Smart Agriculture Management Using IoT

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***Abstract*:- In today's world agriculture plays a vital role. Soil nutrition is an important factor in agriculture. Hence it is necessary to maintain the soil contents.Our project mainly based on sensors which are dipped in the soil to identify the type of nutrient present in the soil hence it is easy for the farmers to find the type of plant that can grow in that soil. These sensors are also used to identify the temperature and moisture present in the soil with the help of internet. Mineral sensors, temperature and moisture sensors are used for this purpose. The output of the sensors is connected to the arduino and its output is connected to the wifi module through the Ethernet shield and the nutrient content of the soil is obtained. These sensors are also fitted on the cultivator sweeps of the tractor so that these sensors can be deeply inserted inside the soil to find the nutrient content of the soil. The main objective of our project is to reduce the risk of the farmers and it is the easy way of testing the nutrient content in the soil. The structure of this project is simple. Thus this equipment produces a great deal in the field of agriculture making farmers simply dependent on themselves.**

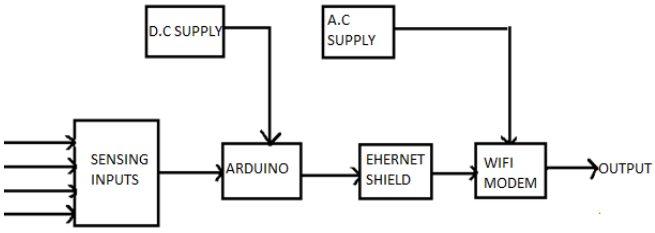
INTRODUCTION:

Soil is the most important renewable natural resources. It is the medium of plant growth and supports various types of living organisms on the earth. Soil fertility refers to the amount of nutrients in the soil, which is efficient to support plant growth. The nutrients present in the soil are sulphur, chlorine, copper, manganese, boron, iron, cobalt, zinc, potassium, phosphorous, nitrogen etc. They are required for the plant growth. By using the mineral sensors it is able to identify the nutrient present in the soil. The temperature and moisture content also plays the major role in plant growth. By using temperature and moisture sensors it is easy to find the temperature and moisture content. By determining nutrients and moisture content it is easy for the farmers to identify the type of plant which is suitable for that soil. It improves the efficiency of the plant growth and reduces the risk of farmers.

COMPONENTS USED:

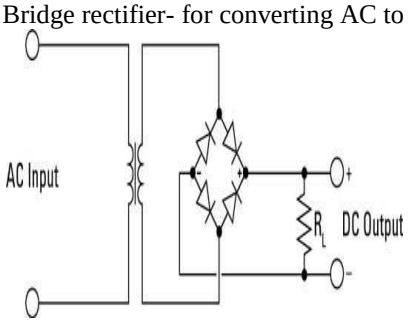
- power supply and regulator
- a set of mineral sensors
- temperature and moisture sensor
- arduino controller
- Ethernet shield
- wi-fi module

BLOCK DIAGRAM:



POWER SUPPLY:

- Step down transformer-230v to 12v.
- To power a microcontroller and other elements, DC source is required.
- Bridge rectifier- for converting AC to DC.



SENSING UNIT:

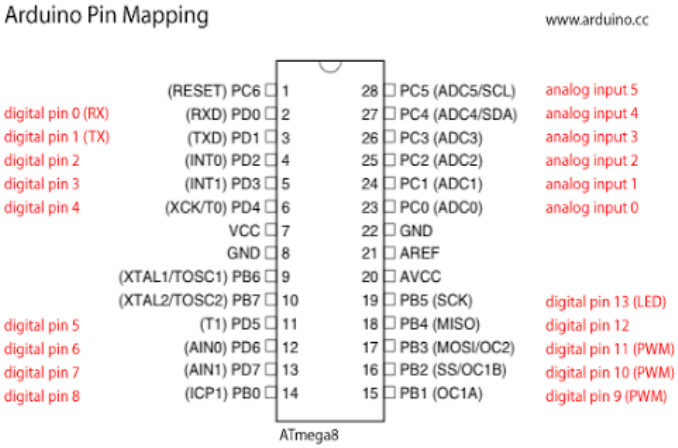
- The Electrochemical sensor comprises of electrode wires.
- The wires (rods) are inserted in the growing medium. It interacts locally with the medium.
- It provides conduction path depending upon the mineral content in the soil.

ARDUINO:

- Arduino is an open-source electronics platform based on easy-to-use hardware and software.
- Program can be directly loaded.

The Arduino Ethernet Shield allows to easily connect the Arduino to the internet.

