

A REVIEW PAPER ON WIRELESS SENSOR NETWORK AND GPRS MODULE FOR AUTOMATED IRRIGATION

Mayuri R. Harde¹, Dr. N. K. Choudhari²,

¹M.Tech student, Dept. of Electronics & Communication Engineering, Priyadarshini Bhagwati College of Engineering, Maharashtra, India

² Principal & professor, Dept. of electronics & Communication Engineering, Priyadarshini Bhagwati College of Engineering, Maharashtra, India

Abstract - In India 60 -70% economy depends on the farming. Irrigation system in India has given a high priority in money making. Many new technology are being urbanized to permit agricultural automation to increase and carry its complete potential. To get whole benefit of these technologies, we would not just think the suggestion of developing a new single technology but should appear at the wider issues for entire development of a system. In our country, crop growing are depends on the climatic condition which is not sufficient source of water. Use of excessive amount of water use there is damage of soil. In Irrigation system, depending upon the soil strategy, water is provided to plant. An automated irrigation system was developed to optimize water use for agricultural crops. The system has a wireless distributed sensor network of soil-moisture, humidity and temperature sensors placed in the root of the plants. In previous, automatic irrigation system based on ARMs and RF module are used. The system were powered by photovoltaic panels and have at a time transmit and receive communication link base on a cellular- Internet boundary that allowed for data examination. The aim of our paper is to modernizing agriculture technology by programming components and built the necessary component for the system.

Key Words: WSN, Irrigation system, soil moisture sensor, temperature sensor, RF module.

1. INTRODUCTION

AGRICULTURE mainly depends on fresh water and there is increased utilization of water due to over population and demand for food materials. So agriculture is in need of a best strategy based on irrigation for optimum use of fresh water, together with quality improvements. With the different landforms, different atmospheric situation and unexpected use of waters natural resources which causes the lack of water forces us to think in different way. Best solution to this trouble is irrigation system and sprinkler irrigation. In agriculture, there is two things is very important, first to get information of

about fertility of soil and second is to determine moisture content of soil. Nowadays for irrigation different techniques are available which is used to reduce the dependence of rain.

There are lots of systems to achieve water savings in different crop, from basic ones to more technologically advanced ones. Infrared canopy temperatures, ambient air temperature and atmospheric vapor pressure shortage values used to measure the index value to resolve when to irrigate corn using drip irrigation. To monitor a variety of environmental parameters or conditions in marine, soil and atmospheric contexts using sensor networks in environmental industry. Appropriate management, such as monitoring of environmental conditions like weather, soil moisture content, soil temperature, soil fertility, mineral content, soil pH range, water quality management, moisture content and monitoring growth of the crop, automated irrigation facility and storage of agricultural products have been used to provide data used in agricultural applications. Irrigation system is very useful in agriculture with the different techniques.

These technique, irrigate using subsequent technique.

- Internet based monitoring using servers , GPRS modems, etc with unlike approaches.
- GSM-SMS protocols using GSM module independently or in grouping with internet technologies.
- Monitor using wireless sensor networks.
- Wireless monitoring using Bluetooth, WI-FI, Zigbee and RF.
- Applications have wide-ranging like home automation security systems, biomedical applications, agriculture, reservoir bridge health monitoring etc.

2. LITERATURE REVIEW

A. A Novel Approach For Automatic Irrigation And Fertigation Using Embedded System [1]

Many irrigation systems are used to apply capable irrigation scheme for the field having different crops. The system can be further better by using fuzzy logic controller. The fuzzy logic scheme is used to increase the accuracy of measured value and assists in decision making. In this also used wireless network. Fuzzy logic is very hard to understand.

B. Review For ARM Based Agriculture Field Monitoring System [2]

The automatic irrigation system based on microcontroller and for communication GSM technology was used. Soil moisture sensor positioned in core zone in paddy ground and sense water level. The system was set up using ARM7TDMI core and GSM. GSM is an important part of this system. GSM service is send SMS to our and is a connection under the ARM processor and centralized unit. This information send to user in the form of SMS and GSM modem controlled with the help of standard set of AT(Attention) commands. These commands are used to control majority of the functions of GSM mode.

C. Microcontroller based Automatic Water level Control System [3]

Zigbee is also have disadvantages i.e. low transmission rate. It is only use for smaller distance. Maximum papers have problem in networking and also some security issues. Therefore we used another technique for irrigation which is very beneficial.

