IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Vol. 8, Issue 10, October 2021

DOI: 10.17148/IARJSET.2021.81138

SMART AUTO IRRIGATION SYSTEM

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Abstract: Our country mainly depends upon the agriculture. The present scenario of agriculture and agriculturist is in the tragic position. The main problem lies in agriculture is water efficiency, man power, capital, soil fertility, etc. in order to overcome these problem we have developed an auto irrigation system. It minimizes human intervention on fields and it provides limited amount of water to each crops / field which minimizes water efficiency. It detects the moisture of the soil and provides sufficient water supply to plants. It helps the growth of the plant widely. By adopting this methodology the person who posses fields in any remote geographic location can also be frequently monitored with limit of cost. Result show the significant improvement in the proposed work.

Keywords: Automatic irrigation , Smart irrigation , Ardiuno, GSM, Moisture sensor.

INTRODUCTION

In the present scenario, irrigation systems are operated manually. To use the water efficiently and effectively, a concept of smart auto irrigation is introduced. Sensor based irrigation system is based on soil moisture sensor that will measure the level of the moisture in the soil and sends the signal to the Ardiuno and accordingly it will irrigate the crops. The Ardiuno plays the role of micro controller. The Ardiuno is brain of this system. This will compare the values received from the moisture sensor with predefined moisture levels already stored in the system. Based on the values received from the sensors, Ardiuno will turn the irrigation system ON / OFF. OR we can ON and OFF it with help of mobile. The Ardiuno also provide the functionality of calculating the pH value of soil. pH is a term that is used to describe degree of acidity or basicity. In addition, the moisture sensor is attached so that the water content of soil is detected. Automatic irrigation system proves to be very helpful for those who travel and who travels. If designed and coded properly, the automatic irrigation systems can be very cost effective and can do a lot of water conservation. Watering with pipe or with oscillator wastes water and none of these method aim plant roots. Automatic irrigation system can be design in such a way that gives the which ever amount water in targeted area, and which will promote water conservation too.

LITERATURE REVIEW

In the research by the Chandan Kumar Sahu and Pramitee Behra,[1]. the authors present a prototype for full automation accessing of irrigation motor where prototypes includes number of sensors placed in different direction of the farm field. Each sensor is integrated with a wireless networking devices and the data received by the “ATMEGA-328” microcontroller, which is an ARDIUNO-UNO development board. The sensor is used to send the message through internet correspondence to the microcontroller process. The objectives of the paper were control the flow of water motor automatically and select the direction of the flow of water in pipe with the help of the flow of water in pipe with help of sensor. The information which is considered as the operation of the motor and direction of water of the farm field is finally sent to the user using email account.

In the paper by R. M. Aileni [2], the author presents a mobile application for healthcare, which process data from humidity and temperature sensors. The mobile app is based on cloud computing SaaS (software as a service) cloud computing model. The cloud-computing infrastructure based on sensors is used in this paper for deploying an application, which provides patients monitoring (moisture, temperature or blood pressure). The data is sent and stored in a dedicated server for being analyzed later by doctors or caregivers. The advantages of sensor cloudal so come from using PaaS (platform as a service) and IaaS (infrastructure as a service) models.

Alauddin et al [3] proposed a Cloud based IoT for Smart Garden Watering System using Arduino Uno which was used to monitor and to maintain the soil moisture and light intensity. The monitored data was sent to Thing Speak IoT cloud. The data gathered in the cloud was analysed and when it reached the threshold value, an action was sent accordingly from the cloud to the irrigation system. It needs further refinement like including temperature sensor and controlling the system using smart phone.

S.Harishanka, R Satishkumar [4] suggested an automatic sprinkler irrigation system using solar power for automating the irrigation process using solar power and to optimize the use of water. When implemented for bore holes, the system was found to be successful. Solar pumps also offered clean solutions with no danger of borehole contamination.

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In the work by Authors A. N. Arvindan and D.Keerthika [5], The android smartphone was used as a remote control to make Ardiuno based automated irrigation system easy -to-use and an economical one. The design of this system includes a voltage a soil moisture sensor that provides a voltage signal proportional to the moisture content in the soil, which is compared with a predetermined threshold value. On the basis of this comparison result, the appropriate data are fed to the Ardiuno UNO processor, which is linked by module to an android phone. Android smartphone allows the user easy control for the irrigation system o switch on, to drive motor. The system has the potential to be used in the real time precision agriculture application.

