parameters should be given utmost attention in order to attain high yield. The controlling of these parameters by performing some control action may result in proper plant growth and increased yield

II. LITERATURE SURVEY

Current System :

In today's world 70% of population depends upon farming .in this there are several problems occurs such as unpredictable weather conditions and the plants may be easily affected by pest and diseases in conventional method of cultivation. We developed Polyhouse Automation System.

Various sensors are deployed in the field like temperature sensor, moisture sensor, water motor and humidity sensor.

Advantages*:*

- Crops can be grown under adverse climatic conditions when it is not possible to grow them in open fields.
- Certain crops can be grown round the year in a particular place for continuous supply
- Production of uniform quality crops..

- Management of insect pests, diseases and weeds is easier under these structures.
- Organic farming is easier under these structures.

Limitations:

As this system is wireless it required the battery for the supply, so the battery power may be the limitation for the system.

Applications:

- Mobile operated pumps save cost of electricity.
- This improves data collection process and helps in wireless monitoring and control.
- It is cost effective method

IV. PROPOSE SYSTEM DESIGN

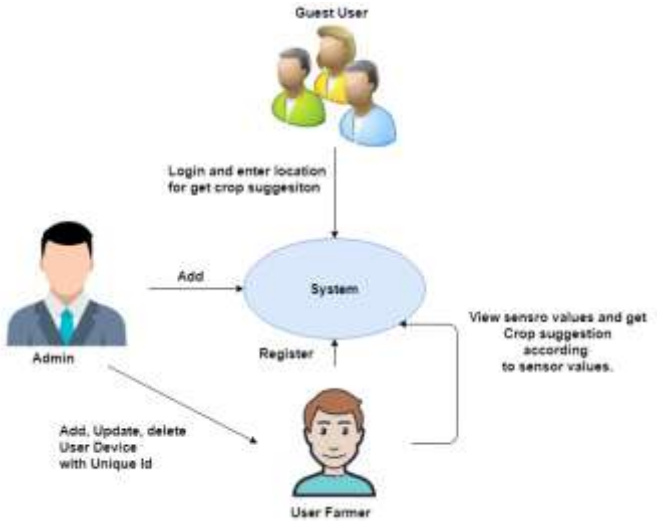


Figure: System Architecture

a.

In the field section, various sensors are deployed in the field like temperature sensor, moisture sensor, water motor and humidity sensor. The data collected from these sensors are connected to the Arduino UNO.

In control section, the received data is verified with the threshold values. If moisture level is low then Arduino switches on a water pump to provide water to the plant automatically.

Water pump gets automatically off when system finds enough moisture in the soil.

Updating the status of water pump and soil moisture. An irrigation system for efficient water management and crops suggestion according to temperature, humidity and moisture level which is sensed by implemented sensors.

Parameters like moisture, temperature, humidity are measured by using sensors.

In present, is added which is a platform to control the arduino that supports hardware platform.

Monitoring the temperature, humidity and moisture level by using sensor and sending the status to the webpage via IOT module.

Watering will be done automatically by predefined time delay.

system if both match then only vehicle will be started otherwise it will be stay off.

Mathematical Model
Appendix A:
Polyhouse(title)

Let S is the system;
S = {I, O, F, DD, NDD, Success, Failure}

I = Input to the system
I = {username, password, Location, soil, User Location, water motor on}

O = Output of the system
O = {sensor value, moisture ratio, crop suggestion, motor off}

F = Fusion in system
F = {adminreg(), adminlogin(), registerFarmer(), farmerLogin(), monitorSensorValue(), monitorMoisture(), waterMotorAccess(), fetchLocationsTempratureHumidity()}

DD = Deterministic data
DD = {Null}

NDD = Non Deterministic data
NDD = {I, O}

Success:

This project includes various features like IoT based remote controlled soil monitoring, moisture & temperature, humidity sensing, crop suggestion and proper irrigation facilities. It makes use of wireless sensor networks for noting the soil properties and environmental factors continuously. Various sensor nodes are deployed at different locations in the farm.

Controlling these parameters are through any remote device or internet services and the operations are performed by interfacing sensors. This concept is created as a product and given to the farmer's welfare.

So making Automatic Plant Irrigation System using Arduino, which automatically provides water to plants.

In this System, the Soil Moisture Sensor checks the moisture level in the soil and if moisture level is low then

Arduino switches on a water pump to provide water to the plant.

Water pump gets automatically off when system finds enough moisture in the soil. System will also provide feature to measure the temperature and humidity of soil and suggest the crop suggestion according to the sensed value by sensor.

