

# Plant Watering System

*Mini Project Report submitted in partial fulfillment.*  
*of the requirement for the degree of*  
**T. E. (Information Technology)**

Submitted By

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# CERTIFICATE OF APPROVAL

**For  
Mini Project Report**

This is to Certify that

**Name of the student's:**

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Have successfully carried out Mini Project entitled

**“Plant Watering System”**

In partial fulfillment of degree course in

Information Technology

As laid down by University of Mumbai during the academic year 2021-22

Under the Guidance of  
“Prof. Vinita Bhandiwad”

Signature of Guide

Head of Department

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Dr. S. A. Patekar

# **ACKNOWLEDGEMENT**

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The days we have spent in the institute will always be remembered and also be reckoned as guiding in our career.

- 1. Atharv Khanvilkar**
- 2. Pooja Naik**
- 3. Tanvi Kurhade**

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# **Abstract**

In this project, we introduce automatic plant watering system, which is considered as one of the most commonly used and the most beneficial automated systems nowadays, which help people in their daily activities by reducing or completely replacing their effort. This system uses sensor technology along with microcontroller and other electronics in order to behave like smart switching system which senses soil moisture level and irrigates the plant if necessary. Purpose of this work is to show how someone can easily make own and cheap automatic plant watering system in just few hours by connecting certain electronic components and other materials required. In our experiment, we connected all required materials exactly as shown in this paper, in order to test whether our system will work properly or not. Although the system made in that way would be the most appropriate for home usage as solution for some daily and usual issues, there is a wide spectrum of possibilities of implementing these systems as a long-term solution for many agricultural and medical problems, some of which are undernourishment and air pollution as most prominent, dangerous and important ones.

# **Introduction**

In daily operation related to watering the plants are the most important cultural practice and the most labor-intensive task. No matter whichever weather it is, either too hot and cold or too dry and wet it is very crucial to control the amount of water reaches to the plants. So, it will be effective to use an idea of automatic plant watering system which waters plants when they need it. An important aspect of this project is that: “when and how much to water”. To reduce manual activities for the human to watering plant, an idea of plant watering system is adopted. The method employed to monitor the soil moisture level continuously and to decide whether watering is needed or not, and how much water is needed in plant’s soil. This project can be grouped into subsystems such as; power supply, relays, solenoid valve, NodeMcu, Soil moisture sensor and temperature and humidity sensor.

Essentially, system is design and programmed in such way that soil moisture sensor senses the moisture level of plants at particular instance of time, if moisture level of sensor is less than the specified value of threshold which is predefined according to the particular plant’s water need then the desired amount of water should be supplied till it reaches to the predefined threshold value.

## **Aim & Objectives**

Since nowadays, in the age of advanced technology and electronics, the life style of the human should me smart, simpler, easier and much more convenient. So, therefore; there is a need for many automated systems in human’s daily life routine to reduce their daily activities and jobs. Here an idea of one such system named as automatic plant watering system is very useful. As many people are facing a lot of problem watering the plants in the garden, especially when they away from the home. This model uses sensor technologies with microcontroller in order to make a smart switching device to help millions of people.

In its most basic form, system is programmed in such a way that soil moisture sensor which senses the moisture level from the plant at particular instance of time, if moisture level of the sensor is less than the specified value of threshold which is predefined according to the particular plant than the desired amount of water should be supplied to plant till its moisture level reaches to the predefined threshold value. System involves

