Smart Irrigation System

D. B. Ashwin[1], R. Balu[2*], Y. Darshan[3], C. K. Devaraj[4]

[1,2,3,4]*Student, Department of Computer Science and Engineering, The National Institute of Engineering, Mysuru, India*

Abstract: **Agriculture is the backbone of India and it requires a lot of manpower.The traditional way of agriculturing leads to waste of water .The Smart Irrigation System is an device based on IoT which reduces the lamitations of traditional agriculturing and system is developed to automate the irrigation process by analyzing the soil moistureness and uses temperature, humidity Sensor to measure the relative parameter in order to water the crops.**

Keywords: **Arduino microcontroller, NodeMcu, Lcd display,water pump**

1. Introduction

Agriculture is the main need of most of the Indian livelihoods and it is one of the major sources of livelihood. For Indian economy agriculture is also one of the major source. Day by day water comsumption is also increasing that may leads to scarcity of water. Water is one of the major resource that human beings are fully dependent and it must be utilized in a proper way. Agriculture is one of the area that needs lot of water. So our project is a simply device that uses arduino microcontroller to automate the irrigation and watering the crops with minimum manpower. The main sensor to measure the soil moistureness is the main idea behind how the system works, the system also takes the values from the sensors such as Humidity sensor and Temperature sensor. The traditional irrigation may consumes lot of water and also man power and it also doesn't allow the farmer to other activities until the land is completely irrigated. By checking the soil moistureness and irrigating the land may reduce the water usage upto 30% -40%.

2. System Analysis

The smart irrigation system takes the output values from the sensors and performs the action based on the thereshold values. The existing system of smart irrigation has different types in it

- *Surface Irrigation System*: Surface irrigation is where water is applied and distributed over the soil surface by gravity. It is the most common form of irrigation done by the farmers in algriculture throughout the world from thousands of years.
- *Sprinkler Irrigation System*: Sprinker irrigation system is a method of normal watering the crops which is almost same as natural rainfall. Water flows throughs pipes usually by pumping. It is then sprayed onto the plants through sprinklers so that it breaks the flow of water into small water drops just as a rain which fall to the ground as a rainfall.

- **Proposed System**

- The smart irrigation system uses temperature, soil moisture and humidity Sensor to measure the relative parameter in order to water the crops. Also the smart irrigation system helps in irrigating correct amount of water to the planted crop as per provided information. The Android application gets the sensed data from the cloud periodically. The system uses image processing to predict the quality planted crop.

3. Implementation

Program run on Arduino board is to fetch the data from the sensor and check the sensor data is greater than or less than the given threshold value to start the water pump is the data is less than the given threshold value the pump will automatically start stop automatically is the sensor data is found higher than the threshold value. Threshold value is given according to the weather condition and soil moisture content of a particular area where the system is implemented. The Android app fetches the data from cloud server on a particular timestamp of the day. The variation of sensor data displayed in the app. User can view the data whenever and values from sensors and the motor status will be notified by mobile notification.
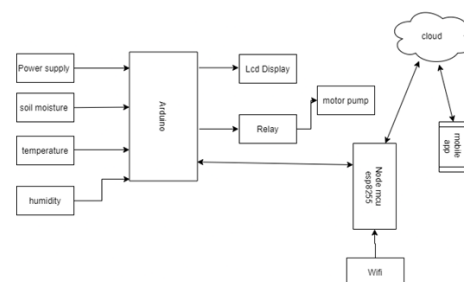
We are basically testing for three conditions
- Dry condition: when the soil moisture sensor is dry

and humidity is greater than the threshold value (heat condition) the motor gets automatically on by the microcontroller.

- *Manually ON (1):* The user can manually ON the motor from Android device. That data which in the form of 0 and 1 send to the cloud server from the android application and it sends to the nodemcu which connected to the microcontroller. Arduino control the motor using Relay and make water pump to turn ON.

- *Manually OFF (0):* The user can manually OFF the motor from Android device.That data which in the form of 0 and 1 send to the cloud server from the android application and it sends to the nodemcu which connected to the microcontroller. Then the Arduino controls the motor using Relay and make water pump to turn OFF.

With the help of the android application we can get the values of sensors from the cloud server by using MQTT protocol and also we turn on/off the motor irrespective of sensors values.
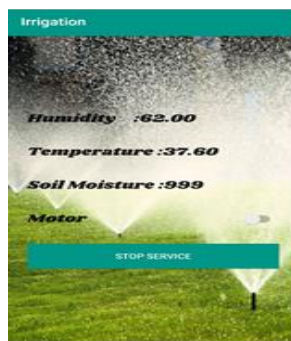
4. Plant Disease Detection

Identification of the plant diseases is the key to preventing the losses in the yield and quantity of the agricultural product. The studies of the plant diseases mean the studies of visually observable patterns seen on the plant. Health monitoring and disease detection on plant is very critical for sustainable agriculture. It is very difficult to monitor the plant diseases manually. It requires tremendous amount of work, expertise in the plant diseases, and also require the excessive processing time. Hence, image processing with machine learning is used for detection of plant diseases.

And in this method helps to identify the plant leave diseases, so that the farmer can take a precautionary measures in order to save the plants and he can take care of his yield. Farmer will be upload the image of plant leaf by using this imaging processing technique, so that it will help to detect whether the palnt is healthy or not.

5. Conclusion and Future Enhancement

In present days especially farmers are facing major problem in watering their agricultural fields it's because they have no idea about when the power is available so that they can pump the water even after then they need to wait until the field is properly watered which makes them to stop doing other activities here is an idea which helps not only for farmers even for watering the garden also with soil moisturizes and takes the humidity and temperature values from the sensors and switches the pump automatically and once it reaches the threshold values the motor get turn off automatically. The proposed system was developed taking in mind the benefits of the farmers and agricultural sector .The developed system can detect disease in leaf of the plants. Knowledge of the disease and the further precautionary measures can be taken for improving the health of the plant. This project enables better and smaller irrigation through temperature, humidity and other sensors networked to communicate with users. For farmers and growers, Internet of Things has provided extremely productive ways to cultivate soil with the use of cheap, easy to-install sensors and an abundance of insightful data they offer. This application can be extended in future by giving an option for the farmer to provide a feedback and also it will be better if he allowed to rate the application. So that it will help the other farmers to view the review on the same and take measures.

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