AUTOMATIC IRRIGATION SYSTEM ON SENSING SOIL MOISTURE CONTENT

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ABSTRACT

The paper is designed to develop an irrigation system to help the farmers. Whenever Farmer is going to pump the water to the field there are some disturbances due to power fluctuations and due to low voltage. It may brings loss to farmer because of improper field that means wilting of plants. So, for helping farmers we are designing this project. The advantage of this project is to reduce human intervention and still ensure proper irrigation. The project uses AT89S52 Microcontroller which is programmed to receive the input signal of varying moisture condition of the soil through the sensing arrangement. This is achieved by using an op-amp as comparator which acts as interface between the sensing arrangement and the microcontroller. Once the controller receives the signal, it generates an output that drives a relay for operating the water pump. For sensing arrangement we use sensors as Humidity sensor, Temperature sensor placed all over the soil. An LCD display is also interfaced with microcontroller to display the status of motor. Here GSM Technology is also used to enhance the project such that whenever the motor going to ON/OFF a SMS is delivered to concerned person regarding this motor.

INTRODUCTION

The Paper is based upon Closed Loop Control System. In closed loop control system, the feedback loop is there which continuously provide the data and with the help of that data the system configures its output. We can automatically water the plants when we are going on vacation or don't, we have to bother my neighbors, Sometimes the neighbors do too much of watering and the plants end up dying anyway. There are timer-based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. The purpose is to regulate water and optimize the water flow so that plants are not starved of water. This is particularly useful during summer seasons when water is scarce. During monsoon and winter seasons, the water flow can be optimized depending on the requirement, thus saving precious water.

A properly configured soil moisture sensor can save up to 60 percent of water used in irrigation. The designed system can be used in turf grass or with small garden plants. The continuous increasing of food demand requires the improvement in food production technology. The food production requires continues monitoring of crops for irrigation with the help of humans. This continuous monitoring by humans is not possible for all the time. Hence automatic irrigation system is a suitable one which helps to irrigate the crops without the help of human intervention. This system will have continuous monitoring that helps better production.

Assimilation is that the artificial application of water to the land or soil It is used to assist in the growing of agricultural crops [3], maintenance of landscapes, and re vegetation of disturbed soils in dry areas and during periods of inadequate rainfall. When a zone comes on, the water flows through the lateral lines and ultimately finally ends up at the irrigation electrode (drip) or mechanical device heads. Several sprinklers have pipe thread inlets on the lowest of them that permits a fitting and also the pipe to be connected to them. The sprinklers are usually used in the top of the head flush with the ground surface [9]. As the method of dripping will reduce huge water losses it became a popular method by reducing the labor cost and increasing the yields.

BLOCK DIAGRAM OF PROPOSED WORK

The block diagram consists of a microcontroller as the heart of the project and there are 3 types of sensors we used are humidity sensor, temperature sensor, moisture sensor. By using these three of sensors we can calculate temperature and moisture of soil and the atmosphere. Dc motor is used as motor pump to pump the water through on or off controlled by microcontroller. We are using GSM technology in our project to send a message on basis of motor pump on or off position which is connected to the NODE MCU
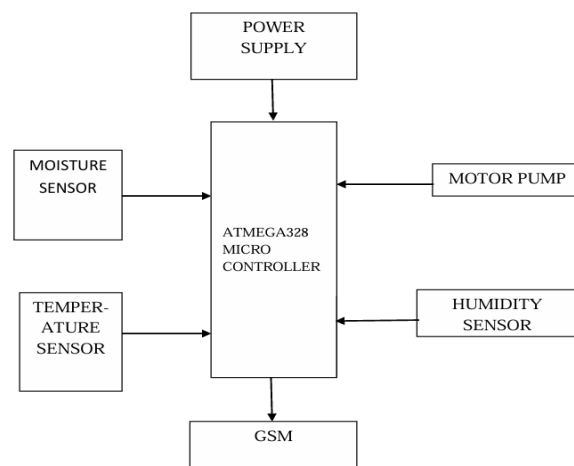
Hardware components

- ✓ Aurdino
- ✓ Power supply
- ✓ Dc motor
- ✓ Temperature and humidity sensor (DHT11)
- ✓ Global system for mobile communication (GSM)
- ✓ Push buttons
- ✓ Relay