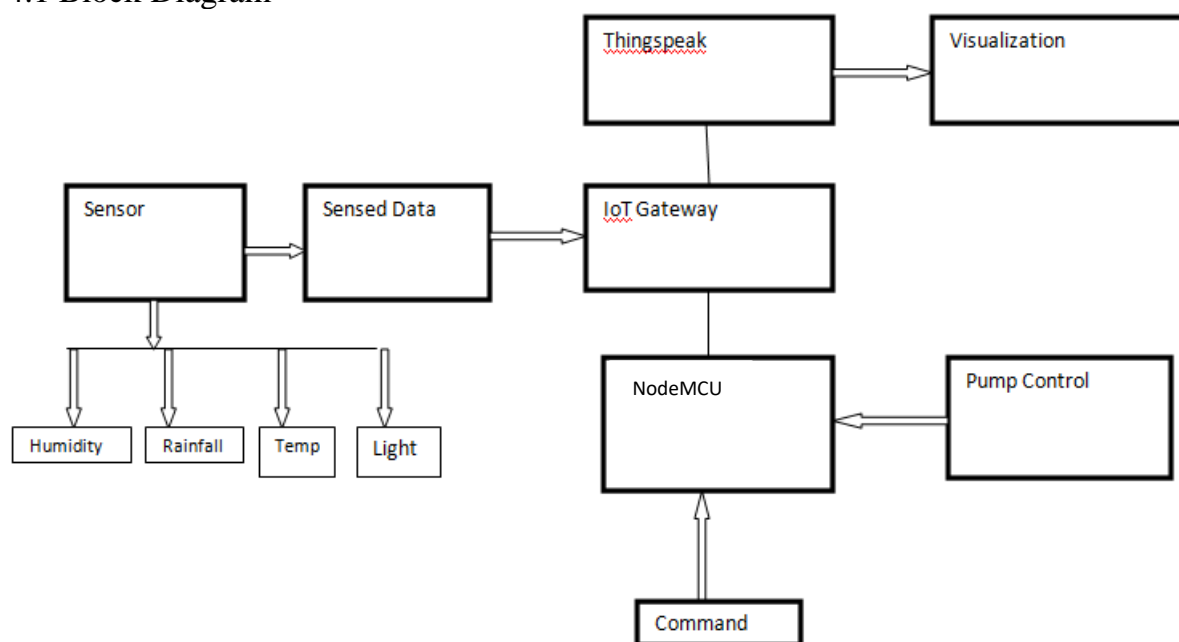
humidity and temperature sensor which keep tracks the current atmosphere of the system and has an influence when watering happens.

## Problem Definition

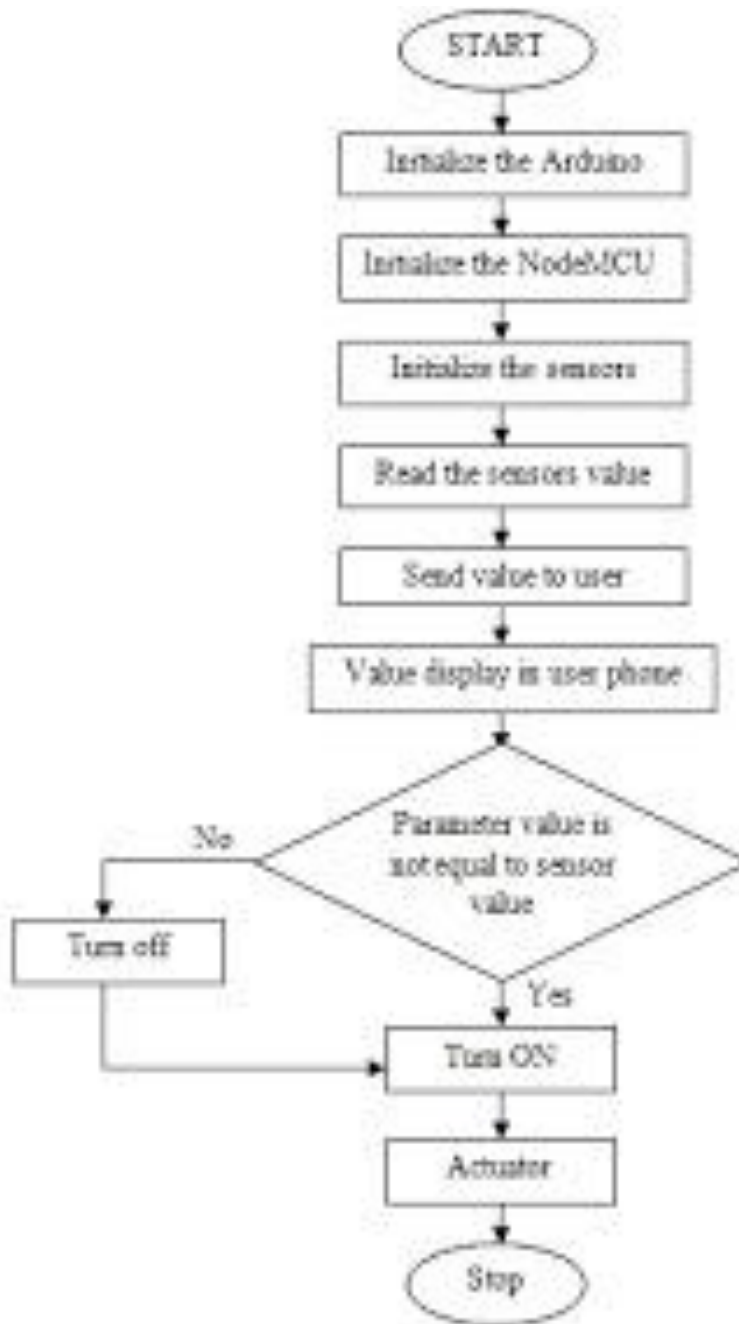
During day-to-day activities may people forget to water their plants or don't have time to pay attention to how much water a plant needs at a particular time. Not providing the right amount of water may prove hazardous to the plant. Hence, we came up with a plant watering system that monitors the soil moisture of the plant, the temperature and humidity of the environment. Using this information, providing the plant with the right amount of water becomes easy.

