Field Monitoring and Automation in Agriculture Domain using IOT

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Abstract - This paper propounds a design for automatic water supply system in farmland using Arduino, Wi-Fi module, android application and couple of sensors. Depending upon the moisture level of farmland the system can detect the appropriate time of supplying water to the trees and can also keep track of the water level to prevent water from being accumulated around the roots of the saplings. This system can be used in place of traditional farming method .We will implement such a system that will help a farmer to know his field status in his Android phone with the help of App. It proposes an automatic irrigation system for the agricultural lands. Now a day's automation plays vital roles in the human life. It is not only compatible but also reduces efforts efficiency and saves the time. Now days the industries prefer automation and control machine which are expensive and are not suitable to be used in a farm. So here we design a smart irrigation technology in low cost which is usable by Indian farmers. Arduino is the main component of the whole system which controls entire automation the objectives of this paper were to control the water motor automatically, and supply the water based on the sensors values which will be implemented in the field and also control and monitor whole system using the mobile application.

Key Words: Arduino, Android application, Wi-Fi module, moisture sensor, Irrigation.

I. INTRODUCTION

Agriculture is the most important sector of Indian Economy. Indian agriculture sector accounts for 18 per cent of India's gross domestic product (GDP) and provides employment to 50% of the countries workforce. Irrigation is defined as "Artificially supplying & systematically dividing of water for agriculture & horticulture in order to obtain higher or qualitatively better production. In India most of the irrigation systems are not automated. These techniques are replaced with semi-automated and automated techniques. The available techniques are like terraced irrigation, drip irrigation and sprinkler system. The global irrigation is categorized by increased demand for higher agricultural productivity, poor performance and decreased availability of water for agriculture. These problems can be appropriately rectified if we use automated irrigation.

II. LITERATURE REVIEW

Ahmed Imteaj, Tanveer Rahman, Muhammad Kamrul Hossain and Saika Zaman [1] worked on a design for automatic water supplying system in farmland using raspberry pi 3, Arduino, Wi-Fi module and couple of sensor depending upon the moisture level of farmland and daylight intensity, the system can detect the appropriate time of water supply in the trees and also keep track of the water to prevent water from being accumulated around the roots of saplings.

Advantage: This system makes use of raspberry which is the microcomputer which uses the latest technology with fast processing power.

As the whole system is automated the labor work is reduce. Disadvantage: It makes use of GSM shield for SMS and GPRS for data communication.

The whole system becomes costly due to use of the raspberry.

Dr.S.Jothi Muneeswari, Merlin Janet E, Rajeshwari, G.Selvarani [2] Advantage: The system makes use of the Arduino microcontroller which reduces the development cost of the system and user friendly device.

The system makes use of the DHT11 sensor which monitors the temperature of the surrounding and water is supplied to the plant according the requirement.

Disadvantage: The system does not make use of the water level sensor.

Priyadharsnee.K, Dr.S.Rathi [3] Advantage: Simple and efficient, Accurate sensing, Low maintenance cost.



Disadvantage: No use of water level sensor, Uses GSM SIM 900 MODEM.

III. SYSTEM DESIGN

The Figure consists of Arduino Uno which is a heart of the proposed system, ESP8266 Wi-Fi module, Moisture sensor, temperature sensor and Android application.



IV. PROPOSED METHODOLOGY

In this research paper we are going to design IOT based field monitoring system. Arduino Uno will be the brain of this research work and ESP8266 Wi-Fi module will interfaced Arduino Uno with the internet. The system is used to turn the valves ON or OFF automatically as per the water requirement of the plants. The soil moisture sensor will determine the moisture of the soil and send the analog signal to the Arduino. We have also used the DHT11 sensor which is used to measure the humidity and temperature in the surrounding. Based on the three parameters such as soil moisture, humidity and temperature the Arduino will take the action if all the three parameter are matched according to the requirement the water will not be supplied to the plant and if the three parameter do not satisfies the requirement the water will be released to the plant till the soil reaches the required condition the water level sensor will be provided near the root of plant to avoid the accumulation of water in the roots. The water level sensor will tell the water level in the water tank if the water level is low the water pump will be ON automatically and it will be turn OFF when the water level reaches certain level. And this whole process will be able to monitor and operate through the android application. Over all information about the moisture contain requirement of water and water level will be updated on daily bases through the use of IOT and the user will also able to perform the required action such as manually switching ON and OFF of the water pump through the android application which will provided to the user and also will be able to select the crop according to the requirement.

V. ADVANTAGES

ADVANTAGE

It saves the water resources and energy so that

it can be made available in future.

Simple and easy to install and configure.

Due to use various sensors it reduces run off from overwatering saturated soils which will

improve crop performance

This system save time and eliminate the human error.

VI. RESULT

SR NO	SOIL CONTAIN	VALUE
1	DRY SOIL	4%
2	WET SOIL	24%

VII. CONCLUSION

This proposed system provides the automated irrigation system. In which the field is monitored with help of various sensors such as DHT11, Soil moisture sensor which continuously monitor the status of the field and the required action is taken and the user is provide with the android application. And this system is mostly used in the areas where there is scarcity of water and the problem of load shielding

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