WORKING: The idea of this paper is to implement an automatic irrigation system by sensing the moisture of the soil. The working of the circuit as follows: The soil moisture sensor is inserted in the soil. Depending on the quality of the sensor, it must be inserted near the roots of the plant. The soil moisture sensor measures the conductivity of the soil. Wet soil will be more conductive than dry soil. The soil moisture sensor module has a comparator in it. The voltage

from the prongs and the predefined voltage are compared under the output of the comparator is high only when the soil condition is dry. The output of the soil moisture sensor is given to the analogue input pin of the microcontroller. The microcontroller continuously monitor the analogue input pin. When the moisture in the soil is above the threshold, the microcontroller display a message mentioning the same and the motor is off. When the output from the soil moisture sensor is high that is the moisture of the soil is less. This will trigger the microcontroller and display an appropriate message on the LCD and the output of the microcontroller, which is connected to the base of the transistor is high. When the transistor is turned on, the relay coil gets energized and turns on the motor. The LCD is also turned on and acts as indicator. When the moisture of the soil reaches the threshold value, the output of the soil moisture sensor is low and the motor is turned off. The system is also designed to warn when the moisture is very high then the threshold and the soil is to wet, which is dangerous for the plants.

**Benifits of automatic irrigation system?**

1.REDUCED LABOUR: As the irrigator is not required to constantly monitor the progress of an irrigation,the irrigator is available to perform the other tasks-un interrupted **2.IMPROVED LIFE STYLE:**The irrigator is not required to constantly check the progress of water down the bays being irrigated.the irrigator is able to be away from property, relax with the family and sleep through the night.

3.MORE TIMELY IRRIGATION: Irrigatiorswith automation are more inclined to irrigate when the plants need water,not when it suits the irrigator.

 4.ASSISTS IN THE MANAGE MENT OF HIGHER FLOW RATES: Many irrigators are lookingto increase the irrigaton flow rates they receive through installing bigger channels and bay outlets.Such flow rates generally require an increase in labour as the time taken to irrigate a bay is reduced thus requiring more frequent change over.Automation allows for these higher flows to be managed without an increase in the amount of labour. **5.MORE ACCURATE CUT OFF:**Automation of the irrigation system allows cut-off of water at the appropriate point in the bay.This is usually more accurate than manual checking because mistakes can occur if the operator is too late or too early in making a change of water flow.

6.REDUCED RUNOFF OF WATER AND NUTRIENTS:Automation can help keep fertilizer on farm by effectively reducing run off from property.Retaining fertilizer environmental benefits. on farm has both economic and environmental benefits.

7.REDUCED COSTS FOR VEHICLES USED FOR IRRIGATION:As the irrigator is not required to constantly check progress of an irrigation,motor bikes,four wheelers and other vehicles are used less.This reduces the running costs of these vehicles and they require less frequent replacement.

RESULT
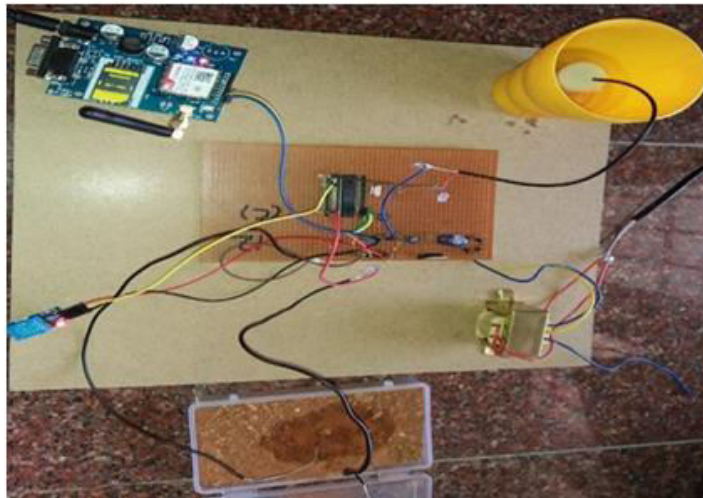
CONCLUSION

The primary applications for this project are for farmers and garceners who do not have enough time to water their crops /plants.It also covers those farmers who are wasteful of water during irrigation.The project can be extended to green houses where manual super vision is far and few in between.The principle can be extended to create fully automated gardens and farmlands.Combined with the principle of rain water harvesting,it could lead to huge water savings if applied in the right manner.In agriculture lands with server shortage of rainfall,this model can be successfully applied to achieve great results with most types of soil.

FUTURE SCOPE The working of project is basically depend on the output of the humidity sensors Whenever there is need to excess water in the desired field (rice crops)then it will not be possible by using sensor technology. For this we will have to adopt the DTMF technology. By using this we will be able to irrigate the desired field and in desired amount.

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