

# Automatic Detection of Soil Moisture & Water Supply System

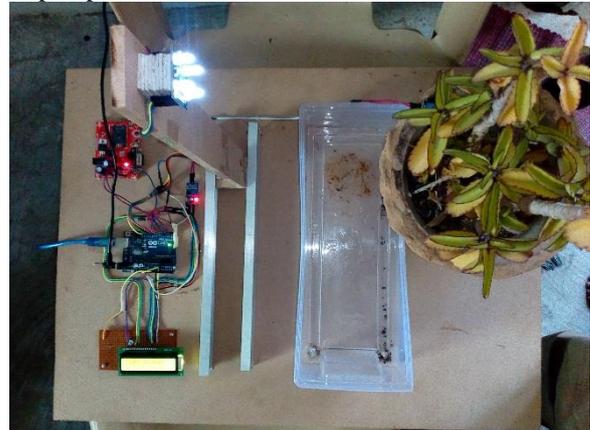
Vivek Bhajipale<sup>1</sup> Neha Kale<sup>2</sup> Riya Rajurkar<sup>3</sup> Kajol Jude<sup>4</sup> Naina Badkhal<sup>5</sup>

<sup>1,2,3,4,5</sup>Suresh Deshmukh College of Engineering, Selukate Wardha, India

**Abstract**— The green city is the broadest economic sector and plays important role in the overall economic development of a nation. Technological advancement in the area of agriculture will ascertain to increase the competence of certain farming activities. In this paper we have proposed a novel methodology for smart plantation by linking a smart sensing system and smart irrigator system through wireless communication technology. Our system focuses on measurement of physical parameter such as soil moisture content, plant health status (live or dead), temperature that plays vital role in plant activities. An automatic irrigation control system has been designed to facilitate the automatic supply of adequate of water from a reservoir to field or domestic crops in all agricultural seasons. One of the objectives of this work is to see how human control could be removed from irrigation and also to optimize the use of water in the process. The method employed is to continuously monitor the soil moisture level to decide whether irrigation is needed, and how much water is needed in the soil. A pumping mechanism is used to deliver the needed amount of water to the soil. The work can be grouped into four subsystems namely; power supply, sensing unit, control unit and pumping subsystems which make up the automatic irrigation control system.

**Key words:** Automation, Irrigation, Pumping, Soil Moisture, Temperature

increase the field productivity. The system is used to turn the valves ON or OFF automatically as per the water requirement of the plants. The system is used for sensing, monitoring, and for controlling purpose. It consist of four sensors, a microcontroller, a LCD display, relays and a water pump or motor.



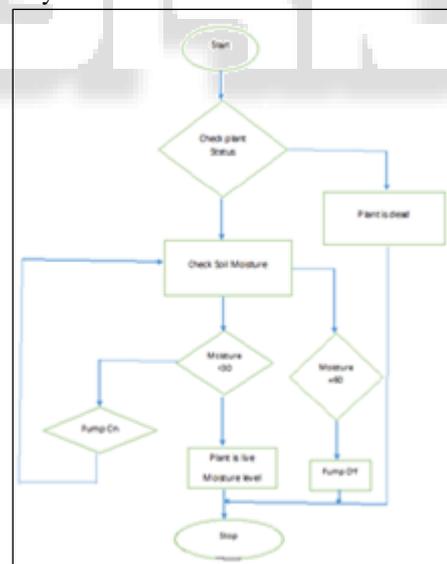
The working of the project is divided in two parts. First is parameter measurement and second is irrigation system. The moisture and temperature sensors are inserted in the soil. All the sensors will record the value and give it to the microcontroller. Microcontrollers then display this value on a LCD screen. The values will be displayed on the screen one by one at an interval of 10 seconds.

## I. INTRODUCTION

It is very much important to water the plant as per their need. Irrigation in agriculture is one of the main task. Very less watering or too much watering can damage the plant. In present irrigation system, an every individual cannot check the moisture level of soil. Hence sometimes it may happen that the watering is more than the need of the plant and sometimes water doesn't reach up to the roots of the plants. This will waste the water and efforts. If water doesn't reach up to the plants roots then it will directly affect the plant growth and profit. Traditional irrigation system requires manpower. Hence, it becomes necessary to do something so that the irrigation will become more convenient. Automatic irrigation system is a project which is developed to automate the irrigation system. It is a simple system, using Arduino to automate the irrigation and watering of plants. This system does the control of soil moisture. In case of dry soil it will activate the irrigation system pumping water for watering plants. The system uses a LCD display to notify all actions that are taking place and a real time clock. This system uses a water level sensor and a moisture sensor to detect the moisture level. A pump is also connected which will get on when moisture level falls down and will automatically turn off when moisture level will become sufficient. A LCD will display the digits indicating operation.

## II. METHODOLOGIES

Automation of the irrigation system is gaining importance as there is need to use water resources efficiently and also to



## III. PROBLEM STATEMENT

If the specific area is irrigated too much with water, there are possibilities that the plant may die due to excessive irrigation.

Whenever there is a variation in moisture content of the soil these sensors will determine the change and will give an interrupt signal to the microcontroller and eventually will send signal to the relay driver and thus the water pump is now activated.

