

# IOT Based Smart Irrigation System

**Shital Mohite, Ankita Thakare, Rutuja Akkavar, Shital Mengaje, Swati Shelke**  
**Department Of Information Technology**  
**PRMIT & R, Badnera**

## ABSTRACT

From last decade few existing system working for reducing the agriculture water consumption but this system have some limitations. Likewise A smart wireless sensor network was used for monitoring environmental parameters using ZigBee. These nodes send data wirelessly to a central server, which collects data, stores it and allows it to be analyzed then displayed as needed and also be sent to the client mobile but weather forecasting and nutrient content is not determined in that system and another system in which soil parameters such as pH, humidity, moisture and temperature are measured for getting high yield from soil. This system is fully automated as per the level of moisture in the soil but the farmer cannot access the information about the current field status. To overcome this problem we will developed IOT BASED SMART IRRIGATION SYSTEM, the modern technology is necessary to resolve the problem and support better irrigation system. Which allow us to control various. appliances automatically, water motor based system is design for irrigation purpose. The main objective of this system is to control water supply to sensitive plant automatically depending on values of DHT11 sensors. In this system RASPBERRY PI KIT or Node MCU is used as an embedded Linux board which is design based on ARMV7 microcontroller architecture. And Android app is going to develop the system automatically.

appliances automatically, water motor based system is design for irrigation purpose. The main objective of this system is to control water supply to sensitive plant automatically depending on values of DHT11 sensors. In this system RASPBERRY PI KIT or Node MCU is used as an embedded Linux board which is design based on ARMV7 microcontroller architecture. And Android app is going to develop the system automatically. So in this way we are proposed a concept of IOT in which farmer can smartly manage the farm from anywhere. The main aim behind these projects is to saving time, money and power of farmers.

**Keywords:** IOT, AUTOMATION, DHT11 SENSOR, RASPBERRY PI KIT, ANDROID APP.

## INTRODUCTION

Now a days there are various technology is used to reduce the number of workers and it also help to reduce the time with the help of that we developing IOT based smart irrigation system. An automated irrigation system is developing to optimize water used for agriculture crops. Automation allows us to control appliances automatically. In which sensor identify the soil moisture and temperature through the DHT11 sensor. And then sensors give this information to raspberry pi kit and as per the value of temperature and soil moisture which senses by

sensor. So in this way the raspberry pi kit control the irrigation system automatically. Also farmer can manually control the irrigation system by using the android app on their smart phone. When the various automatic irrigation systems were tested then concludes that it save 90% water as compared with traditional irrigation system. Because of its efficiency and low cost, the system has the potential to be useful in water limited geographically isolated area. As we know that there is some limitation of existing irrigation system. So, we will developed IOT BASED SMART IRRIGATION SYSTEM, the modern technology is necessary to resolve the problem and support better irrigation system. Which allow us to control various appliances automatically, DC motor based system is design for irrigation purpose. The main objective of this system is to control water supply to each plant automatically depending on values of DHT11 sensors. In this system RASPBERRY PI KIT or node MCU is used as an embedded Linux board which is design based on ARMV8 microcontroller architecture. In this system all the information that are received from the sensors about soil moisture and temperature, with the help of DHT11 sensors and the various parameters are given to the raspberry pi kit as an input. A present value of DHT11 sensor is fixed in raspberry pi, when it goes beyond the particular threshold value water is automatically irrigated to the crops and once required amount of water is fulfilled its stop automatically as well as in this system we will provide water supply scheduling and security to farm from animals. So in this way we are proposed a concept of IOT in which farmer can smartly manage the farm from anywhere. The main aim

## LITERATURE REVIEW

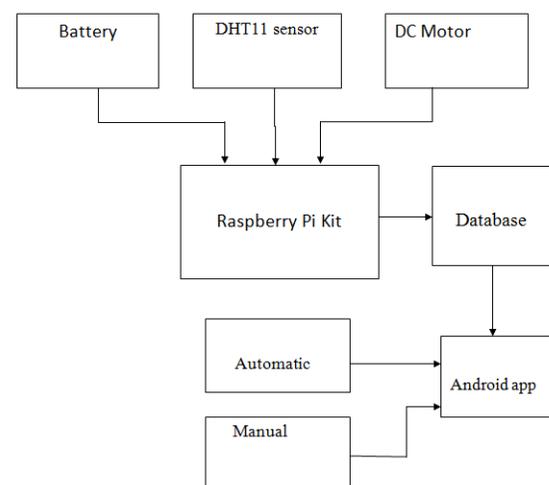
The pervious project gave a review of some existing or proposed systems based on the different technologies and also focuses on generic automated irrigation system based on WSN with GSM-ZigBee for remote monitoring and controlling devices. The objective was to made use of wireless sensor network and communication technology such as ZigBee and GSM in industrial field to made low-cost automated irrigation system to monitor the condition of the soil and to lower the energy consumption. This project was help the farmer to monitor and control the parameters of the soil such as air temperature, humidity, soil moisture. At any abnormal condition, the farmer was informed and will be able to take actions remotely by using GSM. Due to its lower energy consumption and low cost, the system has the potential to be useful in semiarid or arid areas [1]. Auto irrigation project was used soil moisture sensor to detect the moisture level and 4X4 keypad for various crops control. When the moisture content of the soil was reduced then the sensor send detected value to the microcontroller. Then the water pump is automatically ON according to the moisture level. The main aim of this project was to reduce the human intervention for farmers and use solar energy for irrigation purpose. The entire system controlled by the PIC microcontroller [2]. Smart Irrigation System was

