IOT BASED SMART AGRICULTURE SYSTEM BY USING RASPBERRY PI

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ABSTRACT

Water is the most essential contribution for upgrading agricultural productivity and therefore expansion of water system has been a key format in the improvement of farming in the nation. An Automated Sprinkler irrigation method distributes water to crops/plants by spraying it over the crops/plants like a natural rainfall. In this thesis we will develop an automated sprinkle system that will help a farmer/people to know about his field, and the status of his plant at his home or he may be residing in any part of the world. This work will helps the farmers to irrigate the farmland in a very efficient manner with automated irrigation system based on soil, humidity, weather .This sprinkler system will provide control for soil temperature, moisture sensing to ensure plants is watered when there is demand, live streaming and also provide the temperature, humidity sensing, forecast lookup from other weather services. Whenever there is a change in temperature, humidity and current status of rain of the surroundings these sensors senses the change in temperature and humidity and gives an interrupt signal to the raspberry pi. Water excess irrigation not only reduces plants production but also damages soil fertility and also causes ecological hazards like water wasting and salinity. In recent years the awareness of water and energy conversation has resulted in the greater use of sprinkler system .Currently the automation is one of the important roles in the human life. It not only provides comfort but also reduce energy, efficiency and time saving. Now a day the industries are using an automation and control machines which are high in cost and not suitable for using in a farm & garden field. So in this work we will design a smart irrigation technology based on IoT using Raspberry pi. The proposed sprinkler system will be low in cost and usable by the Indian farmers. Raspberry pi is the main heart of the overall system.

Keyword: - *Raspberry Pi 3, PIR , Temperature , GSM, Micro Controllers, IoT Module, Battery , Relay, DC Motor, etc…*

1. INTRODUCTION

One of the key activity smart farming is skills and times. Farmers should know at which time which plant will grow better. Cultivation takes huge amount of time and also money from farmer. So reducing the effort of the farmers is heavy task. It need various resource in large scale. To use modern technologies for farming is reduce human efforts as well as the time require to watering a farm or garden. If we compare traditional system with modern system, wastage of various resources is very high for example water is the important resource for cultivation. In India, Agriculture is a major part of the GDP of the country. Most of people are doing farming in India. The agriculture field is involves in many industries in India. Let's say to make raw material for clothes we need cotton. So to get a cotton, people need to contact farmer or company that collect cotton from farmers. This is only one example there is many example like this. So basically agriculture is a backbone of the country. To growth of industries depends on the various fields. To make a vast amount of production in agriculture field farmer should know many things like moisture of soil, humidity, temperature, rain fall, etc. To make a cultivation smart we will make a fusion of traditional farming and modern technologies.

The importance of building an automation system for an office home or field is increasing day-by-day. Automation makes an efficient use of the electricity, water and reduces much of the wastage. Smart water sprinkler irrigation system makes an efficient use of water for the growth of plants. Heart of the system is Raspberry Pi 3 mini computer, shown in figure 1. Raspberry Pi model 3 has dedicated general purpose input outputs (GPIO) pins. These all GPIO pins can be accessed for controlling hardware such as LEDs, sensors, and relays, which are examples of outputs. Need of automatic Irrigation

- Simpler and easy to install and configure.
- Saving energy and resources, so that it can be utilized in appropriate way.
- Farmers would be able to spread the proper quantity of water at the proper time by automating farm or nursery irrigation.
- Avoiding irrigation at the incorrect time of day, reduce runoff from overwatering saturated soils which will enhance crop/plant's performance.
- Automated irrigation system uses shower to turn motor ON and OFF.

1.1 Existing System

- ➢ The automotive vehicles doesn't have a black box system.
- ➢ The accident data is not stored in any place.

1.2 Objective

Using IoT, we can make communication between devices, machine and also services which based on internet. IoT is also help human to do work very easily. If we have look on policy of Internet of Things of Indian government, they have plan to invest 15 billion up to 2020 in Internet of Things. It is also state that it will help also other industries like agriculture, banking, retail business, auto mobile, and more by making system automated which are used in it. This will help to increase IoT devices to 2.7 billion. Currently there are 200 million devices which are connected to internet in India. It is assume that India will have share 5-7 % in Global market of internet of things.

