Survey on Smart Greenhouse Monitoring based on Internet of Things

Nisha B N[1], Nandini C[2], Pavithra D T[3], Rumana Anjum[4]

1,2,3B. E IV year, Department of CSE, Vidya Vikas Institute of Engineering & Technology, Mysuru, Karnataka, India
4Assistant Professor, Dept. of CSE, Vidya Vikas Institute of Engineering & Technology, Mysuru, Karnataka, India

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Abstract – Conventional greenhouses need regulated climate conditions to grow plants in there. The system controls the temperature, humidity, light and soil moisture level by sensing the values from sensors and controlling coolers/heaters, sprayers, water pumps accordingly. In this paper the different papers have been reviewed and developed the proposed system based on the limitation in the present monitoring system. Greenhouse is building where the plants are grown in a controlled manner. With the advancement technology we can control and monitor the multiple greenhouse using IOT from the central location wirelessly. Greenhouse area or environments monitoring different changes to parameters, the system for this purpose had been provided and given ability to control on climate of greenhouse. The intension is to design a simple, easy to install, user friendly to monitor and record the values of temperature, humidity, soil moisture of the greenhouse that modify and control in order to achieve the maximum plant growth and yield.

***Key Words*: Arduino, GSM, sensors , dc motor controlled sprinkler system.**

1. INTRODUCTION

The greenhouse manufacturing is the quickest developing part of the world. Greenhouse farming is a method of providing favourable environmental conditions to plants by growing them under a farmed structure covered with a transparent material. Internet of things (IOT) can be expressed as the architecture of physical things implanted with electronic circuits, sensors and programming along with an associative system these things to trade information from each other. Greenhouse is a best option to enhance the performance. Hand-operated greenhouse has drawbacks like visual inspection of plant growth, turning on and off the temperature controllers. Greenhouse monitoring on IOT is time consuming, vulnerable to human error and less accurate and unreliable. So fully automized greenhouse may be best. The humidity and temperature of air in a greenhouse are, measured by sensor and whenever temperature is high or air moisture becomes too low, fogger is turned on to provide the required moisture and cool down the temperature.

I. The purpose of the greenhouse monitoring using wireless sensor network prototype that is targeted at transmitting and receiving data within the greenhouse infrastructure.

II. It was used as the target for the amount of data that is useful for an analysis of the factor that enable proper functioning of greenhouse.

1.1 SCOPE

Development of the greenhouse monitoring using wireless sensor network is best project that have been chosen after doing research from books, internet, electronic, magazine and other resources and discussion between the experience in communication fields.

Greenhouse monitoring using wireless sensor network is an innovation of monitoring the temperature and humidity in the greenhouse.

2. LITERATURE SURVEY

1. Somnath D. Bhagwat, Akash I.Hulloli, Suraj B.Patil, Abulkalam.A.Khan,Mr.A.S.Kamble,"SMART GREENHOUSE USING IOT AND CLOUD COMPUTING", International Research Journal of Engineering and Technology, Volume 5,issue 3,March 2018.

In this paper, they have introduced the smart greenhouse farm using IOT and cloud computing technology. Greenhouse always play an important role in the agriculture and in the gardening sectors as they can be used to grow plants under controlled climatic conditions. Different sensors like temperature, soil moisture, sunlight are being used to control the farm. Along with these sensors analog to digital convertor, microcontroller, actuators are used. Initially the sensors senses the change, when the declared climatic variables have crossed the threshold. The microcontroller reads the data at its input ports after being transformed to the digital form by the ADC. The microcontroller is being used as the heart of the

system. Continuous alert messages are being transferred to the user using cloud services. This messages is being accessed is found in "the cloud" and does not require a user to be in a specific place to gain access to it. By gaining these information the farmers can easily monitor the greenhouse farm. The fan, water pump, buzzer, lights can easily monitored even without any manual operations. This system is being used to eliminate the difficulties involved in the system by reducing human intervention to the best possible extent.

2. Mohammad Woli Ullah, Mohammad Golam Mortuza, Md Humayan Kabir, Zia Uddin Ahmed, Sovan Kumar Dey Supta, Partho Das, "Internet of Things Based Smart Greenhouse: Remote Monitoring and Automatic Control", International Conference on Electric and Intelligent Vehicles(ICEIV 2018)

This paper provides the information about the system monitors temperature and humidity, soil moisture and take action according to results. It includes with a database helpful for future analysis and reports. This system is very suitable to be deployed at places like north pole and winter climate countries where people live but plant does not grow due to heavy winter. To check the climate conditions of the greenhouse three things are to be measured. First of all soil moisture, secondly environment temperature and the last of all is humidity. These 3 sensors are implemented and an LDR is used for detecting day/night condition. Also LCD shows the real-time data of humidity and temperature. The fans take out air if temperature gets higher than 27^0C and starts the heating system if temperature gets lower than 14^0C. Also, greenhouses need high humidity conditions. For maintain high humidity inside the greenhouse, the system turns ON the sprayers whenever it detects the humidity level inside the greenhouse goes lower than 90% and turns them OFF after achieving humidity level of 96%. Also it calculates and shows the real time temperature and humidity in different times.

3. Prof. D.O.Shirsath, Punam kamble, Rohini Mane, Ashwini kopla, prof.R.S.More "IOT Based Smart Green House Automation using Arduino."International Journal of Innovative Research in computer Science & Technology (IJIRCST), Volume-5, Issue-2, March 2017

In this paper they have developed a project on Smart Greenhouse automation using IOT and Arduino. They used IOT to control the Greenhouse with android phone one of them was Global system for mobile communication (GSM) this is used to send the notification to the android phones, there was a biggest disadvantage in this was they had to type message which was bit time consuming. The Arduino used here is ATmega328 is a microcontroller board. It consists of

14digital input and output pins, here the input is analog. For this project they have used Atmospheric Sensors namely Soil moisture sensor- immersed in the particular soil to know the moisture level. Light sensor (LDR) - used when natural light are low. Humidity sensor – to sense the vapors in air. Temperature sensor (LM35) – set the fan to cool down the excess temperature. Software Implementation – software parts are programming through Arduino Uno software (IDE), C and C++ are used for programming.

3. ADVANTAGES

1. The automated smart greenhouse always maintains ideal micro-climate conditions.

2. The greenhouse controllers are able to simultaneously leverage the availability of sunlight.

3. Automated greenhouse provide an affordable infrastructure to monitor status and detect suspicious activities.

4. By unlocking massive crop insights, a smart greenhouse allows growers to minimize labor work.

5. IOT sensors allow farmers to collect various data points at unprecedented granularity.

6. The sensors in the field or in the greenhouse can help the farmers plan an optimum time to carry out the harvesting.

4. CONCLUSION

The proposed IOT based greenhouse monitoring system is a complete system designed to monitor and control the environmental parameters inside a greenhouse. The traditional system for greenhouse monitoring is labor-intensive and takes lot of time. The proposed system saves time, money and human effort. It provides a control environment for the plants to prevent them from damage and thus increasing the overall produce. We can control and monitor temperature, humidity, soil moisture inside the greenhouse. Since one can maintain any climate condition in this type of greenhouse, it is possible to cultivate any type of crop.

REFERENCES

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