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Wireless Communications For Determination Of Water Bodies And To Enhance Water Safety

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Abstract
The chemical, physical and biological impurities from waste water are eliminated by domestic water treatment. Discharge of waste water in marine water bodies causes a severe impact due to several conditions' existence in the geographical location. Developing countries discharge wastewater after primary treatment or without any treatment. Water must be kept clean for environment safety and human health. The goal of our system is to design and supervise the contaminants present in the water continuously and to pass the information to the concerned person.
***Keywords**: Wireless Communication, Impurities, Water Safety.*

INTRODUCTION

Normally to assess the quality of water the samples are collected and then it is directed to the quality control lab for the purpose of analysis. This process is not done automatically by machines. Instead human intervention is needed to supervise the process. This may lead to mistakes and this in turn affects the reliability of the system.

LITERATURE SURVEY

"A new microbial biosensor for organic water pollution based on measurement of carbon dioxide production",

The obtained oxygen is forwarded by aerobic respiration and carbon dioxide was generated and the connection betwixt these two values, the type of substances being respired is releated to respiratory quotient. Hence, for the given water is anticipated to have large or few stable RQ, making feasible the estimation of BOD5 by measuring carbon dioxide. Potentiometric carbon dioxide electrode is used to measure microbial breathing intensity constantly. The biometric sensor was named as BODstCO2. The study was performed with microbes to reveal the importance in biological domain. For output response measurement biosensor (Nernstian) was employed. The experiment was carried out with standard glucose measurement and it is used in non-diluted mode. In general, to measure BOD wastewaters prepared artificially was utilized [1].

"An embedded portable biosensor system for bacterial concentration detection"

The primary concern for many products is Microbial screening. Standard plate count (SPC) method provides better accuracy, but consumes larger time. Furthermore, qualified personnel and laboratory environment is required. The engaging alternative to SPC is impedance methodology which aims in altering the electrical behavior of the input sample by inducing metabolism created by bacteria. It can be accomplished easily and automatically [6]. The required component is the bacterial concentration time. In this approach of attainment, a particular value is considered as a threshold (about 10(7) cfu mL (-1)) which has the ability to induce remarkable changes, calibrated by applying voltage of 100 mV and the test signal is considered to be in sinusoidal with a frequency of 200 Hz at 5 min time interval. The outcome shows accurate relation between data obtained with the proposed approach and with measurements of impedance that last for a period of 180 minutes [7]. Further the method employed introduces a movable framework for impedance measurement. The combination of low-cost electronics and shorter estimation time paves the way for efficient screening of microbial components in both commercial and industrial world [2].

SYSTEM ANALYSIS

Existing System

In this system we made those things automatically. Also the water quality management system is manual updated, which lead to human negligence and cause to death. By political and financial power the water quality management system is misused [3].

Proposed System

In our system the individual water meter component collectively forma a network which is called as Personal Area Network that works in wireless mode.

Industries are monitored in group, so networking is preferred. The communication is wireless with N number of nodes which forms a network. Server unit will sent a message to authorized person if there is any abnormal occurrence shown in fig 1.

