Report

ABSTRACT

Plant plays a vital role in maintaining the ecological cycle and forms the foundation of a food chain pyramid and thus to maintain the plant's proper growth and health adequate monitoring is required. Hence the aim of making plant monitoring system smart is using automation and Internet of Things (IOT) technology. The main purpose of automation is to provide comfort to the people by reducing the manual work and to improve the overall performance of any system without the user interaction. The important parameters for quality and productivity of plant growth are soil moisture, light intensity and air temperature. Information to the user about the plant health and growth may be provided to the user by continuously monitoring these garden parameters. This project highlights various features such as smart decision making based on soil moisture, temperature and light intensity real time data. And this information about the garden can be directly monitored and controlled by the owner.

2.1 MOTIVATION BEHIND THE PROJECT

In today's busy world, we forget to nourish and water plants that make our home clean and soothing. Think about it what if your plants are able to tell you when they are happy and when they require proper attention. It would be awesome right! Taking this into account we came up with the idea of building a smart plant monitoring system using iot. It checks the moisture content of the soil and the intensity of sunlight falling on plants and the temperature at regular intervals.

2.2NECESSARY SENSORS AND COMPONENTS

Input sensors -Here is a list of all the sensors used in the project

- **Soil Moisture Sensor**

A Soil Moisture Sensor is one kind of low-cost electronic sensor that is used to detect the moisture of the soil. This sensor can measure the volumetric content of water inside the soil. This sensor consists of mainly two parts, one is Sensing Probes and another one is the Sensor Module.

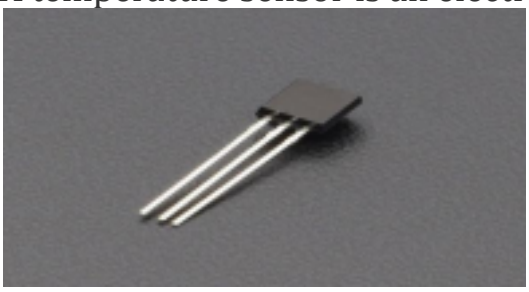
- **Light Dependent Resistor**

Light-dependent resistors also known as LDR's, or photoresistors are electronic

components used where the presence or level of light needs to be detected.

• **Temperature Sensor** (52AB LM35 DZ)

A temperature sensor is an electronic device that measures the temperature of its



environment and converts the input data into electronic data to record, monitor, or signal temperature changes.

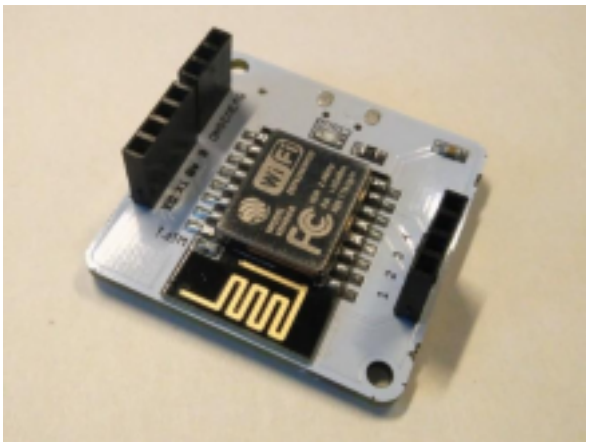
• **Resistor**

Processing unit

- Arduino UNO: Arduino UNO R3 board is used to connect all the sensors (except the push button) and their corresponding actuators in order to process the input from sensors and perform the corresponding actions via actuator.

Cloud computing

- **Iot Bolt**



Bolt is an IoT platform to easily and quickly build products and services. Bolt comes with a WiFi/GSM chip and a cloud platform which helps you connect your devices and sensors to the Internet. With Bolt Cloud you can control and monitor them over the internet, create personalized dashboards to visualize the data, monitor the device health, run machine learning algorithms and lot more. Build scalable IoT systems in just a days' time.

2.3SOFTWARE TOOLS USED

The software used for this project was the Arduino IDE. The IDE allows user written code to be uploaded onto the boards. This IDE is an open-source software that is compatible with most boards. The initial setup for a board is simple. We connect the board to our computer on which we have installed the IDE. In the tools section, we can choose the board we have connected and choose a particular port that will be shown in the port's menu. Once we have finished the setup, we can disconnect the board, make the required connections and write the appropriate code. Later we connect the board, verify the code and upload it to the board.

