



# Intelligent Drip Irrigation System Based on Remote Monitoring

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**Abstract**— Intelligent drip irrigation is artificial technique of providing water to the roots of the plant. Drip irrigation system is based on remote monitoring as well as controlling. In proposed system both mobile and computer are monitor and control the drip devices. In Intelligent Drip Irrigation system, an android mobile sends commands to computer to control drip irrigation system, here different sensors like humidity, temperature, light etc. will use for detection purpose. These sensors send the real time values to micro-controller and micro-controller send these values to computer via serial communication. According to sensor values the graph will be show on computer and mobile and by using this graph user can switch on or off drip devices. Through modular design, the system builds hierarchical management structure to meet different applications requirements. It can monitor the changes in soil humidity, air temperature, humidity and light and feedback the sensor signals by wireless sensor network. Farmer can control as well as monitor the drip devices from anywhere. Proposed system removes drawbacks of previous systems like distance problem, range problem. Due to the automatic mode, drip devices can be controlled automatically by hardware. This approach is very beneficial for increasing crop production. Rest of the paper followed by Introduction, Related work, proposed system, hardware schematics, experimental results, wireless sensor network, advantages, disadvantages, conclusion.

**Keywords:** drip, remote, SDK, API, GSM, GPS

## 1. INTRODUCTION

Irrigation system in India has given a high priority in economic development. Many new concepts are being developed to allow agricultural automation to flourish and deliver its full potential. We should not just consider the implication of developing a new single technology but should look at the wider issues of agricultural sector regarding irrigation system with available water resources.

- High initial cost
- Loss of water due to evaporation from the area during irrigation
- High and continuous energy requirement for operation
- Under high wind condition, temperature distribution efficiency is poor.

## 2. PROPOSED SYSTEM

At present , The project irrigation control using AT89S52 is designed to tackle the problems of agricultural sector regarding irrigation system with available water resources. Prolonged periods of dry climatic conditions due to fluctuation in annual precipitation, may appreciably reduce the yield of the cultivation. The expenses in establishing many of these crops and their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises.

In this project we are using AT89S52, Moisture sensor, AC submersible pump. A submersible motor will get switched ON /OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. An IoT module is interfaced to the controller to update the information in the web server about the condition of the field.

- Expensive land leveling is not required.
- High efficiency due to uniform water distribution.
- Water saving irrigation intensity can be changed in accordance with the infiltration capacity.

## 3. IMPLEMENTATION

The IoT Based Intelligent Irrigation Control using Rain gun Irrigation System mentioned about using automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be intense requirement of water that save a large quantity of water.

These system brings a change to management of field resources where they developed a software stack called Android is used for mobile devices that include an operating system, middleware and key applications.

The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans.

This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These system covered lower range of agriculture land and not economically affordable.

The System Supports excess Amount of water in the land and uses GSM to send message and an android app is been used they have used a methodology to overcome under

irrigation, over irrigation that causes leaching and loss of nutrient content of soil they have also promised that Microcontroller used can increase System Life and lower the power Consumption.

There system is just limited to the automation of irrigation system and lacks in extra ordinary features. In GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile.

- The system supports water management decision, used for monitoring the whole system with GSM(RS-232) module
- The system continuously monitors the water level (Water level Sensor) in the tank and provide accurate amount of water required to the plant or tree (crop).
- The system checks the temperature, and humidity of soil to retain the nutrient composition of the soil managed for proper growth of plant.
- Low cost and effective with less power consumption using sensors for remote monitoring and controlling devices which are controlled via SMS using a GSM using android mobile.

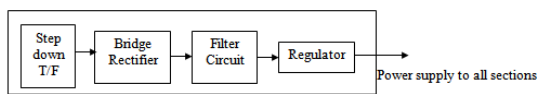
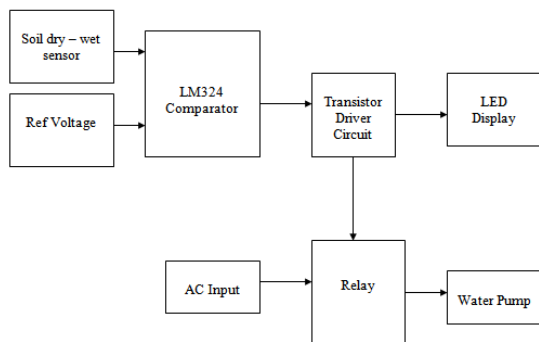


Figure 1 Overview of drip irrigation system

### Irrigation:

Automated irrigation system uses valves to turn motor ON and OFF. These valves may be easily automated by using controllers. Automating farm or nursery irrigation allows farmers to apply the right amount of water at the right time, regardless of the availability of labor to turn valves on and off.

In addition, farmers using automation equipment are able to reduce runoff from over watering saturated soils, avoid irrigating at the wrong time of day, which will improve crop performance by ensuring adequate water and nutrients when needed. Those valves may be easily automated by using controllers [1].

Automating farm or nursery irrigation allows farmers to apply the right amount of water at the right time, regardless of the availability of labor to turn valves on and off.

### Methods:

A pipe with rain gun irrigation mechanism attached, is connected to the water pump, the other end of the pipe is near to the root of the plant. The flow of water is managed by solenoid valve. The opening and closing of valve is done when a signal is send through microcontroller. The water to the root of plant is done drop by drop using rain gun and when the moisture level again become normal then sensor senses it and send a signal to microcontroller and the value is then closed.