developed an automated irrigation mechanism which turns the pumping motor ON and OFF on detecting the moisture content of the earth using the soil moisture sensor without the intervention of human. The benefit of employing these techniques was to decrease human interference and it was quite feasible and affordable. This Smart irrigation system project was using an Arduino micro-controller, that was programmed to collect the input signal according to moisture content of the soil and its output was gave to the op-amp that was operate the pump [3]. Wireless Monitoring of Soil moisture, Temperature and Humidity using Zigbee in Agriculture was developed a smart wireless sensor network (WSN) for an agricultural environment. Monitoring agricultural environment for various factors such as soil moisture, temperature and humidity along with other factors can be of significance. A traditional approach to measure these factors in an agricultural environment meant individuals manually taking measurements and checking them at various times. This project investigated a remote monitoring system using Zigbee. These nodes send data wirelessly to a central server, which collects the data, stores it and will allow it to be analyzed then displayed as needed and can also be sent to the client mobile [4].

Indian economy is mainly based on agriculture. While farming, some important soil parameters such as ph, moisture, humidity and temperature are measured for getting high yield

from soil. The method which was used for measurement of these parameters was completely based on chemical process on soil sample. The process is generally carried out in near agriculture Office. Soil Parameter Monitoring with Automatic Irrigation System include the measurement of these parameters on the field so that the farmer did not need to go somewhere else. This system was consist of a fully automated irrigation which was turn on and off a water pump as per the level of moisture in soil[5].

### WORKING



**Fig: Block diagram of IOT based smart irrigation system**

Raspberry Pi is the heart of the system. In this project, The power supply, sensors, water Motor connect to Raspberry Pi. The Raspberry Pi Model incorporates a number of enhancements and new features. Enhanced features are improved power consumption, increased connectivity and greater IO

which made this powerful, small and lightweight. In our system, we will use model which connects to Raspberry Pi kit through DHT11 sensor and water motor. DHT11 sensor is used to sense the humidity and temperature of soil and data is given to Raspberry Pi kit. Hence as the Raspberry Pi kit is connected to Android app and which is connected to server. In this app there are two modes i.e. automatic and manual. When we click on automatic mode then Raspberry Pi kit extracts temperature and humidity from DHT11 sensor, these readings from different sensors are collected and sent to micro controller. It stores collected data in the database and analyzes the stored data and compares it with particular/fixed threshold value. According to that, motor will start or stop. These all processes are handled by Raspberry Pi kit automatically. If we click on manual mode Raspberry Pi kit will check the status of motor i.e. on or off; it sends to the app and person will decide either to keep motor on or off. Thus an irrigation system which controls the flow as per the requirement along with automation. With the use of low cost sensors and the simple circuitry makes these instruments a low cost product, which can be bought even by a poor farmer. This work is best suited for places where water is scarce and has to be used in limited quantity.

## CONCLUSION

In this way, conclude that we have studied the literature survey of various automated irrigation systems and compared them with each other based on their advantages and disadvantages. We found out some problems of existing systems; this problem will be overcome in proposed IOT BASED SMART IRRIGATION SYSTEM. This system is mainly used in agriculture sector to avoid wastage of water and increase irrigation efficiency by using IOT and

Raspberry Pi based irrigation system with the help of DHT11 sensor, we can calculate soil moisture and temperature. Smart irrigation control technology is easily deployable and can be controlled manually or automatically without physical presence at the system or fields. IOT is the best concept to implement this project. The main aim of this project is to save time, money and power of farmers and increase productivity.

## REFERENCES

- [1] Shikha, Vibha. Automated Irrigation System using ZigBee - GSM. International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 5, Issue 5, May 2016.
- [2] V.R. Balaji and M. Sudha, "Solar Powered Auto Irrigation System" presented at International Journal of Emerging Technology in Computer Science and Electronics (IJETCSE), vol. 20 Issue-2, Feb-2016.
- [3] Apurva, Nina Gupta, Dr. J P Navani, Mr. Raghvendra Tiwari, Mrs. Anamika Gupta, Smart Irrigation System IJRST –International Journal for Innovative Research in Science & Technology| Volume 3 | Issue 10 | March 2017.
- [4] C.H. Chavan and V. Karnade, "Wireless Monitoring of Soil moisture, Temperature and Humidity using Zigbee in Agriculture" presented at International Journal of Engineering Trends and Technology (IJETT), vol. 11, May-2014.
- [5] Sonali.D. Gainwar and Dinesh.V. Rojarkar, "Soil Parameters Monitoring with Automatic Irrigation

System” presented at International Journal of Science, Engineering and Technology Research(IJSETR),vol04,Issue 11,Nov 2015.

[6] R.Nandhini, S. Poovizhi, Priyanka Jose, R.Ranjitha, Dr.S.Anila, “ARDUINO BASED SMART IRRIGATION SYSTEM USING IOT” 3rd National Conference on Intelligent Information and Computing Technologies, IICT '17.

[7][https://www.google.co.in/url?sa=t&source=web&rct=j&url=https://cdn.sparkfun.com/assets/learn\\_tutorials](https://www.google.co.in/url?sa=t&source=web&rct=j&url=https://cdn.sparkfun.com/assets/learn_tutorials)