



Automatic plant watering system with GSM

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Abstract:

Watering the plant is that the most vital cultural practice and one among the labor intensive tasks in daily greenhouse operation. Water is one among the foremost important input essential for production of crops. Watering systems ease the burden of getting water to plants once they need it. Plants need it continuously during in their lives and large quantities. Knowing when and the way much to water is 2 important aspects of watering process. To form the gardener works easily, the automated plant watering system is made. There have a various type using automatic watering system that are by using system, tube, nozzles and other. This technique uses watering system because it can water the plants located within the pots. Deep watering encourages deeper and stronger growth. Therefore, watering the plants about 2 inches once every week is preferable. This project uses Arduino board, which consists of ATmega328 Microcontroller. It's programmed in such how that it'll sense the moisture level of the plants and provide the water when required. This sort of system is usually used for general plant care, as a part of caring for little and enormous gardens. Normally, the plants got to be watered twice daily, morning and evening. Watering the plant is that the most vital cultural practice and one among the labor intensive tasks in daily greenhouse operation.

Keywords: Arduino, GSM, soil moisture sensor, Automatic Watering System, Arduino-Board Sensor, Temperature Sensor

INTRODUCTION:

Irrigation is that the application of controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revalidate disturbed soils in dry areas and through periods of but average. As to how much water do crops need is an inch of water per week, either by rain or watering. In hot weather vegetables need more than that. By using automatic plant watering system we can provide water to plants and set the amount of water to give to plants. It is very useful to people who travel a lot.

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If we set the amount of water to provide the plants we can save water. Studies shows that by using plant watering system we can save up to 50 % water as it consumes 40 to 50% less water as compared to traditional methods. Watering systems ease the burden of getting water to plants once they need it. Knowing when and the way much to water is 2 important aspects of watering process. To form the gardener works easily, the automated plant watering system is made. There have a various type using automatic watering system that are by using system, tube, nozzles and other. This technique uses watering system because it can water the plants located within the pots. This project uses Arduino board, which consists of ATmega328 Micro controller. It's programmed in such how that it'll sense the moisture level of the plants and provide the water when required. This sort of system is usually used for general plant care, as a part of caring for little and enormous gardens. Normally, the plants got to be watered twice daily, morning and evening. So, the micro-controller has got to be coded to water the plants within the garden or farms about twice per day. People-enjoy plants, their benefits and therefore the feeling associated with nurturing them. However for many people it becomes challenging to stay them healthy and alive. To accommodate this challenge we've developed a prototype, which makes a plant more self-sufficient, watering itself from an outsized cistern and providing itself with artificial sunlight. The pro-To type reports status of its current conditions and also reminds the user to refill the cistern. The system automation is meant to beastliness to the user. We hope that through this prototype people will enjoy having plant without the challenges associated with absent or forgetfulness.

PROBLEM STATEMENT:

The continuous increasing demand of food requires the rapid improvement in food production technology. In a country like India, where the economy is mainly based on agriculture and the climatic conditions are isotropic, still we are not able to make full use of agricultural resources. The main reason is the lack of rains & scarcity of land reservoir water. The continuous extraction of water from earth is reducing the water level due to which lot of land is coming slowly in the zones of un-irrigated land. Another very important reason of this is due to unplanned use of water due to which a significant amount of water goes to waste.

LITERATURE REVIEW:

Water conservation: -Includes all the policies, strategies and activities to sustainably manage the natural resource of fresh water, to protect the hydrosphere, and to meet the current and future human demand.

Agriculture: -is the science and art of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago.

Vertical farming :- Is the practice of producing food and medicine in vertically stacked layers, vertically inclined surfaces and/or integrated in other structures (such as in a skyscraper, used warehouse, or shipping container). The modern ideas of vertical farming use indoor farming techniques and controlled environment agriculture (CEA) technology, where many environmental factors can be controlled. These facilities utilize artificial control of light, environmental control (humidity, temperature, gases...) and fustigation. Some vertical farms use techniques similar to greenhouses, where natural sunlight can be augmented with artificial lighting and metal reflectors.

