

Online Crop and Water Management system

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ABSTRACT: Our project describes the use of advanced technology for resolving some of the agricultural problems. It mainly concentrates on the efficient use of water and better yield of crops. This is achieved by considering the main factors that have an impact on the growth of crops, such as soil moisture, temperature and humidity. Two sensors are used those are soil moisture sensor which measures the volumetric water content in the soil by determining the voltage drop in the soil. DHT sensor which detects humidity as well as temperature. C Program is programmed in such a way that whenever the soil moisture drops below its reference value the readings are sent to the microcontroller board (arduino) and to the web server through the internet, same goes with humidity and temperature and from the server the user can control the motor.

KEYWORDS: Agriculture, Soil Moisture, Humidity, Temperature, DTH sensor.

I. INTRODUCTION

The crop water need is defined as the depth (or amount) of water needed to meet the water loss. In other words, it is the amount of water needed by the various crops to grow optimally. The crop water need always refers to a crop grown under optimal conditions the crop thus reaches its full production potential under the given environment. This Water Management Web Server is being designed to help the user with their irrigation scheduling and water management decisions. Access to and interest in the use of the World Wide Web has been growing at a fast pace. This project is designed to improve the transfer of water management knowledge and technology for improved agricultural crop production. In a country like India where agriculture plays an important part in shaping up the economy and the climatic conditions are isotropic, but still we are not able to make full use of agricultural resources. One of the main reasons is the lack of rains and scarcity of land reservoir water. Extraction of water at regular intervals from earth is reducing the water level as a result of which the zones of un-irrigated land are gradually increasing. Also, the unplanned use of water inadvertently results in wastage of water. In an Automated Irrigation System using DHT sensor, the most significant advantage is that water is supplied only when the moisture in soil goes below a pre-set threshold value. This saves us a lot of water. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump on/o when required. This process sometimes consumes more water and sometimes the water supply to the land is delayed due to which the crops dry out. Water deficiency deteriorates plants growth before visible wilting occurs. In addition to this slowed growth rate, lighter weight fruit follows water deficiency. This problem can be perfectly rectified if we use Automated Irrigation System in which the irrigation will take place only when there will be intense requirement of water, as suggested by the moisture in the soil.

II. IMPLEMENTATION

Design Attributes, Constraints and Objectives

In order to Define the design problem clearly and realistically we need to list all the possible design attributes related to the project and subsequently differentiate the constraints and objectives of the project.

Design Attributes

To solve the problem of irrelevant use of water, it is important to remember the two main objectives which are to make a more efficient use of water and to minimize the labour and time consumption.

The constant open loop approach is the simplest line of attack. A constant open loop means that the valve is always open and a required amount of water flows through the pipes, this saves water.

>Low cost.

>Trendy.

Applicability:

- It should be commonly applicable to all agricultural lands
- Marketability
- Simple in design
- Survivability implementation Durable for longer time
- Eco-friendly

Design Objectives and Constraints

Using the above design attributes list we differentiate them as constraints and objectives. The different objectives and constraints of the project are listed below.

Objective:

Design and create a Water Management Web server for user and crop production managers

Develop and maintain a user specified account that will monitor within season water management and growth characteristics of crops.

Utilize automatic collection of real-time weather data (temperature, humidity) into the user specified account for water management.

Pair wise Comparison Chart:

The pair wise comparison chart (PCC) is a tool for ordering the relative importance of objectives; It facilitates the following:

1. Compare every objective with each remaining objective individually.
2. Add total scores for each objective.

Plotting of the PCC is done under the suggestions and discussion between the team mates. Comparing all the constraints in the Pair wise comparison chart SAFETY is given the highest preference than the other constraints.

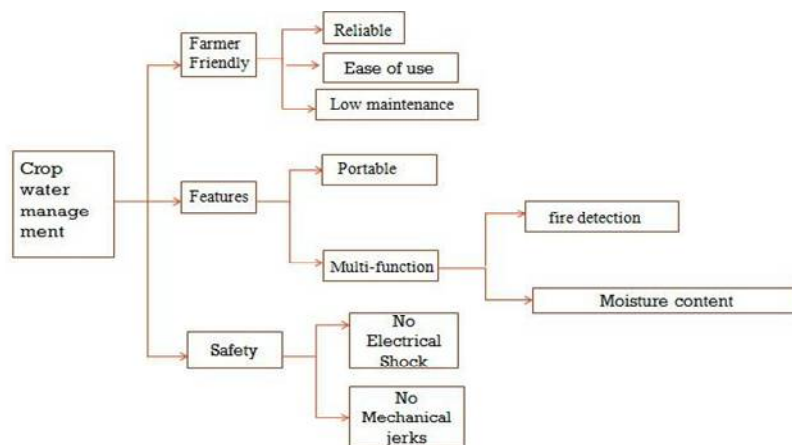


Fig.1 Function Means Tree

Function Means Tree:

Different functions that are to be implemented into the project are:

- Continuous tracking of moisture content, temperature and humidity.
- Alerts the user whenever the moisture content goes low.

Sends message to the user.