2.4WORKING PROCEDURE

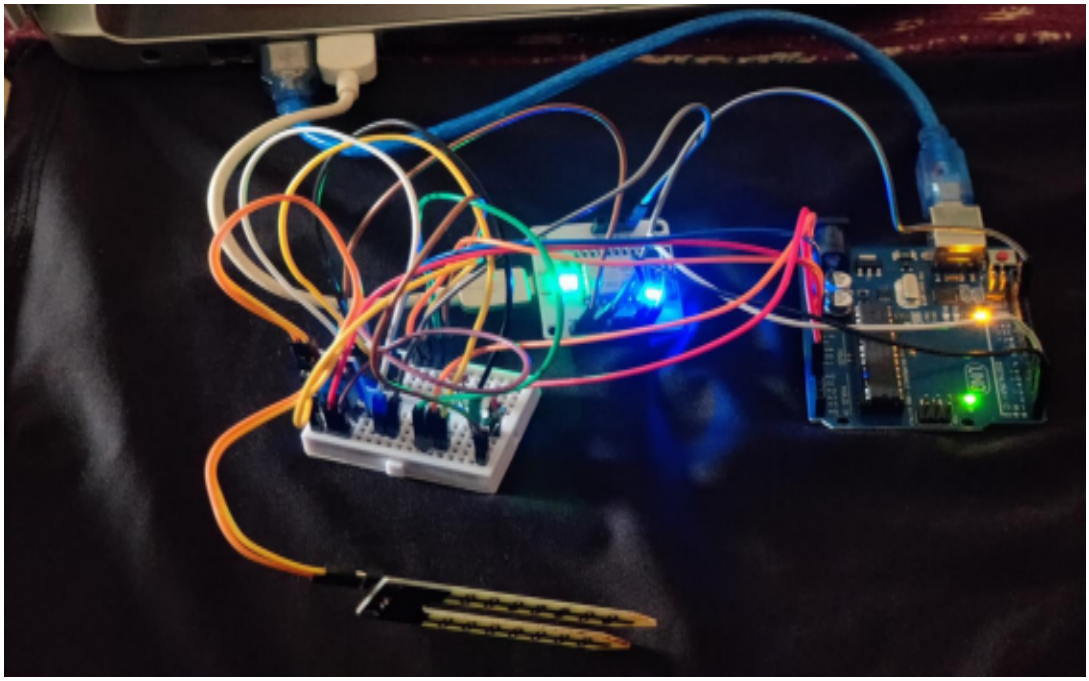
SOIL MOISTURE SENSOR: A resistive soil moisture sensor works by using the relationship between electrical resistance and water content to gauge the moisture levels of the soil. You'll observe these sensors to possess two exposed probes that are inserted directly into the soil sample. A electrical current is sent from one probe to the other, which allows the sensor to measure the resistance of the

soil between them. Here the soil moisture sensor is connected to the A0 analog pin of the uno Arduino board then the reading is taken from the sensor and given to the map function and the moisture percentage is displayed. As the power shoots up initially, the value may or may not be represented in degree Celsius. When the water content in the soil is high, it has a higher electrical conductivity . Hence, a lower resistance reading is obtained which indicates high soil moisture. When the water content in the soil is low, it has poorer electrical conductivity. Hence, a higher resistance reading is obtained, which indicates low soil moisture. Using this mechanism soil moisture levels are calculated.

TEMPRATURE SENSOR: In our system we have used the temp sensor to detect the temp at which the plant presently is. temperature is one of the critical factors significantly determining plant growth and development. A reduction in temperature below the optimal conditions often results in suboptimal plant growth. A different cultivator requires a different temperature level for the photosynthesis process and growth, which can advance the plant growth stage. In the plant system, the optimum growth temperature should not be more than 4°C and less than 30°C, respectively, for successful plant growth. In our circuit the temp sensor is connected to the A1 analog pin of the uno Arduino board and the value taken through this sensor is divided by light intensity value that is 1024 and this is how the temp value is record for the system.

LIGHT DEPENDENT RESISTOR(LDR): We have used light dependent resistor to measure the light intensity that the plant is in. Here we connect one end of the LDR to the A2 (analog) pin and other ends of the LDR to the 5V pin of the Bolt. Connect the ohm resistor between the GND and A2 pin of the Bolt so that LDR and the resistor form a series connection. Here we have used the principle that whenever the light falling on the sensor changes, the resistance of sensor changes which is then converted into a change in voltage. We connect the LDR between 5v pin and the analog input pin (A2), so that when light intensity increases, the resistance of LDR decreases so the voltage across the LDR decreases and as a result, the voltage on the analog input pin increases. This means that as the light intensity increases, the voltage on the analog input pin also increases. The Bolt then converts that voltage into a 10bit digital value that varies from 0-1024 (0 to 2 raised to 10). This digital data is then sent to the cloud where it is plotted for visual representation.

CIRCUIT



CH 3: CONCLUSION

3.1CONCLUSION

Plant monitoring system using IoT with the help of a Arduino uno and cloud iot bolt helps to ease the most tedious job of gardening for plant lovers who are in a time of rush. This system monitors various garden parameters and inform the user about the details of garden. It also helps to solve many issues occurring in the existing plant watering and gardening system. It helps to save water and utility bills. The user can control and monitor the environment of the garden using the android application. The main advantage of the smart gardening of the smart gardening system is that the user can monitor the garden using the internet from far distances.