1.3 Contribution

In agriculture there are more laborer work is there so using automation we can save laborer work and also reduce the size of human resources in cultivation. It is also improve quality and accuracy, saves lots of energy, material. To make this happen researcher and scientist collaborate with large industries and trying to make automatic system which is very efficient and effective. Using automation machine like fan, fridge, AC, lights can be run automatically i.e. depends on environment. It is makes a great use of available resources, like in home it saves electricity and in agriculture it saves water.

2. LITERATURE SURVEY

Boselin Prabhu et.al proposed wireless sensor network system which is reduce the evaporation of water by drip irrigation. In this system, collect information from sensor and send it to the base station. Now when sensor send data to base station as packet so to reduce impact a packet author set a sensor in bulk mode. Now if plant need a water so base system start watering that plant using drip irrigation, these will save water as well reduce evaporation of water.

Minwoo Ryu et.al build a system to make a smart farming by connecting farms based on Internet of Things (IoT). In this they are using various sensors like temperature sensor, humidity sensors and CO2 sensors. Now they are using REST APIs to transfer data, Mobius which is IoT supporting platform and Cube which is a middleware between physical devices i.e. sensor and Mobius. Data which is collected from sensors sends to Mobius using cube and end user send a request for particular farm using REST APIs to Mobius. End user can see result of request can see on Mobile Application

In This Paper author proposed a system with wireless sensor network using RFID. In this system, author put soil moisture on different location in the field i.e. farm or it can be a farm and each sensor has its unique ID. Now sensor sends a data to ZigBee at 2.45 GHz. Now sensor sends that data to base station and if soli is dry then pump station will start sprinkling water only on that portion of the field.

Ravi Kishore Kodali et.al made a smart irrigation system based MQTT protocol. They are using Esp8266 NodeMCU-12E, soil moisture sensor and water pump. In this system Message Queue Telemetry Transport Protocol (MQTT) is used for transfer the data between Esp8266 NodeMCU-12E and the sensor. Soil moisture sends data to Esp8266 NodeMCU-12E, if soil is dry then Esp8266 NodeMCU-12E send instruction to water pump and water pump will start and after moisture goes up by some value it will off the water pump. They are used LCD to display the current state of soil and water pump.

Sneha Angal build a system for plantation in office and home. In this system raspberry-pi, Arduino, ZigBee and soil moisture sensor is used. In proposed system raspberry pi is main control block and process the instruction send from Arduino. Here soil moisture sensor is connected to Arduino and ZigBee is an intermediate between raspberry pi and Arduino. This is a modular system so if any module is not working so user can change it. To enhancement of this system we can add GSM module to get status of soil and also watering plant by giving miscall on number of GSM module.

3. PROPOSED SYSTEM

An IoT based irrigation system is for efficient agricultural management system which enables farmers to contend with challenges they face. There are many applications in IoT, which addresses the major problems like soil moisture detection, water conservation management, crop growth monitoring, etc.,
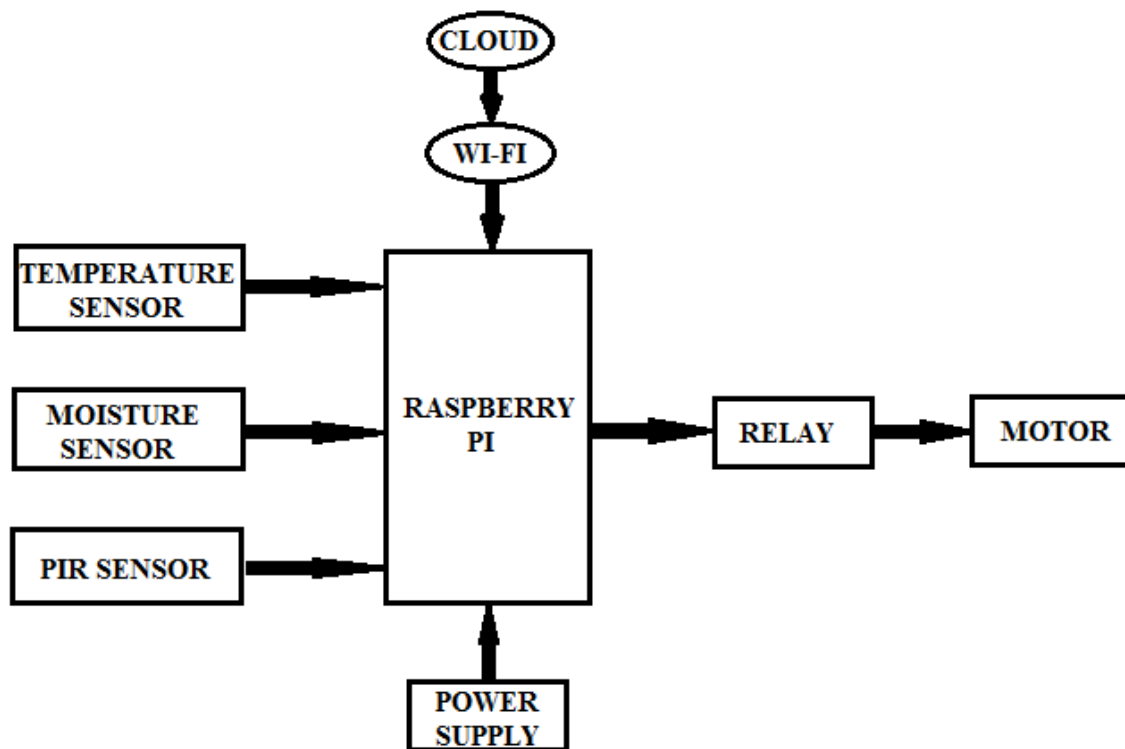