If guest user just to know about crop suggestion then user just log in and enter the city name the system will automatic fetch the temperature and humidity of that location and system show the crop suitable for that location.
This system is very used in Farms.
This system is completely automated and there is no need for human intervention for watering in farm.

Failure:

When sensor can get fails.

Feasibility Study

A key part of this system benefits to farmer and recommends a course of action based on operational, technical, economic, and time factors. The purpose of the study is to determine if the users request should proceed further.

Software Quality Attributes

Adaptability: This software is adaptable by any organization.
Availability: Availability of software is easy.
Correctness: The result of function is pure and accurate.
Maintainability: After the deployment of the project if any problem occurs in weather then it can be easily maintain by the software application.

External Interface Requirements:-

User Interfaces-

In the user interface we are building the system for user so that we have added the notifications or Alerts, sensors indication of detection. As this system is user friendly, so we have built the system in hand hold device.

Hardware Interfaces-

The Hardware Interface is the interface of arduino and temperature sensor, Relative Humidity, Soil Moisture for the detection of Poly house and to indicate that the Android App has been detected we are interfacing the Notification to show the massage and for the another indication we have interfaced the Alerts and Notification Color or Prosperity base lights with green and red, the green Massage been detected on Crop.

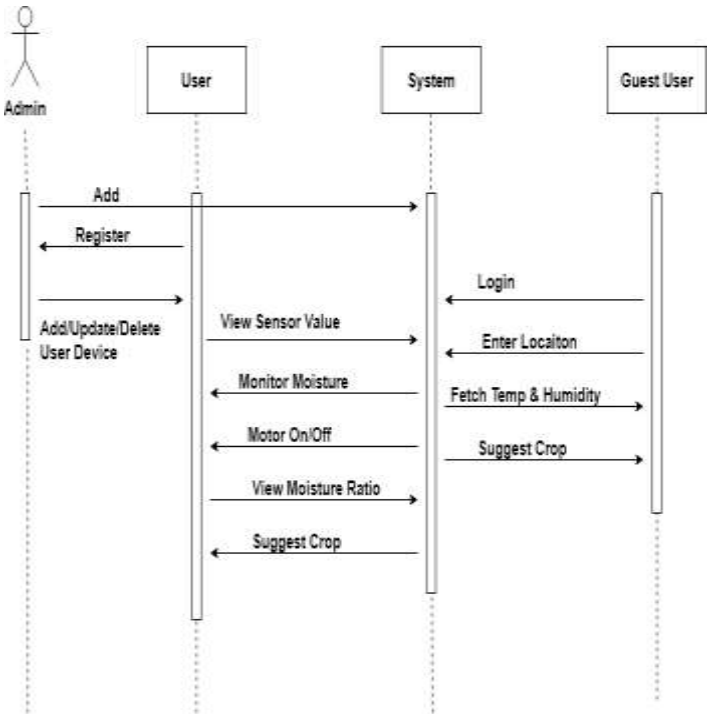
Software Interface-

In the software interface we are just using the Arduino IDE platform for the programming of the arduino controller as per the project requirement and also using the Embedded C, Java programming language for the coding part of our project

Communication Interfaces –

The Communication interface is nothing but the interface of the system with user to show the message of the system output and in our project the system communicates with user (farmer) via Sensor Notification, Android Application, and Notify to communicate the output of the system.

Sequence Diagram



A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place Sequence diagrams specifically focus on the lifelines of an object and how they communicate with other objects to perform task.

Advantages:

- Reduce the workload of farmers
- Organic farming is easier under these structures.
- Production of uniform quality crops.
- Management of insect pests, diseases and weeds is easier under these structures.
- These structures are ideally suited for small farmers

Limitation:

- Battery power should be required

Application:

- It delivers high quality crop production.
- Helps in wireless monitoring and control.
- Sensors help in mapping fields to understand their micro-scale in order to conserve resources such as water.
- After mapping of crop yields, farmers could monitor and water only to required areas.

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CONCLUSION

Internet of Things' is far and wide castoff in relating devices and gathering statistics. This agriculture monitoring system serves as a reliable and efficient system and corrective action can be taken. Wireless monitoring of field reduces the human power and it also allows user to see accurate changes in crop yield. It is cheaper in cost and consumes less power. The smart agriculture system has been designed and synthesized. The developed system is more efficient and beneficial for farmers. It gives the information about the temperature, humidity of the air in agricultural field to the farmer. The application of such system in the field can definitely help to advance the harvest of the crops and global production. In future this system can be improved by adding several modern techniques like irrigation method, solar power source usage.

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