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AGRICULTURE AUTOMATION SYSTEM.

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***Abstract*:** The word population is expected to reach 9.1 billion by year 2050 says Word Food and Agriculture Organization and to feed this population food production should be increased by at least 70%. an automation system which will sense the moisture content of soil with the help of Arduino uno and sensors and according to the need of land it will automatically provide water and fertilizers to the crops.

***Index Terms* - Automation, Sensor, ARDUINO UNO (8051), Microcontroller, moisture content of soil, Irrigation,**

▪ INTRODUCTION:

Irrigation is defined as artificial application of water to land or soil[1].irrigation process can be used for the cultivation of agriculture crops during the span of inadequate rain fall and for maintaining landscapes[4].An automatic irrigation system does the operation of a system without requiring manual involvement of person[2].Every irrigation system such as drip, sprinkler and surface gets automated with the help of electronic appliances and detectors such as compute, timers, sensors and other mechanical device[5].Automation in agriculture will improve our food production and also will help us to use water and other resources in required amount and more efficiently.

▪ MAJOR PROBLEM FACED BY CONVENTIONAL AGRICULTURE SYSTEM

- Too much water is wasted.
- Traditional irrigation system can't be as Energy efficient as an automated one.
- Use of too much water is having a negative impact on both nature sustainability and quality of soil.
- Also, during irrigation time, the farmer faces the danger from the serpents and other insects and rodents.
- With excess use of water over a period of time cause soil to be alkaline or increase content salt in soil which will make farm infertile.

▪ RELEVANCE

In today's age where we face a lot of challenges and issues related to the modern agriculture, we have to find out more reliable and efficient ways to do farming.

In this project we reduce the problems with the use of the automation system. We develop the automatic irrigation system by considering the major problems faced by the farmers given below. This system is more efficient than the conventional system. With less dependency on labor and adequate necessary water supply we will able to ensure the good crop quality and yield.

▪ AUTOMATED IRRIGATION SYSTEM OVER CONVENTIONAL SYSTEM.

- Environmentally friendly.
- Less dependent on labor.
- No excess water supply.
- Better supply of water to the roots of crop in required quantity.
- Moderate capital cost.

▪ LITERATURE SURVEY:

The main purpose of soil moisture sensor is placed in the root zone of plant/field. The sensor sends information and transmits the data to microcontroller. An algorithm was developed to measure threshold value soil moisture sensor that was programmed into a microcontroller to monitor the humidity content of the soil. This paper design a model of automatic irrigation system which is based on microcontroller. Temperature and soil moisture sensors are placed in the field. When the moisture content reaches above the desired threshold value the pump automatically turns off [7] .