Fig.No. 1 Block Diagram For Proposed System

3.1 Advantages of Proposed System

This project enables better and smarter irrigation through temperature, humidity and other sensors networked to communicate with the user. For farmers and growers, Internet of Things has provided extremely productive ways to cultivate soil with the use of cheap, easy-to-install sensors

4. RESULT & DISCUSSION

This enables the user/farmer to have complete awareness about the field and cultivation. This project is mainly useful for farmers who depend on labours to cultivate the land. They need not visit their land often. Instead they can use this smart project and get useful suggestions and warnings about the field. GSM communication is used for sending the text message to the farmer's mobile phone. GSM SIM900 module is used in this project for acknowledging the user. Any GSM module type can be used based on our requirements. It uses AT commands for sending the message. It also enables two way communication where the user can reply to the system. When there is low moisture and high temperature, the GSM sends a message to the user about the condition and requests for irrigating the plant. When the EC value goes beyond the range, the fertilizers for improving the soil nutrient is also suggested in the text message.
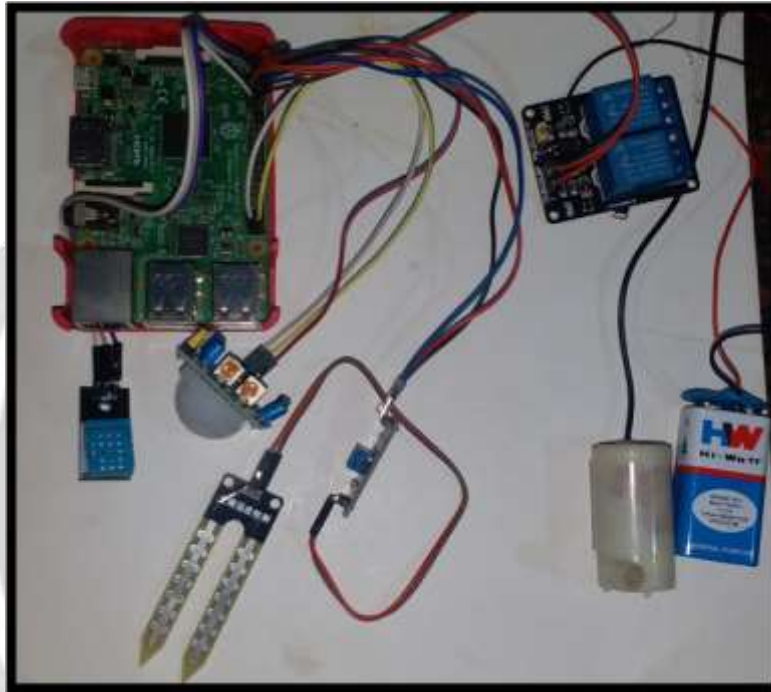

Fig.No. 2: Snapshot of Hardware Prototype

5. CONCLUSIONS

This project presents the design of an IoT based automatic irrigation system. The proposed system can reduce the efforts of farmers and provides high yield. It also conserves water for irrigation by locating the sensor at the right position above the soil level. This work have shown that plants can still sustain at low moisture level when the temperature is moderate. Analysing more than one parameter has made this system an efficient one for managing the field.

6. REFERENCES

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