

Lab view Based Remote Location Water Level Monitoring and Control using RF Communication

Charles. A

Abstract: Almost 70% of earth's surface is covered with water and from that also about 2% of the planet's water is fresh. Water is always a crucial part of everyday life. Due to global environmental situation, water management and conservation is vital for human survival. In recent times many water level monitoring systems are available but those systems does not provide all information about the water availability [2]. In this Paper we proposing new concept of water monitoring system to accurately measure the water availability in cubic meters. This water management is proposed for Educational institutions, large scale companies those have more water storage tanks. This is the method to find the availability of water.

Keywords: Water is always a crucial part of everyday life.

I. INTRODUCTION

In this paper we propose advanced water management system for educational institutions and large scale companies. The educational institutions and large scale industries have many storage tanks such as ground level tanks overhead tanks to provide water for them more than 5000 students or workers. They need to manage more storage tank water availability to provide the water for their students without interrupting the service. The available methods provide only the information about water is available or not, it doesn't provide information about the exact quantity of available water. In this paper we provide solution for the above problem. This paper proposing the new water management system. The scenario of the project is one main tank is supplying the water to the end user area tanks. In end user area there are 4 tanks, these tanks supplies the water for nearly 5000 students. The field level measurement system is measuring the water level and sends the information to the central control unit. The field level measurement system consists of arduino uno, ultrasonic sensor, RF transmitter.

The arduino is programmed to read the available water level and it sends the information to the remote located control unit using RF transmitter

II. PROPOSED SYSTEM

The proposed system consists of two major parts Hardware module and Software.

Hardware module

The proposed hardware scheme is shown in the Fig.1. The hardware module (Fig.1) consists of sensor setup and control unit. Each tank have an one sensor setup, the sensor setup consists of ultrasonic sensor (Hs04), RF transmitter and arduino uno[4,5,6]. The sensor is fitted in top of the tank; it measures the empty height of the tank. Through the measurement available water level is calculated. The available water level is calculated in arduino uno and level information is broadcasted using RF transmitter. Each RF transmitter part of the sensor setup is configured by unique address using encoder. In this project there are five tanks each tank have an sensor setup, so all 5 tanks water levels are broadcasted with different encoded address.

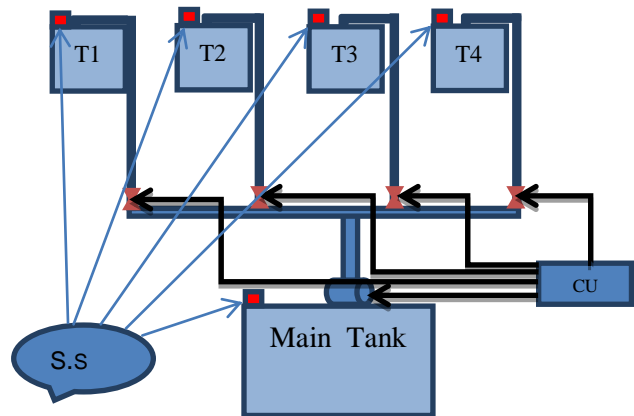


Fig. 1 Block diagram

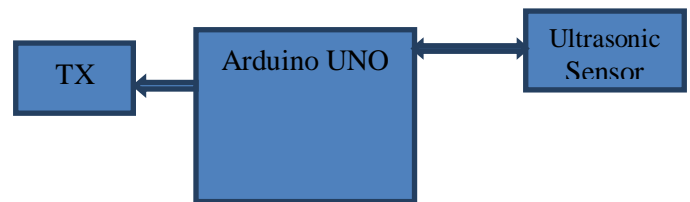


Fig. 2 Sensor Setup

Revised Manuscript Received on February 05 2019.