OBJECTIVE

PROPOSED METHODOLOGY

The demand for higher productivity is increasing day by day. The desire to facilitate food production with limited cost, limited labor, etc., we would like to irrigate the crops whenever needed. This would prevent water overflows. Not only good irrigation gave us better results in terms of productivity. Then we would like to place the pH sensors and detect the soil pH values which discriminate between acidity and basicity and provide the necessary amount of fertilizer. This system remains active from the growth stage of the crop to the harvest period, a stage which requires a thoughtful flow of water. It would also help them grow healthily and provide greater food production.The proposed automatic irrigation prototype. This would irrigate the plant culture periodically according to the sensor values and help conserve water and prevent human intervention. The block diagram of how the Arduino UNO is connected to the connected temperature sensor, humidity sensor, pH sensor, soil sensor and raindrop sensor that reads the values of the ground. Code is generated to turn the engine on and off based on the threshold values and the reading is updated on the web server.

SYSTEM DESIGN:

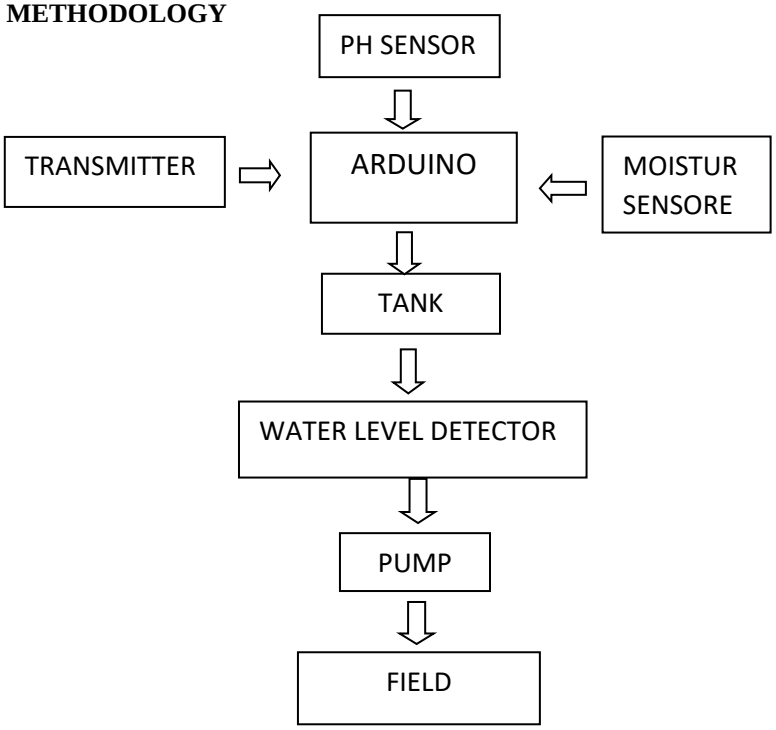
The Ardiuno based system is designed in such a way that it turns the motor on and off on detecting the moisture content of the soil. A GSM module acts as a transmitter and receiver, which can be used to view the readings and stats of the sensors and the moisture level of the soil. The aim of the system is to monitor the moisture content of the soil using a soil moisture sensor. The objective is to turn the pump ON when the soil moisture falls below a certain reference value. Next objective is to display the status of the soil and the tank using a mobile.

PROCEDURE OF MODEL:

The soil moisture sensor checks the moisture level in the soil. If the moisture level is present in soil then conduction occurs between the two probes of Soil Moisture Sensor. Due to this conduction, the transistor Q2 remains in triggered state and so Arduino Pin remains Low. When Arduino Pin reads LOW signal at The GSM module sends SMS to the user that Soil Moisture is Normal and the motor is turned OFF so water pump remains in off state.

In case of low moisture in the soil the Transistor Q2 turns off and then the Pin D7 becomes high. Then the Arduino Uno reads the Pin D7 and triggers the water motor. Using the GSM module message is sent to the user about “Low Soil Moisture level detected and the Motor is turned ON”. The water Motor will automatically turn off when there is sufficient moisture in the soil.

FLOW CHART OF METHODOLOGY



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EXPECTED OUTCOME

This project is feasible and cost-effective for optimizing water resources for agricultural production. This project allows cultivation in places with water scarcity thereby improving sustainability. It will proves that the wastage of water can be reduced. This system is very easy to implement. Here user should visualize his soil's moisture content from time to time and check whether the water level is sufficient or not. Smart irrigation system displays the values of the water level in mobile of the user so that user can operate them anytime.

(a) The system does not require the presence of farmers at the field as it can be operated from anywhere.

(b) The application that it uses displays the moisture content and amount of water being given to the crop.

(C) This suppresses the need of manpower and also saves a lot of time.

(d) This system only provides passable amount of water to the crop thereby saving water that is otherwise wasted blue to water logging.

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