BLOCK DIAGRAM

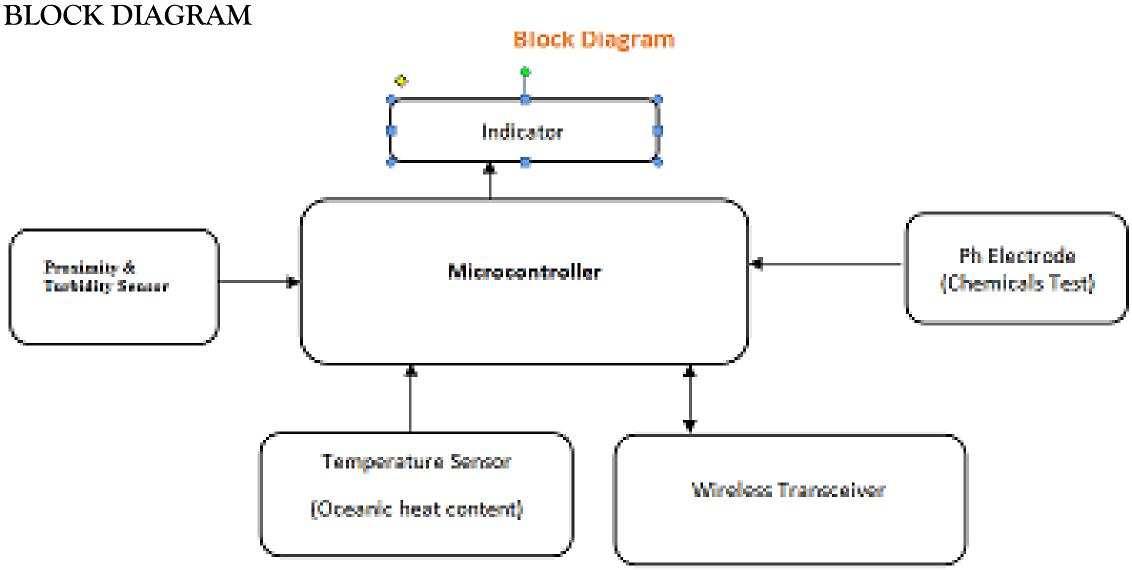

Figure 1: Block Diagram

WORKING:

To estimate the water quality components sensors are employed and shown in fig 1 and 2. To carry out this process pH sensor temperature and proximity sensors are utilized. Their role is to check the acidic and basic components, water temperature and the presence of plastic materials if any. They are operated in the battery mode. The obtained data from sensors is changed in the form of electrical signal and given as an input to the microcontroller for further processing.

The specialty of the primary unit in this module is the reprogramming capability. It either act as an end device or it will function as router or act as a supervisory node. As a device placed at end position it is used as a mediator to pass the concerned information between the router and coordinating nodes. The routing function of the sensor lies in data routing between the several devices.

One centralized unit act for the purpose of monitoring. This unit allocates the required path for the network and also it allocates the appropriate router address and helps in completing the routing task with the input taken from routing table.

Zigbee module act as base station and it coordinate the whole task. It act as a receiver to obtain the different measured components from the individual units. The communication is done in wireless mode.

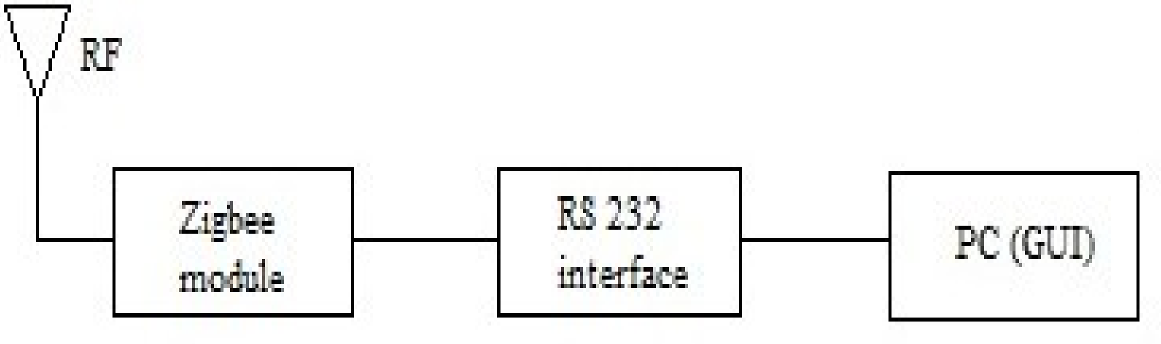

Figure 2: Block diagram of components in base station

PROJECT FEATURES

1. Low cost.
2. High speed networking.
3. Low power consumption.
4. Light weight network
5. Broadcast communication

SOFTWARE DESCRIPTION

To achieve the efficient interaction the platform used was Graphical User Interface shown in fig 3[4]

