IOT for Smart Irrigation System in Indian Agriculture System

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***Abstract*— The Indian agriculture is dependent on the monsoon which is not reliable source of water therefore there is need for irrigation system in the country which can provide water to the farms according to their soil types. This paper discusses how internet of things (IOT) can be used to achieve optimal irrigation by continuously monitoring the water level. It also discusses how water supply can be maintained using the proposed mobile application. This application attained by installing sensors in the field to monitor the soil temperature and raspberry Pi. It is attained by installing sensors in the field to monitor the soil temperature and soil moisture which extends the data to the Raspberry Pi for estimation of water ease of managing all the information using the android application demands of plants and also we provide the user with the extreme ease of managing all the information using the android application.**

***Index Terms*— IOT, Irrigation system, moisture sensors, solenoid valve**

I. INTRODUCTION

In India agriculture plays an important role for the development of food production, But the agriculture system depends on monsoon system which makes agriculture system in efficient because of insufficient source of water so the smart irrigation system is used in the agriculture field. So far the farmers are have been using irrigation technique in India through manual control in which farmers irrigate the land at the regular intervals. This process sometimes consumes more water or sometimes the water reaches late due to which the crops get dried.

There is need in agriculture residential/commercial irrigation industry for an irrigation that responds to

II. LITERATURE SURVEY

Primary investigation is carried out under the following stages, such as understanding the existing approaches, understanding the requirements, Developing an abstract for the system.

In this paper, soil moisture sensor, temperature and humidity sensors placed in the root zone of plant and transmit data to android application. Threshold value of soil moisture sensor that was programmed into a RaspberryPito control water quantity. Temperature, Humidity and soil moisture values are displayed on the android application, also the water outlet to different areas is controlled by using solenoid Valves which can be controlled remotely by the user/Farmers.

"Remote Monitoring in agriculture using green house using wireless sensors and short messages Service (SMS)". In this paper they are sending data via SMS but proposed system sends the values to the mobile application.[1].

"Irrigation Control system Using Android and GSM for Efficient Use of water and Power" this system made use of GSM to control the system which may cost more so to overcome the proposed system used Raspberry Pi 3 which already consists of in build Wi-Fi module[2].

"A wireless application of drip irrigation automation supported by soil moisture sensors" in this paper irrigation is carried out using soil moisture values but extend to this proposed system displays temperature and humidity values [3].

By referring all above papers, it is found that no such systems are existed with all integrated features such as a way of conserving water. Primary purpose of the proposed system is reducing the wastage of water and minimizing the manual labour on the field. for. irrigation system in which a notification intimates a farmer when the motor is to be turned on or when it turned is to be turned off that closes the water inlet to stop the supply which is remotely monitored on the android The mobile application through internet. The mobile application can be used to shut the water

supply automatically, Irrespective of the physical location of the user, provided the user has internet connectivity. Thus the task of switching off the motor manually has been automated and the valves for different planes can be installed in farms to monitor the moisture content of soil continuously. It would turn on the motor automatically when the water content of the soil goes below a certain level. The user can check if the farm is well irrigated remotely on the mobile application without visiting the farm.

These systems would improve the lively wood of the farmers extensively. Extraction of high level of information from raw sensory data is one of the most important aspects of IOT. The machine interpretable data is processed to obtain useful information, which is the basis of implementation of Proposed model. Respberry Pi is the main component of the system. It controls the digital connections and act as a bridge between the sensors and the mobile phone application. The Wi-Fi module in the Raspberry Pi connects it to the hotspot providing access to the internet. It then transmits the data signals to the mobile application over the Internet.

A farmer when the motor is to be turned on or when it is to be turned off that closes that the water inlet to stop the supply which is remotely monitored on the android application. When moisture goes below a certain level ,motor would be turned automatically and water outlet for zones will be controlled by the user ,thus achieving optimal irrigation using IOT.

IV. METHODOLOGY

The algorithm has the following stages:

Step1: Begin the process.

Step2:The initial power is supplied to motor and solenoid valves from transformer.

Sep3: Check soil moisture level and the humidity level.

