Automatic Plant Irrigation System using Arduino

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Abstract—*In the modern world Scarcity of food and water mainly occurs due to the increase in population in order to avoid this there is a need to promote the agriculture sector . There are a lot of wastage water and other resources in the crop field. In order to avoid this problem we are using an automated plant monitoring system using Arduino .This system senses the moisture content of the soil and provides adequate water according to the need .This system also includes the monitoring of crop growth and to detect the water level in the tank .So when the soil is dry the pump will automatically water the fields and when the soil is wet the pump automatically stops, there by eradicate the need of manpower and conserve the time.*

Keywords—*Arduino , Irrigarion , water conservation*

I. INTRODUCTION

the soil for the proper nourishment and growth of plant. Irrigation is one of the most common artificial way of watering It is mainly found or used up in dry areas and places where there is less rainfall throughout the year. One of the greatest advantages of irrigation is that it will suppress the growth of weeds in the agricultural fields. The ancient types of irrigation include irrigation using buckets and watering cans, by using sprinkler irrigation, localized irrigation, drip irrigation etc. In ancient days all the irrigation works are done manually but by the current technologies' irrigation can be done in a unique way that is by using these techniques we can provide water to plants according to their needs at different intervals. If we are using the manual methods there are lot of wastage of water this wastage can be avoided using the modern technologies. That is the main reason why an automatic plant irrigation system is been developed. It prevents the unnecessary wastage of water and other resources. The automatic watering system works by sensing the moisture content of the soil and operates the pump according to the need. Any water sources can be used for this irrigation system. It even senses the crop growth and can detect the water level in the nearby source. The main advantages are it is cost effective, time saving and automatic.
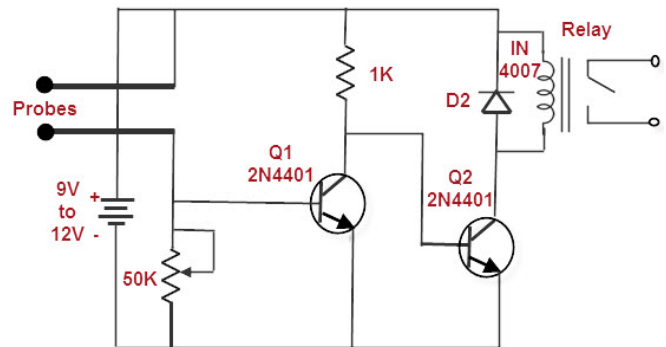

II. SYSTEM DESCRIPTION

Irrigation is that the artificial manner of watering crops in fields. In the present era, water inadequacy because of over exploitation have resulted the urge of developing a brand new technology that would save water from being wasted and since, agriculture is that the most water intense occupation, thus creating irrigation system sensible would be a better manner of checking water loss. Sensible irrigation system is economical and efficient way of watering fields. It monitors weather, soil conditions, evaporation and plant water use and mechanically adjusts watering schedule. Hence approaching sensible irrigation system has become a primary concern to relinquish farmer a wise tool which would support them in yielding quality crops. Since India is Associate in Nursing agro primarily based country and around sixty-one of the population. India occupies second rank in rice export and as rice crop need vast quantity of water for irrigation purpose, hence sensible irrigation project we tend to use differing kinds of detector to make a farmer up to this point regarding the sector. Sensors used are soil wetness detector , water flow detector and temperature sensor(ds18b20) sort of a detector which might calculate the quantity of water in the sector , a soil wetness detector that can calculate the wetness profile of the sector so as to prevent crops from water work problems and a temperature sensing detector so one will check the temperature of the crops as a result of crops area unit temperature sensitive too and if the smart system aware the farmer before then farmer will use sprinklers so as to cool down temperature of the crops it would save each crop and farmer. Our approach is to form this system accessible from even way distance so farmer have the data and management on the sector 24x7 throughout a year. The full setup is controlled by associate in nursing Arduino that is a microcontroller and therefore the information is shipped and received by a module i.e. ESP8266

III SYSTEM DETAILS

a. **Moisture Sensor -** The sensor mainly used for this purpose contains two conducting metal probes which consists of a pair of electrodes to measure the resistance in the soil. These probes sense the moisture content of the soil. Greater the moisture content value smaller the resistance.

b. **Pump -** A 12V DC motor is used which is fully controlled by the Arduino board. These motors can be turned off and on according to the needs.

c. **Relay -** For switching on and switching off the pump according to the water needs.

d. **UV Sensor -** This sensor is mainly used for sensing the crop growth at different intervals of time.

