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Automatic Irrigation System

Mansi Ambalkar, Shruti Bonde, Ganesh Kande, Chetan Shelokar

Miss.Mansi Ambalkar, Electrical Engineering, JDIET Yavatmal, Maharashtra, India, mansi.ambalkar@gmail.com
Miss. Shruti Bonde, Electrical Engineering, JDIET Yavatmal, Maharashtra, India, nomitabonde1999@gmail.com
Mr. Ganesh Kande, Electrical Engineering, JDIET Yavatmal, Maharashtra, India,
kandeganesh123456789@gmail.com
Mr. Chetan Shelokar, Electrical Engineering, JDIET Yavatmal, Maharashtra, India,
chetanshelokar123@gmail.com

ABSTRACT

This project is introduced to develop an automatic irrigation system. Which turns the motor on or off on detecting the moisture level of the soil in the respective field in agricultural system irrigation should be done by proper means which is vital. The advantage of this method is to make human efforts as low as possible but still a proper irrigation.

This project uses at mega 328\p series microcontroller using Arduino which is programmed such that it can detect the moisture level of the soil and also the water level of the well. If the water level is well enough in the well and moisture level in the soil is low then the motor automatically gets ON, and if the moisture level is okay and the water level is not enough to fulfill the requirement which is provided to soil then the motor gets automatically OFF.

Hence by using this automatic irrigation system the life of farmers gets easy.

INTRODUCTION

Water level indicator and humidity sensors installed in the field take the measurement of moisture level of soil and water level of well and send this information to users. The users send data in the form of SMS and GSM network to start the irrigation according to received information.

The complete respective farm is divided into number of sections which contains moisture level sensor which detects the moisture level of the soil, and theses sensors should be placed at proper level below the soil, and when moisture level is detected by moisture sensor then the motor working according to the instruction given by Arduino.

Use of this technique is to reduce the human efforts, by using this technique the farmers can automatically control the farm using their mobile, with the help of GSM module the massage from farmers mobile is given to the Arduino and in this way, the luxurious life is established.

LITERATURE REVIEW

Soil moisture sensor placed in root zone of plant and gateway unit handles the sensor information and transmit data to GSM. One algorithm was developed for measure threshold value of soil moisture sensor that was programmed into a microcontroller to water quantity. The automatic system will able to save 90% compared with traditional irrigation system. Because of its energy autonomy and low cost, the system has the potential to be useful in water limited geographically isolated area in this paper, soil moisture content has been detected using acoustic based technique was developed. The main purpose of this technique is development for measured soil moisture in real time method. The technique based on relationship between two quantities the degree of saturation with water in soil and water level present in the water resources. This experiment found that the with the moisture content following, depending on the kind of soil. This paper designs a model of automatic irrigation system which is based on microcontroller. Various sensors are placed in paddy fields. Sensors sense water level continuously and give the information to farmer

through cellular phone without going in paddy field. If the water level reaches at danger level automatically motor will be off without confirmation of farmer. And it will notify the farmer about condition of water level as error.

Developed a fully automated system which optimizes the use of energy and water resources for the need of the day for small garden. This paper proposes a design and implementation of a highly energy efficient, multimode control of an automated irrigation system. The system uses soil moisture potential measurement and the programmed data to irrigate a desired area the soil moisture potential content is monitored by a microcontroller-based data to acquisition and distribution system. And integrated GSM module provides critical information to the user during system failure. The proposed microcontroller-based system was programmed and tested for its performance

HARDWARE COMPONENTS-

Arduino Board

Moisture sensor

Water level indicator

Relay

DC motor

Resistor

Transistor & Capacitor

ARDUINO CONTROLLER BOARD

As we have used Arduino controller board which us an input device which processes all signals from sensor and displays on to LCD. It also acts as a relay which automatically turns ON and OFF. It is of 14 pins which has 6 inputs and 6 outputs and the USB cable is connected to Arduino and power supply which is AC to DC adaptor in Arduino controller board the power source is selected automatically the range for Arduino as 7 – 12 volts**.**

The power pins are as follows:

VIN – the input voltage to the Arduino board when it is using an external power source.

5 volt- the regulated power supply to power the microcontroller and other component on the board.

3.3 volt- regulated power supply by the on-board regulator.

Gnd – ground pins the at mega328 has 32KB.

MOISTURE SENSOR:

This is the input for Arduino controller kit, this device senses the moisture content in the soil and sends the information to Arduino controller board.

WATER-LEVEL INDICATOR:

It is input device for Arduino controller kit here we use 3 transistors as a water level indicator which sense the analog input to the Arduino. They are placed at a3 different levels.

DC MOTOR:

Dc motors an output device use as water pump it take response from Arduino controller kit. We are using 12 v motor 60 rpm.1amp this are the rating of our motor.

GSM MODEL:

The SIM900 is a complete quad-band GSM solution in a SMT module which can be embedded in the customer application.

It is a most important of our project. By which we can send the SMS on the farmers mobile as the input given by the Arduino GSM in global system for mobile communication.

WORKING

- Water level (full); moisture –motor ON
- Water level (medium); moisture-motor ON
- Motor "ON"; moisture –motor OFF
- Motor "ON"; moisture; water-motor OFF

For better understanding our project working is divided into four different cases-

- The first case is –

As we can see in the dual the water level is full and the moisture level in the form is very low. Therefore, to maintain the moisture level in the farm the motor is" ON" automatically and such SMS is sent to the farmers mobile.

- The second case is-

Now, the moisture level is well enough in the farm and the motor is also "ON". So, the motor will get automatically "OFF" in order to avoid wastage water and this SMS will be send to the farmers mobile.

- The third case is-

Now, the water level is very low and still the motor is "ON" whereas the moisture level is less. As the motor is submersible due to low level of water there are chance of getting the motor damage. So, motor will get "OFF" though the moisture level is low.

- The fourth case is-

In all these cases motor gets "ON" and "OFF" automatically according to the situation but if the farmer or the fellow person wants to "ON" & "OFF" the motor. He can do it by sending SMS from his mobile and therefore with the help of Arduino motor will react accordingly.

In this way the system works.

APPLICATIONS

- Irrigation in agriculture fields.
- Irrigation for garden parks.
- Very efficient for Paddy, Rice fields.
- The circuit can be used to measure the loss of moisture in the soil overtime due to evaporation and intake
- The circuit is designed to work automatically and hence, there is no need for any human intervention. so, it can be beneficial to give water to plants at hilly regions or remote locations.

ADVANTAGES
- Increases crop yield and quality while saving on a operational cost and labor.
- Reduce water consumption, optimize use of fertilizer and, minimize energy cost.
- Manage the irrigation process from practically anywhere whether from the office, from home or on the road.
- Immediately, detect any system irregularities and leaks online and receive real time reports (even to mobile phone by SMS) while automated response in taking place.

FUTURE SCOPE

- Other parameter such as ambient Temperature, light intensity and

- Humidity can be measured.
- Pesticides and fertilizer can also be added automatically and in proper portion.
- In India major problem is load shedding if module is used on solar panel will make system efficient. Also, it can save the power and can eliminate the problem of load shading in village.

CONCLUSION

In present days especially farmer is facing major problems in watering their agriculture field it's because they have no idea about when the power is available so that they can pump water. Even after then they need to wait until the field is properly watered, which makes them to stop doing other activities. Here is an idea which helps farmers for watering the crop. Also, this model is beneficial to various large industries, companies, indoor which will increase the sustainability and growth of plants.

REFERANCE

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