WORKING PRINCEPLE

In This Plant Watering System, Soil Moisture Sensor checks the moisture level in the soil and if moisture level is low then Arduino switches on a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil. Whenever system switched on or off the pump, a message is sent to the user via GSM module, updating the status of water pump and soil moisture. This system is very useful in Farms, gardens, home etc. This system is completely automated and there is no need for any human intervention. The main working principle behind this system is in connecting the soil moisture sensor, which was previously embedded into the plant, to the Arduino microcontroller, which is also connected to other electronic components listed above as shown in Figure 1. Measurement of soil moisture is done by the sensor which forwards the information and parameters regarding the soil moisture to the microcontroller, which controls the pump. If the level of soil moisture drops below a certain value, the microcontroller sends the signal to the relay module which then runs a pump and certain amount of water is delivered to the plant. Once the enough water is delivered, the pump stops doing its work. Power supply has a task to Power the complete system and the recommended voltage should inspect the input supply range for the microcontroller, that is, from 7V to 12V. Relay module is a simple circuit consisting of a single transistor, several resistors, diodes and a relay and it is controlled digitally by microcontroller. Since the complete system should be embedded in a small box, Arduino Nano is a perfect microcontroller for this purpose because of its dimensions and its work performance. Soil moisture module is consisting of the two parts: amplifier circuit and probes. This module has digital and analog outputs, where digital output is set to logical 1 when the threshold is activated. The threshold is set by potentiometer. Analog output gives the real time information regarding the moisture in the plant and this output is used in the system. Water pump is connected to the relay module and it only works when the relay module gets a command from the he microcontroller.

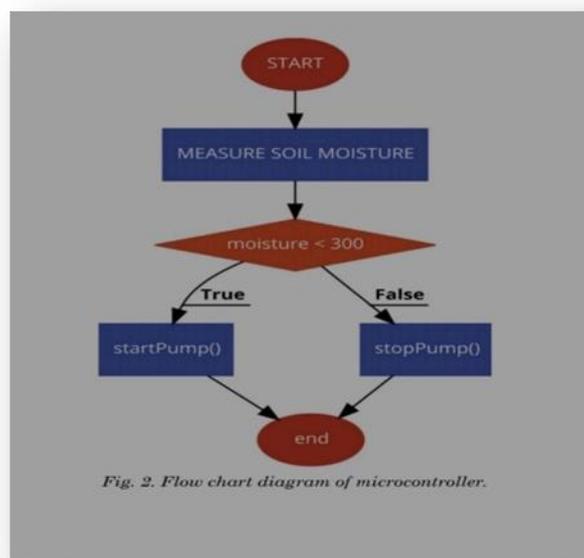


Fig. 2. Flow chart diagram of microcontroller.

Figure 1:- Working Block Diagram

WATER PUMP: -The pump is employed to artificially supply water for a specific task. It are often electronically controlled by interfacing it to a microcontroller. It are often triggered ON/OFF by sending signals as needed. the method of artificially supplying water is understood as pumping. There are many sorts of water pumps used. This project employs the utilization of little pump which is connected to a H-Bridge.

The pumping of water may be a basic and practical technique, much more practical than scooping it up with one's hands or lifting it during a hand-held bucket. This is often true whether the water is drawn from a fresh source, moved to a needed location, purified, or used for irrigation, washing, or sewage treatment, or for evacuating water from an undesirable location. No matter the result, the energy required to pump water is a particularly demanding component of water consumption. All other processes depend or benefit either from water descending from a better elevation or some pressurized plumbing.



Figure 2:- Water Pump

Relay Circuit: - Relay circuit is significant a part of this project as all the mechanical parts of the project are done by relays. Relays work as interfacing between the electronic circuit and mechanical circuit.

