SMART WATER IRRIGATION SYSTEM MODEL

MINOR PROJECT 2

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About the project:

The purpose of this project is to build a basic model system of water irrigation and integrate this into an advanced model which can be produced and successfully be implemented into a real world. Today the world face the problems of water scarcity as the world suffers from lack of rain and lack of groundwater throughout the year thus requiring us to change our old methods into modern green sustainable ways.

Reason to choose the topic:

Agriculture is developing from mechanized by simpler methods in the twentieth century to being automated in the second decade of the 21st century. Today the main requisite of a successful agriculture model is its production value, its accuracy,its effect on the environment and most importantly its production cost. To reach these prerequisites, automated systems must be introduced and a framework of mechanics and technology must be achieved.

In India, agriculture sector is the largest sector to its economy, but when it comes to technology we find that it is still very deficient. This is because of the high cost it takes than the presently used conventional methods. Now a day's there is huge enhancement in technology which plays a vital impact on various fields like healthcare, education, etc. The problem with Agriculture is that most farmers are unable to afford these technology from big brands due to their large price marks. This result into a devastating fact that most of the irrigation systems are operated manually. This is a risky method as it may give rise to problems of wasting water, over watering, lack of watering. The available techniques that are used for irrigation are drip irrigation and sprinkler irrigation etc. These techniques are to be combined with IoT so that we can eliminate human error and analyze the soil through various sensors and conclude if there is a requirement for watering.

Objective and scope of the project:

In this project, we have attempted to build a smart irrigation systems using IoT and achieve the desired objectives of this system. The project is facilitated to simplify the irrigation systems by installing the system, and increase crop performance by reducing overwatering from saturated soil. The idea is to eliminate human error by assigning an engine to realize the need of watering and thus preserving water from wasting. In recent years, with a decrease in the cost of internet, there is a hope of light to provide the farmers with a fairly low-cost but an effective system to help them irrigate their fields as per requirements through automatic engine and thus decreasing cost of watering and manpower. By solving these problems we might also be able to change this cycle of wasting water and help prevent water scarcity.

Methodology:

The proposed system consists of three sensors – rain, soil-moisture, and temperature, humidity sensors. All the sensors along with the pump and the relay are connected with the microcontroller. After the sensor read the data from the environment, the microcontroller decides if the pump needs to be set ON/OFF. The data collected are also trained and tested using AR and ARIMA model, which give us an idea of how much the experimental value differ from the predicted values.

System Requirement:

Functional requirements:

Our system works through different stages and this stage can be found in:

1. If the moisture sensor is dry in the line (its locations), the system will be checked by the rain sensor if there is rain, the system will not work because no need to irrigate at the same time of rain, otherwise the system will check the temperature sensor with light sensor if the temperature is high and the percentage of light Is high as well then the system will not work because it is not the right time for irrigation process because the water will easily evaporate.

2. If the temperature is low and the light is low and there is no rain but the moisture sensor is dry then signal will be sent to the controller to open the valve and pump.

3. If water level is low in the tank then the system will shut down automatically and send SMS to the user, by using water level sensor.

4. When the system is ON by using flow meter sensor connected to LCD we can know the amount of water goes from tank to each line so if there is a leak in the pipe we can know from LCD.

Non—Functional Requirements:

The materials required for this project must be easy to install to implement a successful project. In addition, materials should be easy to connect with each other to build this project and become more effective. Also, the materials of this project must be easy to replace it in case of any damage.

FUTURE ENHANCEMENT:

The following are some features we would like to add to this project:

1. A Mobile Application – With increase in usage of this device we would like our users to be equipped with a mobile application to monitor and control this system.

2. Image Processing – Use of this technology will allow us to get a new aspect to the information that we are collecting and we would be able to know more about the condition of the crop.

3. Machine Learning – Using these algorithms can help us predict our data beforehand and thus making us able to schedule and plan for our next steps to irrigation or agriculture.

CONTRIBUTION OF THE PROJECT:

- It reduces water consumption to a greater extent.
- It needs minimal maintenance .The power consumption has been reduced very much.
- The system can be used in greenhouses. The System is very useful in areas where water scarcity is a major problem .
- The crop productivity increases and the wastage of crops is very much reduced using this irrigation system.
- The developed system is more helpful and gives more feasible results.

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