AUTOMATIC PLANT WATERING SYSTEM

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ABSTRACT

Watering is the most crucial practice and the most labor-intensive chore in everyday gardening or farming operation. You want to be able to manage how much water gets, to your plants regardless of the weather, whether it's too hot and dry or too over cost and damp. Plants could be effectively watered as needed using contemporary irrigation systems. However, two crucial factors must be taken in to account while using this manual watering method. When and how much to water. We developed an autonomous plant watering system to replace manual tasks and simplify the work of gardeners. You can assist all the plants grow their maximum capacity and conserve water by installing an automatic plant watering system in your garden or agriculture area. We have created a system that is perfect. For each plant in the yard using sprinklers, drip emitters or a mix of the two.

For implementation of automatic plant watering system, we have used combination of sprinkler system. Pipes and nozzle. In this we have used microcontroller.

It is design to detect the moisture content of the plants at a specific moment. If the moisture content is below a threshold that has been set in advance based on the specific plants water requirement, the desired amount of water will be delivered until the threshold is reached. Plants often require watering twice day, in the morning and in the evening. Microcontroller is therefore setup to water plants twice daily. The system is setup to notify the user when water needs to be added to the tank and report its current status.

KEYWORDS-*Soil Moisture, Water, Agriculture, Automatic Watering System*

.**INTRODUCTION**

The aim of this project is to create an automatic plant watering systems that can water plants

Based on their needs, rather than on a predetermined schedule. The system will use various

Sensors to detect the moisture levels in soil and then water the plant accordingly. All human benefit greatly from plants in numerous ways, as is well known. By organically purifying the air and creating oxygen, plants contribute to a healthy environment. The presence of plants in the backyard is very popular.

However, due to urbanization and lack of space, many people used to cultivate plants in a mold or pot of dirt that was set on a windowsill. This plant needs standard breeding practices including watering and the correct quantity of sunlight to support life and growth. People frequently forget to water their plants owing to their hectic daily schedules, which cause the plants to become ill and eventually die. The lack of water resources is also the biggest issue facing modern society, as agriculture requires a lot of water and is a labor-intensive industry. The wise use of water resources cannot be stressed enough. In order to handle this task automatically, a system is needed. An automated system for watering plants measures and estimates the existing plant before supplying the water the plant need. In addition to maintaining the health of the plants, it reduces excessive water use.

0BJECTIVE

- The objectives of this project are-
- To design and build an electronic circuit that can detect the moisture level in the soils.
- To connect the circuit to a water pump and solenoid value to create automatic watering system
- To program the system to water the plants at a specific time of the day or when the soil becomes too dry.
- To test the system and ensure that it functions as intended.

MATERIAL REQUIRED

- Arduino board
- Soil moisture sensor
- Water pump
- Relay module
- Jumper wires
- Pipes
- Power supply
- Battery
- Solar panel
- LCD display
- Water tank

METHODOLOGY

The automatic plant watering system works by monitoring the moisture levels in the in the soil using a soil moisture sensor the sensors is connected to an Arduino board that can detect the level of moisture in the soil. Once the moisture level is too low, the Arduino board activated a water pump and solenoid valve to water the plants.

The water pump is connected to a plastic tee connector that is connected to a PVC pipe that runs along the plants. The solenoid valve is also connected to the flow of water to the plants. The system is powered by a power supply that is connected relay module, which control the activation of the water pump and solenoid valve.

The system is programmed to water the plants at a specific time of the day or when the soil becomes too dry. The program is stored on the Arduino board,

and it uses. LCD display to show the watering schedule and the moisture levels in the soil.

