

CLASSIFICATION OF SOIL CONTAMINATION

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Abstract: The analysis aim was to the study the intelligent soil wetness system in agricultural inexperienced house supported Adriano Uno microcontroller automation management. This type of intelligent soil wetness system helps to manage the wetness level of the sphere and provide the water if needed. during this analysis embedding a sway system into AN automatic pump controller rely upon the wetness of the soil. This method conjointly ability to find the amount of methane series gas within the inexperienced house. The intelligent soil wetness system in agricultural inexperienced house designed within the analysis had rattling effort of man-machine interface, it's terribly straightforward, cheep and convenient high degree of automation system. Not solely that this method helps to forestall wastage of water. this method may be a model, that makes this self-sustaining, watering itself from a reservoir. Solar power is employed during this system makes it additional surroundings friendly.

Keywords: Arduino Uno Microcontroller, Soil wetness sensing element, attach Wires, Bread Board.

1. INTRODUCTION

India is a country where majority of our population are dependable on the agriculture to live their daily life. This project made automatic field monitoring & controlling system that can be utilize to improve the condition of green houses. In this modern technological era poor farmers of India cannot get enough assistance from others to help them with technology and make their work easier. The soil moisture sensor consists of two probes that measure the volume of water in the soil. The two probes allow the electric current to pass through the soil and, according to its resistance, measures the moisture level of the soil. Arduino Uno microcontroller is the main controlling unit of whole system. This system performed the following task:

1. To determine the efficiencies of moisture measuring instrument.
2. To determine the temperature of the soil.

Soil is natural body consisting of layers that are primarily composed of different materials. Soil moisture content is an important factor of influencing crop's growth. It is very important that the moisture content is measured. Soil moisture content is the single most important factor determining plant growth. The moisture measuring devices are programmed such that they detect arrange of moisture content. No resource will be more precious to agriculture in the future than water. Soil contamination is characterized by solid or liquid hazardous substances mixed with naturally occurring soil. Soil contamination can arise from number of sources, which could be both naturally occurring in soil and manmade.

Hardware Requirements:

The basic components of our projects are ATmega328p microcontroller, LM35 temperature sensor, Moisture sensor, Hook up Wires, Bread Board.

1. LM35 Temperature Sensor

The temperature sensor is used to sense the temperature in the field and its output voltage is proportional to the centigrade. The LM35 sensors have low output impedance, linear output and precise inherent calibration makes interfacing to the control circuitry easy. It is shown in figure 1.

Minimum and Maximum Input Voltage is 35V and -2V respectively. Typically 5V. Can measure temperature ranging from -55°C to 150°C



FIG 1: Temperature Sensor.

2 Soil Moisture Sensor :

A typical Soil Moisture Sensor consist of two components. A two legged Lead, that goes into the soil or anywhere else where water content has to be measured. This has two header pins which connect to an Amplifier/ A-D circuit which is in turn connected to the Arduino. shown in figure 2.

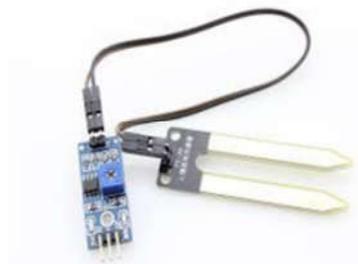


FIG 2: Soil Moisture Sensor

3 Arduino Uno:

The Arduino Uno is a microcontroller is shown in figure 3 that has 14 digital input-output pins, 6 analog inputs, 16 MHz ceramic resonator. It is connected with a computer with the help of a USB cable or powers it with ac to dc adapter or a battery for power supply.