e. **Water Level Depth Detector** - These are used for knowing the amount of water available in various resources through which irrigation is done.
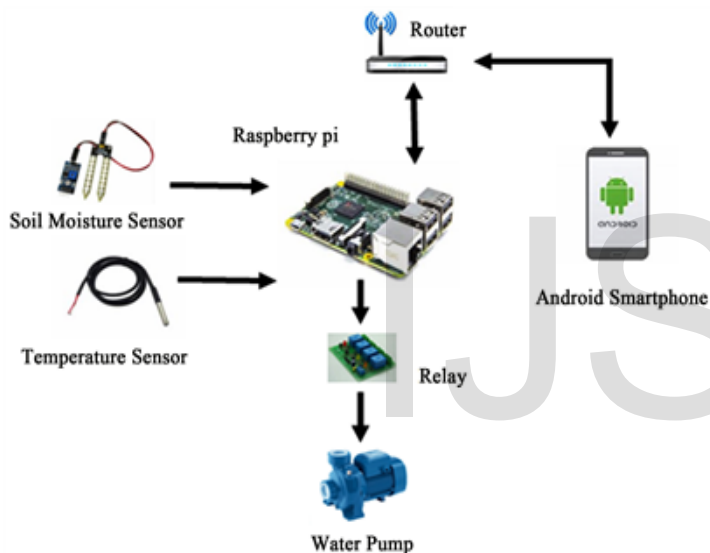
IV SOFTWARE IMPLEMENTATION

The computer code used here is Arduino. It provides a number of libraries to create the programming of the system thus simple. As our example, the controller AtMega 328 is programmed that contains some resistance price travel from zero to 1023. zero suggests that totally wet condition and 1023 suggests that fully dry condition. a price is being set in between these 2 values which can decide whether or not the pump needs to be switched on off.
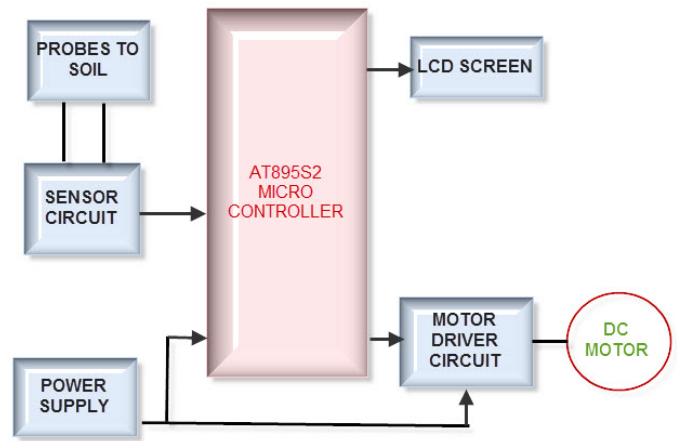
V HARDWARE CONSTRUCTION

The main a part of the system is Arduino micro-controller. Arduino is AN open supply physics platform accompanied with a hardware and software package to style, develop and check advanced physics image and product. To communicate with user over an internet site, a server is needed which can send and receive knowledge from micro-controller to user and vice-versa. so as to realize a desired output, a correct algorithmic rule is needed. The algorithmic rule comprises the subsequent steps:

Step 1: Power ON the system which incorporates the microcontroller, sensors and alternative peripherals.

Step 2: Initialize the system, that consists of sensors, Wi-Fi module and program.

Step 3: Browse the system configuration file which suggests to browse the directions from the configuration file and therefore the system operation consistent with the configuration file.

Step 4: browse knowledge from the sensors and analyze knowledge to see whether it's need to alert the user or continue observance.

Step 5: Send the info to the user upon request mistreatment ESP8266 and expect the feedback from the user.

Step 6: If feedback is affirmative then check the state of irrigation pumps and sprinklers, toggle the state and save this state in system configuration file. User will send totally different commands to settle on between sprinklers and irrigation pumps.
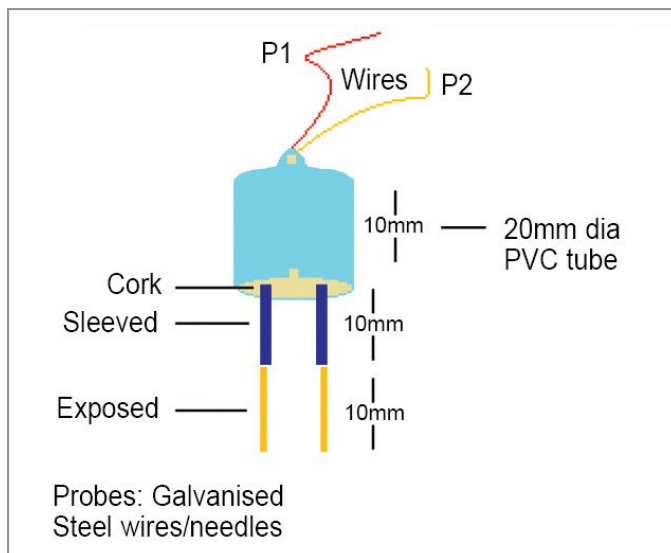
VI NEED FOR THE PROJECT

