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Smart Irrigation System with Monitoring of Co $_2$ Level and Position of the Plant Using Iot

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ABSTRACT: As water supply is becoming scarce in today's world there is an urgency of adopting smart ways of irrigation. The paper describes how irrigation can be handled smartly using IOT. In this system we are using various sensors like temperature, soil moisture sensors and position sensors which sense the various parameters based on the soil moisture, temperature and position of the plant. These sense the parameters and motor status will be displayed on user android application. The eternal need of every human being in this world is oxygen. Plants play a vital role in maintaining the carbon dioxide and oxygen content in the air. Number of plants are being destroyed each and every day for urbanization process. The number of plantings made is alsoreduced. Apart from these things more plants die due to lack of the maintenance. The main aim of this project is to maintain human beings. The automatic systems are preferred to a manual system. Android software is used to create mobile applications which are used to monitor the parameters of the garden and automate the watering process. NodeMCU is used to connect different sensors which collect the parameters of soil and transmits the information to firebase through inbuilt Wi-Fi .

KEYWORDS: Measure of the plant position, temperature, soil and CO $_2$ level and saving time.

I. INTRODUCTION

Agriculture is the major source of income for the largest population in India and is major contributor to Indian economy. However, technological involvement and its usability have to be grown still and cultivated for agro sector in India. Although few initiatives have also been taken by the Indian Government for providing online and mobile messaging services to farmers related to agricultural queries and agro vendor's information to farmers. Based on the survey it is observed that agriculture contributes 27% to GDP, and Provides employment to 70% of Indian population [21]. IoT is changing the agriculture domain and empowering farmers to fight with the huge difficulties they face. The agriculture must overcome expanding water deficiencies, restricted availability of lands, while meeting the expanding consumption needs of a world population. New innovative IoT applications are addressing these issues and increasing the quality, quantity, sustainability and cost effectiveness of agricultural production.

Agriculture is the backbone of Indian Economy. In today's world, as we see rapid growth in global population, agriculture becomes more important to meet the needs of the human race. However, agriculture requires irrigation and with every year we have more water consumption than rainfall, it becomes critical for growers to find ways to conserve water while still achieving the highest yield. But in the present era, the farmers have been using irrigation technique through the manual control in which they irrigate the land at the regular interval.

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According to statistics, agriculture uses 85% of available freshwater resources worldwide, and this percentage will continue to be dominant in water consumption because of population growth and increased food demand. There is an urgent need to create strategies based on science and technology for sustainable use of water, including technical, agronomic, managerial and institutional improvements. Agricultural irrigation based on Internet technology is based on crop water requirement rules. By using Internet technology and sensor network technology we can control water wastage and to maximize the scientific technologies in irrigation methods. Hence it can greatly improve the utilization of water and can increase water productivity.

The Internet of Things (IoT) is a technology where in a mobile device can be used to monitor the function of a device. The Internet of Things (IoT) is concerned with interconnecting communicating objects that are installed at different locations that are possibly distant from each other. Internet of Things (IoT) is a type of network technology, which senses the information from different sensors and makes anything to join the Internet to exchange information.

It can also be used to modify the status of the device. The central processing unit will also include communication device to receive data from the sensors and to be relayed to the user's device. This will be done using a higher communication device such as a Wi-Fi module. The data processed by the central module is converted to meaningful data and relayed to the user. The user can view the data with the help of a handheld device such as a mobile phone or a tablet. Nowadays water scarcity is a big concern for farming. This project helps the farmers to irrigate the farmland in an efficient manner with automated irrigation system based on soil moisture.

The proposed system has been designed to overcome the unnecessary water flow into the agricultural lands. Temperature, moisture and position readings are continuously monitored by using temperature, moisture and position sensor and send these values to the assigned IP address. Android application continuously collects the data from that assigned IP address. Once the soil moisture values are exceeded the particular limit then the relay, which is connected to the arduino microcontroller controls themotor. The android application is a simple menu driven application, with 4 options. This includes motor status, moisture, temperature and position values. The motor status indicates the current status of the pump.

II. PROPOSED SYSTEM

This below Figure 3.1 is a overall block diagram of arduino based automatic irrigation system which consist of three sensors which are connected to controller and sensed values from these sensors are send to the mobile application .