- **BLOCK DIAGRAM:**

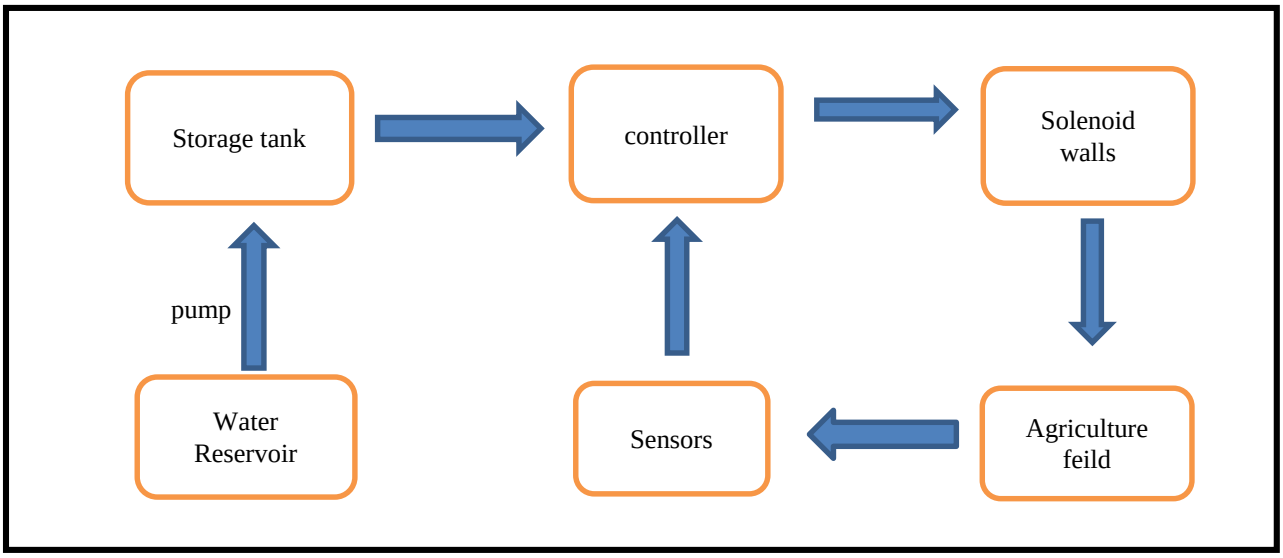

Fig.1.Block Diagram Of Agriculture Automation system

- **EXPLANATION OF BLOCK DIAGRAM:**

Here Initially the water is stored in storage tank from water reservoir with the help of pump. Then the soil moisture level of land is measured with the help of moisture sensors. The controller will check the sensor reading and according to the readings it will supply the water to the field with the help of solenoid walls.

The microcontroller ARDUINO UNO (8051) has been used in the system. The system also uses moisture sensor which is placed near the roots of plant which provide the humidity level of the soil to the controller.

