iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** V **Month of publication:** May 2018

DOI: http://doi.org/10.22214/ijraset.2018.5125

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue V, May 2018- Available at www.ijraset.com

Design and Development of GUI based Underwater Monitoring System

Keerthana R[1], Meghana C[2], Pallavi GA[3]
[1, 2, 3]*New Horizon College Of Engineering*

Abstract: ***Water quality monitoring is a very important prospect that would ensure safe and clean water being delivered to the end users. Water quality monitoring is essential in controlling physical, chemical and biological characteristics of water.To ensure the proper monitoring of underwater sources such as borewells data has to be collected from different locations and sent to one particular station where it can be efficiently monitored. This paper proposes the use of a system which uses cheap, effective and efficient sensors and Wireless Sensor Networks which is able to sense, process and transmit the sensed data.***
Keywords: ***Underwater sensors, Water quality monitoring, wireless sensor network***

I. INTRODUCTION

India being an agrarian country, our farmers and other villagers depend mainly on groundwater for irrigation and consumption. With increasing population, lesser land holdings and urbanisation, deeper borewells are dug for groundwater abstraction. A water well is an excavation or structure created in the ground by digging, driving, boring, or drilling to access groundwater in underground aquifers. The well water is drawn by a pump, or using containers, such as buckets, that are raised mechanically or by hand. Borewells & tubewells, are very similar. Both are basically vertical or horizontally drilled wells, bored into an underground aquifer in the earth surface, to extract water for various purposes. Boreholes can also be use for extract liquid(petroleum) or gases. Electrical pumps are usually used to pump out the water from the borewells. This convenience of pumps may increase the depletion of the groundwater at an increased pace.

Fig 1. Borewell

Millions of people in India use borewells as a source for drinking water .This source of drinking water can be contaminated by naturally occurring minerals and chemicals. Contamination of bore well water can impact on the household served by the well .Government is responsible for ensuring the water from borewell is free from contamination and potable for drinking. Water level of borewells is not easy to determine as water runs around 1000ft below surface .Traditional methods used in measuring water level include scale and chalk which provides inaccurate reading. Major concern is that the person has to be at borewell site in order to measure level, PH and contamination which is very time consuming and quite impracticable method.

Fig 2. Contaminated Water from a Borewell

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue V, May 2018- Available at www.ijraset.com

II. GAPS IN LITERATURE

Wireless Sensor Networks for Water Quality Monitoring: A Case of Zambia-Current water quality monitoring methods in Zambia are mostly sparse and manual. This paper proposes the us of Wireless Sensor Networks to monitor water quality using efficient sensors that have the ability to sense, process and transmit the sensed data. A new wireless network approach for high speed communication services- In this paper anew system architecture for limited coverage wireless communication networks, called Intermit stations, is proposed. Researches on survivability issues of heterogenous wireless communication network-In this paper status quo of network survivability researches is summarized and particularities of heterogeneous wireless communication network survivability are emphasized.

III. IMPLEMENTATION

Here we build system block diagram and divide the complete system into small modules as per the behaviour of the system.

A. Development Methods

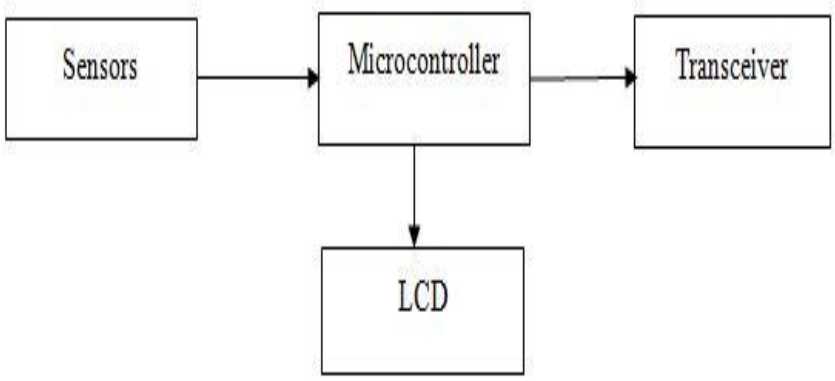


Fig 3.Data Flow at sender site

Data from the sensors are transmitted to the controller via serial port, where this data is processed and then further transmitted to a transceiver. The data is also displayed on an LCD.