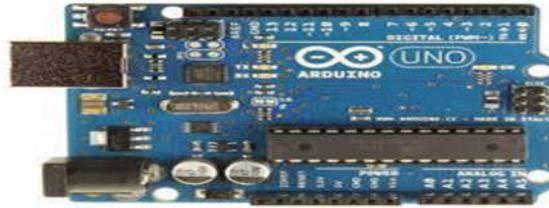
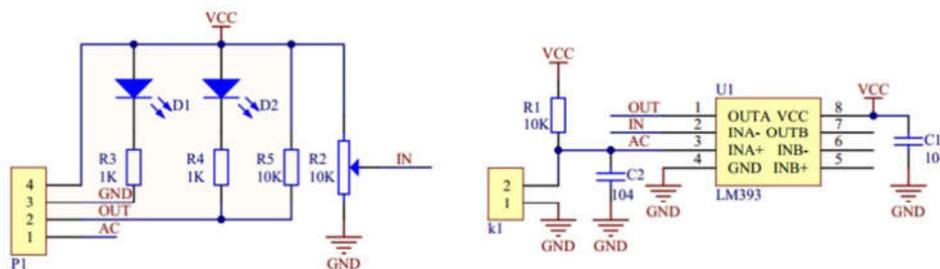


FIG 3: Arduino Uno microcontroller.

2. OBJECTIVE

Following are objectives are set for the implementation. To determine the efficiency of wet instrument. To calibrate sensors, insulator probe to live wet content. Provide index of nutrients accessibility of soil. Estimation of the accessible nutrients standing of soil. Determination of acidity, salinity and pH scale of soil and analysis of suitability of the soil.

3. OPERATING THE SENSORS

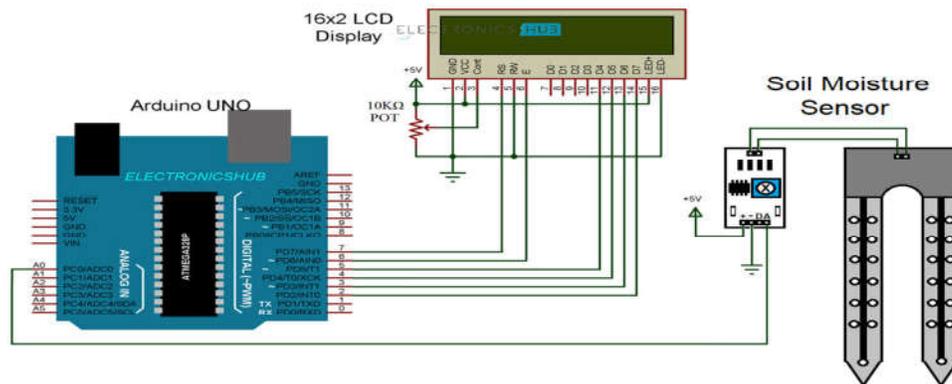


The operating of the Soil wet detector is extremely straightforward. It works on the principle of voltage comparison. The subsequent circuit are useful in understanding the operating of a typical soil wet detector. As you'll see, one input of the comparator is connected to a 10K Ω Potentiometer whereas the opposite input is connected to a potential divider network fashioned by a 10K Ω electrical device and therefore the Soil wet Probe. Based on the number of water within the soil, the physical phenomenon within the probe varies. If the water content is a smaller amount, the physical phenomenon through the probe is additionally less and thus the input to the comparator are high. This suggests that the output of the comparator is HIGH and as a result, the semiconductor diode are OFF. Similarly, once there's adequate water, the physical phenomenon of the probe will increase and therefore the output of the comparator becomes LOW. The semiconductor diode then starts glowing.

