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IOT BASED ADVANCED GREENHOUSE SYSTEM

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ABSTRACT-*The world over decades has made considerable advancement in automation. Automation is employed for every sector where it is home, industry agriculture. Greenhouse is the technical approach in which farmers in the rural areas will be benefitted by automatic monitoring& control of greenhouse environment replace the direct supervisions of the human. The paper focuses on the generic architecture which can be applied for many other automation application. The great needs is growing of crops with advancement of technology.*

Greenhouse are climate controlled structure with wall &roofs &specially designed for off season growing of plants. Internet of things is one of the latest advance in information &communication technologies providing global connectivity &management of sensors devices, users with information. Temperature/Humidity Sensor, Moisture Sensor, Light Sensor efficiently inside the greenhouse by actuating a Cooling Fan, LED, Motor respectively according to the required conditions of the crops to achieve the maximum growth &yield.

1. INTRODUCTION

First let us discuss about green house & greenhouse effect. Green house is something related to a building or a place where small plants & vegetables are grown. And the area under greenhouse is covered with glass or translucent plastic roofsand this plays & important role for the vegetation in cold regions, because it is still very cold to take them to an outside environment. And now moving forward to discuss about the greenhouse effect. Greenhouse effect is simply a process in which various greenhouse gases entraps the infrared rays from the sunlight thus leading to increase of level of carbon dioxide which further helps in increasing the amount of chlorophyll and the leading to impressive plant growth & yield. And the greenhouse system helps in boosting the efficiency. And thus our system is based to perform such activities that are to monitor& control the system from a particular place which would take care weather inside the greenhouse.In this paper, the designed had been aimed data acquisition in greenhouse for multiple sensors to use data for simulation or processing to achieve the better enhancement of growth in greenhouse, this data has effect on the climate.

2. LITERATURE RIVIEW

Automated greenhouse system helps the farmers by controlling the environment parameters through the environmental parameters through the internet of things (IOT) including crop health inspection using image analysis the greenhouse is generally affected by two factors: plant diseases &weather condition, which leads to the fall in production. The weather condition can be controlled through Microcontroller Unit (MCU) & the plant diseases can be monitored using image inspection system. The research recommends cheaper image evaluation framework for the plant disease can be monitored using image inspection system. The research recommends

cheaper image evaluation framework for the plant diseases analysis& fully automated greenhouse data security. The prototype of the proposed system consists of Temperature/Humidity Sensor, Moisture Sensor, &Light Sensor. The Motor, Fan Light, are controlled by Arduino UNO through Relays upon reaching predetermined threshold values. The proposed architecture is equipped with embedded data security by implementing Extended Tiny Encryption Algorithms (XTEA) lastly, the agriculturists can familiarize with the recommended framework through the cloud-centered application. The autonomous frameworks permits the agriculturists to evaluate &control their greenhouse ecology remotely.

