**Smart Irrigation System**

1. **Sensors:**

(a) Soil moisture sensor:

The soil moisture sensor is used to measure the volumetric water content of soil. It is used to monitor soil moisture content to control irrigation in greenhouses. A moisture sensor is used to sense the level of moisture content present in irrigation field. It has a level detection module in which we can set a reference value.

(b) Temperature and Humidity Sensor

The temperature and humidity sensor is necessary to reduce the watering frequency. That is when the weather gets cooler, less water is needed whereas vice versa in the other case.

1. **Relay Module:**

The relay module is an electrically operated switch that allows you to turn ON or OFF a circuit using voltage and/or current much higher than a Microcontroller could handle. There is no connection between the low voltage circuit operated by the Microcontroller and the high power circuit. The relay protects each circuit from the other. Each channel in the module has three connections named NC, COM, and NO. Depending on the input signal trigger mode, the jumper cap can be placed at high level effective mode which ‘closes’ the normally open (NO) switch at high level input and at low level effective mode which operates the same but at low level input.

### 3. Peristaltic Pump:

A peristaltic pump is a type of positive displacement pump used for pumping a variety of fluids. The fluid is contained within a flexible tube fitted inside a circular pump casing. It is reputed to pump water from a depth of about 31 feet.

**The Model works as follows:**

The results of the moisture, temperature and threshold level can be calculated through the sensors used in the project. Analysis of soil parameters can be done and the needed nutrients can be calculated for the soil. The need of water supply of the soil can be calculated and hence appropriate irrigation is done through smart techniques.

**Featured experimental result and analysis:**

**System configuration:**

This module is used to configure all hardware devices. Soil moisture sensor, Temperature and Humidity sensor, Pump all are connected to major component arduino with Bluetooth connectivity.

**Soil moisture and temperature sensing:**

In this module we analyze the moisture content in the soil and it’s temperature. According to the sensor values further decision are taken.

##### **Send the results on Arduino serial monitor:**

##### Once the values of temperature and moisture are generated on serial monitor. The threshold can also be notified on serial monitor itself. And if result of Moisture, Temperature and Humidity goes below the threshold value the pump will automatically turn ON and if the level of Moisture, Temperature and Humidity increase upto threshold level of field then pump will automatically turn OFF.