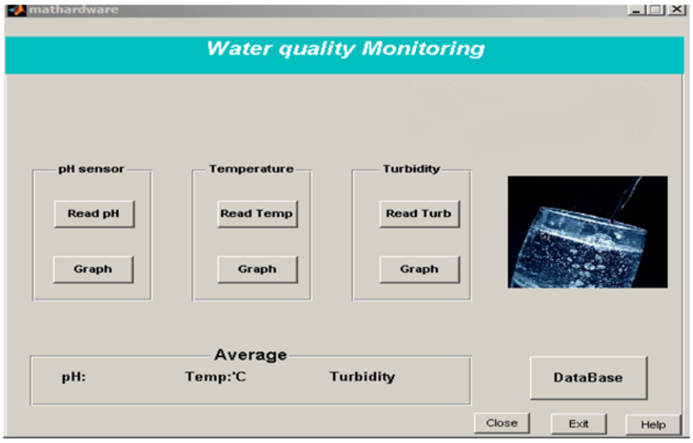

Figure 3: Layout Design of the front end of the GUI

On switching ON the sensor unit the respective sensors measure the concerned data. The measured values can be read by the provided push buttons. When a particular button is pushed momentarily the communication takes place between transmitter and receiver to get the appropriate data. The output is analyzed graphically by plotting the obtained parameters and for further analysis the data is saved as a database in Excel format [5].

Test Setup

For quality checking of water sensors which are of different types are employed .The required amount of data is collected through microcontroller and information is transmitted through proper transmission system and also the whole process is supervised through proper monitoring system. These components help in evaluating the various parameters related to water quality. The employed microcontroller is used in this process and later they are analyzed. The collected data is informed to the center involved in monitoring process through GPS. The information is sent in the form of messages. In case of any abnormalities the collected information is transferred to the concerned management. The management will take this issue seriously and will take the necessary action at proper time. The system by adapting this methodology van easily accomplish the task automatically without human interference. The collected information will be accurate and also the time involved is also very less.

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SIMULATION AND RESULTS

8.1 pH Measurements and Results

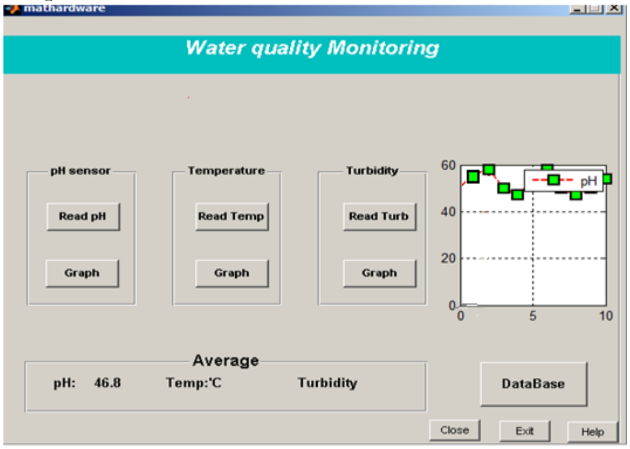
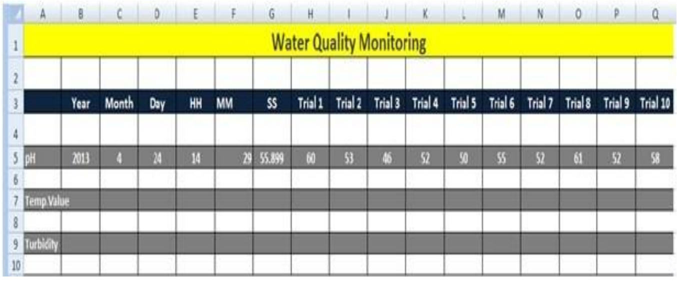


Figure 4: pH Measurements

The graph for the received pH values is plotted and average is calculated and shown in fig 4.