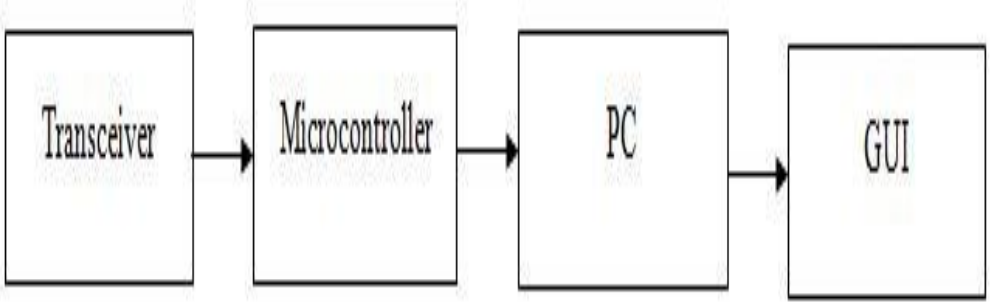


Fig 4. Data flow at receiver site

The received data over the wireless link is fed to the controller to displaying it on the terminal window of the pc for monitoring. The data is also used to build a GUI to easily analyse the data.

B. System Architecture

The project is divided into two major modules

1) Sender site consists of sensors placed in water and processing unit and transceiver module for wireless transmission.

2) Receiver site for monitoring received data from various bore wells.

The system architecture includes the Transmitter and receiver block diagram for the proposed project as shown in the figure below.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue V, May 2018- Available at www.ijraset.com