3. BLOCK DIAGRAM

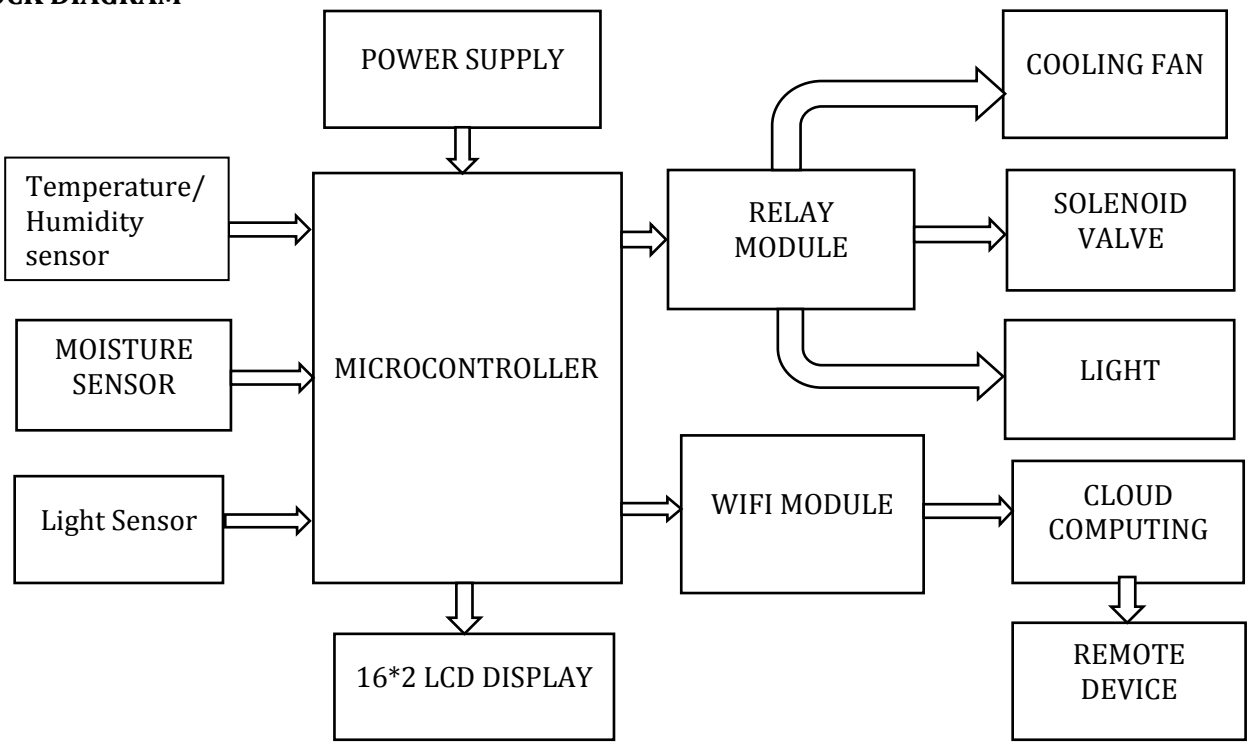

Fig-1: Block Diagram of IOT Based Advanced Green House System.

4. COMPONENTS EXPLINATION

It is a microcontroller-based circuits which monitors& records the values of various parameters such as Temperature, Light intensity, Humidity etc. And all these values continually updated & are optimized in an order to get maximum yield& growth. Some of the important sensors& other hardware component that are going to be used in this project are listed below:-

4.1 HARDWARE COMPONENTS

1. Light Sensor
2. Temperature/Humidity Sensor
3. Moisture Sensor
4. Power Supply
5. Microcontroller(Arduino UNO)
6. 16*2 LCD Display
7. Relay Module
8. WIFI Module
9. Cooling Fan

10. Solenoid Valve
11. Light
12. Cloud Computing
13. Remote Device

4.1.1 LIGHT SENSOR (LDR)

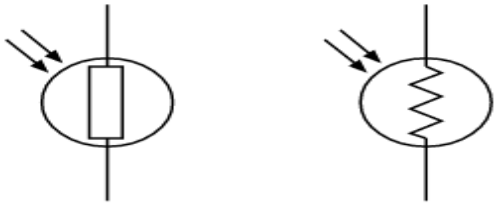

Fig-2: Light Sensor

A Light Dependent Resistor (LDR) or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices.

They are also called as photo conductors. The working principle of an LDR is photo conductivity that is nothing but an optical phenomenon. When the light falls on the LDR then the electrons in the valance band of the material are eager to the conduction band LDR is the light sensor which is usually used for the purpose. Its main function is to monitor the intensity of light. It turns off the light when it need to save the power and turns on the light when light is required in the greenhouse.

