

# Smart Plant Watering System

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**Abstract**—Plants are exposed to many stress factors such as temperature changes, herbivory etc. This project helps to understand the clear plant communication standards. The idea decreases the man power to water the plants and to monitor it. In this IOT based smart plant watering system, we can monitor and control the plant. In this project different modules are used such as IOT, Arduino as controller, soil moisture sensor and a pump for pumping water. Moisture sensor senses the soil whether it is dry or wet. If the soil is dry, the pump starts and the plants are watered and a notification is sent to your mobile.

**Index Terms**— Arduino UNO, Arduino IDE, Soil moisture sensor, Adafruit IO.

## I. INTRODUCTION

Smart Plant Watering System is an automated system for watering the plants. This system helps in conserving both electricity and water. This Smart Plant Watering system also saves the plants from being dried. The technology that is used in this system is IOT i.e., Internet of Things. This system uses Arduino, Soil Moisture Sensor, Arduino IDE software, a 6V pump with a pipe for watering the plants. The soil moisture sensor detects the moisture content from the roots of the plant and the soil. Depending on the moisture content from the server, the pump gets automatically turned on and the plants are watered hassle free and a notification is also sent to your phone when the motor is turned on. This system mainly focusses on budding farmers and terrace gardening.

### A. Related Work

There are many papers related to this project. The base reference for this project is from [1] where the author uses Raspberry Pi, Pi camera and ultra-sonic sensors for constructing the system. This project helps to identify the affected plants.

The paper [2] uses pH sensor to detect the pH of the soil, Flame sensor, DHD sensor, Wifi module, Machine learning and cloud is used to store the data. This project detects the plant health.

In Paper [3] the author uses Soil moisture sensor, Relay switch, Solino id wall, Blynk app. The notifications are sent to blynk app when the plants are being watered. The author uses a third-party app and Internet of things concept in the project.

The paper [4] uses Raspberry Pi, MCP 3008 airlock to digital converter, Hardware SBI Bus. A microprocessor is used in this project to monitor the plants. The author uses Internet of Things concept in this project. In Paper [5] the author uses Sensors, GSM Module, Relay switch. Micro Processor and the technology called IOT i.e., Internet of Things is used to monitor the plants.

## II. PROPOSED SYSTEM AND ARCHITECTURE

### A. Proposed System Methodology

The proposed system contains Soil moisture sensor, Arduino (micro controller), Arduino IDE Software, 6V Pump with a pipe for watering plants. The soil moisture sensor detects the moisture content in the soil. The values from the sensor indicates whether the soil is dry or not. If the soil is dry, the pump gets turned on and the water is pumped. A notification is also sent to your mobile phone when the motor is turned on. Instead of Raspberry Pi, an Arduino is used as its cost efficient. The accuracy of the values from the sensor is high and the durability of the system is also good.

### B. System Architecture

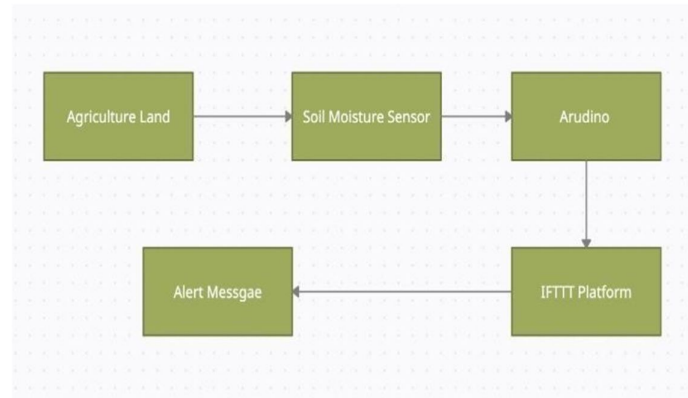


Figure 1. Smart plant watering system architecture

### C. Flow Chart

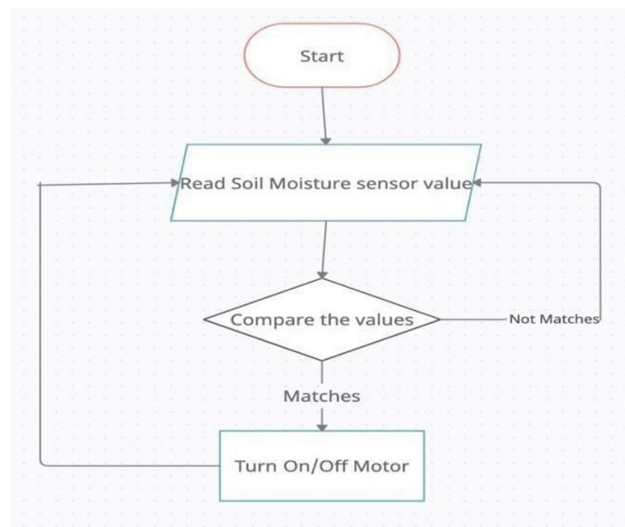


Figure 2. Smart plant watering system flow chart

## III. WORKING PRINCIPLE AND COMPONENTS

### A. Working Principle

**6V Pump:** It works on the Principle Positive displacement principle and kinetic energy and push the water.  
**Moisture Sensor:** It works on the principle of conductivity in non-metallic conductor's dependent on water content.

## B. Components

### Arduino UNO



Figure 3. Arduino UNO Chip

Arduino UNO is a micro controller-based board. It is based on ATmega328P. It is connected to the soil moisture sensor at the port numbers 5V, GND and A0. It is connected to 6V electric pump at the port numbers 4 and GND

### Soil Moisture Sensor

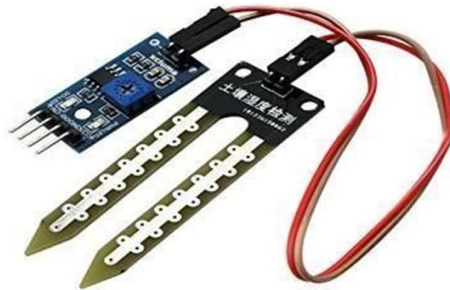


Figure 4. Soil moisture sensor detects moisture

It measures the volumetric water content in soil. It has a sensor board which is connected to Arduino and also has a nail. This nail is inserted in the soil and it measures the moisture content of the soil.

### 6V Pump



Figure 5. 6V DC motor

It is a 6V Direct Current (DC) motor. It is used to pump water from the water storage area only when the soil is dry. When the soil attains its sufficient moisture level, the pump stops watering the plants.

### Jumper Wires



Figure 6. Jumper wires



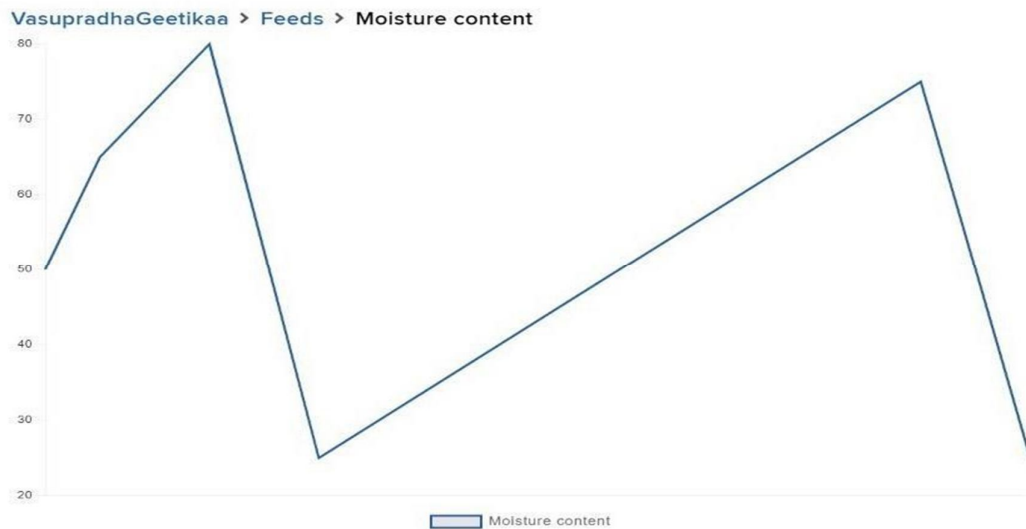


Figure 10. Variation of moisture content in the form of graph

## V. CONCLUSION

This paper deals with the watering of plants automatically using Iot i.e., Internet of Things. Arduino IDE is used to execute the code. IFTTT Platform is used to send a notification to your mobile phone when the motor gets turned on. This is a hassle free smart plant watering system which is easy to use and keeps your plants watered and healthy.

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