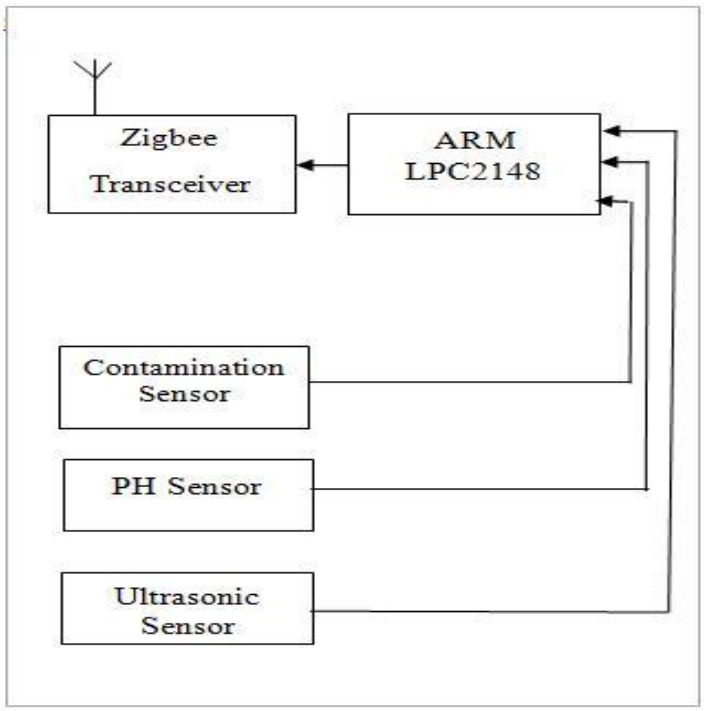


Fig 5. Transmitter Block Diagram

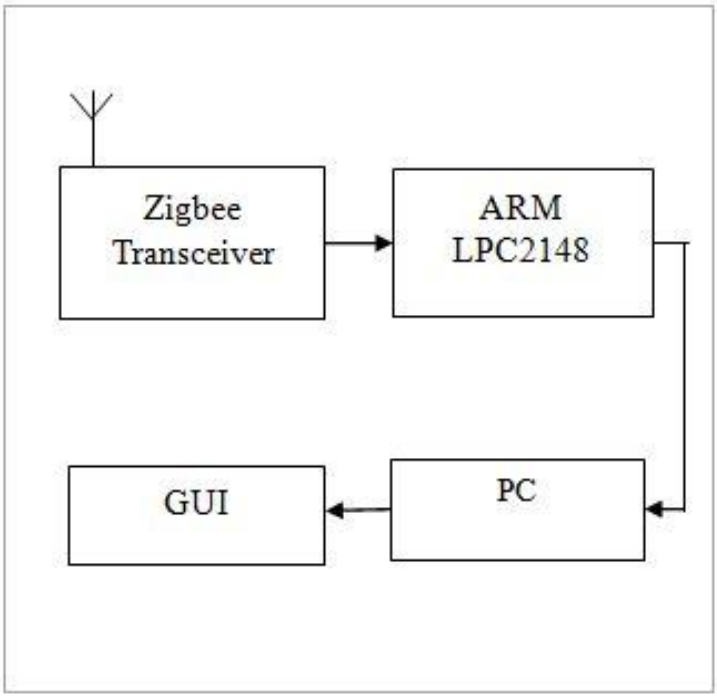
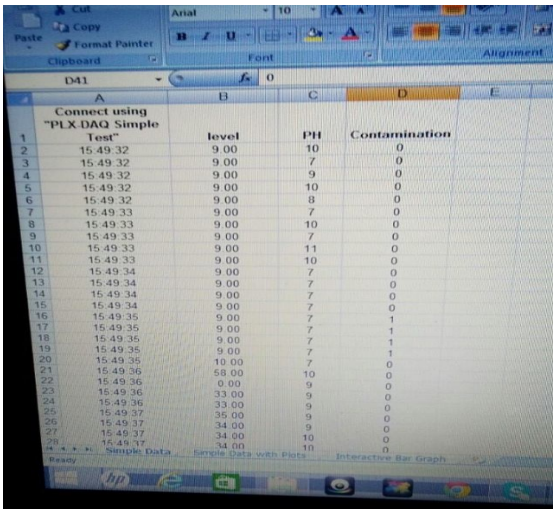


Fig 6. Receiver Block Diagram

1V. RESULTS AND SNAPSHOTS

All the components of the system were found to be working in the right condition and the changes in the water level, PH and contamination were observed perfectly. The values from the sensors which were collected on PLX DAQ excel sheet and the graph plotted for the same using GUI is as shown below. The values are plotted against time.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue V, May 2018- Available at www.ijraset.com



	A	B	C	D
1	Connect using "PLX-DAQ Simple Test"	level	PH	Contamination
2	15:49:32	9.00	10	0
3	15:49:32	9.00	7	0
4	15:49:32	9.00	9	0
5	15:49:32	9.00	10	0
6	15:49:32	9.00	8	0
7	15:49:33	9.00	7	0
8	15:49:33	9.00	10	0
9	15:49:33	9.00	7	0
10	15:49:33	9.00	11	0
11	15:49:33	9.00	10	0
12	15:49:34	9.00	7	0
13	15:49:34	9.00	7	0
14	15:49:34	9.00	7	0
15	15:49:34	9.00	7	0
16	15:49:35	9.00	7	1
17	15:49:35	9.00	7	1
18	15:49:35	9.00	7	1
19	15:49:35	9.00	7	1
20	15:49:35	10.00	7	0
21	15:49:36	58.00	10	0
22	15:49:36	0.00	9	0
23	15:49:36	33.00	9	0
24	15:49:36	33.00	9	0
25	15:49:37	35.00	9	0
26	15:49:37	34.00	9	0
27	15:49:37	34.00	10	0
28	15:49:37	34.00	10	0

Fig 7. Sensor data as seen on excel sheet on the receiver side

The contamination sensor detected the contamination successfully. It showed contamination when some impurities were added into the water. In the same way ultrasonic sensor showed the changes in water level.