Water Quality Monitoring

	Year	Month	Day	HH	MM	SS	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
pH	2013	4	24	14	29	55.899	60	53	46	52	50	55	52	61	52	58
Temp.Value																
Turbidity																

Figure 5: pH Excel values

Excel database of the received pH values over 10 trials and shown in fig 5.

8.2 Temperature Measurements and Results

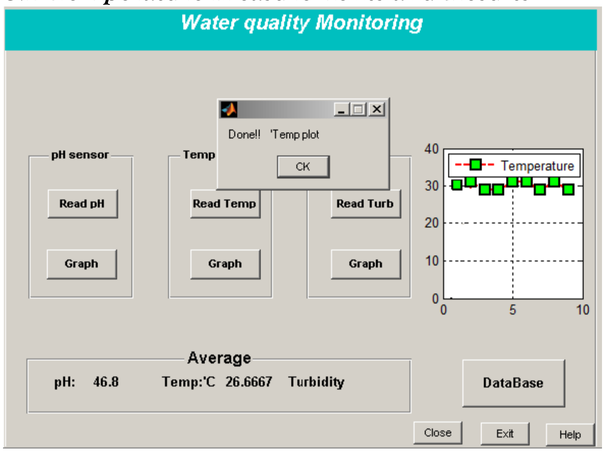


Figure 6: Temperature Measurements

The graph for the received temperature values is plotted and average is calculated and shown in fig 6.

Water Quality Monitoring

	Year	Month	Day	HH	MM	SS	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
pH	2013	4	24	14	31	22.098	23	25	25	26	27	25	30	32	33	31
Temp.Val	2013	4	24	14	37	14.089	31	30	29	30	31	29	28	31	30	30
Turbidity																

Figure 7: Temperature Excel values

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Excel database of the received temperature values over 10 trials and shown in fig 7.

8.3 Turbidity Measurements and Results

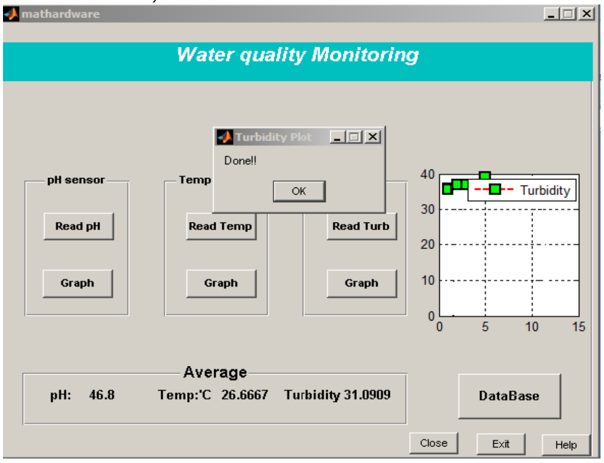

Figure 8: Turbidity values

The Graph For The Received Turbidity Values Is Plotted And Average Is Calculated and shown in fig 8.

	Year	Month	Day	HH	MM	SS	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
pH	2013	4	24	14	31	22.098	23	25	25	26	27	25	30	32	33	31
Temp.Val	2013	4	24	14	42	54.234	43	45	45	45	44	43	43	43	43	43
Turbidity	2013	4	24	15	12	22.12	45	45	47	47	45	45	46	45	44	45

Figure 9: Turbidity Excel values

Excel database of the received turbidity values over 10 trials and shown in fig 9.

CONCLUSION

In the recent era embedded systems are efficiently used for automatic monitoring processes. Here in our system water quality monitoring is done efficiently and accurately by means of wireless communication. The future work lies on providing the improvement in this project by utilizing the concept of IoT to assess the quality of water and to save the water resource by controlling the wastage of water

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