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Wet and Dry Land Irrigation System

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Abstract
Agriculture plays an important rolr for develop food production. The objective of our project is to reduce the manual work by the farmer. The purpose of the system is to enhance the water irrigation for the agriculture. The system sense the moisture content of the soil. It automatically switches the pump when the power is on. The soil moistutre is detected by the arduino using soil moisture sensor. If the moisture level of the soil is low, then the pump is switches on and the water is allowed into the field, If the moisture level of the soil is increased, automatically the pump switches off. This is under the control of arduino. By the help of this equipment the water loss is minimised, the manual work is reduced,and it saves the money and time.

Keywords: Auduino, irrigation system, sensors

Introduction

Agriculture is the source to meet continuously increasing demand for food requirement. It plays a major role in production of food. Agriculture uses 85% of available fresh water sources. In agriculture two things are important first to get the information about fertility of the soil, and the second is to measure the moisture content of the soil. Nowadays in agriculture different types of techniques are available which is used to reduce the dependency of rain. A automatic irrigation system does the operation of a system without requiring the manual involvement of the person. The automatic irrigation system with the irrigation will take place only when there will be accurate requirement of water. The automatic system on sensing soil moisture is intended for the development of an irrigation system that switches submerged pumps are on by using this irrigation system is to reduce human interference and ensure proper irrigation

Objectives of the Project

1. To promote uniform growth of crop by providing sufficient water.
2. To save the electricity and water.
3. To ensure safety to the farmers from snake bites.
4. To reduce man power.

Methodology

Equipment required for the Project

Soil moisture sensor.
1. Arduino
2. Relay module
3. DC pump
4. Connecting jumper wires
5. LCD panel
6. Main IC (Integrated Circuit)

- **Working Principal of Each Equipment**

1. Soil Moisture Sensor

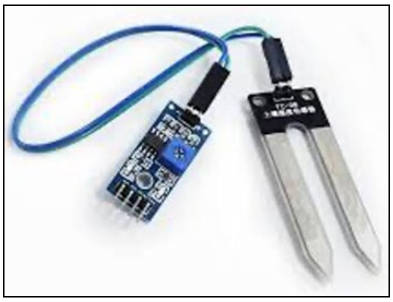

Fig 1

The soil moisture sensor uses capacitance to measure dielectric permittivity of surrounding medium. In soil dielectric permittivity is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity and therefore the water content of the soil.

2. Arduino

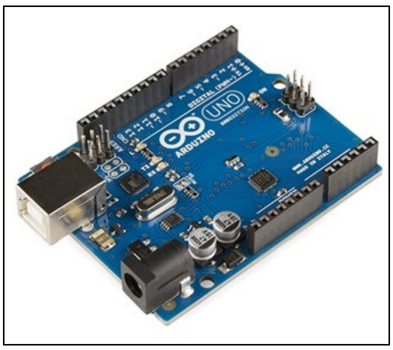

Fig 2:

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Arduino works in a very simple way. It uses three main things to do its job: Inputs: Sensors and switches are connected to the controller to give it information. These are called input.

3. Relay Module

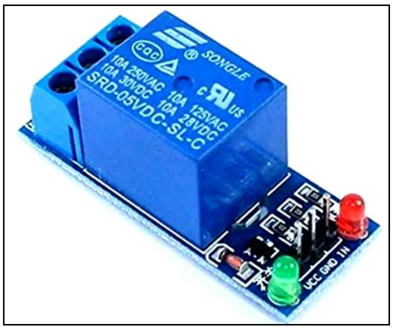

Fig 3

A power relay module is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low-power signal from a micro controller. When activated,the electromagnet pulls to either open or close an electrical circuit.

4. DC PUMP

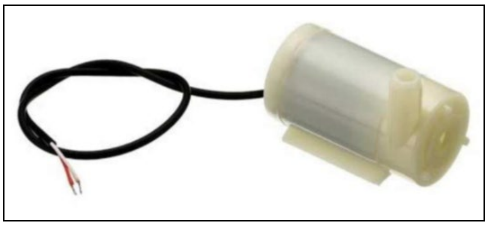

Fig 4

DC powered pumps use direct current from motor, battery, or solar power to move fluid in a variety of ways. Motorized pumps typically operate on 6, 12, 24, or 32 volts of DC power.
Solar-powered DC pumps use photovoltaic (PV) panels with solar cells that produce direct current when exposed to sunlight.