The PH sensor detected the PH of water as 7 and the value increased when a chemical (NaOH) was added to the water.

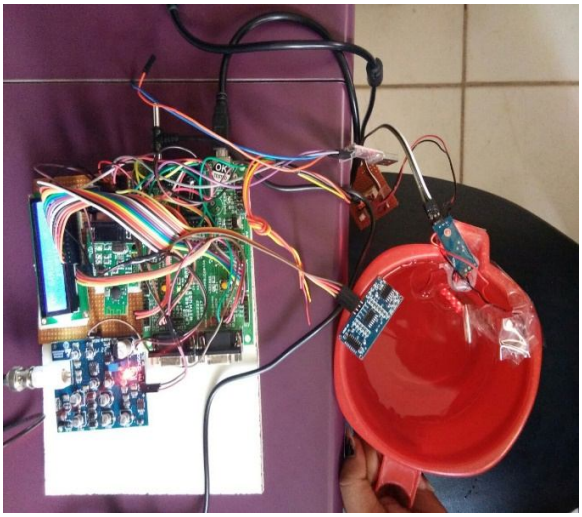


Fig 8. Sender site

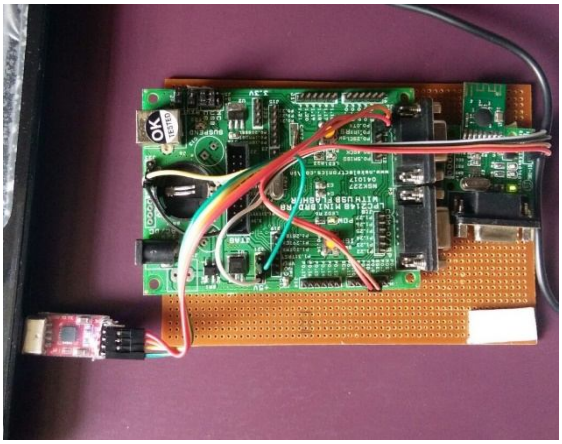


Fig 9. Receiver site

All the sensor readings were accurately displayed on the LCD present at the transmission end.
Using the zigbee module the sensor data was successfully transmitted to the receiver site. At the receiver site the data was collected and was successfully seen on the PLX DAQ excel sheet. GUI was successfully created for the obtained data.