## Proposed System

### 4.1 Block Diagram



## 4.2 Flowchart





# Components

## 5.1 Hardware

- NodeMCU
- Soil Moisture Sensor
- Temperature Humidity Sensor
- Relay Module
- Submersible Water Pump
- Jumper Wires

## 5.2 Software

- Blynk

# Architecture

Here we are designing plant monitoring and smart gardening system using Iot with the help of a controller NodeMCU. All the parameters of the garden like temperature, humidity, moisture is controlled with the help of sensors like humidity sensor, moisture sensor, temperature sensor is interfaced with the NodeMCU board. And this information about the garden can be directly monitored and controlled by the owner of the garden through his or her mobile phone using Iot. The proposed system is generally for the people who love gardening but are busy in their jobs or day- to- day lives. It is not possible for the people to maintain garden regularly. This will cause improper growth of the plants. This system helps to solve those worries. Thus, by installation of this application on the owner 's smart phone the user can forget about watering the plants on a regular basis. This proposed system takes care of this tedious job. Moreover, this system also tracks humidity, soil and air temperature. It then uploads this information to cloud through the database. Humidity is the presence of water in the air. The presence of water vapor also influences various physical, chemical and biological processes. Humidity measurement determines the amount of water vapor present in the gas. It is the mixture of pure gas such as nitrogen and argon. Soil moisture sensor measures the volumetric water content in the soil. Soil moisture sensor measures the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, for the moisture content as a proxy. The relation between the soil moisture and measured property must be checked and it may also vary depending on environmental factors such as soil type, temperature and electrical conductivity. This sensor is used to detect the moisture of the soil and inform the user through this mobile application.

# Code

```
#define BLYNK_PRINT Serial
#include <OneWire.h>
#include <SPI.h>
#include <BlynkSimpleEsp8266.h>
#include <DHT.h>
#include <DallasTemperature.h>
#define ONE_WIRE_BUS D2

OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);

char auth[] = "CxY6hfhjH0vozkuXn0ViifjCMeeekBap";
char ssid[] = "Terrace home";
char pass[] = "manorama21";

int LED = D3;

#define DHTPIN 2
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
SimpleTimer timer;
void sendSensor()
{
  float h = dht.readHumidity();
  float t = dht.readTemperature();

  if (isnan(h) || isnan(t)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  Blynk.virtualWrite(V5, h); //V5 is for Humidity
  Blynk.virtualWrite(V6, t); //V6 is for Temperature
}

void setup()
{
  Serial.begin(9600);
  dht.begin();

  timer.setInterval(1000L, sendSensor);
  pinMode(LED, OUTPUT);
  Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
  sensors.begin();
```

```

}

int sensor=0;
int output=0;
void sendTemps()
{
  sensor=analogRead(A0);
  output=(145-map(sensor,0,1023,0,100));
  delay(1000);
  sensors.requestTemperatures();
  float temp = sensors.getTempCByIndex(0);
  Serial.println(temp);
  Serial.print("moisture = ");
  Serial.print(output);
  Serial.println("%");
  Blynk.virtualWrite(V1, temp);
  Blynk.virtualWrite(V2,output);
  delay(1000);
}
void loop()
{
  Blynk.run();
  timer.run();
  sendTemps();
}
BLYNK_WRITE(V7) {
  int pinValue = param.asInt(); // Assigning incoming value from pin V7 to a variable
  Serial.print("Pin number: ");
  Serial.println(LED);
  Serial.println(pinValue);
  if (pinValue == 1) {
    digitalWrite(LED, HIGH); // Turn LED on.
  }
  else {
    digitalWrite(LED, LOW); // Turn LED off.
  }
}

