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# IOT Based Automatic Temperature Controller System for Horticulture Application

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**ABSTRACT:** Horticulture is the science and art of the development sustainable production, marketing and use of high value, intensively cultivated food and ornamental plants. The major intricacy in horticulture is maintaining the temperature within the polyhouse or green house which leads to plant damage like root rot, leaf spots, downy mildew. Arduino through interfacing the environmental data with Internet of Things. Due to increased popularity of Node microcontroller unit (MCU) it finds varied range of applications in Smartphones, Bluetooth interface for connectivity, Refrigerators, Air Conditioner and automation etc. Internet of Things node (MCU) microcontroller temperature regulation is critical in a variety of industry. Internet Of Things based temperature monitoring system transmit temperature data to a control center in real time via a network. It has the facility to monitor the farm area for implementing to maintain a temperature specified by the user. This project proposes an system to control the temperature for four different flowers which are of highly farmed in Hosur, Krishnagiri area namely Rose, Gerbera daisy, Chrysanthemum and Button rose. The proposed Automatic temperature controller used in flower for detecting the temperature which can also be implemented for other Agricultural purposes Alfredrasm108@gmail.com

**KEYWORDS:** Internet of Things, Arduino Uno, Automatic Temperature Controller System, Horticulture and Temperature sensor

## I.INTRODUCTION

IoT prototype consists of user interface, hardware devices software devices, including sensors, and processors, backend software and connecting wires. An mobile applications or web software work as a user interface. A sensor is may measure a hardware and software transform it into an electric signal. An actuator takes an electrical input and turns it into physical action. The Unit of Internet of Things systems is generally a node (MCU) which is responsible for processing the data and run software full stacks interfaced to a wireless device for connectivity. Through connectivity the hardware is connected with the backend, and the backend with the user interface. Backend software implements the Arithmetic logic and data storage in memory. Internet of Things in node microcontroller unit (MCU) or development board is a prototyping solution that features low-power consumption which support various programming environments, collect various sensor data using firmware and transfer it to an memory unit or cloud-based server. Internet of Things based on the microcontroller unit node (MCU) Prototyping Hardware or Development kits are breadboard friendly and optimized for expandability.

## **II. RELATED WORKS**

### **[1].Automatic temperature control for plant house**

It is summarized that the temperature control can run all day in both of cooling with cool and general water. Setting point increases because water vapor in inside house is increases in order to do more evaporate water. The system has to water the plant and control temperature in range of 24-30 OC. Arduino Uno R3 was used as microcontroller.

### **[2].Temperature humidity monitoring /sending system, which is based on digital technology and computer technology**

It would be sufficient to measure the internal wound temperature for a few times a day to catch the early onset of infections. The LCR sensor was demonstrated to be stable with temperature, producing linear and consistent temperature with no observable measurement.

## **III. EXISTING METHOD**

The present irrigation system (poly house, green house etc) consist of pipeline method of watering the plants. It requires human knowledge to monitor the temperature, humidity and soil moisture etc. External motor has been used in the present irrigation system which needs human intervention for maintenance purpose. Continuous monitoring of the plants is required to avoid happening of any plant disease

## **IV. FIELD WORK**

Many commercial glass greenhouses or hothouses are high tech production facilities for vegetables, flowers or fruits. The glass greenhouses are filled with equipment including screening installations, heating, cooling, and lighting, and may be controlled by a computer to optimize conditions for plant growth. Area of the farm is around 1 acres of filed land. The yield maybe 10-12 times higher than outdoor cultivation depending on the type of greenhouse, type of crop, and environmental control facilities. Reliability of crop increases under greenhouse cultivation. Ideally suited for vegetables and flower crops. Year-round production of floricultural crops. Off-season production of vegetable and fruit crops. The number of plants in one acres around 435,600 plants.



Fig 1. Green house plant

## **V. PROBLEM IDENTIFICATION**

Greenhouse crops can be especially at risk for the formation of crop diseases. This is due to the unique characteristics created in the greenhouse. Puccinia horiana is a species of fungus that cause Chrysanthemum white rust is a disease of



plant. These are the most dangerous Spots are initially pale-green to yellow in color and up to 5mm in diameter. This disease is occurs due to high temperature. By using our techniques we can prevent the plants. Life span for Chrysanthemum 4 to 8 weeks, Rose 6 years, Gerbera daisy 2 to 3 year. We can reduce the Labour cost. When compare to old method we can get more yield. The accuracy improvement will create temperature and Humidity and monitoring. Automation increases more efficiency.