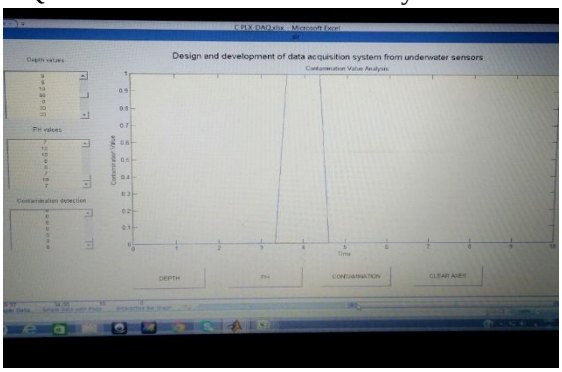


Fig 10. Graph for contamination

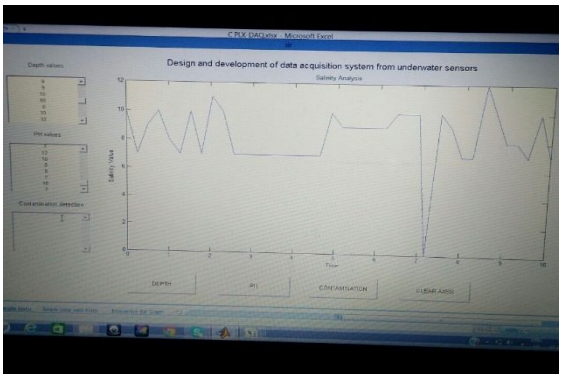


Fig 11. Graph for PH

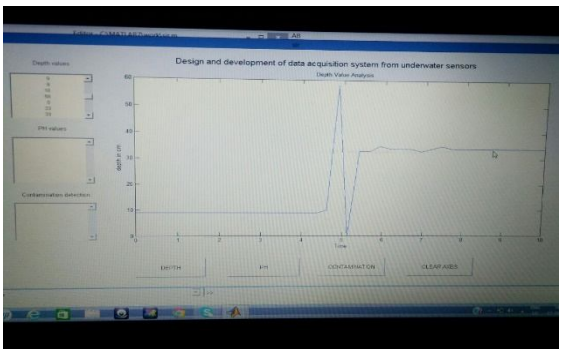


Fig 12. Graph for water level

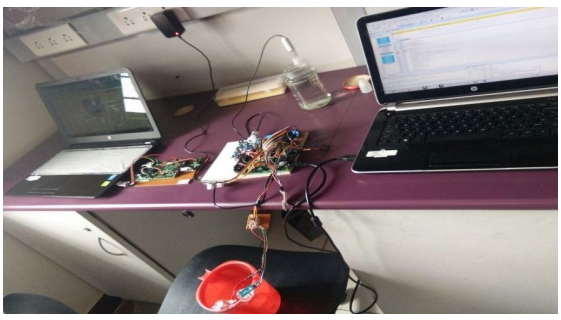


Fig 13. The overall setup

V. CONCLUSION

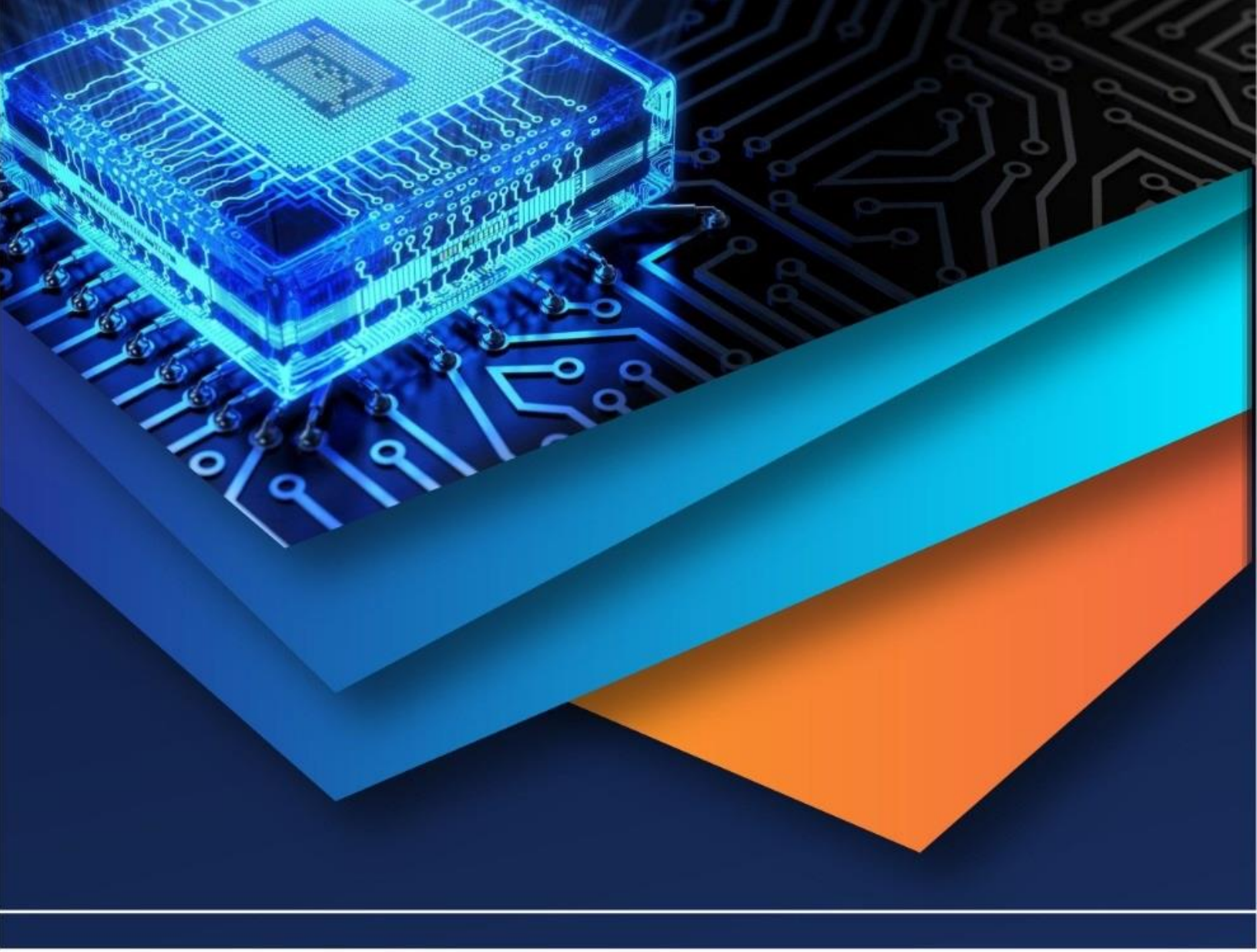
The system was successfully designed and tested for real time data. Sensors HC SR-04, PH Sensor and water contamination sensor were interfaced with the controller ARM LPC2148 and the output of the sensors was successfully read by the controller. The output of the sensors was processed, displayed on the LCD. The data from the sender site was transmitted to the receiver site via Zigbee module. This data was then received successfully at the receiver site and was displayed on the HyperTerminal and GUI was created.