4.1.2 TEMPERATURESENSOR DHT11

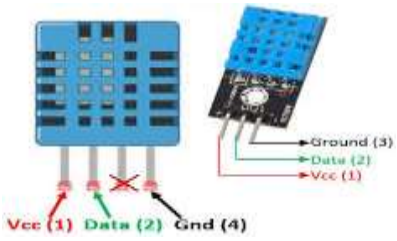

Fig-3: Temperature Sensor

We have used DHT11 sensor. It is basically a humidity& temperature sensor which is helps in getting in digital output. It is quite reliable& has good stability and also the cost is effective. It comprises of three main elements-a resistive type humidity sensor, an NTC thermistor and the an eight-bit microcontroller which helps in converting analog signals from both sensors& helps in sending out digital signal. And a critical value of temperature is fixed. When sometimes the temperature inside the greenhouse reaches above the critical temperature level, the cooling fan is provided to cool down the temperature.

4.1.3 MOISTURE SENSOR

Fig-4: Moisture Sensor

The Soil Moisture sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, dielectric is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity, and therefore the water content of the soil. The sensor averages the water content over the entire length of the sensor.

4.1.4SOLENOID VALVE

Fig-5: Solenoid Valve

A solenoid valve is an electromechanical controlled valve. The valve features a solenoid, which is an electric coil with a movable ferromagnetic core in its center. This core is called the plunger. In rest position, the plunger closes off a small orifice. An electric current through the coil creates a magnetic field. A solenoid valve is an electromechanically operated valve. Solenoid valves are the most frequently used control elements in fluidics.

4.1.5 WIFI MODULE

Fig-6: Wifi Module

WI-FI MODULE is a wireless technology standard for exchanging data over short distances from fixed and mobile devices, and building personal area networks.

4.1.6 RELAY

Fig-7: Relay

Relay is simply an electromagnetic switch which helps in opening& closing of circuits electronically. It has four important components, electromagnet, an armature, a spring& set of electrical contacts. In short it is a magnetism device for remote or automatic management that's motivated by variation in conditions of an electrical circuit which operates successively alternative device (such as switches) within the same or a special circuit. The sensor give the accurate value or status of the temperature, humidity, light, and smoke inside the greenhouse.

4.1.7 NODEMCU CONTROLLER

It includes firmware which runs on the ESP8266 Wi-Fi So C from Express if systems& hardware which is based on the ESP-12 module. Espressif's ESP8266EX delivers highly integrated Wi-Fi SoC solution to meet user'scontinuous demands for efficient power usage, compact design and reliable performancein the Internet of Things industry.With the complete and self-contained Wi-Fi networking capabilities, ESP8266EX canperform either as a standalone application or as the slave to a host MCU.

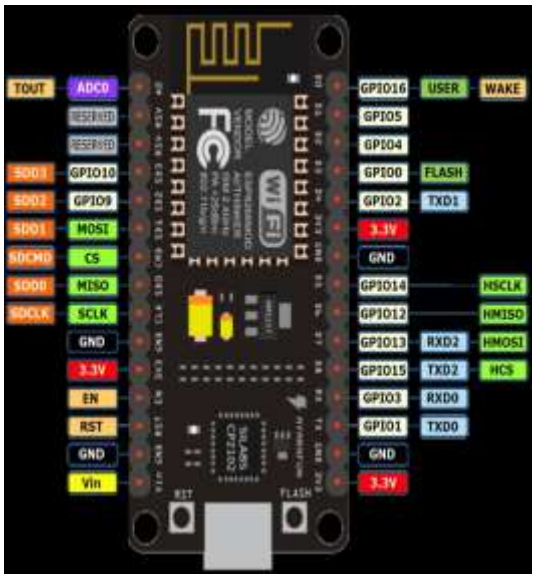

Fig-8: Node MCU Controller

4.2SOFTWARE COMPONENTS

1. Blyank App

4.2.1 BLYANK APP

Blyank is a new platform that allows you to quickly build interfaces for controlling & monitoring your hardware projects from your IOS & Android device. After downloading the Blyank App, you can create a project dashboard &arrange buttons, sliders graphs and other widgets onto the screen. Using the widgets, you can turn pins on and off or display data from sensors.

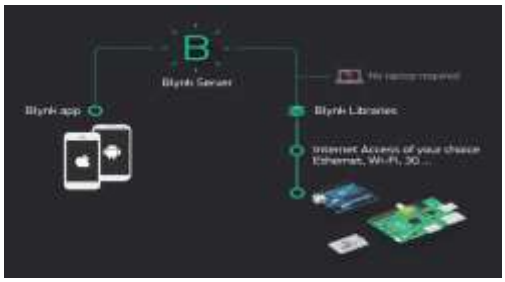

Fig-9: Blyank App

5. ADVANTAGE

1. Easy to use.
2. Easy to implement.
3. More accurate results.
4. Increases Fertility.
5. Better Productivity.
6. Focus is on important parameters.
7. Off-season crops.
8. Allow to establish the most suitable climate conditions for each crops and stage.

6. APPLICATION

1. The project has a great application in agriculture industry.
2. Temperature monitoring& controlling action can be used in home or various halls like conference room, seminar hall to control the temperature of room.
3. It can be used in greenhouses, botanical gardens and agriculture farms.
4. And also with little modification, this project can be used in Mechanical Companies to measure various parameters of operating machines like temperature and light.

7. RESULT

IOT based advanced greenhouse system is implemented successfully using the concept of Internet of Things (IOT) which would be a benefit for agriculture industry. The model is shown in below.

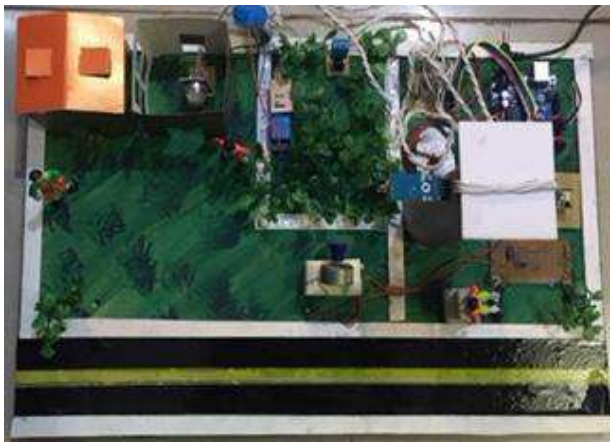

Fig-10: System Photo

8. CONCLUSION

The proposed design is implemented with Arduino platform for greenhouse monitoring, controlling the environmental parameter such as temperature/humidity, light and soil moisture with the help of Web Server using IOT. The purposed system saves time, money& human efforts. The traditional system for greenhouse monitoring is labor-intensive& time consuming. It provides a controlled environment for the plants in to prevent.

9. REFERENCES

1. Remote Sensing In Greenhouse Monitoring System - SSRG International Journal Of Electronics And Communication Engineering (SSRG-IJECE) – EFES April 2015
2. "Green House Automation using IOT" by JET. [2] "IOT Greenhouse "(Embedded project) https: //you tube/owlkoisfyy [3] Montgomery .k, Chiang. k, "A new paradigm for Integrated Environmental Monitoring", ACM International conference proceeding series 2010.
3. LIU Dan, Cao Xin, Huang Chongwei, JI Liangliang, "Intelligent Agriculture Greenhouse Environment Monitoring System Based on IoT technology", ICIT, 2015.
4. Alausa Dele W.S, Keshinro Kazeem Kolawole, "Microcontroller Based Green House Control Device", The International Journal Of Engineering And Science (IJES), Volume 2, Issue 11, Pages129-135, 2013.
5. Zhao, Ji-chun, et al. "The study and application of the IOT technology in agriculture." Computer Science and Information Technology (ICCSIT), 2010 3rd IEEE International Conference on. Vol. 2. IEEE, 2010.
6. Dan, Liu, et al. "Intelligent Agriculture of the Greenhouse in this Environment of the Monitoring to System Based on the IOT system Technology."Intelligent Transport, Big Data and Smart City (ICITBS), 2015 International Conference on. IEEE, 2015.