

# Irrigation Management System

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**Abstract:** Water scarcity is a big concern for farming. This project helps the farmers to irrigate the farmland in an efficient manner with automated irrigation system based on soil humidity. Humidity sensor is used to find the soil humidity and based on this microcontroller drives the solenoid valve. Irrigation status is updated to the server or localhost. Java platform is used here for getting information via serial communication from microcontroller and to update the user. In addition for better cropping system, further in the extension of this project, fertilizers required for the crops, best crops to cultivate for the particular climatic and soil conditions are updated to server at regular basis by monitoring soil PH level, Temperature level of the field area etc., By using PC host, crop is continuously monitored. Also LCD is used to display the PH, temperature and moisture level. This will improve the cultivation method and leads to better productivity.

By using the concept of modern irrigation system, a farmer can save water up to 50%. This concept depends on two irrigation methods those are: conventional irrigation methods like overhead sprinklers, flood type feeding systems i.e. wet the lower leaves and stem of the plants. The area between the crop rows become dry as the large amount of water is consumed by the flood type methods, in which case the farmer depends only on the incidental rainfalls. The crops are been infected by the leaf mold fungi as the soil surface often stays wet and is saturated after irrigation is completed. Overcoming these drawbacks new techniques are been adopted in the irrigation techniques, through which small amounts of water applies to the parts of root zone of a plant. The plant soil moisture stress is prevented by providing required amount of water resources frequently or often daily by which the moisture condition of the soil will retain well.

## II. RELATED WORK

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**Existing System-**It is a simple project more useful in watering plants automatically without any human interferential. People do not pour the water on to the plants in their gardens when they go to vacation or often forget to water plants. As a result, there is a chance to get the plants damaged. This project is a solution for such kind of problems. Many irrigation systems exists such as,

1. Monitoring of rice crops using GPRS and wireless sensors for efficient use of water and Electricity.
2. Wireless Sensor Based Remote Monitoring System for Agriculture Using ZigBee and GPS.
3. Design of Embedded System for the Automation of Drip Irrigation.
4. A Survey of Automated GSM Based Irrigation System.
5. Wireless Sensor Networks Agriculture: For Potato Farming.
6. Design and Implementation of GSM based Irrigation System Using ARM7. [4]

### III. DESIGN AND IMPLEMENTATION

The implementation of the system is described in detail. Here the detail view of Arduino. The Platforms like Arduino IDE plays a major role.

#### a). Arduino IDE

Arduino is an open-source platform used for building electronic objects. Arduino consists of both a physical programmable circuit board (often referred as microcontrollers) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics. A program for Arduino may be written in any programming language for a compiler that produces binary machine code for the target processor. The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It is originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

The following are the pictures that display the step by step Hardware Connections

#### Connecting Arduino with Soil Moisture Sensor

The Arduino UNO is connected to soil moisture sensor using jumpers cables. Battery supply is provided to Arduino UNO which is used by soil moisture sensor.

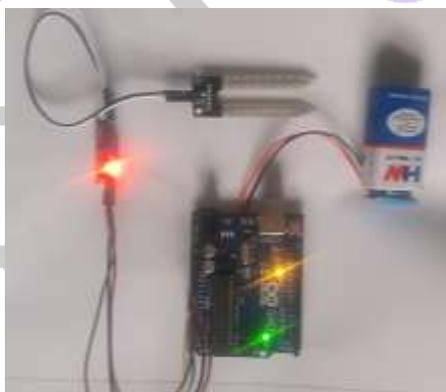
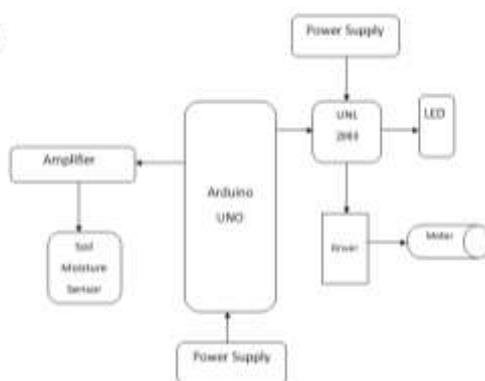


Fig a). Connecting Arduino UNO with Sensor

### IV. SYSTEM ARCHITECTURE

The history of the soil moisture sensors. There are various methods of existing sensors.. The proposed system is derived by reviewing various preceding methods. In this analysis and design of the system is explained in detail.



Power supply is given to the arduino. This power generated is used by soil moisture sensor. UNL is provided by different power supply through which driver motor and LED works. UNL and Arduino is connected and the whole system works.

## V.CONCLUSION AND FUTURE WORK

In the project, the primary applications for this project are for farmers and gardeners who do not have enough time to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. As water supplies become scarce and polluted, there is a need to irrigate more efficiently in order to minimize water use and chemical leaching. Recent advances in soil water sensing make the commercial use of this technology possible to automate irrigation management for vegetable production. However, research indicates that different sensors types perform under all conditions with no negative impact on crop yields with reductions in water use range as high as 70% compared to traditional practices. Further in the extension of this project, fertilizers required for the crops, best crops to cultivate for the particular climatic and soil conditions are updated to server at regular basis by monitoring soil PH level, Temperature level of the field area etc., by using PC host, crop is continuously monitored. Also LCD is used to display the PH, temperature and moisture level. This will improve the cultivation method and leads to better productivity.

## ADVANTAGES

- 1) Relatively simple to design and install.
- 2) It is safest system and no manpower is required

## REFERENCES

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- 4) Luis Ruiz-Garcia, Loredana Lunadei 1, Pillar Barreiro 1 and Jose Ignacio Robla 2 "A Review of Sensor Technologies and Applications in Agriculture and Food Industry: State of the Art and Current Trends" Sensors 2009, 9, 4728-4750; doi:10.3390/s90604728.
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