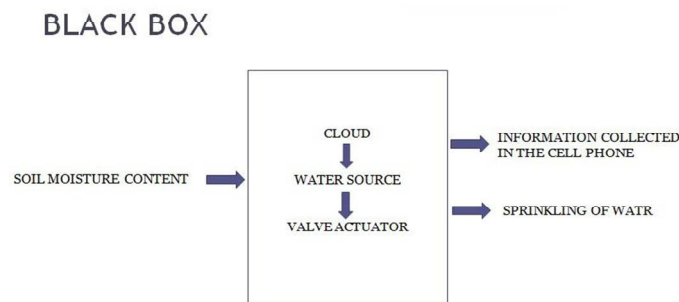


Fig 2 Black Box

Black Box:

The black box are used to represent the block diagram of the intelligent braking and alerting system where the flow of the working is shown in fig.2

| Selection criteria | weightage | Crop water | | Drip irrigation | | Virtual optimiser | |
|--------------------|-----------|------------|-----|-----------------|-----|-------------------|-----|
| Ease of use | 20% | 4 | 0.8 | 3 | 0.6 | 2 | 0.4 |
| accuracy | 10% | 4 | 0.4 | 3 | 0.3 | 2 | 0.2 |
| Reliability | 20% | 3 | 0.6 | 2 | 0.4 | 3 | 0.6 |
| cost | 20% | 2 | 0.4 | 2 | 0.4 | 1 | 0.2 |
| maintenance | 30% | 3 | 0.9 | 2 | 0.6 | 2 | 0.6 |
| Total score | 100% | 3.1 | | 2.3 | | 2.0 | |

Fig 3 Concept of Work.

Concept Scoring:

It is a quick, approximate evaluation aimed at producing a small number of viable solutions. It is a table where the criteria are weighed according to their importance which is done in order to choose the single best option.(fig.3)

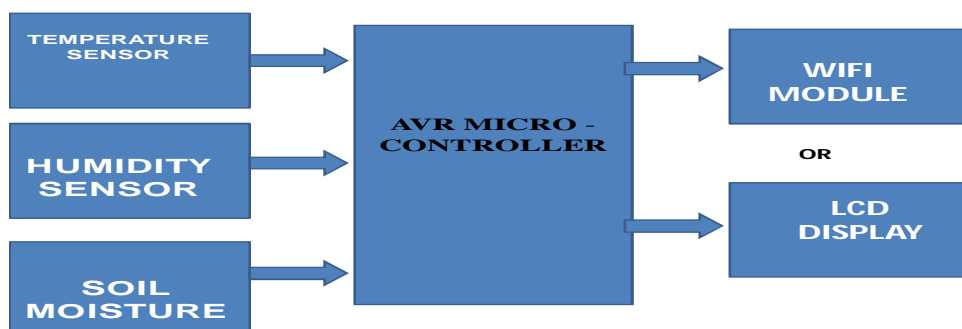


Fig 4 Block Diagram Representation

Fig.4 shows the block diagram representation of the system, where the sensors like temperature, humidity and soil moisture taken as the inputs and the wi-fi module or LCD is taken as the output. The out part is wi-fi module where is then acts as the transmitter to the device which transmits the input data to the device which can be obtained through the IP address

III. RESULTS AND DISCUSSION

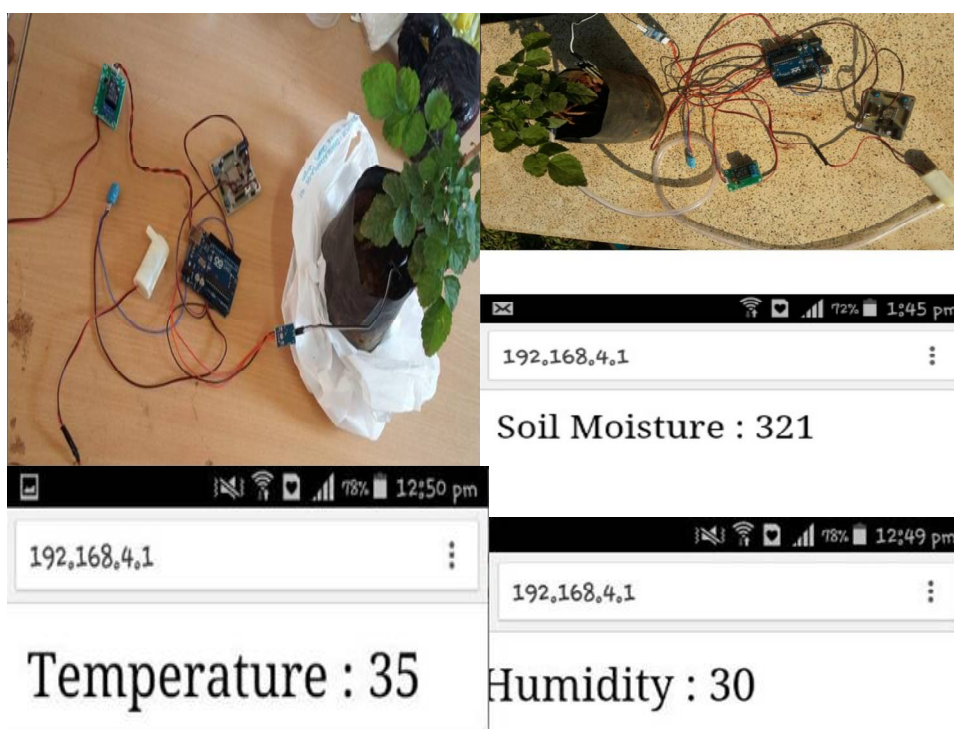


Fig.4 Results

As the result shown in fig 4, the variations of the temperature in degree Celsius with respect to the soil moisture, temperature and humidity is shown. As the values may vary with each plant. As user needs to obtain the IP address and then the module is inserted in the soil for the results.

IV. CONCLUSION

The goal of this project is to develop, test, and display a user friendly Web Server that will provide a personal crop production account system with real time water management information and computer assisted decision tools for improved water use efficiency, crop management and planning, and increased economic returns. This approach for measuring the soil parameter is used for the efficient plant growth. The results obtained from the measurement have shown that the system performance is quite reliable and accurate.

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