Charles. A, Assistant Professor, Karpagam College of Engineering, Coimbatore-32, Tamilnadu, India

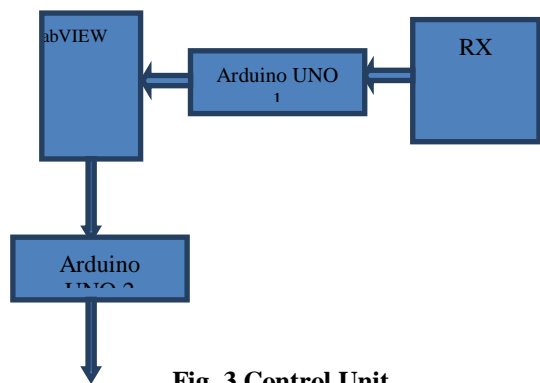


Fig. 3 Control Unit

The control unit have RF receiver, arduino uno, Lab view installed personal computer. The LabVIEW 2014 version having an compatibility with arduino uno. The control unit receiver sequentially receives and processes the transmitted signal. In a first stage it is addressed to receive transmitter 1 signal, after calculate the measurement it is addressed to receive tank 2 transmitter signal. This operation continued upto maintain. The receiver address is changed from the LabVIEW. The main program is developed in LabVIEW (main.vi). The main vi send digital signal through arduino uno, it provide address for receiver to receive signal from tank 1 transmitter. The received signal is water level of the particular tank, based on the water level the available quantity water is calculated in liters. The available amount of water is calculated by the following formula available water in Tank $Q_1 = H_1 * L_1 * B_1$ cubic meters, Where, Q_1 is the available amount of water in tank in terms of liters, H_1 is the available water of the tank 1 in terms of meter, L_1 is the length of the tank 1 in meters, B_1 is the breadth of the tank 1 in terms of meters.

Labview

Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) programs is a graphical programming language which uses icons for creating applications such as instrumentation, data-acquisition, communication and control with automation [10,11]. It is also called virtual instruments, or VIs. It is developed software, like various program languages such as C/C++ and Graphical language offers an advantage of the users that have the ability to change graphical representations of hardware by examining their dynamic link libraries or respective hardware drivers. A set of tools and objects can be used to build a user interface which is called front panel. By using a graphical representation of functions, the code is adding to control the front panel objects .In addition, a simulation with LabVIEW software saves project development time. LabVIEW debugging tool is self-adaptive and easy it is implement and which saves considerable amount of time.

Programming in Labview

The Labview is connected with arduino uno through the Makerhub add-on tool, the add-on tool is installed via VIPM(Virtual Instrument Package Manager). The front panel and block diagram of the program is shown in below Fig.4 & Fig.5 respectively. Monitoring and control program is done through stacked sequence structure. The stacked sequence structure is added with 5 frames. One frame of the sequence structure is allocated for one tank setup measurement. The address for decoding the transmitter 1 signal is programmed in 1, 2, 3, 4th digital I/O pin of the arduino uno. After addressing the receiver decoder, the decoder decoding the corresponding signal and it is read. The received signal is providing information of water level, the water level is converted to volume based on the corresponding dimension of the tank.