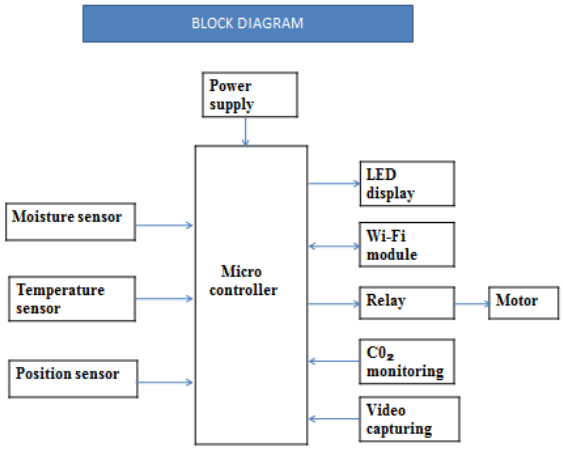

Figure 3.1: Block Diagram of Automatic Irrigation System

Figure 3.1 shows the diagram of smart irrigation system with IoT. Farmers start to utilize various monitoring and controlled system so as to extend the yield with help of automation of an agricultural parameters like temperature, position and soil moisture are monitored and control the system which can help the farmers to improve the yield.

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This proposed work includes an embedded system for automatic control of irrigation. This project has wireless sensor network for real-time sensing of an irrigation system. This system provides uniform and required level of water for theagricultural farm and it avoids water wastage. When the moisture level within the soil reaches below threshold value then system automatically turn on the motor. When the water level reaches normal level the motor automatically cut . The sensed parameters and current status of the motor are going to be displayed on user's android application.

OBJECTIVE OF THE PROJECT

The main objective of this project is to provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention are often minimized.

III. DESIGN

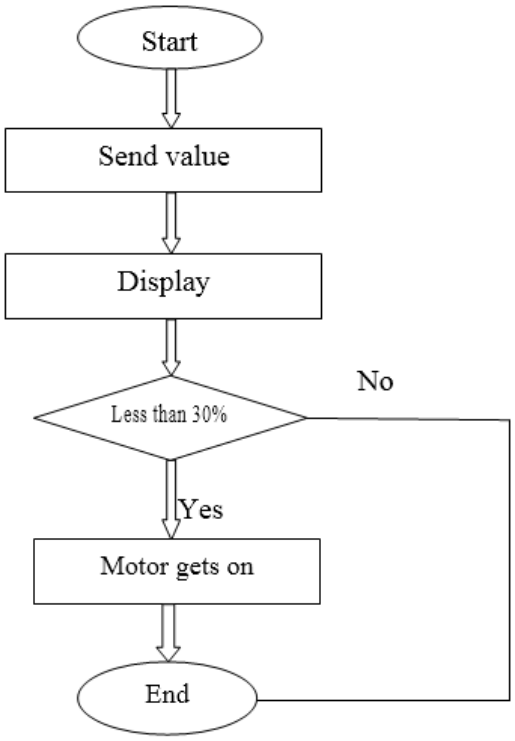
Design of a system explains temperature, position and soil moisture values using flow chart.

TEMPERATURE AND POSITION SENSOR

This below Figure 4.1 shows the sensed values of temperature and position The DHT11 is a basic, digital temperature and position sensor. It uses a capacitive position sensor and a thermistor to live the encompassing air, and spits out a digital signal on the info pin(no analog pins needed).It is simple to use, but requires careful timing to grab data. Position sensors are used for measuring moisture content in the atmosphere. Then current temperature, position values are send to the microcontroller, those values will display in the users android app.

SOIL MOISTURE SENSOR

This below Figure 4.2 shows the procedure of displaying soil moisture value .



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Soil moisture sensors measure the water content in soil. Moisture within the soil is a crucial component within the atmospheric water cycle.Sensor module outputs a high level of resistance when the soil moisture is low. It has both digital and analog outputs. Digital output is straightforward to use, but it's not as accurate as analog output supported moisture level motor gets turn on/off automatically.

IV. IMPLEMENTATION

The proposed agricultural system is meant to unravel to seek out an optimal solution to the water crisis. The design implements IoT technology using an android device, a main controlling unit (MCU), sensors to live various parameters and a pump ,which can be wont to supply water to the farm.

V. CONCLUSION

The application of agriculture networking technology is need of the fashionable agricultural development, but also a crucial symbol of the longer term level of agricultural development; it'll be the longer term direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production.

With more advancement within the field of IoT expected within the coming years, these systems are often more efficient, much faster and fewer costlier. In the Future, this technique are often made as an intelligent system, where within the system predicts user actions, rainfall pattern, time to reap , animal intruder within the field and communicating the knowledge through advanced technology like IoMTare often implemented in order that agricultural system are often made independent of human operation and successively quality and large quantity yield can be obtained.

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