

# Design and Implementation of Smart Irrigation System based on IOT

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## I. ABSTRACT

The project is designed to develop an automatic irrigation system which switches the pump motor ON/OFF on sensing the moisture content of the soil. In the field of agriculture, use of proper method of irrigation is important. The advantage of using this method is to reduce human intervention and still ensure proper irrigation. The project uses an raspberry pi series microcontroller which is programmed to receive the input signal of varying moisture condition of the soil through the sensing arrangement. Once the controller receives this signal, it generates an output that drives a relay for operating the water pump. An displayed is interfaced to the controller to display status of the soil and water pump.

**Keywords:** *Raspberry pi, Soil, Temperature, Humidity, PIR sensor, Ultra sonic sensor, Turbidity, Motor, GPRS etc.*

## II. INTRODUCTION

To develop the technology in order to increase the productivity of agriculture. Saving water is most important issues in dry lands. It is also an important element for the plants to survive. Therefore, the humidity of the soil that determines the amount of water in soil must be checked regularly to prevent the plant from wilting otherwise in the worst case it might die. To become part of the government effort on giving the new spirit to the agriculture sector, a system which monitors the humidity of the soil and temperature of the air will be developed so that the end user such as farmer, gardener and so on can use it to determine the exact time to sprinkle their plant to improve the efficiency of water use in irrigation systems. Common methods of water distribution can be enhanced or replaced by using recent technological advances. I hope to use it to improve the efficiency of water distribution, to automate the process of irrigation management, to provide an easy to use programming and reporting interfaced.

Automation makes an efficient use of the electricity and water and reduces much of the wastage. smart irrigation system makes the efficient use of water. This paper presents an smart irrigation system for agriculture farm with the use of devices like raspberry pi. Embedded c programming language is used for programs this paper contributes an efficient and fairly cheap automation irrigation system. System once installed has less maintenance cost and is easy to use this paper focuses on online monitoring of agriculture field with the help of temperature and soil moisture etc. It is more advantageous than the traditional agriculture techniques.

#### EXISTING METHOD:

One of the main drawbacks with the old fashioned farming system that is experienced by the farmers themselves is that they do not accommodate for changing environmental conditions. Temperature, wind, rainfall and other elements can dramatically affect the amount of water needed to sustain a plants health. If these elements were monitored and used to influence the watering cycles, then the water used should be more effective. Once the basic requirements of our

#### PROPOSED METHOD:

The proposed system is automated irrigation system allows farmers to apply the right amount of water at the right time. Besides, human attention was reduced on irrigation significantly. Moreover, energy consumption on water pumps

could be reduced by efficient water allocation based on the crop water requirement The main hypothesis in regards to this work is that using sensor technology to automate irrigation in which it improves water usage efficiency. This is due to the fact that the sensors could provide information about the water content of the environment to an irrigation controller, and preset watering of plants could be adjusted to suit current conditions.

### III. BLOCK DIAGRAM

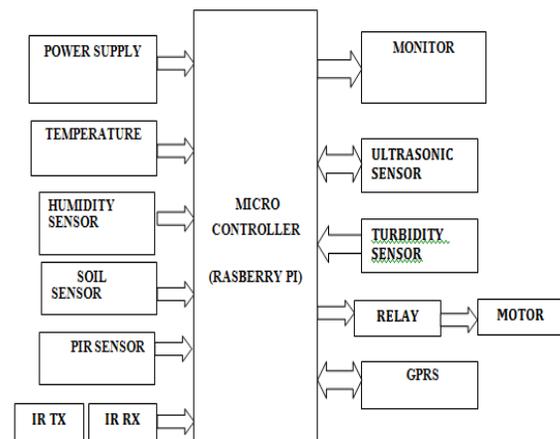


Fig.(3.1) System block diagram

#### SYSTEM OVERVIEW

**Power Supply:** This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using a

capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

**Raspberry Pi:** The Raspberry Pi is a small but full-featured computer on a single board. It plugs into a monitor and you attach a keyboard, mouse and speakers. The Raspberry Pi can be used for browsing the web, creating documents and spreadsheets, playing games, watching videos and lots more. It also provides a great environment for learning programming and digital making. You can also connect up hardware to the Pi's GPIO (general purpose input/output) pins and learn to program using electronics components.

**Temperature sensor:** Thermistors are a temperature sensing device. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

**PIR sensor:** A Passive Infra Red sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors (see below). Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall.

**Humidity sensor:** Humidity sensor is a device that measures the relative humidity of in a given area. A humidity sensor can be used in both indoors and outdoors. Humidity sensors are available in both analog and digital forms.

**GPRS:** This section consists of a GPRS modem. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver. The Global Packet Radio Service is a TDMA based digital wireless network technology that is used for connecting directly to internet. GPRS module will help us to post data in the web page directly.

**Relay Section:** This section consists of an interfacing circuitry to switch ON / OFF the system whenever any unhealthy conditions i.e. overload is detected. This circuitry basically consists of a Relay, transistor and a protection diode. A relay is used to drive the 230V devices.

**Ultrasonic Sensor:**

The sensor is primarily intended to be used in security systems for detection of moving objects, but can be effectively involved in intelligent children's toys, automatic door opening devices, and sports training and contact-less-speed measurement equipment.

**Motor:** motor is an output for this project. And DC motor is connected to microcontroller. And this motor controlled by the microcontroller with the respective inputs given by us. Its speed will be varied according to the speed set by the switches.

#### IV. CONCLUSION

In this work, we successfully develop a system that can help in an automated irrigation system by analyzing the moisture level of the ground. The grounded sensors all around the farming land will give notification about the need of water and accordingly it will be supplied. Simultaneously we configured an automated approach for the water tanker to be filled when it is empty. In our future work we are planning to have an automated irrigation system with the help of wireless sensor network.

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