Smart Drip Irrigation Using IoT

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ABSTRACT

As we can see in today's world only some devices like PC's and mobiles are connected to the internet. Nowadays the world is fully overtaken by the internet and the internet of things. The Internet is used for the basic need of all human beings. The Internet of Things (IoT) is the network of physical objects. It simply means to monitor a physical device or machine or it is inter-networking of physical devices which are embedded with electronics, sensors, software, and network connectivity to enable it to achieve greater value and services by exchanging data with the manufacturer. IOT permits objects to be sensed or controlled remotely across the network infrastructure. The result improves accuracy, economic benefits, efficiency and reduces the intervention of a human. In this paper, we are going to deal with basic and important concepts of IOT and its scope in the upcoming future. This paper studies the need for IOT in day to day life for different applications and gives brief information about IOT. IOT contributes significantly toward revolutionary farming methods. So, we are trying to demonstrate IOT in the Automatic watering system. An automatic watering system monitors and maintains the approximate moisture content in the soil. Raspberry Pi is used as a microcontroller to implement the control unit. The set up uses the temperature sensor, moisture sensor and humidity sensor which measure the approximate temperature, moisture, and humidity in the soil. This value enables the system to use an appropriate quantity of water which avoids over/under irrigation.

***KEYWORDS:** IOT, Moisture, Temperature, Humidity*

1. INTRODUCTION

Agriculture is and will be the backbone of Indian economy. We have only 4% of the world's freshwater resources to satisfy the agricultural needs for our 1.324 billion populations and improper method of irrigation is the primary reason for water wastage in agriculture. To make sustainable agriculture and prevent water wastage, Smart Drip Irrigation using IOT is proposed. The objective of this system is to render a reliable, robust, efficient and intelligent drip irrigation controller device-based system which is smart enough to analyse distinct parameters of a field like moisture, temperature, humidity, etc. and provide a water delivering schedule in a targeted manner near the root zone of the crop to ensure all the crops get enough water for their healthy growth, thereby reducing manual intervention of farmer. [4]The system analyses the soil quality to avoid soil erosion. The system uses emitter lines with different nozzles that can control water flow so that plants like succulents can get less water, while plants with high water requirements can get more, and keeps a check on the amount of water used for irrigation. [4]The system gathers local weather information and some even factors in the field landscape (types of plants, soil quality, slopes, etc.) to make irrigation run-time adjustments so the crops always receive the appropriate amount of water.[8] In order to inform the farmer about exact field condition and provide manual control over the system, System incorporates the concept of IoT (Internet of Things) via mobile App.

2. EXISTING SYSTEM

The previous system consists of two parts hardware and software. The software is a web page designed by using PHP and hardware consists of an embedded system which monitors soil content. In this system open source Arduino boards along with moisture sensors, it is applicable to create devices that can monitor the soil moisture content and accordingly irrigating the fields as when needed. [7]This system introduced a GSM-SMS remote measurement and control system for farms based on PC-based database system connected with the base station. Which is developed by using a microcontroller, GSM module, actuators, and sensors? It informs users about many conditions like the status of electricity, dry running motor, increased /decreased temperature, the water content in soil via SMS on GSM network or by Bluetooth.[5] In practical the central the station receives and sends messages through GSM module Values of temperature, air humidity and moisture which are set by the central station are measure in every base station Information is exchanged between a far end and designed system via SMS on GSM network. A SIM with 3G data pack inserted into a system which provide IOT features

to the system. This system sets the irrigation time depending on reading from sensors and type of crop and it can automatically irrigate the field when needed. By using the GSM-GPRS SIM900A parameter from the sensor regularly updated on a webpage. This application makes use of the GPRS feature of mobile phone as a solution for the irrigation control system. This system was used to cover a lower range of land and not economically affordable.

3. PROPOSED SYSTEM

3.1 Features of Smart Drip Irrigation using IOT

3.1.1. Automated drip: system collects real-time data of the water content in the root zone of the crop as an input argument, correlates it with other parameters such as temperature, humidity, insolation, light-intensity, barometric pressure of environment and outputs the precise amount of water/fertilizers required for the crop.

3.1.2. Water Source: The water level in the water reserve is kept in check by the SDIS and the farmer is informed accordingly.

3.1.3. Real-time monitoring: System comprises a mobile app and GSM messaging facility which enables the farmer to remotely monitor the status of the field by knowing the sensor values.