The electromagnetic relay consists of a multi-turn coil, wound on an iron core, to make an electromagnet. When the coil is energized, by passing current through it, the core becomes temporarily magnetized. The magnetized core attracts the iron armature. The armature is pivoted

Which causes it to work one or more sets of contacts? When the coil is de-energized the armature and contacts are released. The coil are often energized from a coffee power source like a transistor while the contacts can switch high powers like the mains supply. The relay also can be situated remotely from the control source. Relays can generate a really high voltage across the coil when transitioned. This will damage other components within the circuit. To stop this a diode is connected across the coil.

ARDUINO:-

The receiving side contains a laptop or a smartphone that will allow access to the cloud server in order to see the monitoring parameters and the state of devices. In case a fault occurs on the sender side, the receiver will be notified with a notification on the device using as long as the client is logged in with the unique id.

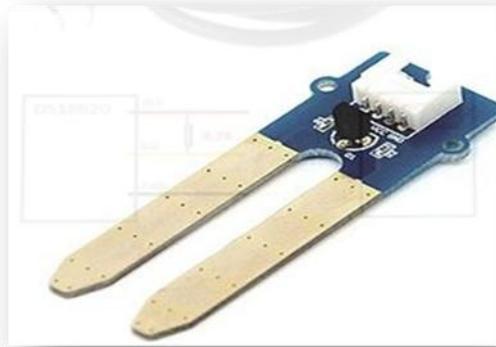


Figure 3:- Arduino Uno

MOISTURE SENSOR:

- Soil moisture sensors measure the water content in soil. A soil moisture probe is made up of multiple soil moisture sensors. Technologies commonly used in soil moisture sensors include.
- Neutron moisture gauges, utilize the moderator properties of water for neutrons.
- Electrical resistance of the soil.
- Frequency domain sensor such as capacitance sensors.

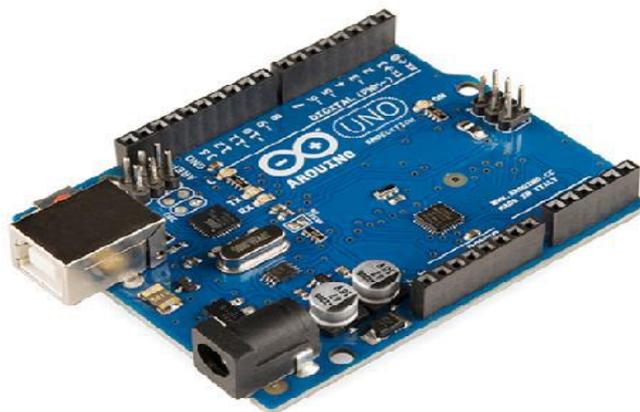


Figure 4:- Moisture Sensor

GSM Modem:-

Short Message Service is GSM techniques to transfer data from distant places such as from one area to the area of the same city or from another city .In our project we are using SMS technique to instant or quick transfer of data or notice to the required destination. It is a convenient facility of the GSM network. A message consisting of a maximum of 160 alphanumeric characters can be send to or from a mobile station. If the subscriber's mobile unit is powered of f or has left the coverage area, the message is stored and offered back to the subscriber when the mobile is powered on or has reentered the coverage area of the network. This function ensures that the message will be received.



Figure 5:- GSM Module

CONCLUSION:

We concluded that when the moisture sensor sense the moisture of the soil if it is less than a particular value then sensor will send instructions to Arduino and Arduino will start the motor after the moisture of soil gain enough water and the moisture of soil increases then the motor stops. When the motor starts the owner gets the message that the motor is started and after it stops again the message is sent to the owner.

ADVANTAGES:

- It reduce the labor intensive work and saves the labor cost.
- With every drop we used, we get more crop.
- We get better quality, early maturity and higher yield.
- We saves water up to 70%.
- Saves more electricity.

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