

AUTOMATIC BLUETOOTH BASED IRRIGATION SYSTEM

T.Sri Lakshmi¹, T.Sowmya², P.Pushpa³

^{1,2&3} Assistant Professor, Dept. of ECE, St.Martins Engineering college, Dhulapally(v), Kompally, Secunderabad-500100 Telangana state, India

ABSTRACT:

An automated irrigation system was designed based on Bluetooth to use in the agricultural crops. The Bluetooth is a wireless radio communication between the farmers Smartphone and the Microcontroller AT89S52. The Bluetooth is preferred because of its cost efficient, so that it can be affordable to almost all farmers. This paper describes the details of the design and instrumentation of wireless network, control of irrigation system with correct soil, water, and temperature content. Also the light emitted by AC load is also sensed by LDR. The information on the AT89S52 is displayed in the LDR. The experimental results show that the use of Bluetooth in the irrigation process of agriculture could become a practical tool for agriculture.

Keywords: *Bluetooth, HC05, AT89S52, Soil Moisture sensor.*

1. INTRODUCTION

Irrigation is the delivery of water to grow crops. The irrigation system helps the farmers to have less dependency on rain-water for the purpose of agriculture. The types of irrigation are Tanks, Well, Canal. Some 53.5 billion gallons of groundwater are used daily for agricultural irrigation. In today's irrigation method, 2000 more cubic km of water will be needed per year. It is mainly used to monitor temperature, humidity, light intensity and water level. In this paper, an automatic irrigation system that works based on Bluetooth wireless network by the use of Arduino UNO is designed in order to reduce the manual work of farmers using Bluetooth based smart wireless sensor network.

1.1 Objective.

- In today's world due to irrigation there might be some possible wastage. It may be water wastages, wastages of crops.
- In order to solve this issue we introduce an automatic irrigation system.
- By using this system it will possibly reduce such wastages. So that better utilization of resources can be made possible.
- It shows the basic switching mechanism of motor using sensors by sensing moisture present in the soil.

1.2 Purpose.

- To prevent wastage of water and energy.

- For sustainable use of water and judicious use of electricity.
- Attention and observation.

OVER VIEW:

Agriculture or farming is a process of cultivation and breeding of animals, plants and micro-organisms present in soil such as fungi for food, medicine, fuel and other products that are essential for leading a self-sustainable and auto enhancing human life. Agriculture play a vital role in rise of human civilization which led to farming of domesticated species with the motive of creating food surpluses that nourished the developing civilization. The agriculture is the back bone of Indian economy and ranks second world wide for agro products in today's scenario. Agriculture along with its supporting sector accounts 13.7% as its contribution to Indian GDP. Agriculture is a sector where more human power is required along with climate support. This sector does not yield money as much as its products. Though the monetary benefit is less, the demand for agro-products increases with increase in population as it is the only source for food and nutrients to human beings.

2. RELATED STUDY

Irrigation is a process of watering the crops in the field in controlled manner at specific intervals of time. It plays a most significant role in agriculture

such as distribution of soil nutrients to crops; maintain landscapes and collection of distributed soil from dry area, etc. Irrigation is must for agriculture both in modern and organic way during the season where monsoon fails. In organic farming farmer depend on seasonal rainfall and this type of farming is known as dry land farming. In today's environment dry land or rain-fed farming is not completely reliable. Thus, irrigation technique is employed. The irrigation technique varies from country to country, region to region, state to state as it has to be adapted to climatic condition, soil types and variety of the crop in agricultural fields.

The irrigation process used for cultivation of crops in order to supply the required amount of water to them during inadequate rainfall can be automated. Though irrigation technique varies depending on soil type, water availability and type of crop. An automatic system can be developed using micro-controllers which can adapt to any type of irrigation method with a main objective to cut down the man power once and for all after its installation. Some of such systems which differ in their circuits, components used and their way of working are elaborated here.

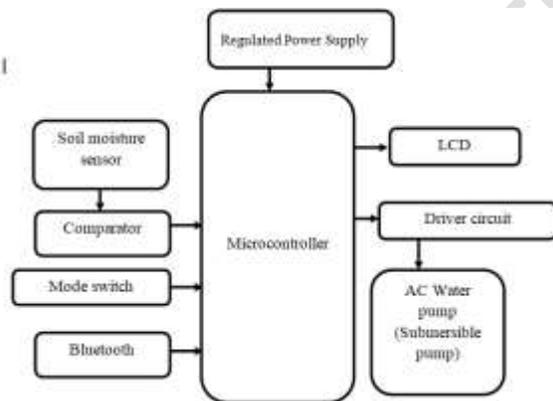


Fig.2.1. Proposed model.