Due to the rise in population, water scarceness happens. The per capita water uses and per capita water resource. From the higher than graph it's clear that as years passes per capital water use will increase and per capita water resources falls. therefore, it's our duty to avoid wasting the earth from water depletion and conserve one drop of water that being wasted reserve throughout irrigation. whereas doing this, water wastage is additional by water work. therefore, associate automatic plant irrigation system is important to conserve water since the pump gets turned on and off mechanically once the employment. one amongst the most objective of this method is to get rid of human management from fields for watering the plants and its time saving.
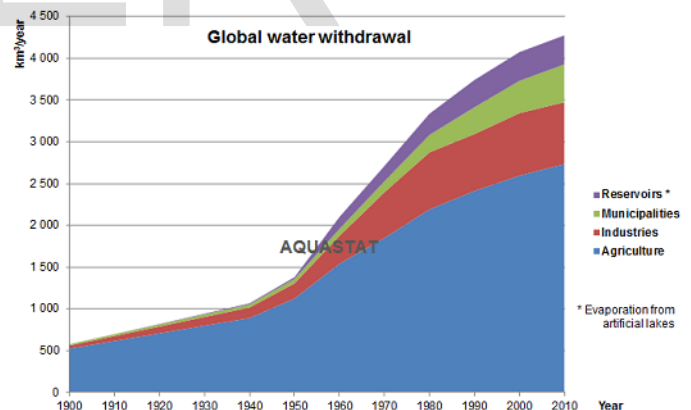
VII ADVANCED PRACTICAL USES.

This system will be developed, if there's a massive agricultural land. we should always use variety of wet detector to the system and may embody temperature detector in order that it'll work in line with the weather conditions. The potency of this method is a smaller amount as a result of most of the elements utilized in this method square measure product of plastic. The direct sun rays from the sun towards the agricultural fields can destroy the system, since it's product of plastic. So, these circuits are place in a very specially build rooms or on special coverings to stop the direct sun rays falling thereon. thus, the lifetime of the system is raised. This water delivered by knowing what proportion water a crop must grow healthy.

Probes: Galvanised Steel wires/needles

IX CONCLUSION

Automatic plant irrigation system has been designed and made. The miniature model of the system worked consistent with specifications quite properly. This technique parts square measure simply offered and that they work quite reliable. By rising the irrigation potency in agricultural sector, this trade become a lot of competitive and property. additionally, in dry areas, wherever there's no ample downfall, correct irrigation isn't doable. Hence by victimization this irrigation system by watching the wet content of soil square measure will meet the water necessities necessary for the sector. To avoid wasting effort of farmers, the necessary concerns square measure water and time. In gift condition, they have to attend till field is totally patterned. This restricts them to try and do alternative activities.

REFERENCES

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VIII ADVANTAGES

We will now [3] discuss some of the benefits associated with the installation of an automatic irrigation system for your landscape and the environment.

Saves Time

A programmed water system framework will spare you a lot of time that you in the past would have spent watering your yards, gardens and blooms. You would now be able to have your clocks set, with the goal that watering will occur at the occasions that best suits your scene and the atmosphere where you live. You can go on that occasion realizing that your gardens and blossoms will be kept up and prospering when you return.

Saves Money

With a programmed water system framework there is no cash or water squandered, for everything is coordinated, modified and these frameworks all have rain sensors, so every drop of water is utilized just when it is required.

Saves Water

Whatever sort of water system framework you introduce, there will be a more prominent saving money on water. You can enable preserve to water with programmed frameworks, for there is no squandering of water, each drop is utilized not squandered away. You can spare somewhere in the range of 30 and 50 percent of the water that you would ordinarily use with other more customary watering strategies.

Improves Growth

Whenever plants, yields, yards or blossoms are watered with littler measures of water over a more drawn out timeframe, they become quicker, for it is the perfect condition for development. You will appreciate greener and more delicious greenhouses and gardens

Weed Reduction

You will notice a reduction in the number of weeds appearing, this is due to the fact that those areas that need water are the only areas receiving water, with the implementation of a specifically designed irrigation system.

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