Soil Monitoring and Smart Irrigation System

Nidhi Karulkar[1] Kartik Mishra[2] Nazifa Ahmedi[3] Nawaz Kapadia[4] Ankit Pandey[5]
[1,2,3,4,5]Student
[1,2,3,4,5]Department of Computer Engineering
[1,2,3,4,5]Thakur Polytechnic, Kandivali, Mumbai, Maharashtra, India

Abstract— Imagine a day without water think about what homes, parks, cities and most importantly the agricultural fields that provides us the basic necessity called food .what would it look like without healthy landscapes. How would farmers grow crops or raise livestock? So an approach has been taken to raise awareness of the need to conserve our most precious resource with the help of the developing technology by taking smart irrigation into action by utilizing the nature supplies in an efficient and conservable manner.
Keywords: Irrigation system, PH level, soil

I. INTRODUCTION

To fulfill increasing demand of growing population over the years there is a need of increase in food production. Continuous monitoring of humidity and pH of soil is leading to an automation in agricultural areas to improve crop productivity.

We will be building a smart irrigation system that also provides real time updates about the condition of the soil wirelessly to your smartphone. To achieve this we will be using Arduino and Our own mobile application which will communicate with each other over a wireless network.

We are using a advance form of drip irrigation which would be Valve operated irrigation system. This will avoid the supplying too much water which can adversely affect the crop. This is archived by monitor the humidity and moisture in the soil.

If the moisture or humidifier is more than the recommended limit than

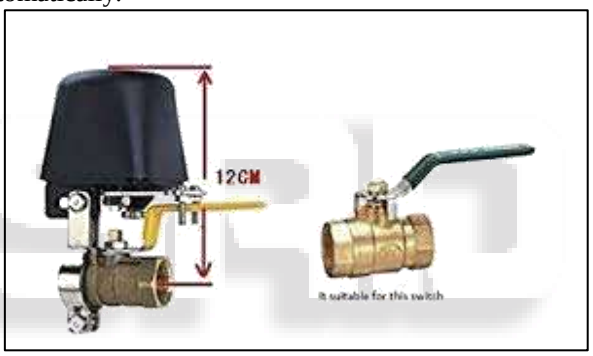
II. OBJECTIVES

To save water and lessen human involvement in crop farming observe and check the progress or quality of (agricultural field) over a period of time; keep under systematic review.to get the proper overview of the yield to be produced.

III. SMART DRIP IRRIGATION SYSTEM

Specific parts of the field are watered using different pipes. Using pipes with valves allows us to water just a specific region on the field which prevents flooding of the crops. Drip irrigation is also considered to be the most water efficient way of irritation where water reaches the roots the fatses and there is minimum wastage of water.

This system enables us to partially water the field or we can say water the parts of field that really need it. The moisture sensor on the field sends data to the main system that is running that software that controls the valves automatically.

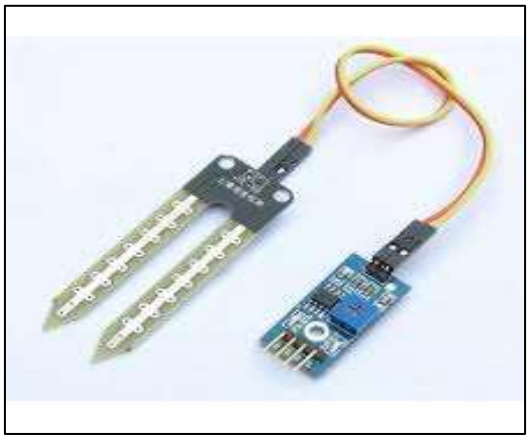


IV. SOIL MEASUREMENTS

Our Arduino based sensor allows us to send data like Moisture, PH level, Light Intensity in that area of soil. These components are really important for the crop to grow to its full potential.

The data is sent by Arduino sensors and received by a mobile application which we developed and all the devices should be on the same network. You can see which region of farm lacks in which component and gives the farmer a insightful view of the farm. Which then helps him decide which fertilizer to use and in what proportion.

All rights reserved by *www.ijsrd.com*

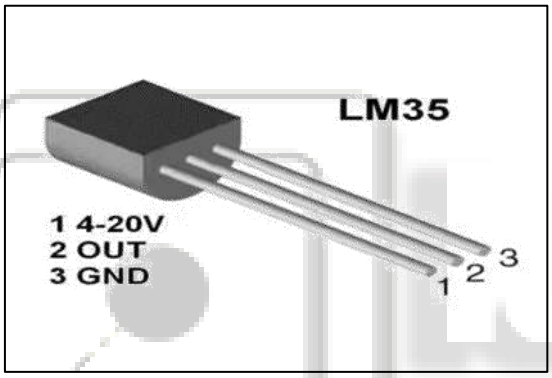


V. SENSORS

The Sensors used in the system which are as follows:

1) Temperature.
2) Soil Moisture.
3) Humidity.

A. *Temperature Sensor*

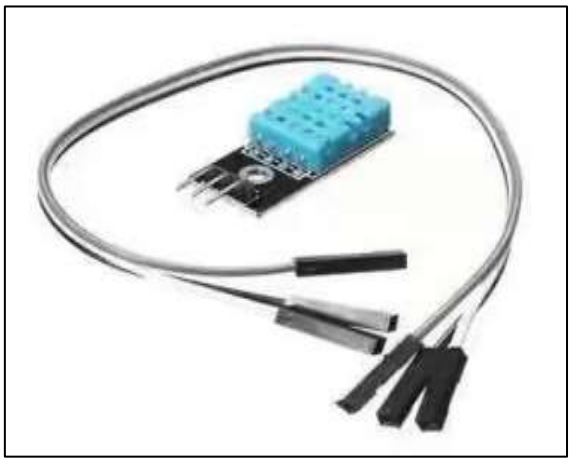


- LM35
- Output voltage is linearly proportional to the Celsius (Centigrade) temperature.
- Temperature range is -55 to 150 degree C.