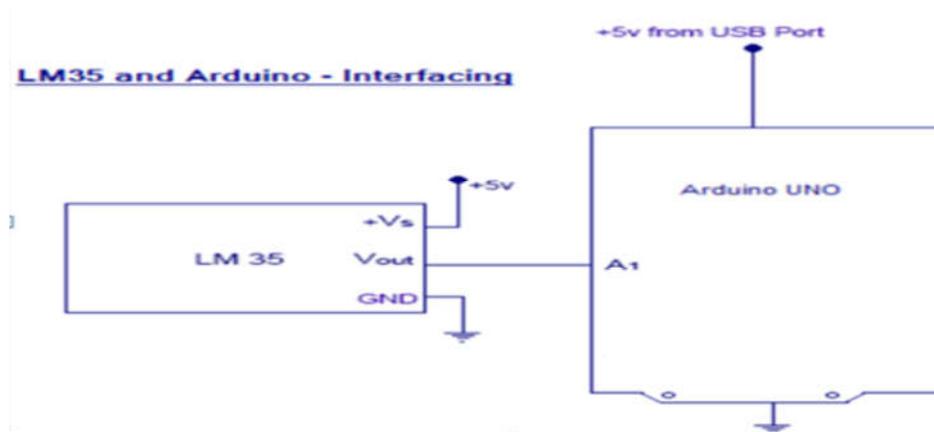
4. METHODOLOGY

Now that we've seen however a typical soil wet detector works, let ME take you thru the steps of Interfacing Soil wet with Arduino. the most advantage of this soil wet module is that you simply will get the analog output from it. By exploitation this analog signal and giving it to the Analog IN of Arduino, you'll exactly calculate the share of wet within the soil. coming back to the setup for testing the project, I even have went to plastic cups crammed with soil from my garden. the number of water in every cup is quite the previousone.

Circuit Diagram:



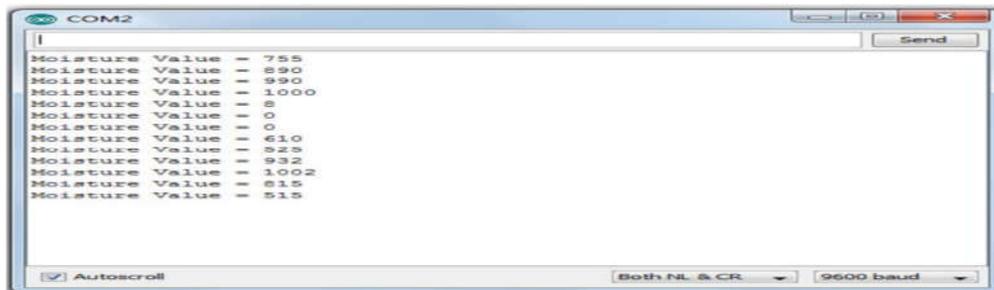
For temperature detector: to create our temperature sensor circuit with Arduino Uno Connect Arduino Uno GND to LM35 GND. Connect Arduino 5V pin to LM35 pin one. Program and skim the detector. transfer and open the connected ASCII text file on Arduino IDE. transfer the sketch and skim the detector output on Serial Monitor.



5. RESULT

Efficient results are obtained from the subsequent project. Table one shows the recorded knowledge at field in many days. The hardware implementations are roaring and that they are reliable and therefore the sensors that we have a tendency to exploitation are giving smart results and playing to the expectations.

Date & Time (11.30 am)	Atmospheric Temperature	Soil Temperature	Soil Moisture (%)
25/03/2020	29	28	32
26/03/2020	28	27	30
27/03/2020	30	29	28
28/03/2020	32	31	26

Output:

This is Computer screen on which the output will be displayed like this. As we insert the moisture detector in the soil sample the moisture level of the soil will get instantly get displayed on the computer screen.

6. APPLICATIONS & FUTURE SCOPE

A Soil Moisture Sensor has many applications, especially in agriculture. Irrigation is a key factor in farming. Detecting the amount of moisture and temperature in the soil and turn on the system when the moisture level falls below a certain predefined value helps to avoid a lot of wastage of water and human resources. These kinds of sensors make automation of farming easier. This is also used in controlled environments where experiments are conducted.

Soil moisture sensor can be designed according to the various types of soil. A database can be formed. It can be used to determine the types of acids, alkalis or salts present in the soil. Salinity of soil can also be calculated by correlating it with the output voltage. Wireless transmission of the output data directly to the user can be done using Zigbee or Bluetooth. We can get the values from stored data base in PC so that the moisture holding capacity of the soil can be determined.

7. CONCLUSION

The soil wet response observation system designed is extremely straight forward to grasp and handle. It will be operated by all age-groups of farmer. It are often reprogrammable to add a lot of options. The wet is measured up to the foundation zone of the crop. so it are often wont to check the wet worth for any crop. detector are often placed vertically in the soil to examine the depth of irrigated water and conjointly it will be placed horizontally at completely different heights in the

soil consistent with the crop. it's user friendly and may be employed by uneducated farmers. The wet is checked in the morning and the evening and it is found that wet is linear up to 20%VWC (volumetric water content) and after output voltage becomes virtually constant

8. REFERENCES

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