

# Intelligent Automatic Plant Irrigation System

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**Abstract**— This paper proposes an intelligent and smart Irrigation method that can be used for controlling the watering or irrigation of plants. It controls the irrigation of plants automatically and the need of human intervention can be greatly nullified. This mainly focus on wastage of water, which is a major concern of modern era. It also aids time saving, cost effectiveness, environmental protection, low maintenance and operating cost and efficient irrigation service. The development of the prototype model uproot the system compact and sustainable. There is a provision in system for including sensor that measures the moisture of the soil and switches relay is in charge of controlling solenoid valve according to the requirement. The model demonstrated will give expected results at the different moisture levels.

**Key words:** Plant Irrigation System, Irrigation Method

## I. INTRODUCTION

The trademarks of India's economy relies on Agriculture sector. It plays a vital role in the development of the country. But in today's world, these areas are getting reduced due to laziness of mankind in irrigation. Current technology is time consuming and also rude away large amount of water. Our country has surplus amount of water resources. This paper proposes an intelligent, dynamic and automated irrigation system for the agricultural crops. The system concentrates on controlling the irrigation process automatically using the device PIC controller. In the automation part the system consists of soil moisture sensors which monitor the moisture content of the soil. The paper mainly focuses on conservation of water resources through automated system. Once when the system installed, has less maintenance cost and is easy to use. The major leverage of the system is that the irrigation process can be easily monitored and controlled at anytime, anywhere by anyone having an internet connection.

## II. HARDWARE REQUIREMENT

- Control Circuitry
- Humidity sensor
- LCD
- Micro Controller
- Power supply
- Temperature sensor

## III. SOFTWARE REQUIREMENTS

- Embedded C
- Code vision PIC

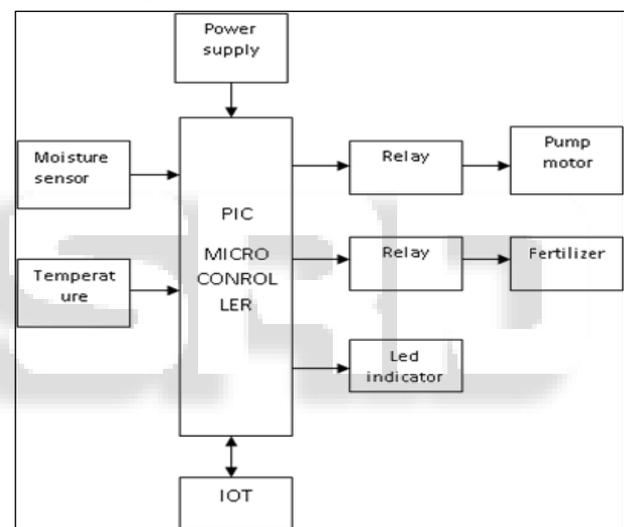
## IV. WORKING PRINCIPLE

In our model the automatic plant or crop irrigation system is designed and monitoring. In agriculture field, they cultivate many type of crops like paddy, wheat, vegetables, etc. Here, microcontroller controls the total circuit. Total setup consists

of PIC microcontroller, Moisture sensor, Temperature sensor, Relay, Pump motor, indication LED and Fertilizer mechanical setup.

When the moisture level falls low in the soil, the moisture sensor detects the value and sends the information to the microcontroller, that turn on the relay then the motor pump is activates and pass water. The adequate water is passed out then the motor becomes off. On the other hand the temperature sensor detects the higher amount of heat, the controller turn on the motor ant it passes water in the field. Fertilizer depends on moisture the controller provides the adequate fertilizer for the plants. This operation is monitor by using IOT at any location.

### A. Block Diagram



### B. Features

The PIC Microcontroller Pic16f877a is one of the most renowned microcontrollers in the industry. The coding or programming of this controller is so easier so that this controller is very convenient to use. One of the main advantages is that it can be write-erase as many times as possible because it use flash memory technology. It has a total number of 40 pins and there are 33 pins for input and output. Pic16f877a is used in many pic microcontroller project. Pic16f877a also have many applications in digital electronics circuits.

Pic16f877a has its applications in a huge number of devices such as remote sensors, security and safety devices, home automation and in many industrial instruments. An eeprom is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. And with easier handling, the cost of this controller is low. It's flexible and can be used in areas where microcontrollers have never been used before as in coprocessor applications and timer functions etc.



In case of dry soil and high soil temperature, it will activate the irrigation system, pumping water for watering the plants. It consists of a microcontroller which is the brain of the system. Both the moisture and temperature sensors are connected to the input pins of the controller. The water pump and the motor are coupled with the output pins. If the sensors depart from the predefined range, the controller turns on the pump. The servo motor is used to control the angular position of the pipe, which ensures farmers equal distribution of water to the soil. An LED indicator indicates the status of the pump.

#### G. Pump Motor

As the name implies, water pumps pump water. Whether that be in a vehicle, at a business, in the home, or in a well, shoppers can probably find a water pump to fit their vehicle or to help them draw water from the ground in a self-dug well to be used in pressure tanks within the location. Reduced noise Available in DC and AC Supply voltage: +12VDC Supply voltage: 230V AC Vehicle water pumps help regulate the flow of water through a vehicle's cooling system; when the seal on these go bad, the whole pump must be replaced. Located within the home or business, pressure water pumps regulate the water pressure year round, controlling water flow to different areas of the location. A pump motor is a DC motor device that moves fluids. A DC motor converts direct current electrical power into mechanical power. DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move.



#### H. Fertilizer

A fertilizer is a natural or synthetic, chemical-based substance that is used to enhance plant growth and fertility. Fertilizers may also enhance water retention and filter any excess liquid, hence enhancing soil effectiveness. Fertilizers typically offer the three major macronutrients potassium, phosphorus, and nitrogen. Fertilizers may also add secondary nutrients such as sulfur, magnesium, and calcium to the soil or growing media

#### I. Proteus Environment

Proteus PIC Bundle is the complete solution for developing, testing and virtually prototyping your embedded system designs based around the Microchip Technologies TM series of microcontroller. This software allows you to perform schematic capture and to simulate the circuits you design. A demonstration on the use of PROTEUS will be given to you on this lab session, after that; you are encouraged to learn to use the software interactively.

#### V. RESULT

A computer control for drip irrigation is the most beneficial approach for the farmers. This system reduces the extra manpower of the farmer for his farm like supplying water to plants. This system uses different sensors like temperature and moisture and according to this sensors parameters farmer can control drip due to internet connectivity between client and servers farmer can control drip component and fertilizer from anywhere. This system remove drawback of previous system like distance range problem. It. Hence we require an automatic system that will precisely monitor and control the water requirements in the field. Installing Smart irrigation system saves time and ensures judicious usage of water. Moreover this architecture uses microcontroller which promises an increase in system life by reducing power consumption. This approach is very beneficial for the farmer for increase crop production .This system can be used in area where water resouras are less. This system can be used for large area farms.

#### VI. CONCLUSION

In the present era, the farmers use irrigation technique through the manual control, in which the farmers irrigate the land at regular intervals. This process seems to consume more water and results in water wastage Moreover in dry areas where there is inadequate rainfall, irrigation becomes difficult. Hence we require an automatic system that will precisely monitor and control the water requirements in the field. Installing Smart irrigation system saves time and ensures judicious usage of water. Moreover this architecture uses microcontroller which promises an increase in system life by reducing power consumption.

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