3.1.4. Customization: A farmer can monitor and control the valve/motor status and set the desired crop moisture level by operating a mobile app or through GSM messaging service. 5. Set Preferences: Through the mobile app, a farmer can select the crop type, soil type preferences to adjust the System for a specific type of crop.

This is smart drip irrigation using IOT is the system which is designed to minimize water wastage in agriculture. It is cost effective and any farmer can use it in farm fields, it increases productivity and saves water resources.

3.2 Working: The Smart drip irrigation using IOT comprises four major sections which are as follows:

3.2.1 Sensor section: System collects real-time data of the water content in the root zone of the crop as an input argument, correlates it with other parameters such as temperature, humidity, insolation, light-intensity, barometric pressure of environment and outputs the precise amount of water/fertilizers required for the crop. The water level in the water reserve is kept in check by the system and the farmer is informed accordingly.

3.2.2 Control section:
Raspberry pi monitors the system based on approximate parameter calibrated by various sensors. It defines the threshold value based on which it takes decisions whether to irrigate or not irrigate the field. SIS provides an online communication via mobile app to inform the user about the exact field conditions.

3.2.3 Android application (via the internet):
A farmer monitors and controls the valve/motor status and set the desired crop moisture level by operating the mobile app.

3.2.4 IoT section:
• Monitor different parameters of the crop, water reserve, weather patterns and supervises the irrigation.
• Maintain records of different crop parameters and corresponding weather conditions.
• Notifications to the farmer via mobile app.

3.3 E-Plant: (Mobile app)
• Controlling the motor/valve status.
• Set the desired crop moisture level if necessary.
• Monitoring different parameters of the crop, water reserve, and weather patterns.
• Selection of plant type, soil type as per farmer requirement. • Day-wise graphical analysis of crop data.
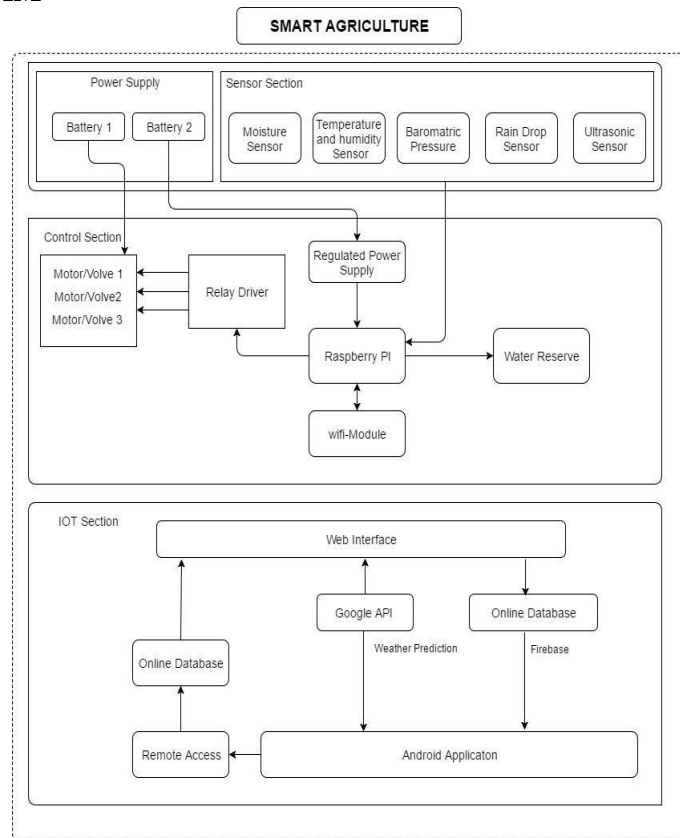
4. BLOCK DIAGRAM

Fig no 4. Block Diagram

5. CONCLUSION

A system to monitor temperature, humidity, moisture levels in the soil was designed and the project provides an opportunity to study the existing systems, along with their features and drawbacks. Agriculture is one of the most water- consuming activities. The proposed system can be used to switch the motor (on/off) depending on the favorable condition of plants i.e. sensor values, thereby automating the process of irrigation. which is one of the most time efficient activities in farming, which helps to prevent over-irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through an Android App. Though this project can be concluded that there can be considerable development in farming with the use of IOT and automation.

6. REFRENCE

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