

# Automated Drip Irrigation Using Wireless Sensor Network

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**Abstract-** An automated drip irrigation system is developed for supplying the accurate amount of water required for the crop from the estimated standards. The system has a distributed wireless sensor network of soil moisture, humidity and temperature sensors placed in the root zone of the plants and the kit respectively. In addition to this a gateway unit handles sensor information which triggers effectors and transfers information to a desktop and android application. An algorithm is developed with average values of temperature and soil moisture per day which is programmed into a Raspberry Pi microcontroller based gateway to control water quantity. The information from sensors and the database will be stored on Cloud. The calculation is based on the sensor input values and the database for irrigation schedule for grapes. The water will be supplied to the plant according to the computed values.

**Keywords:** IOT, Cloud Computing, Automated wireless system, Raspberry Pi.

## I. INTRODUCTION

The continuous increasing demand of the fruit requires the rapid improvement in fruits production technology. In a country like India where 75% of the economy is based on agriculture and the climatic conditions are isotropic still we are not able to make full use of agricultural. The main reason is the lack of rain water. The Zone of unirrigated land in India is because of continuous removal of water due to which the water is decreasing day by day. Another very important reason of water wastage is due to irregular use of water in farming. The modern drip irrigation focuses on saving water by supplying the water at the root zone of the plant in drip by drip form. The most significant advantage of using the modern systems is large amount of water can be saved. In India, in the present era techniques that are used in irrigation is through manual control that is the farmers manually irrigate the land in regular periods of time. The disadvantages of this system are either it consumes more water or inadequate amount of water is supplied to the crop due to which the crops get dried. Due to inadequate water supply, the fruits produced will be in lighter in weight, the lighter weight fruit follows poor marketing. By using the Microcontroller (ARM 11) based Drip irrigation system, the problem can be perfectly dissolved by irrigating the crop when there will be intense requirement of water.

This irrigation system uses relays too mechanically ON/OFF the valves. Earlier the farmers used their experience to irrigate the land but Automatic Drip Irrigation system allows farmers to irrigate the land by supplying the correct amount of water. The valves that were once manually controlled by the farmers are now controlled by Raspberry Pi which is ARM 11 and solenoids.

By using the scientific data the farmer can do smart farming instead of hard laboring. Regardless of the number of labors available the farmer can turn the relays ON/OFF by just triggering the microcontroller. Using this system saturating the soil with improper amount of water at wrong time of the day can be avoided. This system avoids human error and enhances the productivity of crops.

## II. LITERATURE SURVEY

1. Automated Irrigation System Using a Wireless Sensor Network and GPRS Module: An automated irrigation system was developed to optimize water use for agricultural crops. The system has a distributed wireless network of soil moisture and temperature sensors placed in the root zone of the plants. In addition a gateway unit handles sensor information triggers actuators and transmits data to a web application. We evaluated our project according to this techniques we used three sensor like temperature, Soil Humidity for optimizing the water level of crops after setting the set position of sensors<sup>[7]</sup>.

2. MobiCrop Supporting Crop Farmers with a Cloud Enabled Mobile App: This paper enables the crop developers to have up to date information about pesticides and how to use the pesticides. We have developed a mobile application with use of cloud computing where farmer get all information about the crops directly on mobile apps. Design Development of Daughter Board for Raspberry Pi to support Bluetooth Communication using UART Reliable and secured communication between two or more devices requires wired connection. A wireless communication such as Bluetooth WIFI ZigBee etc provides flexible and inexpensive solution for remote applications. A large number of low cost hardware platforms such as Raspberry Pi Arduino bed boards etc. are available that do not provide any inbuilt wireless

module but are equipped with UART I2C ports for design and development of Internet of Things IOT and embedded applications. We access the sensor values on mobile using Wi Fi medium stored on cloud database [6].

### III. EXISTING SYSTEM WITH ARCHITECTURE

In India, an artificial application called Irrigation is used to water the land or soil. This artificial application, gives an entire or an appropriate way in the maintenance of growing agricultural crops of land of disturbed soils in drought affected areas and in low rainfall periods. Frost is one of the main hazardous things related to crops, by using Irrigation system this can be avoided thoroughly which is actually a boon to the farmers. Different types of Irrigation techniques are used to water the crop which automatically differs in how water is supplied or distributed to the entire field from the source. Generally the exact goal of using the Irrigation technique is to supply water to the crops in correct proportion evenly so that all the crops in the particular field will get water neither too much nor too less.

In olden days, the technique used for watering the crops or plants was Surface Irrigation. Then later on, new technique called Sprinkler Irrigation came into existence. But now mostly farmers are using Drip Irrigation System for irrigation of water to the crops or plants.

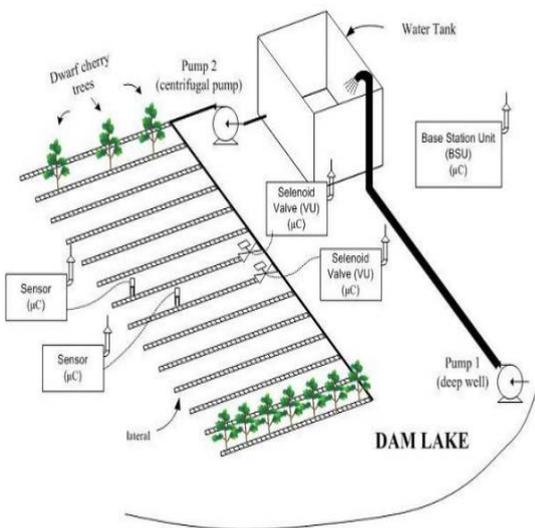


Fig.1 Drip Irrigation System Architecture

Existing system Advantages Disadvantages:

Advantages:

Water is used at Maximum level

Yield of crop is Maximum.

Fertilizers used with high efficiency.

Operational cost is low.

Fertilizers Ground water is not mixed.

Waste of fertilizers is lesson.

Disadvantages:

Initial costing is high.

May cause clogging if water is not filtered correctly.

Problem in Moisture distribution.

High skill required.

### IV. CONCLUSION

Using this system we can reduce man power. And one can operate this system by being anywhere in the world because the system is real time. This system helps the farmers to maintain their irrigation schedule based on the research done by agriculture scientist. Thus farmers can increase their productivity by applying scientific knowledge along with traditional farming.

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