

# A REVIEW ON GSM AND SOLAR PANEL BASED AUTOMATIC IRRIGATION SYSTEM

<sup>1</sup>Kriti Sisodia, <sup>1</sup>Mohd Azharuddin, <sup>1</sup>Mohd Monis, <sup>1</sup>Richa Yadav, <sup>2</sup>Manjari Sharma  
<sup>1</sup>U.G. Scholars, Dept. of E&C Engg., MIT Moradabad  
Ram Ganga Vihar, Phase II, Moradabad (244001), India

## ABSTRACT

*The farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation. Even if the farmland has a water-pump, manual intervention by the farmers is required to turn the pump ON/OFF whenever needed. Therefore using an Android application which helps the farmer to ON/OFF the motor without his physical presence in the field. This paper has real time sensing and control of an irrigation system. When the condition of water in the agricultural farm is abnormal then the system automatically switches OFF. Based on the soil moisture, through relay the pumping motor will be automatically switch on or off which saves the water and on the other hand the plant can get most appropriate water level which increases the productivity of the crop. Using GSM (Global System for Mobile communication) technology which is used to inform the user about the exact condition of the field. This information is passed onto the user request in the form of SMS (Short Message Service). The proposed system provides uniform and required water level for the agricultural farm and it avoids water wastage.*

**KEYWORDS**-GSM, Rain sensor, Soil moisture sensor, Pump, Relay.

## I. INTRODUCTION

Agriculture plays the major role in economics and survival of people in India. Nowadays Indian agriculture faces a two major problem. They are as follows; know government has promoted a free supply of electricity for farmers to run their motors and pumps for irrigation purpose. But it is found that the farmers misusing the electricity to run their home appliances such as radio, TV, fans, etc. This misuse of electricity has brought a considerable problem for government to supply free electricity. Since most of the farmers have less knowledge about the nature of their soil and its fertility, they cannot find the right seeds for their fields to be sowed.

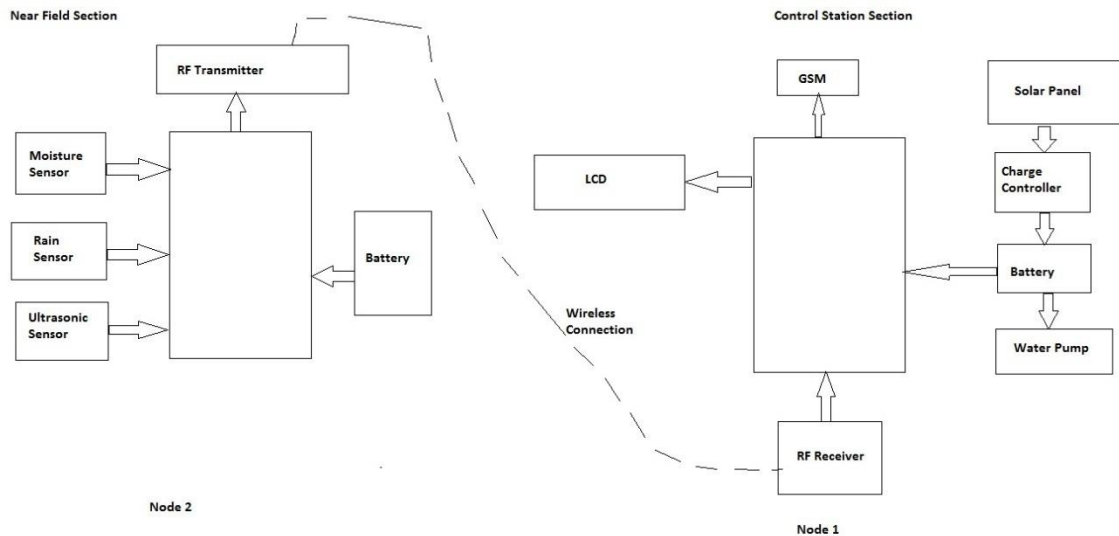
To avoid these problems a microcontroller based embedded system has been proposed in this project. This proposed system recognizes whether the free electricity has been used other than electric motors for pumping water and if so electricity is being misused, it shuts the total supply for the farmers through a tripping circuit. By using wireless networks can intimate the electricity board about these mal practices. This system also helps the farmers to find their soil fertility. In this paper also use humidity sensor to identify humidity of the soil where as this senses automatically water will pumped to certain field.

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.

An algorithm was developed with threshold values of temperature and soil moisture that was programmed into a microcontroller-based gateway to control water quantity.

