eFSI

DRIP IRRIGATION USING WiFi MODULE

COMPONENTS:

1. ESP8266 WiFi module
2. 12V dual channel Relay
3. DC-DC Buck converter
4. YL-38 moisture meter (soil moisture sensor)
5. DHT-22 sensor (Digital Humidity and Temperature sensor)
6. Solenoid valve
7. CD74HC4067 16:1 Analog Digital Multiplexer

PRINCIPLE:

The ESP8266 WiFi module is interfaced with a soil moisture sensor so as to measure the volume of water inside the soil and give exact moisture level as its output.

WORKING:

1. The 2 probes of the moisture sensor measure the electrical resistance of soil between the two conductors.
2. That electrical resistance is converted proportional to its moisture content.
3. As the ESP8266 module has only one analog pin (A0), it is necessary to use a multiplexer so as to give appropriate sensor value to the module. The select pins select the proper sensor input and connects it to the analog pin of the module.
4. The value of this analog pin is given as input to the ESP8266 module through the multiplexer, where it is further processed.
5. If the moisture content is very low, the ESP8266 controls the Solenoid valve and the sprinkler is turned on in order to water the plants.
6. When the moisture content is enough for the plants, the solenoid valve turns the sprinkler off.
7. When the sprinkler is turned on, the buzzer attached to ESP8266 module beeps twice. Similarly, the buzzer beeps for a longer period only once which indicates that the sprinkler is turned off.
8. If the moisture level is too low, the analog value shown is 1023.
9. All the real time values provided by the sensors are monitored on a mobile through an application.
10. The application is named ‘BLYNK’, and it is used as a user interface for monitoring the system. It displays the sensor values which are sent by ESP8266 through WiFi. Also, the working of solenoid can be controlled manually through the BLYNK app.
11. Simultaneously, the surrounding temperature and humidity is measured using a DHT-22 sensor. It uses a Negative Temperature coefficient thermistor.

12. According to study, higher humidity better is the plant's growth rate, so to keep track of growth of plants DHT sensor is needed.
13. All the values like moisture content, humidity and temperature are uploaded automatically on the Google Sheets with the help of Google Script after every one minute, which further are used for data collection and also for maintaining record.

APPLICATION:

1. Detecting the moisture level in the soil of the agricultural fields and sprinkling water accordingly, hence avoiding excess water wastage and drying of fields.
2. Automated water sprinkling, hence manual work is reduced.
3. Volume of water used can be calculated and logged by saving the water accordingly.

ENHANCEMENTS:

1. Alarms and sirens can be programmed for the soil which is overly or underly moist in the case of extreme or harsh weather conditions.