Step 4:If soil moisture contents is grater than a fixed value then there is no need of irrigation

Step5:If the soil moisture content is less than fixed value then start irrigation.

III. DESIGN AND IMPLEMENTATION

The main objective of the system is providing Water Management in irrigation system which on motors and controls the parameters in agriculture sectors. The proposed system has been designed to overcome the unnecessary water flow into the agriculture lands The proposed system allows user to continuously monitor the water level in the field.

4.1 SOIL MOISTURE SENSOR:

Measuring soil moisture is very important in agriculture to help farmer for managing the irrigation system. Soil moisture sensor is one which solves this. This sensor measures the content of water. soil moisture sensor uses the capacitance to measure the water content of soil. It is easy to use this sensor. simply insert this rugged sensor into the soil to be tested and the volumetric water content of the soil to be tested and the volumetric water content of the soil is reported in either of two states Dry or Moist.

4.2 TEMPRETURE AND HUMIDITY SENSOR

The humidity sensor is used to measure humidity of the field. This sensor senses the field humidity and it is connected to the Respbery Pi, we have to set points of humidity as 54% to 80% for standard irrigation but it is changeable according to the climate and the type of soil.

4.3 RASPBERRY PI 3 MODEL B

The Raspberry Pi is a series of credit cardiszed single board computers developed in the United Kingdom. the B-models have an 8P8 Ethernet and Pi 3 has on board Wi-Fi 802.11 and Bluetooth. It consists of a micro SD card slot, GPIO pins,4 USB ports etc. It also has an extremely low power consumption of about 3 watts. the general purpose input and output pins are used in the Raspberry Pi to associate with other electronic boards. These pins can accept input and output commands based on programming Raspberry Pi. The raspberry Pi affords digital GPIO pins. These pins are used to connect it to the sensors to transmit digital data.

4.4 SOLONOID VALVES

A solenoid valve is an electro mechanically operate valve. It is used to direct water to the field. the valve can be turned ON and OFF based on user necessity

Step6: When the water reaches the prescribed point of water level sensor then irrigation systematic stops itself and send the moisture content and the humidity.

Step7: User can operate the system remotely through an android application.

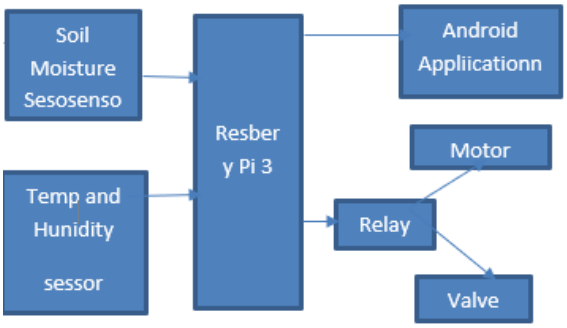

Figure 1 Block diagram of Praposed System

VI. CONCLUSION

The application of agriculture networking technology is need of the modern Agriculture development ,but also an important symbol of the future level of agricultural development after building the agricultural water irrigation system hardware and analysing 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 highly effective and safe agricultural production has significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of agricultural production. With more advancement in the field of IOT expected in the coming years, these systems can be more efficient, much faster and less costly. This system can be made as an intelligent system where in the system predicts user actions, rainfall pattern, time to harvest and many more features which will make the system Independent of human operations.

V.RESULTS

Irrigation system is based on the soil moisture and humidity. Sensors are placed in the farm, distance between the two sensors are placed in the farm. Distance between the two sensors is based on the type of soil in the farm Raspberry Pi and sensors are used for capturing the moisture content in the soil. Depending on the moisture content present in the soil irrigation system works. Soil moisture content present in the soil values are displayed on the android application, By using android application, sensor data is stored in the cloud. by using android application user can monitor and control the system. this system provides several benefits and can be operated with less manpower, Overwatering and under watering affects the crop so proper amount of water should be supplied. By analyzing the soil faster and less costly. In the future, this system can be made as an Intelligent system where in the system predicts user actions, rainfall pattern, time to harvest

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