ARDUINO BOARD

Arduino consists of both a physical programmable circuit boards (often referred to as a microcontroller) and a piece of software or IDE (integrated development environment) that runs on your computer, used to write and upload computer coded to the physical board.
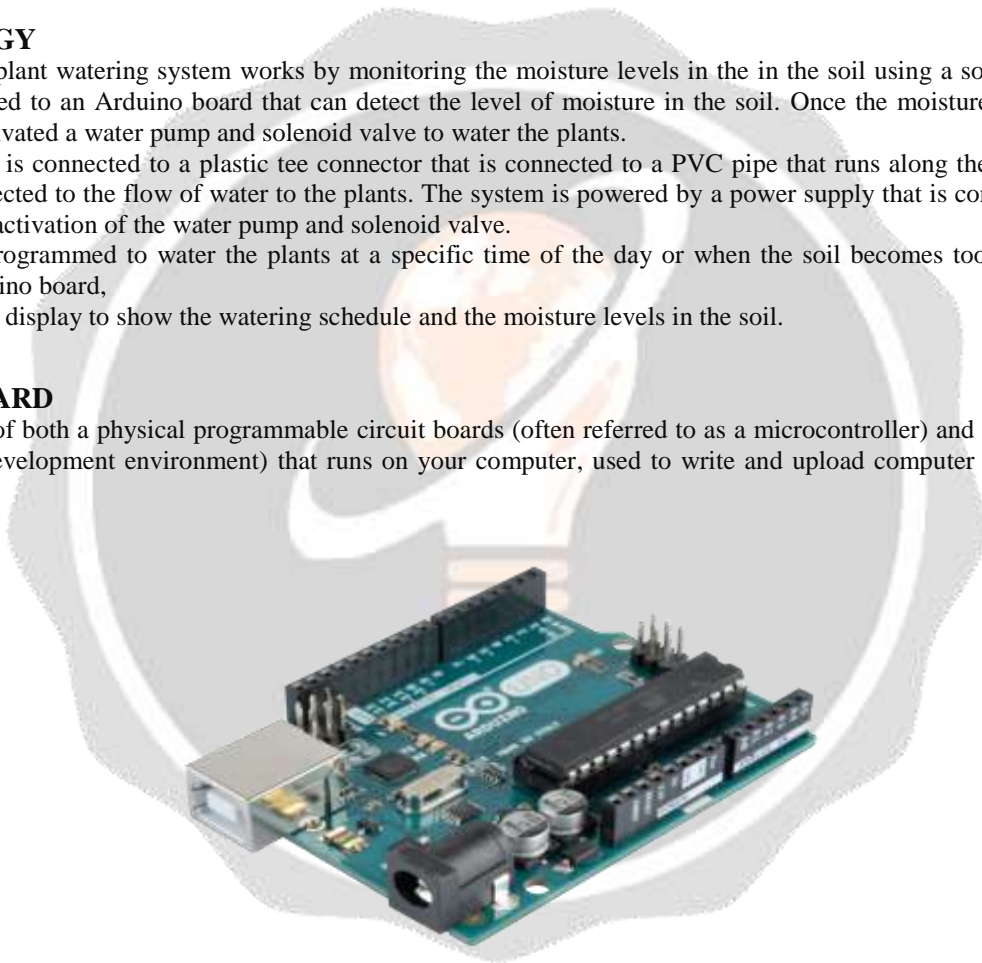

Figure-1

SOIL MOISTURE SENSOR

When you hear the term "smart garden" one of the first thing that comes mind is a system that monitors level of the soil and automatically supplies the necessary amount of water to the plant.

With this system, plants can be watered only when required avoiding over or under watering.

If you want to build such a system, you will undoubtedly require a soil moisture sensor.

Figure-2

WATER PUMP

It can also be utilized in the irrigation needed for agriculture. Water pumps are employed for getting rid of excess water to reduce the down time from large rain events.

Figure-3

RELAY MODULE

Relay module use low-level data signals to switch relays capable of handling load up to 10 Amps. Ideal for devices like PIR detectors and other sensors that output low level signals that need to turn other devices on or off.

Figure-4

SOLAR PANEL

A solar cell panel, solar electric panel, or solar panel, also known as a photo-voltaic module or PV panel, is an assembly of photovoltaic solar cell mounted in frame. Solar panel capture sunlight as a source of radiant energy, which is converted into electric energy in the form of direct current electricity.

Figure-5

BATTERY

A battery is a device consisting of one or more electrical cells that convert chemical energy in to electrical energy.

Battery is a device which store electrical.it stores the 12-volt DC current and used in power transmission. Battery is charged by help of solar energy or the electrical energy.

Figure-6

LCD DISPLAY

We also display the soil moisture sensor values on the LCD 16*2 display. Soil moisture sensor has both digital and analog output.so in this project, we are going to interfacing the sensor in both modes. The soil moisture sensor is used to measure the water content of soil.