The two mobile are connected using GSM. The GSM and microcontroller are connected using MAX232. when moisture of the soil become low moisture sensor sense it and send signal to microcontroller, then the microcontroller gives the signal to mobile and it activate the buzzer. This buzzer indicates that valve needs to be opened by pressing the button in the called function signals are sent back to microcontroller.

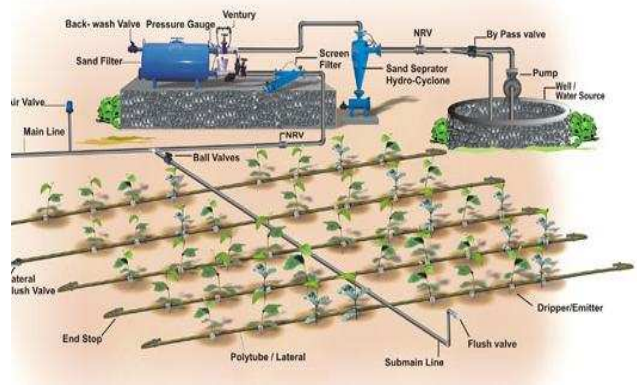


Figure 2: Block diagram of irrigation in field

### Algorithm:

It states the steps that the proposed system undergoes.

- Step 1: Start the process.
- Step 2: Initialize power is supplied to GSM.
- Step 3: Check the moisture level (less than or more than).
- Step 4: If the level will be more than a fixed criteria, no need to irrigation.
- Step 5: If Moisture level is less than a fixed criteria, start irrigation.
- Step 6: Initialization of pump and rain gun.
- Step 7: After the process completed, It moves to original state.
- Step 8: Stop the process.

Another methodology is broad based and is relatively one of the efficient system that has developed windows application to monitor the field. Field is equipped with wireless communication sensors that avails better facilitated sensor communication and covers wider field area.

A conceptual system layout of distributed in-field WSN is illustrated in below Figure. The system consists of five infield sensing stations distributed across the field, an irrigation control station, and a base station. The in-field sensing stations monitor the field conditions of soil moisture, soil temperature, and air temperature, whereas a nearby weather station monitors



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micrometeorological information on the field, i.e., air temperature, relative humidity, precipitation, wind speed, wind direction, and solar radiation. All in-field sensory data are wirelessly transmitted to the base station. The base station processes the in-field sensory data through a user-friendly decision making program and sends control commands to the irrigation control station. The irrigation control station updates and sends geo-referenced locations of the machine from a differential GPS mounted at the cart to the base station for real-time monitoring and control of the irrigation system. Based on sprinkler head GPS locations, the base station feeds control signals back to the irrigation control station to site-specifically operate individual sprinkler to apply a specified depth of water [2].

## 4. EXPERIMENTAL RESULTS

- Save water, energy and manpower in the agriculture sector.
- Resource optimization technique is achieved in intelligent drip irrigation system.
- Provide the decision support for intelligent drip irrigation system.
- Automatically as well as manually system handling and detecting of water level.
- Increases the crop production and it uses the different sensors like temperature, light, humidity, soil moisture so it can be used in area where water resources are less.
- Complete elimination of manpower

## 5. CONCLUSION

This review is proposed to supports aggressive water management for the agricultural land. Microcontroller in the system promises about increase in systems life by reducing the power consumption resulting in lower power consumption. It is considered to be used at Cricket stadiums or Golf stadiums and also in public garden area for proper irrigation. Automated irrigation system has a huge demand and future scope too. It is time saving, led to removal of human error in adjusting available soil moisture levels and to maximize their net profits in accordance to factors like sales, quality and growth of their product.

## REFERENCES

- [1]. NandiniPatil, LaxmiShabadi, Nikita.M, Shruti.J, Smitha. P&Swati. C, "Irrigation Control System Using Android and GSM for Efficient Use of Water and Power", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 7, July 2014
- [2]. Pavithra D.S, M. S .Srinath, "GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) Vol 11, Issue I, Jul-Aug 2014, pp 49-55.
- [3]. R.Suresh, S.Gopinath, K.Govindaraju, T.Devika, N.SuthanthiraVanitha, "GSM based Automated Irrigation Control using Raingun Irrigation System", International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 2, February 2014.
- [4]. Shiraz Pasha B.R., Dr. B Yogesha, "Microcontroller Based Automated Irrigation System", The International Journal Of Engineering And Science (IJES), Volume3, Issue 7, pp 06-09, June 2014.
- [5]. S. R. Kumbhar, Arjun P. Ghatule, "Microcontroller based Controlled Irrigation System for Plantation", Proceedings of the International MultiConference of Engineers and Computer Scientists 2013Volume II, March 2013.
- [6]. S. Harishankar, R.Sathish Kumar, Sudharsan K.P, U. Vignesh and T.Viveknath, "Solar Powered Smart Irrigation System", Advance in Electronic and Electric Engineering, Volume 4, Number 4 (2014)..
- [7]. Venkata Naga RohitGunturi, "Micro Controller Based Automatic Plant Irrigation System", International Journal of Advancements in Research & Technology, Volume 2, Issue4, April-2013.
- [8]. Mahir Dursun and Semih Ozden, "A wireless application of drip irrigation automation supported by soil moisture sensors", Scientific Research and Essays, Volume 6(7), pp. 1573-1582, 4 April, 2011.
- [9]. S. Harishankar, R.Sathish Kumar, Sudharsan K.P, U. Vignesh and T.Viveknath, "Solar Powered Smart Irrigation System", Advance in Electronic and Electric Engineering, Volume 4, Number 4 (2014). Yunseop (James) Kim, Member, IEEE, Robert G. Evans, and William M. Iversen, "Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network", IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, Volume 57, Number 7, JULY 2008