PIN CONFIGURATION:

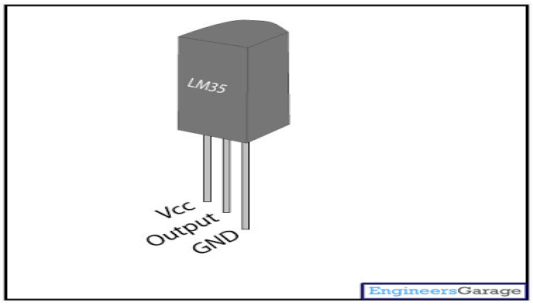


- 28-pin
- 14-digital pin
- 6-pin analog input
- 2-connect to ground(8,22)
- 1-connect to supply(7)
- 1-connect to reset(1)
- 1-AREF (reference voltage for the analog input)
- 2-pin crystal oscillator(9,10)

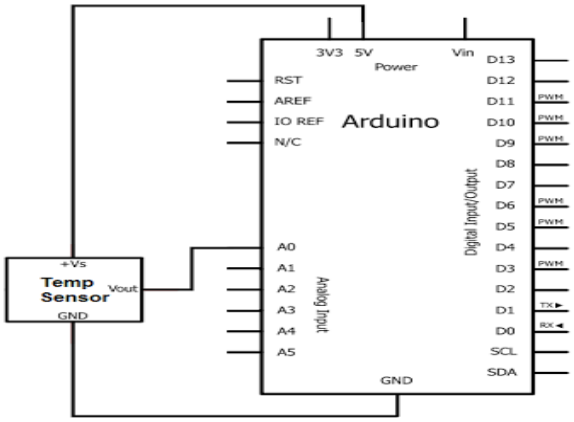
ETHERNET SHIELD:

- The Arduino Ethernet Shield 2 connects your Arduino to the internet. Just plug this module onto your Arduino Board, connect it to your network with an RJ45 cable requires an Arduino Board (not included).
- Operating voltage 5V (supplied from the Arduino Board).
- Ethernet Controller: W5500 with internal 32K buffer.
- Connection speed: 10/100Mb.
- Connection with Arduino on SPI port.

LM35 TEMPERATURE SENSOR:

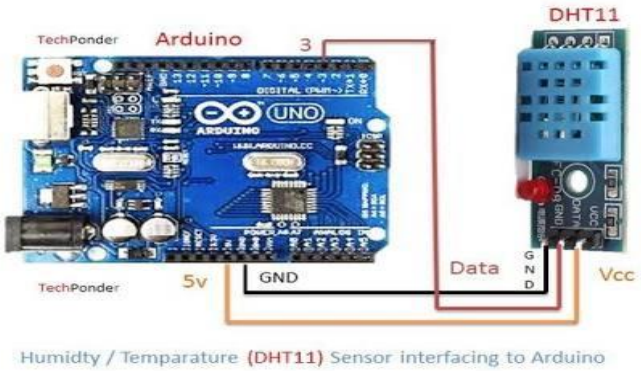


LM35 TEMPERATURE SENSOR INTERFACE WITH ARDUINO:



Features of LM35 Temperature Sensor:
Low cost
Calibrated directly in Degree Celsius
Rated for full -55°C to a 150°C range
Suitable for remote applications
Operates from 4 to 30 volts
Low self heating. Low impedance output, 0.1Ωfor 1 mA load

MOISTURE SENSOR:



Humidty / Temparature (DHT11) Sensor interfacing to Arduino

Soil Moisture Sensor Probe Features are Extreme low cost Not conductivity based. Probe does not corrode over time. Small size. Consumes less than 7mA for very low power operation. Output Voltage is proportional to moisture level. Can be buried and is water proof.

Potassium:

- The Potassium Ion-Selective Electrode makes the measure of potassium ions portable. When used with a Vernier Lab Quest 2, the Potassium ISE can be used to take readings in the field – at lakes or streams.
- Because it is a stick-style sensor
- Ion-Selective Electrodes require good chemical technique and careful calibration to obtain accurate results.

WIFI MODULE:

- It modulates and demodulates the signal.
- The goal is to produce the transmitting signal.
- Used for transmitting any analog signals.

WORKING:

- The sensing inputs determine the values of the soil.
- These values are calibrated with the help of microcontroller.
- By means of Ethernet shield the arduino board is connected to the internet.
- Local devices can be connected by using local IP with the help of wifi modem.

PROTOTYPE MODEL:

IMPLEMENTATION:

The project can be implemented in the tractor. if we implemented means no need of transformer to step down voltage .and we can use supply from battery itself for displaying the result in tractor ,by using a small LCD display so that the working people in farm can be also identify what type of plant is suitable for the land.

ADVANTAGES:

- Low cost
- Easy way of testing
- Simpler in structure
- Risk of farmers is reduced

CONCLUSION:

Today India ranks second in the world in farm output and 64% of cultivated land depends on monsoons. Irrigation accounts for 55-75% of water usage in India. To meet the needs of our population growth the agriculture should gets developed. IOT is now mainly focusing on agriculture as it plays vital role in the development of country's economy. Thus this equipment produces a great deal in the field of agriculture making farmers simply dependent on themselves and to complete their work in the short period of time with high profit. Thus it leads to the development of our Indian economy too.