



Automated Irrigation System Based on Soil Moisture using Arduino

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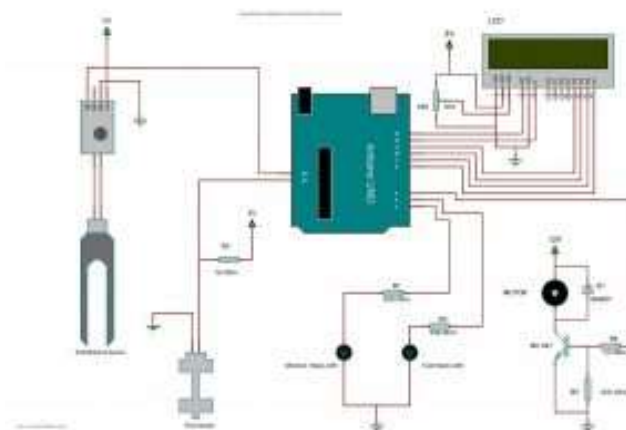
Abstract:

In this project an automation of farm irrigation and soil moisture control by Arduino using soil moisture sensor. This automatic irrigation system senses the moisture content of the soil and automatically switches the pump when the power is on. A proper usage of irrigation system is very necessary because the main reason is the shortage of land reserved water due to lack of rain, spontaneous use of water as a result large amounts of water goes waste. For this reason, we use this automatic plant watering and soil moisture monitoring system and this system is very useful in all climatic conditions.

Introduction:

The main aim of this project was to provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically watering 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. Assimilation is that the artificial application of water to the land or soil It is used to assist in the growing of agricultural crops, 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. As the method of dripping will reduce water losses it became a popular method by reducing the labor cost and increasing the yields. When the components are activated, all the components will read and gives the output signal to the controller, and the information will be displayed to the user (farmer). The sensor readings are analog in nature so the ADC pin in the controller will convert the analog signals into digital format. Then the controller will access information and when the motors are turned On/Off it will be displayed on the LCD Panel, and serial monitor windows. There are many systems are available to water savings in various crops, from basic ones to more technologically advanced ones. For instance, in one system plant watering status was monitored and irrigation scheduled based on temperature presents in soil content of the plant.[1]

Circuit Diagram



Working

An automatic plant watering system using Arduino microcontroller UNO R3 is programmed such that it gives the interrupt signals to the motor via the motor driver module. Soil sensor is connected to the A0 pin to the Arduino board which senses the moisture content present in the soil. Whenever the soil moisture content values goes down, the sensor senses the humidity change, giving signal to the microcontroller so that the pump (motor) can be activated. This concept can be used for automatic plant watering system. The circuit comprises an Arduino UNO board, a soil moisture sensor, a 5V motor pump to run the water pump. You can power the Arduino board using a 5V to 9V wall wart or plug-in adaptor or solar panel. You need a separate 5V to 9V battery for the pump motor.[2]

Advantages:

- Time saving.
- No need Extra work Hard.
- Save Water, Accordingly our Requirement of water, depends upon water level quantity soil and crops.
- Money Saving (Electricity bill+ Water).[3]

Conclusion

Thus the “Automated Irrigation system based on soil moisture using Arduino” has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Thus, the Arduino Based Automatic Plant Watering System has been designed and tested successfully. The system has been tested to function automatically. The moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is goes to be below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler. When the desired moisture level is reached, the system halts on it’s own and the water Pump is turned OFF. Thus, the functionality of the entire system has been tested thoroughly and it is said to of the entire system has been tested thoroughly and it is said to function successfully.[4]

Future Scope

- Sensors like fire detection sensor can be added to safe guard the yield by any fire accidents.
- To avoid top soil erosion, addition of rain gun device can be added to sprinkle the water.
- This system can be developed by using renewable energy which is solar power to run the “single board computer (SBC)” i.e. raspberry pi, using solar energy will help to reduce future cost.[6]

References

[1] <https://www.wikipedia.org/>

[2]. www.fadooengineers.com

[3]. <https://www.slideshare.net/>

[4] <https://circuitdigest.com/microcontroller-projects/iot-based-smart-irrigation-system-using-esp8266-and-soil-moisture-sensor>

[5] <https://www.instructables.com/SMART-IRRIGATION-SYSTEM-Using-IoT/>

[6] <https://www.irjet.net/archives/V8/i6/IRJET-V8I6160.pdf>