AUTOMATIC PLANT WATERING SYSTEM

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Abstract

An adequate water supply is important for plant growth. When rainfall is not sufficient, the plants need additional water. We know that people do not pour the water on to the plants in their gardens when they go to vacation or often forget to water plants. As a result, there is a chance to get the plants damaged. The project I have undertaken is "Arduino Based Automatic Plant Watering System". This project is taken up as India is an agriculture oriented country and the rate at which water resources are depleting is a dangerous threat hence there is a need of smart and efficient way of irrigation. In this project I have implemented sensors which detect the humidity in the soil (agricultural field) and supply water to the field which has water requirement. The project is microcontroller based design which controls the water supply and the field to be irrigated. There are sensors present in each field which are not activated till water is present on the field. Once the field gets dry sensors sense the requirement till the sensors is deactivated again. In case when here is more than one signal for water requirement then the microcontroller will prioritize the first received signal and irrigate the fields accordingly.

Keywords -*Arduino, Irrigation, Soil Moisture Sensor, Agriculture Field, Water, servo motor.*

INTRODUCTION

Agriculture is the need of most of the Indians livelihood and it is one of the main sources of livelihood. It also has a major impact on economy of the country. A major quantity of water is used for irrigation system and therefore 85% of available fresh water resources are used for yielding agricultural crops. This resource of water will decrease day by day and consumption of water will dominate and increase more than 85% in upcoming half century. This is due to the high growth in population due to this tremendous growth in population there is huge demand for food. Agriculture is the main source for food production. Using science and technology we need to implement a method by which there can be limited consumption of water

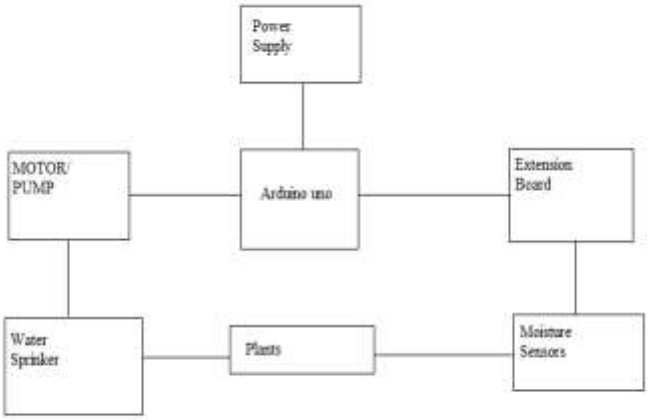
Till date many methods have come into existence where water can be limitedly consumed. A method where monitoring water status and based on status of water

whether it is high or low irrigation is scheduled which is based on canopy temperature of plant, which was captured with thermal imaging. Another method is making use of information on volumetric water content of soil, using dielectric moisture sensors to control actuators and save water, instead of the scheduled irrigation at a particular time of day and supplying water only for a specific duration. This above method just opens the valve and supply water to bedding plants when volumetric content of soil will drop below threshold value. In this paper a use of the second method where sensors are placed and based on that water is supplied to the field and intimated to the farmer using software application. Wireless sensor networks is also called as wireless sensors and actor network, are distributed spatially autonomous sensors to monitor physical or environmental conditions as temperature, pressure sound, moisture etc. and it co-operatively passes these data via network to the main location. WSN is built of few to several thousand nodes, where each node is connected to sensors each sensor network node has typically several parts: a radio transceiver with an internal/external antenna, a microcontroller, an electronic circuit for interfacing with sensors and an energy source such as battery.

BLOCK DIAGRAM & WORKING

There are two functional components in this project. They are the moisture sensors and the motor/water pump. Thus the Arduino Board is programmed using the Arduino IDE software. The function of the moisture sensor is to sense the level of moisture in the soil. The motor/water pump supplies water to the plants. This project uses Arduino Uno to controls the motor. Follow the schematic to connect the Arduino to the motor driver, and the driver to the water pump. The motor can be driven by a 9 volt battery, and current measurements show us that battery life. The Arduino Board is programmed using the Arduino

IDE software. The moisture sensor measures the level of moisture in the soil and sends the signal to the Arduino if watering is required. The motor/water pump supplies water to the plants until the desired moisture level is reached.



Required Tools and Components

- Arduino board
- Serial USB cable
- PCB
- Transistor
- Diode
- Resistances
- Connecting wires
- Moisture sensor
- Servo Motor
- Motor Pump

ARDUINOUNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Fig2: Arduinouno

FEATURE	SPECIFICATIONS
Microcontroller	ATmega 328
operating voltage	5v
Input voltage	6-20v
Digital I/O pins	14(of which 6 PWM output)
Analog I/O pin	6
DC current per I/O pins	40mA
Flash Memory	32 KB (ATmega 328) of which 0.5 KB used by boot loader
SRAM	2KB
EPROM	1KB
Clock Speed	16 MHz

Table:Arduino Specifications

MOISTURE SENSOR

Soil moisture sensors measure the volumetric water content in soil .Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.

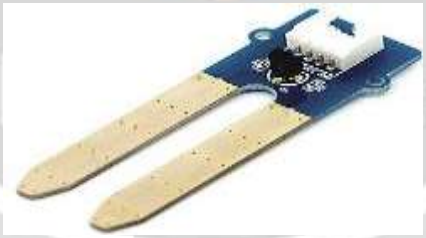


Fig.3Moisture sensor

RESULT

Irrigation becomes easy, accurate and practical with the same soil sample impossible. Because of the idea above shared and can be implemented in agricultural difficulties of accurately measuring dry soil and water fields in future to promote agriculture to next level. The Volumes, volumetric water contents are not usually output from moisture sensor and level system plays major determined directly. Role in producing the output.

CONCLUSION

The primary applications for this project are for farmers and gardeners 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 greenhouses where manual supervision 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 agricultural lands with severe shortage of rainfall, this model can be successfully applied to achieve great results with most types of soil.

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