VI. ACKNOWLEDGMENT

We would like to thank Prof. Aravinda K, HOD of ECE dept, New Horizon College of engineering for his kind support in making this paper. We would also like to thank Mr. Naveen H, Assistant professor, Dept of ECE, New Horizon College of engineering for all his technical support and constant guidance.

REFERENCES

[1] Pahlavan.K;Probert.T.H;Chase.M.E.,"Trends In Local WirelessNetworks", Communications Magazine, IEEE (Volume:33 , Issue:3) , March 1995
[2] Chaamwe, N. ; **"**Wireless Sensor Networks for Water Quality Monitoring: A Case of Zambia**"** Bioinformatics and Biomedical Engineering (iCBBE), 2010 4th International Conference ,18-20 June 2010Sungbok Kim ; Hyunbin Kim "Several performance measures for the obstacle detection of an overlapped ultrasonic sensors ring" Intelligent Control (ISIC), 2012 IEEE International Symposium on , 201
[3] Uda, R. ; Naito, K. ; Ehara, M. " wireless "Optamization of unstable multi hop communication networks with digital forensics" Sustainable Technologies (WCST) World Congress on 201
[4] Wang Haitao ; Song Lihua "Researches on survivability issues of heterogeneous wireless communication network
[5] Lei Zheng ; Ning Lu ; Lin Cai "Reliable Wireless Communication Networks for Demand Response control "Smart Grid, IEEE Transactions on Volume: 4 , Issue: 1 ,201
[6] Hernández-Valdez, G. ; Cruz-Perez, F.A. ; Lara-Rodriguez, D. "A new wireless network approach for high speed communication services" Personal, Indoor and Mobile radio Communications, 2003. PIMRC 2003. 14th IEEE Proceedings on Volume: Messer, H. ; Zinevich, A. ; Alpert, Pinhas "Environmental sensor networks using existing wireless communication systems for rainfall and wind velocity measurements" Instrumentation & Measurement Magazine,IEEE Volume15, Issue 2,2012



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY