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GREENHOUSE AUTOMATION USING IOT AND CLOUD COMPUTING

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ABSTRACT - Irrigation is an important task when comes to farming. India is also known for its farming outputs based on several methods used while irrigating a farm field which involves manpower, water resource and most significantly, water availability. We are therefore proposing a system that would replace manual labour with automated technology that is able to irrigate fields automatically without human interventions in order to conserve these efforts and the water. The automated system here is made for greenhouses and includes a soil moisture sensor that senses the soil's moisture content. Based on that information, the system will operate the pumps and irrigation process is carried out. Another parameter is temperature within Green-house, so we are using temperature sensor to sense the temperature in Green-house and the temperature cooling mechanism will get operated. Android will act as a user interface where the user can manipulate system using the device and also gets the information related to its farm field.

I. INTRODUCTION

The history of agriculture in India dates back to the Indus Valley Civilization. India ranks second worldwide in farm outputs. As per 2018, agriculture employed more than 50%of the Indian workforce and contributed 17-18% to country's GDP.

Policymakers are concerned about the slow growth of the agricultural sector because two-thirds of India's population depends on rural employment for a living. India's agricultural yields for several commodities are low, and current agricultural practices are neither commercially viable nor environmentally sustainable. Among the causes include poorly maintained irrigation systems and an almost universal lack of effective extension services. Farming involves many vital tasks, including irrigation.

While manually irrigating a farm field involves manpower, water resource and most importantly is availability of water. Due to climatic conditions sometimes it becomes difficult to manage the irrigation. We propose a smart method of farming with automation of Greenhouse to make irrigation easier and manage the Greenhouse parameters like humidity, temperature automatically as well as from android app.

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II. BLOCK DIAGRAM

A. The Block Diagram

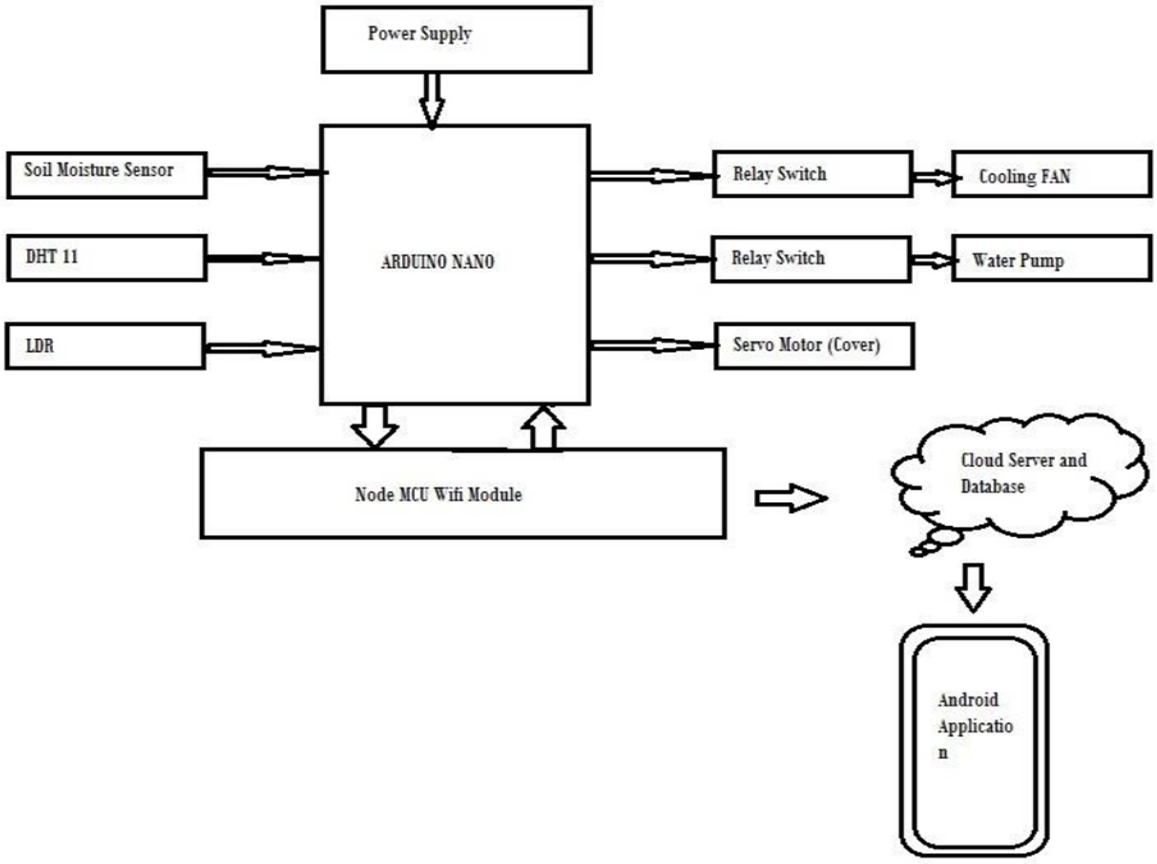

Fig.1. Block Diagram

• Arduino: Arduino is the middle hardware where the other component are connected.
• WiFi Module: It is used to collect the data through Arduino kit and sends to the remote devices e.g. Smart phone, Tablet, PC etc.
• Smart phone: It is used to access the details and get the feedback through system and also can give permission to the system to work.
• Relay switch: Through Relay switch the Water pump is connected to Arduino kit and it switches the pump on and off while irrigating farm land.
• Temperature sensor: Senses Farm temperature and regulate the temperature adjusting mechanism
• Soil-Moisture sensor: Senses the Moisture content of soil bases on threshold values and regulates the water pumps for irrigation.
• Fan: The fan is used to control the temperature in greenhouse. If temperature goes high the fan starts to bring down the temperature.

B. Hardware Implementation

1) Arduino Nano:

The Arduino Nano is a small Arduino board based on ATmega328P or ATmega628 Microcontroller. The connectivity is the same as the Arduino UNO board. The Nano board is defined as a sustainable, small, consistent, and flexible Microcontroller board. It is small in size compared to the UNO board. The Arduino Nano is organized using the Arduino (IDE), which can run on various platforms. Here, IDE stands for Integrated Development Environment. The devices required to start our projects using the Arduino Nano board are Arduino IDE and miniUSB. The Arduino IDE software must be installed on our respected laptop or desktop. The miniUSB transfers the code from the computer to the Arduino Nano board Using the constant voltage, the Arduino Nano is used to produce a clock of a precise frequency.

- The operating voltage of the Nano board varies from 5V to 12V.
- The total pins in Nano are 22 Input/Output pins.
- There are 14 digital pins and 8 analog pins.

2) Soil Moisture Sensor:

The two probes that make up the soil moisture sensor, which is used to gauge moisture levels, a use to gauge the volumetric content of water.These two probes enable circuit to conduct current through the soil and obtain the resistance value needed to calculate the soil's moisture content.There will also be less resistance on a soil when the water level is higher since the soil will conduct electricity more readily.As a result, there will be more moist ure present.Since dry soil causes the probes to conduct electricity poorly, when there is less water present, the soil will conduct less electricity, resulting in greater resistance and favourable findings.

3) LDR:

Light dependent resistors, LDRs or photo-resistors are electronic components that are often used in electronic circuit designs where it is necessary to detect the presence or the level of light.
A photo-resistor or light dependent resistor is an electronic component that is sensitive to light. When light falls upon it, then the resistance changes. Values of the resistance of the LDR may change over many orders of magnitude the value of the resistance falling as the level of light increases.

4) DHT11:

The DHT11 is a low-cost, and easy to handle digital temperature and humidity sensor. This sensor used to measure temperature, and humidity in the surroundings. It has an 8-bit micro-controller to output the values of temperature and humidity as serial data. The sensor is calibrated and easy to interface with the micro-controller. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of

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±1°C and ±1 %. So if you are looking to measure in this range then this sensor might be the right choice for you.

5) Node MCU (ESP8266 Wi-Fi Module)

The Node MCU ESP8266 is a low-cost Wi-Fi microchip module, with full control in a TCP/IP stack and micro-controller capability. ESP8266 module allows micro-controllers to connect to a Wi-Fi network and make simple TCP/IP connections using commands The ESP8266 with 1 MB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi. The ESP8266 development board comes with the ESP-12E module containing the ESP8266 chip having a TensilicaXtensa 32-bit LX106 RISC microprocessor.

Features:

- Low cost, compact and powerful Wi-Fi Module
- Power Supply: +3.3V only
- Operating frequency: 2400 – 2484 MHz
- Current Consumption: 100mA
- I/O Voltage: 3.6V (max)
- I/O source current: 12mA (max)
- Built-in low power 32-bit MCU @ 80MHz
- 512kB Flash Memory

III. CONCLUSIONS

The system can offer a more efficient and practical method of farming so that farmers can work with the right information and grow crops with greater quality and quantity.The technology can so lessen human effort while facilitating adequate water consumption.A better output may be harvested from the farm thanks to temperatur e monitoring and control, which helps boost farmers' livelihoods.
With the usage of cameras to take pictures of crops for an image processingbased system, additional enhancem ents can be made to the system.In order to prevent power outages, electricity can also be generated using solar panels.

REFERENCES

1. Manjunath Deshpande1, Shraddha Patil2, Priyanka Kanaka3, Diksha V M4 “Automatic Plant Irrigation Based on Soil Moisture and Monitoring Over IOT” International Journal of Innovative Research in Computer and Communication Engineering An ISO 3297: 2007 Certified Organization Vol.5, Special Issue 4, June 2017
2. Pavankumar Naik, Arun Kumbi, Vishwanath Hiregoudar, Chaitra N K , Pavitra H K , Sushma B S, Sushmita J H ,Praveen Kuntanahal “Arduino Based Automatic Irrigation System Using IoT

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3. Dr. N. K. Choudhari1, Mayuri Harde2 “Automated Plant Irrigation System Based on Soil Moisture and Monitoring Over IOT” Volume 5 Issue VI, June 2017 ICValue:45.98 ISSN: 2321-9653
4. Nikhil Agrawal Engineering Manager, Siemens, Noida , Smita Singhal ASET, Amity University, Noida “Smart Drip Irrigation System using Raspberry pi and Arduino” International Conference on Computing, Communication and Automation (ICCCA2015)
5. Abhinav Rajpal, Sumit Jain, Nistha Khare and Anil Kumar Shukla “Micro-controller based Automatic Irrigation System with Moisture Sensors” Volume 5 Issue VI, June 2015