1. SMART IRRIGATION SYSTEM USING INTERNET OF THINGS

Considering this documentation they initially looked at the idea of developing a system that processes the data obtained from the soil sensor which will then automatically water plants accordingly and analyze the real time condition of soil.

The main focus of the study is for crop’s welfare and production. They convey in the paper that the system is not so advanced and is till ineffective when it comes to the measurement of moisture of soil.

The following paper shows result and discussion on the basis of comparison of normal irrigation and smart irrigation, direct sunlight and 20% sunlight, low ph level and high ph level and the weather condition that is windy and not windy. And according to the paper smart irrigation gives the best desired result than the normal one.

The paper conveys that the entire 3 desired objective were accomplished and in future it can be improved further by making use of solar and the system could go eco-friendly.

1. ROBUST SMART IRRIGATION SYSTEM USING HYDROPONIC FARMING BASED ON DATA SCIENCE AND IOT

In this documentation, they focused on the way of farming which eliminates the idea of more water and space consumption and aim to build an automated irrigation system that incorporates the data from all sensors and transfer to IOT server through network.  
They talked about the NUTRIENT FILM TECHNIQUE which is most prevalent technique and for that indoor plantation, environmental temperature Ph value, humidity, electrical conductivity and water temperature are to be monitored and controlled.

The system is been developed in such a way that the data can be read on the web base application. Further they talk about machine learning techniques used to predict plant growth. Their main motive intended in the paper is to check the moisture level in soil.

The proposed system in the paper comprises of structured hardware, control section, data analysis and a frost algorithm to bring the system in implementation.

Hence this hydroponic system emerged to be fruitful and the data collected and analyzed accelerated in efficient plant growth.

**- Hydroponic: the process of growing plants in sand, gravels or liquid ( places other than land)**

1. SMART IRRIGATION WITH SOLAR POWER AND GSM TECHNOLOGY

According to this paper the main purpose of the developed system is to make efficient utilization of solar power in irrigation and notify the owner about the need of supply of water through SMS.

This proposed system works according to the soil moisture and keep updating owner about the condition of the crops and soil through GSM technology. The motor is turned ON and OFF automatically on the condition and demand of soil. Furthermore the paper shows the comparison between the proposed irrigation system and the traditional existing system which conveys that the proposed system is far better as it uses solar energy, it has ability to operate automatically and it will make efficient use of water and there won’t be any wastage also that it will be a low cost system, low power consumption and low maintenance needed.

1. A Low cost smart irrigation system using MQTT protocol

This documentation intended the idea of designing a simple WATER PUMP CONTROLLER by using soil moisture sensor and Esp8266 NodeMCU-12E, depending on the soil moisture level, it will control the supply of water and display the sensor data and pump status on web page or mobile. The major objective of proposing this system is to collect the data from the sensor and send this data to the user so whenever they want to check the required soil moisture and water pump status they can. The advantage of this system is that farmer can turn on and off the water pump by internet connectivity and automate the process. The system is designed in such a way that the first section consists of sensor and relay and the second section consist of MQTT –thinger.io and display obtained results.

As per the paper the results given were:

1. Soil moisture value in percentage,

2. Temperature,

3. Humidity,

4. Water pump state,

5. Location of ESP8266; displayed on the web page.

Also that ESP8266 Node-MCU 12E is low cost, low power consumption, small microcontroller which makes proposed system appropriate for given application.

And the high precision soil moisture sensor provides analog reading, so we correctly measure soil moisture value. And finally they display all the reading in mobile app and web page.

1. A smart irrigation system

This paper focused on an automated irrigation system which regularly supervise RH of soil and controls supply of water but here in practice, the pump on which control action is to be taken is at a distance from the irrigation land. The current work aims to develop a wireless microcontroller based low cost RH monitoring system that can track RH at different locations of the field in real time. Moreover, as thought of it allows water to be sprinkled on the field if soil moisture falls below a threshold limit depending upon the nature of crop grown in the soil.

Here the system design flow chart states that 4 out of 14 channels are used to drive different devise, first for scanning the system, second for displaying the value of supply voltage, third for measurement and wireless control of RH and fourth for measuring soil temperature acquision of data.

Later the system is been tested in real time and it gave results as:

Case 1: when LED 1 is ON, The entire instrumentation is scanned to check whether all the ports of microcontroller chip are operating properly.

Case 2: when LED 1 and 2 are ON, checks the line voltage value is within prescribed value or not.

Case 3: when LED 1 and 3 are ON, RH smart sensor module measures the relative humidity of soil.

Case 4: when LED 1 and 4 are ON , the temperature is measured using LM35DZ and viewed on pc.

Hence automation helps in fruitful utilization of water. They say system can be further modified by incorporate intelligent control of sprinkle flow, message can be conveyed from environment to the controller ‘CAN’ can be implemented to setup communication between distributed nodes for irrigation system. These are the possibilities that can be implemented in future according to the paper.