The development of the automated irrigation system based on microcontrollers and wireless communication at experimental scale within rural areas is presented. The aim of the implementation was to demonstrate that the automatic irrigation can be used to reduce water use. This gateway

permits the automated activation of irrigation when the threshold values of soil moisture and temperature is reached.



**Fig 1.1:** Block diagram of proposed project

### Advantages of proper watering for plants:

- 1) When irrigation becomes necessary and sufficient water should be applied so that the soil is wetted to the depth of four to six inches. This amount of water will vary with the soil texture, approximately one inch of water should thoroughly wet most soils to a depth of four to six inches.
- 2) Irrigate the field at any time during the day or night times. However, both day and night time watering have their advantages and disadvantages. The Midday watering can serve to cool the turf and reduce heat stress on hot summer days.
- 3) Night irrigation helps to conserve water because of the minimal evaporation at night. Unless disease will occur and actively damaging the field, there is little reason to avoid the night watering. The late afternoon or early morning watering may help to minimize evaporation without aggravating disease activity.

## II. LITERATURE SURVEY

**K.S.S. Prasad[1]** In this author proposed an embedded system for automatic control of irrigation. In this author introduce system which will provide wireless connection between server and nodes. Embedded system for automatic irrigation provide potential solution to support specific irrigation management, maximize productivity and saves water. This project is designed using microcontroller. Sensors value are sent to the base station by detecting field temperature and field humidity (using their respective sensors). Automatic irrigation is performed after the conditions checked by base station for irrigation. Field station communicates with base station through GSM.

**Rashid Hussain[2]** In this author proposed the automated control to avoid damage of crops due to surplus usage of water. In manual control we simply using a water pump to supply water to crops. Here, system uses a automatic control by continuous monitoring. We uses various microcontrollers with GSM to develop continuous monitoring. By incorporating this method, water and electricity was used efficiently. It gives better performance by avoiding problems in a very efficient and innovative manner by using wireless technology.

**Pranita A. Bhosale[5]** By this technique we can reduce water consumption by setting lower and upper threshold to maintain optimum soil moisture saturation and minimize plant wilting. This provide deeper plant root growth, less favorable conditions for insect and fungal disease. It lower nutrition costs by controlling the nutrition levels. Controlled system prevents from environmental nutrition pollution. Hence will have great saving of irrigation water, stronger, healthier plants and stable, high yields results in improvement of biological yields.

**Neelam R. Prakash[7]** In this author works on WSN based automated agriculture monitoring system. The readings of temperature and moisture were recorded and sent to farmer's mobile to take proper action. In this author proposed GSM based remote controlled embedded system for irrigation. Exchange of information via SMS on GSM network. By using this system farmer get the information of electricity status at farm field, warning message like smoke in farm field due to fire etc using a mobile phone. The farmer can switch off the motor from anywhere far from the field. GSM technology provide efficient utilization of water and men power.

**ChandrikaChanda[8]** The irrigation system based on GSM were all remotely controlled systems where exchange of information takes place via SMS and GSM. The soil moisture level is one of the important parameter of agriculture, which controls the quality of crops grown in any type of field. The system monitors soil moisture and perform automated irrigation management. System divided into two main blocks- Sensor module and substation. The system includes an 8-bit microcontroller (Atmega64), Bluetooth module, GSM and RS232 interface. Here the microcontroller is interfaced with different sensors for monitoring the crops. The analog to digital converter converts the analog data into digital data.

**HemantIngale[9]** According to other, "Automated solar based agriculture pumping" help in saving men power, water to improve production, finally profit. Water saving is the main aim of our system and with the help of scheduling principle we have tried to achieve that, it will definitely helps the human being to save water and in such a way and it will be helpful for earth.

**Abhinav Rajpal[7]** In this the author proposed a microcontroller based automatic irrigation system and says that The heart of the automatic irrigation system is the 80C51 microcontroller. The Intel 80C51 incorporates therein a 128×8 read/write data memory, which has 4K bytes of EPROM and is expandable to 64K bytes via RAM module [3]. The microcontroller also includes four 8-bit ports (32 I/O lines), two 16-bit timer/counters, a high performance, full-duplex serial channel and on chip oscillator and clock circuits. Eight of the I/O lines comprising Port 0 function as an address bus 20 and a data bus. Address information at

Port 0 may be applied, via an address latch, to the address bus. A moisture sensor is associated with each of the plurality of zones. Each such sensor is periodically interrogated by a pulse signal provided by the microcontroller via a driver or buffer circuit. This interrogation signal causes the moisture sensors to output an analog voltage which is proportional to the amount of moisture in the soil in which the sensors are embedded.