- **OPERATIONAL BLOCK DIAGRAM:**

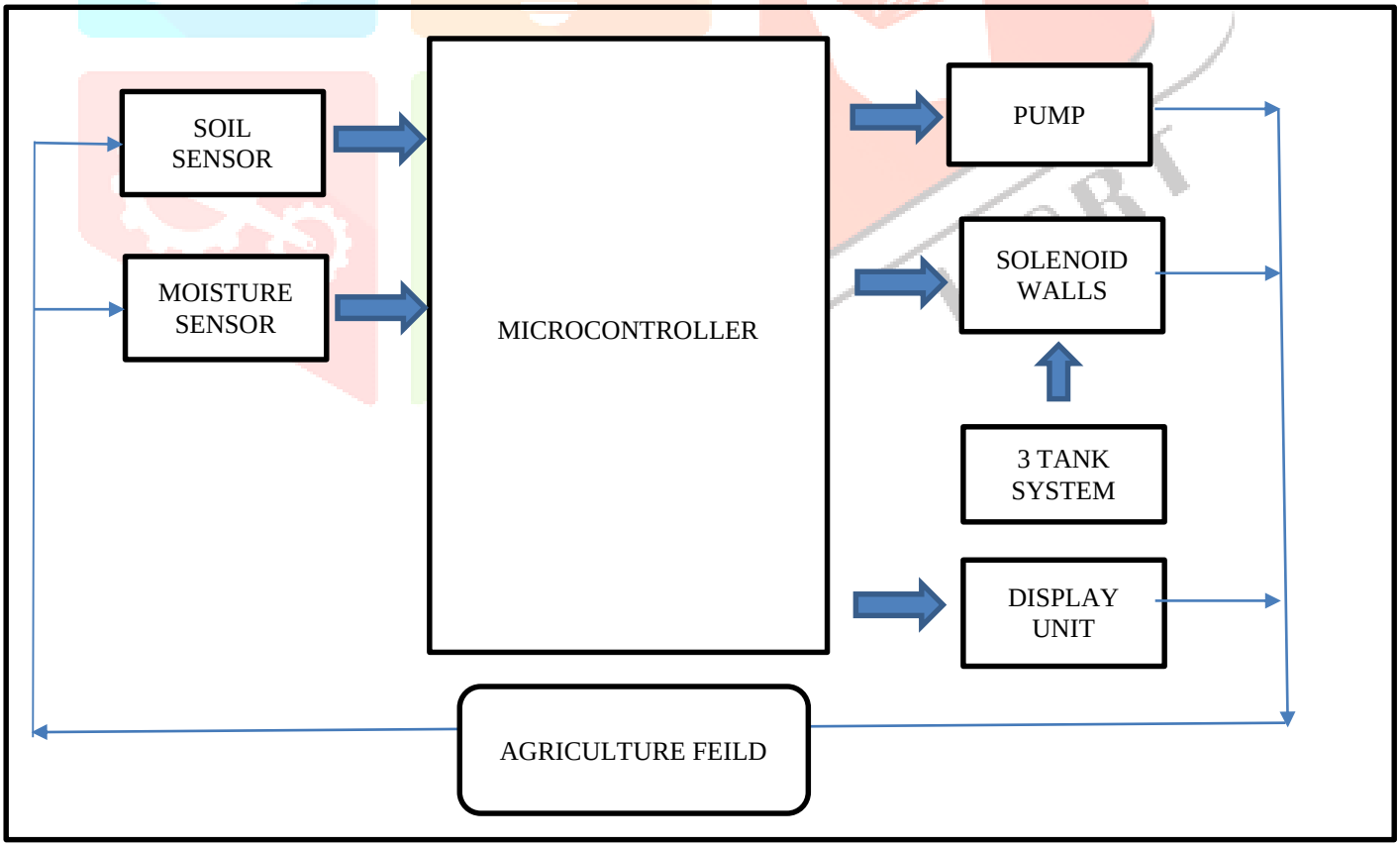

Fig.2. Operational Block Diagram

Figure 2 illustrate the operational block diagram of the system. Control over irrigation system is accomplished by fixing a threshold value if measured value goes below the threshold value, then the irrigation should be initiated. When the moisture content detected by the sensor is below threshold value the drip irrigation system is switched on and the field is irrigated till the soil is completely moist. Microcontroller plays an important role in this system. The data collected form the moisture sensors is given as input to the microcontroller. Microcontroller compares these values to the standard values and performs operations according to it. Solenoid walls are controlled by microcontroller. Display unit shows the current status of the irrigation system.

- **SIMULATION:**

For simulation purpose Autodesk Tinkercad is used. Tinkercad is a collection of software tools that design electronics and coding. By using this software mainly two desired outcomes are obtained.

