CS226 - MINI PROJECT PART - II REPORT

SOIL MOISTURE, TEMPERATURE AND LIGHT READING SENSOR PROTOTYPE

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ABSTRACT

This project is an application which gives out values like soil moisture, humidity, temperature and light. This project is a combination of 4 different applications which can be seen. The project can be utilized as to know when to water a plant and other information.

IDEA

The basic idea initially was only about soil moisture. But later it was thought to work over few other aspects of it too. Knowing these characteristics of soil helps us in maintaining the health of the plants.

WHAT WAS USED

A soil moisture detector (FC28), Temperature and Humidity Sensor (DHT11) and an LDR Sensor were used in carrying this out. An arduino was used as an interface.

FC28: The soil moisture sensor consists of two probes that are used to measure the volumetric content of water. The two probes allow the current to pass through the soil, which gives the resistance value to measure the moisture value.

When there is water, the soil will conduct more electricity, which means that there will be less resistance. Dry soil conducts electricity poorly, so when there is less water, then the soil will conduct less electricity, which means that there will be more resistance. This sensor can be connected in analog and digital modes

DHT11: The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings can be up to 2 seconds old.

LDR: An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

When the light level decreases, the resistance of the LDR increases. As this resistance increases in relation to the other Resistor, which has a fixed resistance, it causes the voltage dropped across the LDR to also increase. When this voltage is large enough (0.7V for a typical NPN Transistor), it will cause the Transistor to turn on.

The value of the fixed resistor will depend on the LDR used, the transistor used and the supply voltage.

Arduino UNO: It is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

WHAT WAS DONE

The model's soil moisture sensor is put into the soil so as to find the moisture of the soil. The temperature and humidity are given by the DHT11 sensor and the light reading is given by the LDR. An Arduino UNO was used as an interface for the model to work. The source code for this model is attached along with this document. The output of the code is displays the digital values of moisture, temperature, humidity and light reading as a percentage (between 0 and 100). This can further be developed to get these values onto the mobile phone using a Bluetooth or Wi-Fi modules.

THE OUTPUT

The output is taken for six different values of measurement as follows:

1. Temperature < 19 => It's really cold here. Can you turn the heater on?
2. Temperature > 35 => It's warm over here. Gimme some AC.
3. Moisture > 70 => Flooding over here. Water Out?
4. Moisture < 20 => Thirsty Mister. Hand me some water.
5. Light < 40 => I think it's dark for a while now. Give me some sunshine.
6. Otherwise => I'm happy right now. All cool.

CONCLUSION

The project is a prototype which gives out the values of moisture, temperature, humidity and light. The LED glows when there is scarcity or excess of any requirement under the cases mentioned above.