3. PROPOSED SYSTEM

In this system, 8051 micro-controller is used to control and co-ordinate the entire process of irrigation. The required power of 5v is given by a supply circuit that contains a transformer, bridge rectifier circuit and a voltage regulator. The soil moisture content is measured by using two metallic rods. These metallic rods are inserted in the soil and

their output is given to an OP-AMP IC which acts as a comparator and compares the sensed value with the fixed value. The output of this OP-AMP is given to the 8051 controller which ON (or) OFF the submersible pump of the motor through a relay driver circuit. This system is enhancement of the above mentioned system. Here the power required to drive the entire system is obtained by harnessing solar energy by using photovoltaic cells. The moisture content of the soil is determined by inserting two stiff copper wires in the soil which output is given as input to OP-AMP IC -the comparator. The output of comparator is given as input to 8051 which decides whether the motor to be ON (or) OFF and implement it through driver circuit.



Fig.3.1. Hardware output.

OPERATION:

Thus the Microcontroller OFF the Motor using the relay driver and sends an alert message through the Bluetooth as "Water Level Low". Humidity sensors detect the relative humidity of the immediate environments in which they are placed and when it is likely to rain, the sensor read a high value which leads to tripping of the Motor when moisture is low in soil by the Arduino. It is indicated to the farmers by sending a message that "Humidity occurred" and the Motor can be OFF by sending "2" through the Bluetooth. A Light Dependent Resistor (LDR) or a photo resistor is a device that senses the light radiation. Thus it is also known as photo conductors, photo conductive cells or photocells. The motor is

turned on and off by a relay.. After collecting the information it is displayed on the 16X2 LCD screen. Finally the Microcontroller transmits alert information to the farmer's Smartphone through the Bluetooth.

5. CONCLUSION

The design proposed in this paper incorporates the usage of AT89S52-Boot loader. AT89S52 board designs use a variety of microprocessors and controllers and also the board is equipped with sets of digital and analog I/O pins which can be interfaced to various expansion boards and other circuits along with inbuilt ADC IC for signal conversion turned as boon to the proposed system. Automation is done using wireless sensor network reduces the delay when compared to a circuit designed using OP-AMP IC and to increase the accuracy of measuring the physical quantities for real time environment. The Bluetooth's connection establishment is very quick, has less interference and data communication is more secure than Bluetooth and cut down the cost of the system. Thus the design proposed in this paper is low cost, low power consuming, more efficient and secure which helps to reduce the manual work of farmers and this system helps the farmers in a huge way for their agricultural process.

REFERENCES

- [1] Joaquin Gutierrez Jaguey, Juan Francisco Villa-Medina, Aracely Lopez-Guzman and Miguel Angel Porta-Gandara "Smartphone Irrigation Sensor" IEEE Sensors Journal, VOL-15, NO. 9, September 2015.
- [2] Federico Viani, Member, IEEE, Michael Bertolli, Marco Salucci, Member, IEEE, and Alessandro Polo, Student Member, IEEE "Low-cost wireless monitoring and decision support for water saving in agriculture" IEEE Sensors Journal, VOL-17, NO. 13, July 2017.
- [3] Iafang Zhu, Shunlin Liang, Senior Member, IEEE, Yaozhong Pan, and Xiaotong Zhang "Agricultural irrigation impacts on land surface characteristics detected from satellite data products in Jilin , China" IEEE Journal of Selected Topics in Applied Earth Observation and Remote Sensing, VOL 4, NO. 3, September 2011.
- [4] Andrew J. Skinner and Martin F. Lambert "An Automatic soil pore-water salinity sensor based on a

wetting-front detector" IEEE Sensors Journal, VOL-11, NO. 1, January 2011.

[5] Yunseop (James) Kim, Member, IEEE, Robert G. Evans and William M. Iversen "Remote sensing and control of an irrigation system using distributed wireless sensor network" IEEE Transactions on Instrumentation and Measurements, VOL 57, NO. 7, July 2008.

[6] Mehdi Roopei, Paul Rad, and Kin-Kwang Raymond Choo "Cloud of Things in smart agriculture: Intelligent irrigation monitoring system by Thermal Imaging" IEEE cloud of computing by IEEE Computer Society, January/February 2017.

[7]. M. N. Umeh, N. N. Mbeledogu, S. O. Okafor, F. C. Agba, "Intelligent microcontroller-based irrigation system with sensors", American Journal of Computer Science and Engineering, vol. 2, no. 1, pp. 1-4, 2015.

[8]. B. N. Getu, N. A. Hamad, H. A. Attia, "Remote Controlling of an Agricultural Pump System Based on the Dual Tone Multi-Frequency (DTMF) Technique", Journal of Engineering Science & Technology (JESTEC), vol. 10, no. 10, October 2015.