### III. CONCLUSION

The automated control is implemented here to avoid damage of crops due to surplus or deficit usage of water. The already existing system uses simple water pumps to supply water to the crops as and when required by manual control. Another disadvantageous method is the discontinuous monitoring of the water level by using GSM (global system for mobile communications) technology. But, the proposed system uses automatic control by using continuous monitoring.

Thus the continuous monitoring of the agriculture was designed and developed using various microcontrollers by using GPRS. In existing method, only discontinuous was obtained by the use of GSM which led to inefficient use of water and electricity. Hence by incorporating this method, the water and electricity was used efficiently. Compared with the existing method it gives better performance.

### REFERENCES

- [1]. K.S.S. Prasad, Nitesh Kumar, Nitish Kumar Sinha and Palash Kumar Saha "Water-Saving Irrigation System Based on Automatic Control by Using GSM Technology" Middle-East Journal of Scientific Research 12 (12): 1824- 1827, 2012.
- [2]. Rashid Hussain, JL Sahgal, Anshulgangwar, Md.Riyaj International "Control of Irrigation Automatically By Using Wireless Sensor Network".
- [3]. Godfrey a. mills, Stephen k. Armoo, Aagyeman k.Rockson "GSM Based Irrigation Control and Monitoring System".

- [4]. 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” VOL. 57, NO. 7, JULY 2008 1379.
- [5]. Pranita A. Bhosale, Prof. V. V. Dixit “ Water Saving-Irrigation Automatic Agricultural Controller” volume 1, issue 11, december 2012.
- [6]. Sanjukumar, R.V.Krishnaiah“ Advance Technique for Soil Moisture Content Based Automatic Motor Pumping for Agriculture Land Purpose” Volume 04, Article 09149; September 2013.
- [7]. Neelam R. Prakash, Dilip Kumar, TejenderSheoran, “Microcontroller Based Closed Loop Automatic Irrigation System”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Volume-1, Issue-1, June 2012.
- [8]. ChandrikaChanda, Surbhi Agarwal, Er. B.Persis Urbana Ivy, AP, “A Survey of Automated GSM Based Irrigation Systems”, International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, Volume 2, Issue 10, October 2012).
- [9]. HemantIngale, N.N.Kasat, “Automated Solar Based Agriculture Pumping”, International Journal of Advanced Research in Computer Science and Software Engineering ISSN: 2277 128X Volume 2, Issue 11, November 2012.
- [10]. ZachariaMzurikwao, Dr.WangLiqiang, “Zigbee and GSM Technology Based Irrigation Control System”, International Journal of Engineering Research &Technology (IJERT), Vol. 2 Issue 3, March – 2013, ISSN: 2278-0181.
- [11]. Chavez, J. L., Pierce, F. J., Elliott, T. V., Evans, R. G., Kim, Y., &Iversen, W. M. (2009). “A remote irrigation monitoring and control system (RIMCS) for continuous move systems. Part A: Field testing and results”, Precision agriculture Precision Agriculture.
- [12]. MahirDursun and SemihOzden (2011). “A wireless application of drip irrigation automation supported by soil moisture sensors”, Scientific Research and Essays Vol.

## **AUTHOR’S BIOGRAPHY**

**Manjari Sharma**, Assistant professor in the department of Electronics and Communication Engineering at M.I.T Moradabad. She has completed her master’s degree from Mewar University Rajasthan and bachelor’s degree in electronics and communication engineering. Her main research interest lies in the area of communication and VLSI design. In recent year, she focused on using modern Digital communication techniques and VLSI design. She has published several papers in journal and in the conference papers as well.



**Kriti Sisodia**, Student of Electronics and Communication Engineering, Moradabad Institute of Technology, Moradabad, Uttar Pradesh (244001), and Area of interest Microcontroller and Embedded System.



**Mohd Azharuddin**, Student of Electronics and Communication Engineering, Moradabad Institute of Technology, Moradabad, Uttar Pradesh (244001), and Area of interest Digital electronics and Embedded System.



**Mohd Monis**, Student of Electronics and Communication Engineering, Moradabad Institute of Technology, Moradabad, Uttar Pradesh (244001), and Area of interest Digital electronics and Embedded System.



**Richa Yadav**, Student of Electronics and Communication Engineering, Moradabad Institute of Technology, Moradabad, Uttar Pradesh (244001), and Area of interest Digital electronics and Embedded System.