Figure-7

WORKING

The logic of this system is very simple. In this system, the moisture sensors sense the moisture level of the soil and when the sensor senses a low moisture level it automatically switches the water pump with the help of a microcontroller and irrigates the plant. After supplying sufficient water, the soil gets retains the moisture hence automatically stopping the pump.
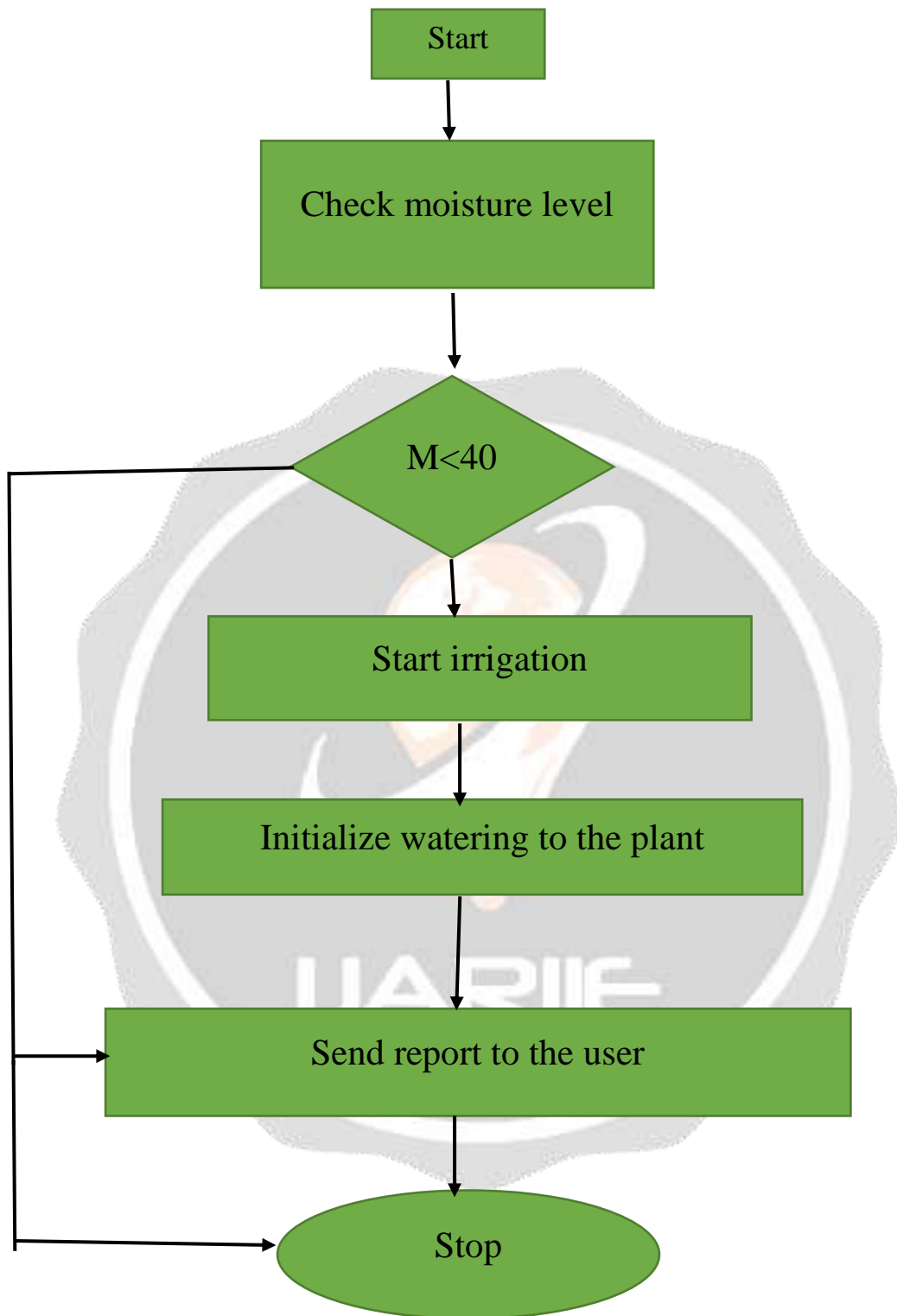
Figure-8   **Figure-9**

ADVANTAGE

- This makes increases productivity.
- Reduce water consumption.
- Reduce man power.
- Much land will be irrigated.
- Time reduces.
- Plant disease, reduce weeds.

DISADVANTAGE

- Costs for purchasing, installing and maintaining the equipment.
- Reliabilty of irrigation system (due to human error when setting up).
- Increased maintenance of channels and equipment to ensure it is working
- properly.

FUTURE SCOPE

The first thing we need to do after completing the demo is, use it in the large scale and control it with WI-FI modules instead of using wires.

We can try using renewable energy sources instead of regular source. Now we need to create an application to a access the system easily and control it from any place.

COST ANALYSIS

Arduino board	1100
Relay module	450
Battery	1200
Jumper Wires	250
Water Pump	450
Pipe	160
Moisture sensors	350
Solar Panel	1400
System board	250
Digital display	450
Bucket	130
TOTAL COST	**6190 (INR)**

RESULT

The automatic plant watering system was successfully built and tested. The system able to detect the moisture level in the soil and water the plants
accordingly. The LCD display shows the watering schedule and the moisture
level in the soil. The system was able to run for an entire day without any issue.

CONCLUSION

The automatic plant watering system is an effective way to water plants based on their needs.   This system can save time and water by only watering the plants when needed. This system is scalable and can be used to water variety of plants. overall, this project was successful in achieving its objectives can be used as a starting point for future improvements.

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