PLANT WATERING SYSTEM

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Abstract-

In this project, we introduce a plant watering system, which is considered as one of the most commonly used and the most beneficial systems nowadays, which helps people in their daily activities by controlling the needs and monitoring the environment of their plants. This system uses sensor technology to record various factors like soil moisture level, temperature and humidity of the surrounding so that the correct amount of water can be provided to keep the plant thriving. 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.

I. INTRODUCTION

In daily operation related to watering the plants are the most important cultural practice and the most labour-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 reaching the plants. So, it will be effective to use an idea of a plant watering system which monitors the requirements and the environment the plants are in which makes watering the plants easy. An important aspect of this project is that: “when and how much to water”. 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 the plant's soil. Along with the soil moisture, the temperature and humidity levels are also monitored as they affect the plant. 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 designed 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.

II. PROBLEM STATEMENT

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.

III. METHODOLOGY

Based on our problem statement, we have created a prototype to implement a plant watering system considering all aspects of small gardens to large crop fields. The main components of the project are NodeMCU, soil moisture sensor, temperature and humidity sensor, water pump and relay module. Using ARDUINO IDE software we can program NodeMCU in such a way that it helps us to water the plants based on the feedback of moisture content provided by the soil moisture sensor. The lower the soil moisture indicates that the plant needs watering. One must typically water the plant until the moisture level reaches its maximum capacity i.e 100. We can use a sprinkler or drip system for irrigation. The moisture, temperature and humidity levels are monitored through the Blynk mobile interface. In case the plant is indoors, the user can adjust the heat through the mobile interface making the experience of growing plants as smooth as possible.

IV. COMPONENTS USED

A. NodeMCU

NodeMCU is an Internet of Things (IoT)-focused open-source Lua-based firmware and development board. It includes software for Espressif Systems' ESP8266 Wi-Fi SoC as well as hardware for the ESP-12 module.The major argument for choosing this is that it is cheap and includes a built-in Wi-Fi module. Because it is similar to Arduino, it can be programmed using the Arduino

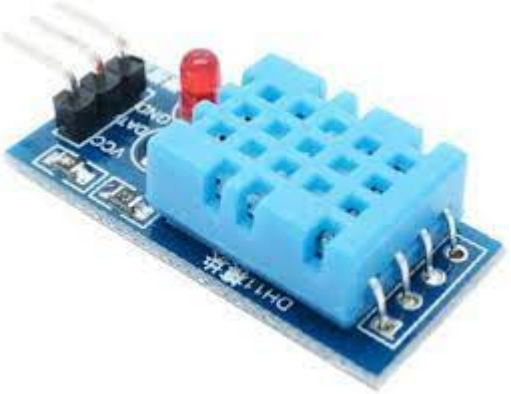
IDE software. It has ten General Purpose Input/Output pins for connecting to external devices. A standard NodeMCU, complete with pin numbers.

B. Moisture Sensor

The Soil Moisture Sensor is a straightforward breakout for determining the moisture content of soil and other similar materials. The soil moisture sensor is simple to set up and operate. The sensor's two big exposed pads serve as probes, and combined they operate as a variable resistor.The greater the amount of water in the soil, the better the conductivity between the pads will be, resulting in a lower resistance and a larger SIGout.

It's commonly used in greenhouses to regulate water supply and other bottle enhancements. Experiments in biology to track the amount of water in the soil.

C. Humidity and Temperature Sensor



Temperature and humidity sensor (or rh temp sensor) is devices that can convert temperature and humidity into electrical signals that can easily measure temperature and humidity. Temperature humidity transmitters on the market generally measure the amount of temperature and relative humidity in the air, and convert it into electrical signals or other signal forms according to certain rules and output the device to the instrument or software to meet the environmental monitoring needs of users.

D. Relay Module

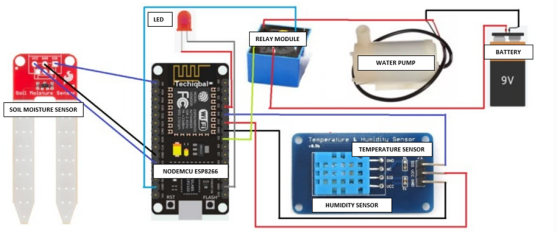
The relay module is an electrically operated switch that can be turned on or off deciding to let current flow through or not. They are designed to be controlled with low voltages like 3.3V like the ESP32, ESP8266, etc, or 5V like your Arduino.

E. Pump & Battery

V. 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 in case 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 and also send the readings to thingspeak.com for graphical visualisation of the three parameters.
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 supplying water to the plant till the soil moisture level is 100.

CIRCUIT DIAGRAM



VI. CONCLUSION

From this work, we can control the moisture content of the soil of cultivated land. According to soil moisture, the 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 utilisation 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 minimises the efforts of major agricultural regions. Many aspects of the system can be customised 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.

VII. ACKNOWLEDGEMENT

We would like to express our deepest appreciation to all those who provided us the possibility to complete this report. We express our profound gratitude to our Prof. Vinita Bhandiwad Ma'am, our respectable project guide, for her gigantic support and guidance. Without her counselling our project would not have seen the light of the day

We extend our sincere thanks to Dr. Vipul Dalal, Head of the Department of Information Technology for offering valuable advice at every stage of this undertaking.
We would like to thank all the staff members who willingly helped us. We are grateful to VIDYALANKAR INSTITUTE OF TECHNOLOGY for giving us this opportunity.

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

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