Front panel & block diagram in Labview

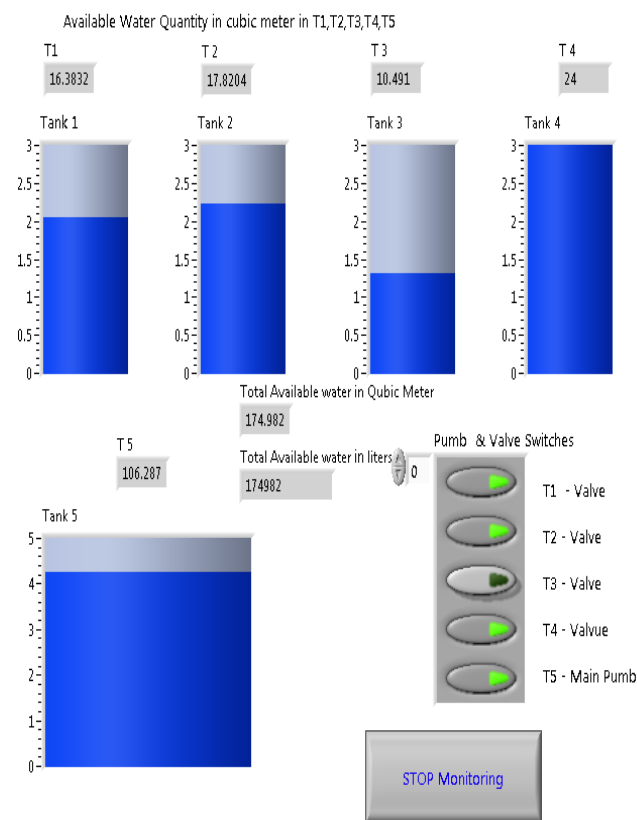


Fig. 4 Front Panel

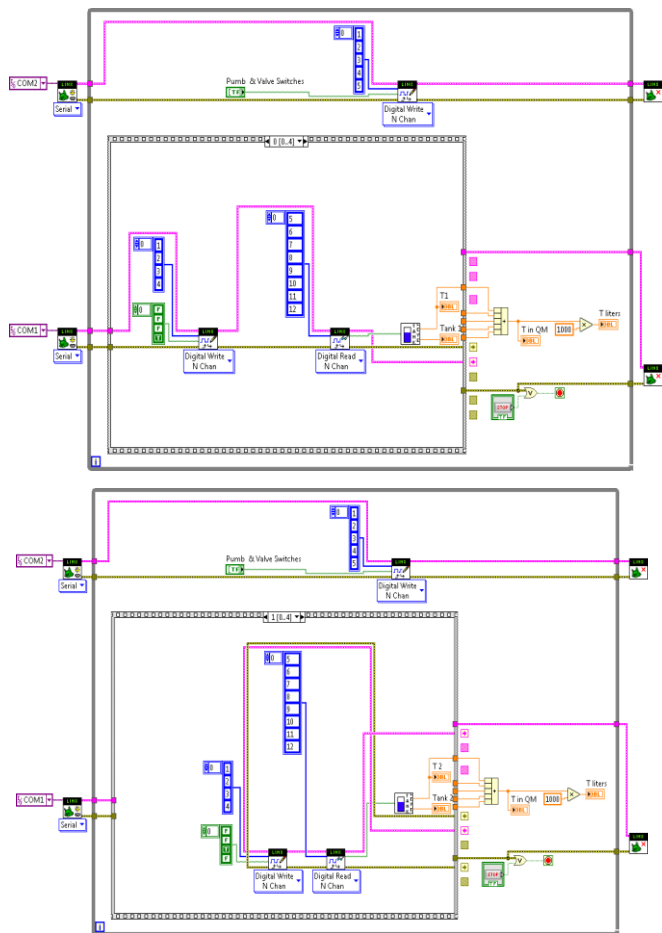


Fig. 5 Block diagram

III. CONCLUSION

This water management scheme is very helpful to save water in educational institute or in large scale industry. In future we can extend this water management technique for suburban and urban areas instead of RF communication, IOT can be used. Through this we can able to monitor the water quantity lively and control water supply from centralized location. This method reduces the wastage of water

REFERENCES

1. Abdul Latheef M M, Shinu M M, Clint Augustine, Rahul Antony, "Labview Based Pid Controller For Cylindrical Tank Level Controlling", International Advanced Research Journal in Science, Engineering and Technology Vol. 2, Issue 4, April 2015.
2. Ejiofor Virginia Ebere, Oladipo Onaolapo Francisca, "Microcontroller based Automatic Water level Control System", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 1, Issue 6, August 2013.
3. Erua J. Band, Anyasi, F. I, "Design of an Automatic Water Level Controller Using Mercury Float Switch", IOSR Journal of Electronics and Communication Engineering, Volume 9, Issue 2, Ver. II Mar - Apr. 2014.
4. Massimo Banzi, "Getting started with Arduino", O'Reilly, second edition 2011.
5. Marco Schwartz, Oliver Manickum, "Programming Arduino with LabVIEW", Packt publishing 2015.

6. Mike McRoberts, "Arduino Starter Kit Manual", Earthshine Design 2009.
7. T. Sivaranjani, P. Malarvizhi and S. Manoharan, "Smart Data Acquisition Technique for Level Process using LIFA", ARPN Journal of Engineering and Applied Sciences, VOL. 10, NO. 13, JULY 2015.
8. Jadhav, G. J(2014), "Design and Implementation of Advanced ARM Based Surveillance System using Wireless Communication, International Journal of Advance Research in Computer Science and Management Studies" Vol 2, 2014.
9. Neena Mani, Sudeesh T.P, Vinu Joseph, Titto V.D, Shamns P.S, "Design and Implementation of a Fully Automated Water Level Indicator", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering 2014 Vol 3 Issue 2, February 2014.
10. National Instruments "Getting Started with LabVIEW", 2013.
11. National Instruments "LabVIEW Basics I Course Manual", March 1998.