Manual irrigation system is simple and cheap but is more labor intensive and wastes water. As water is brought into the system manually, this requires high labor input, moreover it is important to check the systems regularly to improve the production and avoid water loss on the plantation. Due to water costs and increasing water demands, gardeners need to be concerned about conservation.

This thesis paper will allow garden owners and other household areas or certain facilities in the efficient, convenient and effective method of water irrigation and may direct future research on the development of more advanced water irrigation system.

It gives the information about the field condition to the user through SMS in case of extreme conditions AND all the sensors sense their respective values.

#### IV. RESULT AND DISCUSSIONS

The main objective is to develop an automated irrigation system by implementing a controlled technique to meet soil moisture requirement that will contribute to water conservation and minimize the labor in the field of gardening.

Develop a program using a microcontroller that will process the data from the sensor and control the whole irrigation system.

Identify the suitable amount of water to be delivered that will assist in maintaining the level of soil moisture AND water tank which stores the water that will aid in the irrigation system;

An automatic moisture sensing and watering system detects a moisture level within the soil.

As soon as the atmospheric temperature and humidity exceed this threshold values receiver sends command to the GSM module, activated GSM800 module will send this message to the number saved in database.

The project focused solely in constructing a water irrigation system with a device that will determine the moisture condition of the soil and will trigger the water irrigation system to operate.

The project can automatically determine if the soil-moisture is below the minimum allowable limit.

Will be using a microcontroller to control the right amount of water to release based on the moisture content of the soil, uses a power SUPPLY source of the system, can simply determine the water level condition of the water tank by water level indicator.

#### V. LITERATURE REVIEW

In this paper, soil moisture sensor, temperature sensors placed in root zone of plant and gateway unit handles the sensor information and transmit data to a web application. One algorithm was developed for measure threshold values of temperature sensor and soil moisture sensor that was programmed into a microcontroller to control water quantity. For power photovoltaic panel was used. Another fact like cellular-Internet interface used that allowed for data inspection and irrigation scheduling to be programmed through a web page.

In this paper, soil moisture content has been detected using YL-69 sensor. The main propose of this technique is development for measure soil moisture in real time method. The technique based on relationship of the degree of saturation with water in soils.

This paper design a model of automatic irrigation system which is based on microcontroller was used only for data processing and source of power supply. Various sensors are placed in plant field. Sensors sense water level continuously and give the information to individual through cellular phone. Person controls the motor using cellular phone without going in plant field. If the water level reaches at danger level, automatically motor will be off without conformation of farmer.

The automatic system based on Arduino and for communication GSM technology was used. Irrigation system provides foe adequate irrigation in particular area which is real time. Soil moisture sensor placed in root zone in plant field and sense water level. The GSM is an important part of these this system. System communicates using GSM. GSM operate through SMS and is a link between microcontroller processor and centralized unit. This system detects condition and field condition in real time. This information send to user in the form of SMS. These commands are used to control majority of the functions of GSM model. In the paper, automatic irrigation technique irrigated using sensor network. The idea was developed for improve irrigation system and reduced cost of irrigation water. Sensors are placed in farm and sense continuously and collect he information. This information stored at center monitor and also passes to data collection interface and then transmits to the sensor node.

This project finds application in domestic agricultural field. In civilian domain, this can be used to ensure faithful irrigation of farm field, since we have the option of finding out moisture level of soil in a particular are. The purpose of this paper is to provide a review of a range of popular sensors on the market. The paper also discusses their operating principles as well as addresses their advantages and disadvantages. This project implements the emerging applications of GSM technology. Using GSM networks, a control system has been proposed that will act as an embedded system which can monitor and control an agricultural motor and other devices locally using built-in input and output peripherals.

#### VI. CONCLUSION

The development of our project which is the Automatic Soil moisture Sensing and Water Supply System with water level indicator is the device that will provide the needed water when the soil moisture sensor detects if the soil is dry.

The development of program is obtained to operate the automatic irrigation system, given the scheduling process, the amount of suitable water(based on range of its soil moisture) needed to deliver for the plants is being controlled so there is no excess water , which mainly contributes to conservation of water.

REFERENCES

- [1] R. Hofstedt, "Water Treatment methods", International Journal of Scientific and technology research, 2011, Volume 6, Issue 11
- [2] R. Helmer, "Water sensor feedback control system for surface irrigation", American Society of cultural engineers, 1997, Volume 5, pp 27-29.
- [3] R. Gunturi, "Micro-controller based automatic plant irrigation system", International journal of advancements in research and technology, 2013, Volume 2, issue 4.
- [4] [Online]. Available: <http://earthobservatory.nasa.gov/Features/WeighingWater/> [Accessed: July, 2014].
- [5] [Online]. Available: <http://water.usgs.gov/edu/irquicklook.html> [Accessed: July, 2014]
- [6] [Online]. Available: <http://arduino.cc/en/Main/ArduinoBoardUno> [Accessed: August, 2014].
- [7] [Online]. Available: [www.gardenguides.com/123999-characteristics-loam.html](http://www.gardenguides.com/123999-characteristics-loam.html) [Accessed: September, 2014]
- [8] [Online]. Available: [http://www.pavesearch.com/irrigation\\_system\\_types.htm](http://www.pavesearch.com/irrigation_system_types.htm) [Accessed: March, 2015]