```

## **Implementation**

### 8.1 Working

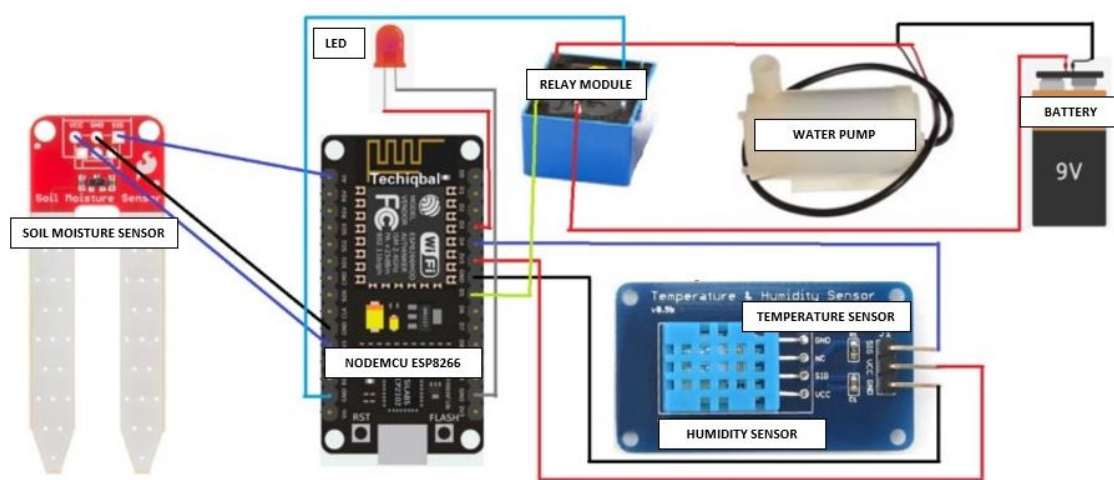
With the help of the plant watering system, we can monitor the moisture level of the soil using a soil moisture sensor along with the temperature and humidity levels of the environment the plant is in using the temperature and humidity sensor (DHT). The project also enables us to control the heat incase the plant is indoors through mobile interface.

For a mobile interface, we have used Blynk app which allows us to view the moisture, temperature and humidity levels and also enables us the control the light (heat) supply for the plant if it is indoor.

The project requires an internet connection as it uses a NodeMCU to connect the sensors to the Blynk app.

When the soil moisture level is low it indicates that the plant needs watering, this can be one by plugging in the water pump to the power supply and supply water to the plant till the soil moisture level is 100.

## 8.2 Circuit Diagram



## Result

As all the testing was done with satisfactory result. The system works with moisture and DHT11 (temperature and humidity) sensor which takes reading according to the current room temperature and humidity. Readings from the moisture sensor in the circuit also depend on what the current moisture level is for the plant. Otherwise, overall result coming out from the circuit in terms of functionality was good for motivation.

## **Conclusion and Future Scope**

From this work, we can control the moisture content of the soil of cultivated land. According to soil moisture, water pumping motor turned on or off via the relay automatically. This saves water, while the water level can be obtained in a preferred aspect of the plant, thereby increasing productivity of crops. Servo motor from vegetation water uniformly dispersed in water, in order to ensure the maximum utilization of absorption through. Thus, there is minimal waste of water. The system also allows the delivery to the plant when needed based on the type of plant, soil moisture, and observed temperature. The proposed work minimizes the efforts of major agricultural regions. Many aspects of the system can be customized and used software to fine-tune the requirements of the plant. The result is a scalable, supporting technology. Using this sensor, we can see that the soil is wet or dry. If it is dry, the motor will automatically start pumping water.