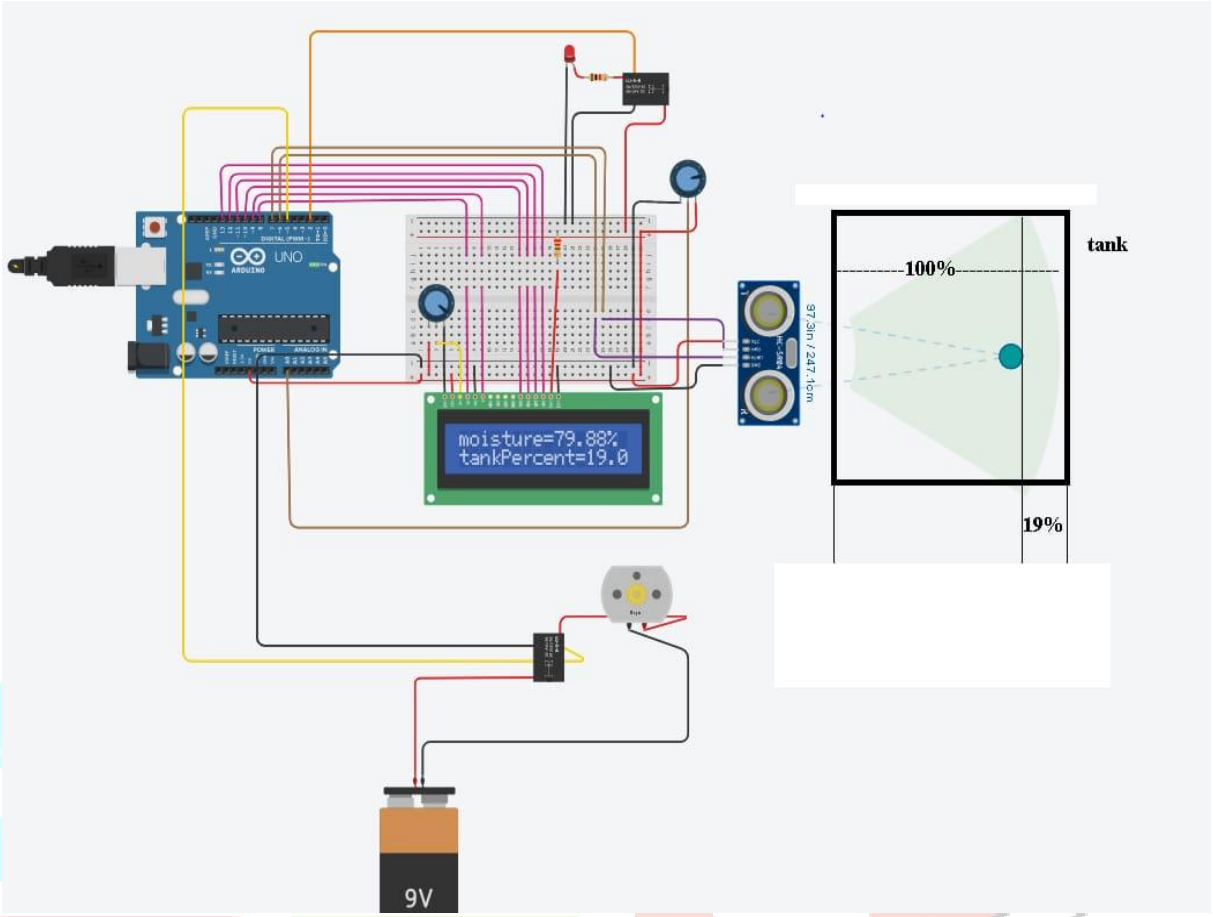

Fig.3. Simulation.

In this model mainly two types of sensors viz. moisture sensor and soil sensor are used. Data from these sensors and given to the microcontroller as input. Microcontroller analyze the data and based on the data it will control the solenoid walls and solenoid valves supply the water to the farms with the help of drip irrigation system. The ARDUINO UNO (8051) has 14 digital input/output pins, out of which 6 can be used as PWM outputs, 6 analog input pins, a USB connection, A power barrel jack, an ICSP header and a reset button.

The detailed connection for simulation is as follows, the pin number eight to thirteen of microcontroller are connected to the LCD. Pin number two of Arduino is connected to the NO terminal of first relay and that NO terminal is connected to solenoid valve. The input from the moisture sensor is given to the AO terminal of Arduino, the 5v supply from Arduino is given to the moisture sensor.

The second relay's NO terminal is connected to pin number 5 of Arduino and the supply to this relay is given through battery, pin number 6 and 7 of Arduino is connected to the ECHO and TRIG terminal of ultrasonic sensor respectively. The VCC and GND terminal of ultrasonic sensor has given supply of 5V from Arduino.

- **RESULTS AND DISCUSSION**

RESULTS OF VARIOUS CONDITIONS

Case no.	Moisture content (in %)	Water supply
1	Below 50	ON
2	Above 50	Off

Case 1:

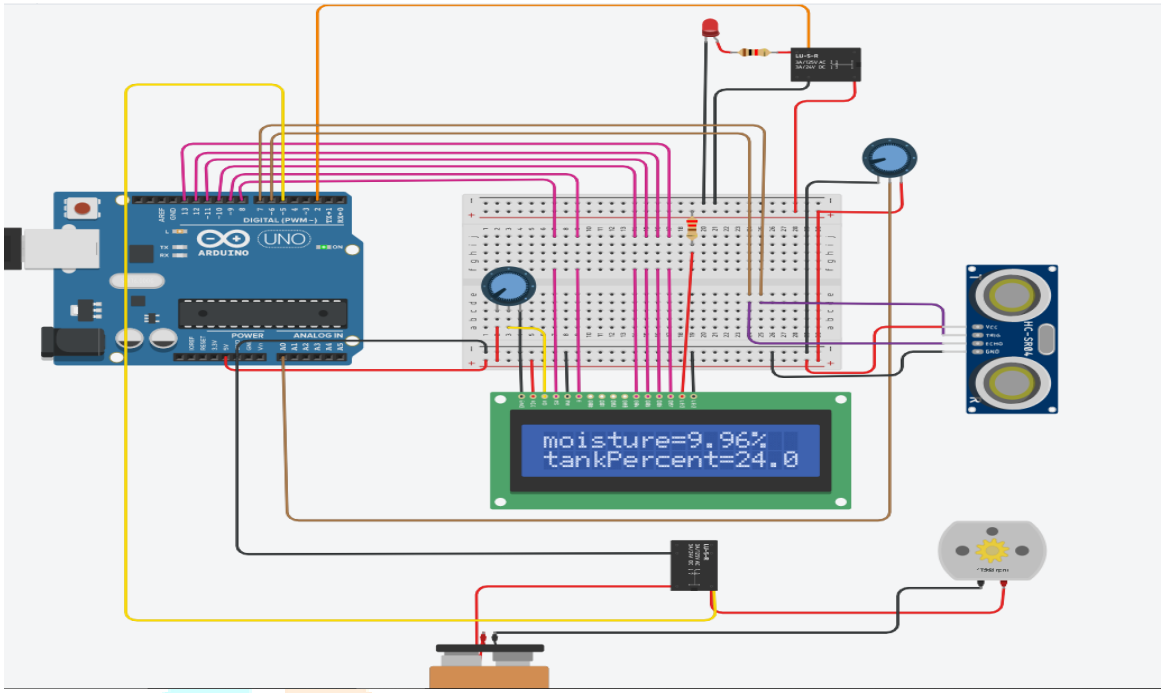

Fig.4. case 1

In this case the tank percentage is 24 and the moisture content of the soil is 9.96% so according to the condition the moisture percentage of the soil is below 50% so the solenoid valves opens and the water supply is turned on.

Case 2:

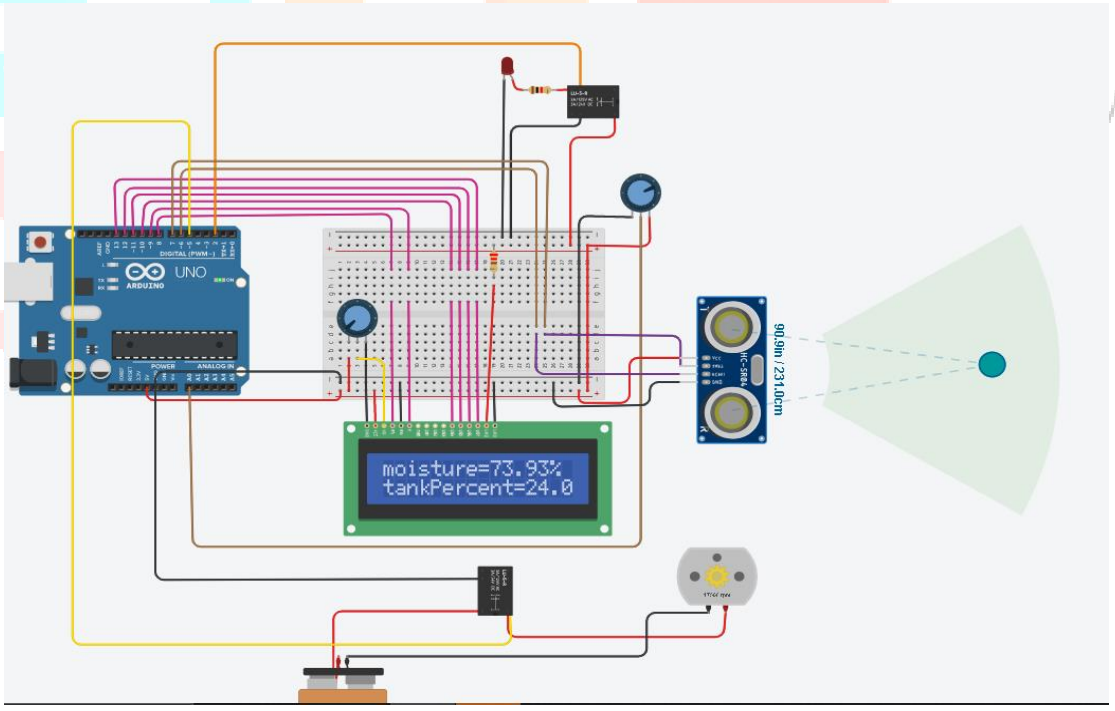

Fig.5. case 2

In this case the tank percentage is 24 and the moisture contain of the soil is 73.93% so according to the condition the moisture contain of the soil is above 50% so the solenoid valves closes and the water supply is turned off.

- **CONCLUSION:**

  The automated agriculture system for farming provides benefits to farmers in farming. These systems help the farmer to monitor the farm remotely and save time money and energy. Today, there are countless systems present which use different techniques for automation and communication. However, these systems are not full-fledged and lack in many aspects. There is scope of improvement in existing systems and hopefully this paper will be useful in constructing an improved automated agriculture system free from most of the drawbacks in the existing systems

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