B. *Soil Moisture Sensor*

- Common type is a Frequency domain sensor
- Neutron moisture gauge
- In this sensor we are using 2 stands to be immersed acquainted in the soil by virtue of moisture an Analog Output variations will be generated from 0.60- 12volts. Input Voltage 12 VDC

C. *Humidity sensors*



- It measures both air temperature and moisture.
- Relative humidity expressed as a percentage.
- HS1100 is used for sensing humidity.

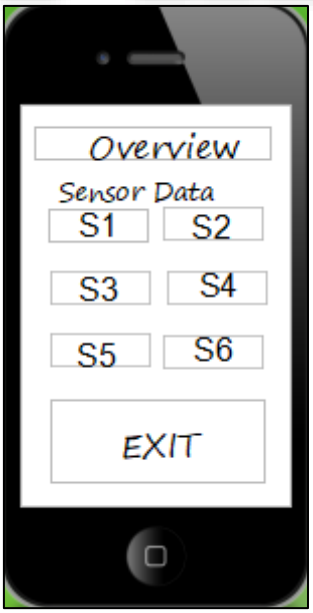
The output in terms of frequency range 5khz to 10khz.

VI. WORKING OF SENSORS

The soil moisture sensor consists of two probes which are wont to measure the volumetric content of water. The two probes allow the present to undergo the soil then it gets the resistance value to live the moisture value.

When there's more water, the soil will conduct more electricity which suggests that there'll be less resistance. Therefore, the moisture level will be higher. Dry soil directs electricity poorly, when the water is in a smaller extent, then the soil will direct less electricity which ultimately degrades the resistance. Therefore, the moisture level will be lower

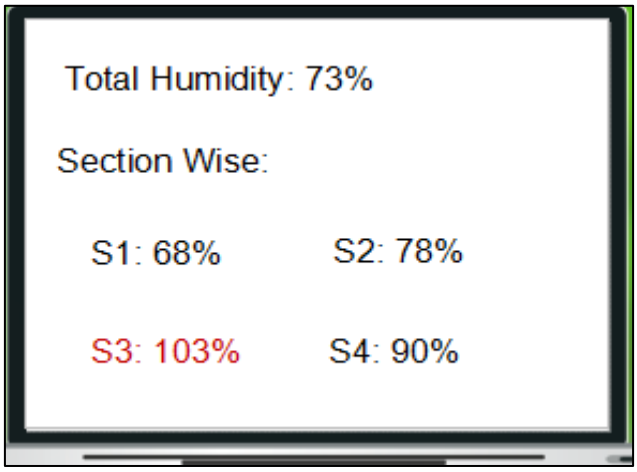
A. *Mobile Application Interface Concept*

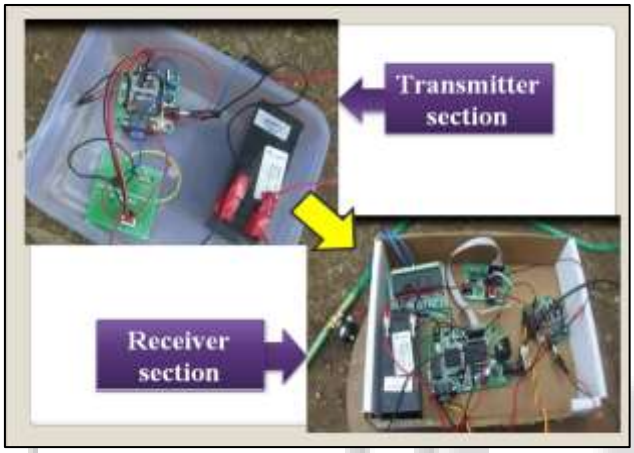


The sensors on the field collects the information/data from all over the field and transmits it to the mobile application, which helps the farmers to get a virtual overview of the soil.

Based on the data sent by the sensors if the water level of the soil goes down then the applications opens up the electronic valve automatically and providing water to the soil.

All rights reserved by www.ijsrd.com





System uses sensors to plan a course of action by checking the parameter of the field & based on the data the water is then supplied to the crops.

- Outputs of the sensors measured are analog in nature the system makes use of ADC which is inbuilt in microcontroller
- These digital signals at microcontroller 328P then uses Zigbee module for communication to send data at the receiver and GSM module at the receiver side interfaced with microcontroller 328P for communication at a particular level.
- Microcontroller sends the measured values to wireless communication zigbee module and further uses GSM module to send message to the farmer.
- Microcontroller sends the measured values of various parameter and according that water is given to the crops.

VII. ADVANTAGES

- Increase in productivity
- reduced water consumption
- Safe
- No manpower required
- Reduce soil erosion and nutrient leaching
- Require smaller water sources

VIII. CONCLUSION

The soil Monitoring and smart irrigation system is structured in a organized way that makes it more economically stable for optimizing water resources for agricultural production. This fertilization system allows cultivation in places with water scarcity, so improving sustainability. It proves that the use of water can be diminished. The utilization of solar energy during this system is significantly important for organic crops.

REFERENCES

[1] Tope G., Patel A. 2014. International Journal of Current Engineering and Scientific Research (IJCESR). Vol.2.
[2] www.ijert.org/ smart- irrigation-system-using- wireless-sensor-network
[3] The zigbee alliance website online available: http:// www.zigbee.org

All rights reserved by *www.ijsrd.com*