D. Efficient Registration Of Optical And IR Images For Automatic Plant Water Stress Assessment [4]

Automatic listing of optical and IR images is a crucial step towards constructing an automated irrigation organize system where plant water information is sensed using thermal processing. A computationally efficient algorithm is designed and packaged as a

software application. This work provides an interference free process for extracting plant water stress information which can be fed into an automated irrigation development program.

E. An Acoustic Method For Soil Moisture Measurement [6]

In this paper, soil moisture content has been detected using acoustic based technique was developed. The main propose of this technique is development for measure soil moisture in real time method. The technique based on two quantities i.e. speed of sound and the degree of saturation with water in soils. This testing found that the rate of sound decreases with the moisture content depending on the kind of soil.

3. PROPOSED WORK

All above techniques have some trouble like security measures issues, low broadcast rate etc. For eliminate this problem, so we need new modern technology for efficient crop production. In this model, automatic irrigation system based on GPRS module and wireless sensor network based on internet of things (IoT) is used. GPRS module is packet based wireless communication service that promises data rate from 56 upto 114 kbps and continues connection to the internet and computer user. All nodes is connected will be integrate node and this node is used ARM and lasting two nodes is used microcontroller which is low power device. One more thing will be further that is node to node communication for better results and more area will be cover. The system has a distributed wireless network of soil-moisture and temperature sensors placed in the root zone of the plants and sense condition and convey the information to centralized node and other nodes. When nodes are receiving the information then system will be start automatically.

4. APPLICATION

- This is used for poly houses for providing suitable irrigation to plants.
- This is also used in garden plants.

5. ADVANTAGE

- Irrigation improves the yield of crops and make people prosperous.

- For proper nourishment of crops certain amount of water is required. If rain fall is adequate there will be deficiency in fulfillment of water. Thus irrigation is mostly used in dry years.

6. CONCLUSIONS

This paper developed on agriculture field and increase growth food production. This can also useful for increasing the economy and demand of food necessity. The use of solar power in this irrigation system is pertinent and significantly important for organic crops and other agricultural products that are geographically isolated, where the investment in electric power supply would be expensive. The irrigation system can be adjusted to a variety of specific crop needs and requires minimum maintenance.

REFERENCES

- [1] Vimal. P, Priyanka. V, Rajyasree.M, SanthiyaDevi.P.T, Jagadeeshraja.M, SuthanthiraVanitha.N, "A Novel Approach For Automatic Irrigation And Fertigation Using Embedded System," International Journal Of Vlsi And Embedded Systems-IjvesVol 05, Article 03257; March 2014
- [2] Ms. Sweta S. Patil, Prof. Mrs. A.V. Malvijay, "Review for ARM based agriculture field monitoring system", International Journal of Scientific and Research Publications, Volume 4, Issue 2, February 2014
- [3] Ejiofor Virginia Ebere (PhD)1, Oladipo Onaolapo Francisca (PhD)2, "Microcontroller based Automatic Water level Control System", International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 6, August 2013
- [4] X. Wang, W. Yang, A. Wheaton, N. Cooley, and B. Moran, "Efficient registration of optical and IR images for automatic plant water stress assessment," *Comput. Electron. Agricult.*, vol. 74, no. 2, pp. 230–237, Nov. 2010.
- [5] Jia Uddin, S.M. Taslim Reza, Qader Newaz, Jamal Uddin, Touhidul Islam, and Jong-Myon Kim, "Automated Irrigation System Using Solar Power" ©2012 IEEE
- [6] Samy Sadeky, Ayoub Al-Hamadiy, Bernd Michaelisy, Usama Sayedz, "An Acoustic Method for Soil Moisture Measurement", IEEE 2004
- [7] G. Yuan, Y. Luo, X. Sun, and D. Tang, "Evaluation of a crop water stress index for detecting water stress in winter wheat in the North China Plain," *Agricult. Water Manag.*, vol. 64, no. 1, pp. 29–40, Jan. 2004.
- [8] S. B. Idso, R. D. Jackson, P. J. Pinter, Jr., R. J. Reginato, and L. Hatfield, "Normalizing the stress-degree-day parameter for environmental variability," *Agricult. Meteorol.*, vol. 24, pp. 45–55, Jan. 1981