### VI. PROPOSED SYSTEM

IoT-based agriculture system helps the farmer in monitoring different parameters of his field like soil moisture, temperature, and humidity using some sensors. Farmers can monitor all the sensors parameters by using a web or mobile application even if the farmer is not near his field. watering the crop is one of the important task for the farmers. They can make the decision whethert to water the crop or postpone it by monitoring the sensors parameters and controlling the motor pumps from the mobile application itself.

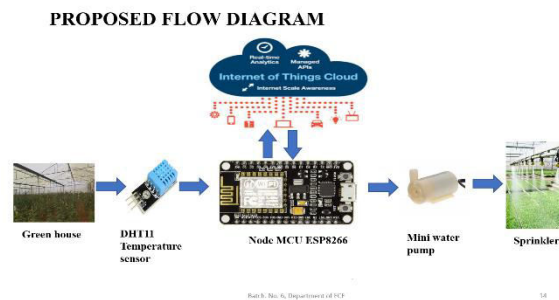


Fig 2. Block diagram of proposed solution

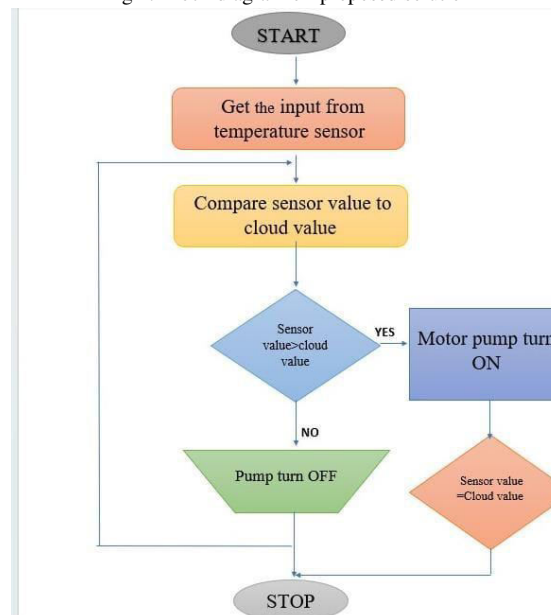


Fig 3. Flow chart proposed solution

Here we get the input value from temperature sensor (DHT11) and it moves on the node (MCU)ESP8266 wifi module. Collected data will be uploaded in Cloud. It compares the sensor value and cloud value. Condition will be the

sensor value is greater than the Cloud value Motor pump turn into ON mode.If it lesser the cloud value it will turn OFF the pump.

## VII. EXPERIMENTAL RESULTS

DHT11 sensor sense the temperature and humidity, The mini pump gets ON when the temperature is above the cloud value. The arduino microcontroller is used as the main process controlling unit in the controlling of the room temperature. Operating voltage is given to the system is 5v. Temperature and Humidity is measured by the DHT11 temperature sensor. The measured value of the temperature and humidity Current temperature and the humidity are viewed in the graph that have shown in fig.5.

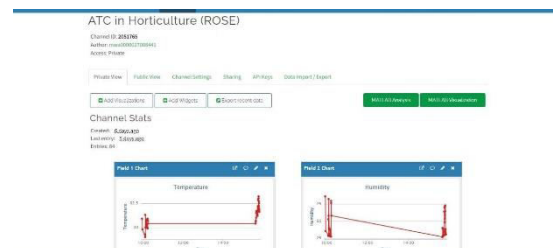


Fig 4. Output Screen shot

## VIII. FUTURE SCOPE

The signal from the sensor can further improve with increasing number of turns and a thicker wire in the sensor's inductor. In this project, the room temperature is maintained and monitored continuously by using the dht11 temperature and humidity sensor with arduino. This project helps to keep the people always in comfort zone and it also helps the people to know the current temperature and humidity in the cloud graph.

## IX. CONCLUSION

It can hereby seen that the combination of hardware and software provides a economic irrigation controlling system which is extremely user friendly because it requires very less human interference for it operations once it is manufactured and implemented. It not only saves the most precious gift of the nature, i.e., water. It also helps the farmers to grow their crops under controlled conditions and under continuous observation by temperature monitoring. Hence, this project "Automatic Irrigation System with temperature monitoring" also helps in increased and good quality production.

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