5. LCD Panel

Fig 5:

A liquid-crystal show (LCD) could be a flat-panel display or different electronic visual show that uses the light-modulating properties of liquid crystals. Liquid crystals don't emit light-weight directly. LCDs are accessible to display arbitrary images(as)in an exceedingly, in a very all-purpose pc or laptop display) or mounted pictures with low info content, which may be displayed or hidden, like predetermined words, digits, and 7-segment displays as during a in a very digital clock. They use an equivalent basic technology, except that arbitrary pictures are created from a larger variety of tiny pixels, whereas different displays have larger components.

6. Main IC

Fig 6:

The black thing with all the metal legs is an IC, or Integrated Circuit (13). Think of it as the brains of our Arduino. The main IC on the Arduino is slightly different from board type to board type, but is usually from the A Tmega line of IC"s from the ATMEL company. This can be important, as you may need to know the IC type (along with your board type) before loading up an ewprogram from the Arduino software.

Procedure

1. Connect the Arduino to your computer.
2. Download the attached code and open it.
3. Select your COM Port and your Arduino Board from Tools Option. If you want to change the sensitivity of the sensor for different soil conditions alter the values of the 3 conditions commented in the Code. Connect the Arduino to power supply (5V) via USB or External power source.
4. Dip or bury the moisture sensor in the soil. Better place the sensor near the roots of plants for accurate measurements. Do not short the terminals.
5. Connect the Water pump to the Relay (N/O and Common terminals) and switch ON the mains. Refer the Circuit for connection details and pin out.
   Warning: High voltages. Understand the wiring before you proceed.
6. The temperature sensor can be placed on the PCB itself or on the soil. Do not immerse the sensor in water.
7. The potentiometer can be varied to adjust the LCD brightness.

Result

The same soil test makes irrigation accurate, practical, and simple. Because of the idea shared and its potential for implementation, agriculture can be advanced by accurately monitoring dry soil and water fields in the future. The volumetric water contents, as well as the quantity, are typically not directly determined by moisture sensor output. contribution to the output, The non-inverting input receives a lower positive supply when the soil is dry than when it receives a higher positive supply, which causes the comparator output to be logically low. This instruction is given to the microcontroller. In this circumstance, the microcontroller generates a logic high output that activates a relay driving transistor, turning on the relay and turning on the pump motor.
Thus the water flow is initiated, and as the soil becomes sufficiently moist, the soil resistance reduces, giving the non-inverting input available a voltage higher than the inverting input, causing the comparator's output to be logic high and being supplied to the microcontroller. The pump motor tends

to be stopped in this situation because the microcontroller sends logic low to a transistor, which conducts by turning off the relay.

Conclusion

Soil moisture, humidity, light intensity, temperature, and many other vital characteristics for plant growth can be measured and controlled by using an appropriate algorithm approach when creating a controller-based system. The evaluation's ultimate findings, which are determined after sensing parametric values, must be precise and conclusive. By carefully managing the complexity and offering a flexible method of maintaining the environment, the system has to avoid quite a few major flaws in the current systems. Control systems that we can rely on will produce both quality and quantity of production as a result of ongoing efforts to reduce the costs of hardware and software, expand the use of electronic systems in agriculture, and develop the agricultural control system industry. For application in agricultural production, better, more affordable, and more dependable sensors will be created. Many of these systems have been independently created, and the necessary technology and components are readily available. Additionally, the successful integration of these technologies is not a constant test.

1. **Future Scope**
   The performance of the system can be further enhanced in terms of the operating speed, memory capacity, and instruction cycle period of the controller. The number of channels can be enhanced to interface more number of sensors which is possible by using advanced versions and more effective controllers.
2. The system can be updated with the help of a data logger and a graphical LCD panel showing the measured data over a period of span.
   This system can be connected to communication devices such as modems, cell phones or satellite terminal to enable the collection of recorded data.
3. A multi-controller system can be developed that will be enable to master controller along with its slave controllers to automate multiple greenhouses simultaneously.

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