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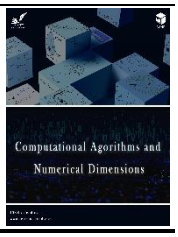

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River Water Quality Monitoring Through IoT Enabled Technologies

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Abstract

In this paper named Internet of Things (IoT) based river water quality monitoring gives the outcome of Quality River of water by the advantage of various advanced techniques (IoT), Wireless Sensor Network (WSN). As part of this we have made the things to collect the data and transfer the data to the software that we have made. Then the data that we collect using various equipment and be analyzed using the software that we have designed. Other than that, the hardware of the system, data visualization, software, we automate the process of monitoring This water quality monitoring system has been the major issue and can be use the digital, intelligent, and effectively gives the quality of river water.

Keywords: Water quality monitoring, Sensors, Data analysis, IoT.

1 | Introduction

The most important environment things are whether, rivers (water), soil, environment vegetation farming lands etc. In which the very important one is water which saves all the living creatures [1]. Water is used for many purposes like for domestic use for drinking purpose for preparation of food and lot more. So, it is very important for us to protect the water resources from contamination [2]. If it won't happen automatically the whole ecosystem will be damaged [3]. It is very dangerous not only for the human but also for all the creatures [4]. Water contamination is very serious problem for the globe as well [5]. We have to stop this even from global level to local levels [6]. It is one of the main reasons for all the diseases that we are facing now [7]. In some areas without proper purification of water the same polluted water is taking as their drinking waters the reasons for this might be many which may finally leads to very bad health problems [8].

By knowing the disadvantages of having the water contamination we have designed an IoT based Wireless Sensor Network (WSN) work which automates the monitoring of the water quality with information provided by the sensors in the water [9]. By using the different sensors in the water we will be going to collect the lots of information related to water like pH of the water ,to how much

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extent the water is contaminated all the related information is collected using the sensors [10]. With the fast growth of the WSN the real time data analysis will be taken and will be processed to get the useful data [11]. In this paper we will be providing all the parameters related to river using the IoT based monitoring system [12].

2 | Literature Review

2.1 | IoT Platform

The various information that we get from the sensors can give the give the information like to how much extent the water is contaminated with the help of neural networks [13]. *Fig. 1* describes the sensors that are going to use in the monitoring system and what are the other parameters that are there in the block diagram *Fig. 2* describes the various IoT layers of platform that will run on the Hadoop cluster [14].

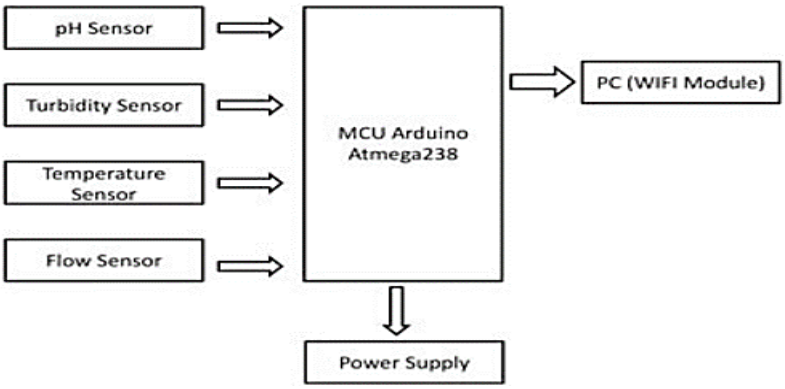

Fig 1. Sensors and basic structures.

2.2 | Disadvantages

In Normal method samples of water are collected manually from different parts of a water body [15]. For various parameters like PH, dissolved oxygen, conductivity chloride content are been analyzed by the collected water samples [16]. It is challenging to gather the water tests from all the region of the water body. The expense of investigation is exceptionally high [17]. The lab testing and investigation takes a few time and consequently the lab results doesn't reflect continuous water quality estimation because of deferral in estimation [18]. The interaction is tedious because of slow course of manual information assortment from various areas of the water body [19]. The technique is inclined to human blunders of different structures. Thus the disadvantages of the normal method are more when compared to the automated real-time water quality monitoring system [20].

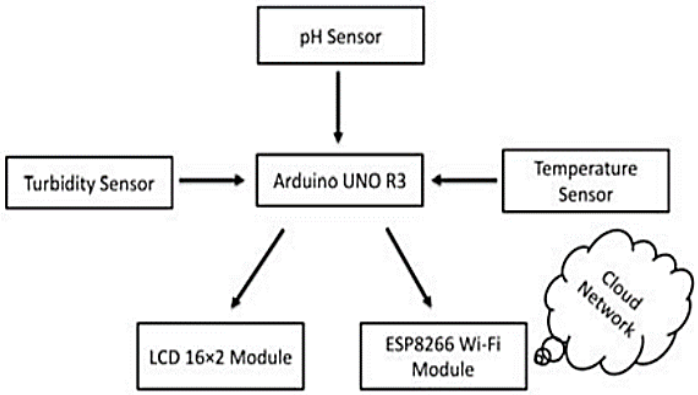

Fig. 2. Layers of IoT platform.

2.3 | Advantages

Standard of water is polluting year by year due to various changes that are happening in the environment changes and by the man kind. So, it has become more important to calculate the quality of the water at different areas of water bodies [21]. This may help in reducing water pollution and consecutively in saving aquatic life. As the boat is mobile in nature number of samples are collected from different locations in very less time [22]. The IoT based water quality monitoring system is very easy to maintain as we can carry the all the electronic boards. The budget the same is very low and also the software also does not cost much. To plot data points we have various algorithms of machine learning which can formats for proper analysis [7]. Various cloud storage platforms helps in storing the data immediately.

3 | Proposed System

The primary thing here is to give a automated specific thing for observing water quality at specific locations utilizing local sensor with low consumption of energy or power, low money, high discovery etc.. There are some areas where the standard of water is to be increased effectively. Following are the points of thought execution: a) to calculate or to collect the data from the river we want some sensors to collect data related to the water pH to which extent the water is polluted, b) the collected information related to water need to send to hubs and then to base stations, c) after sending the data it has to be calculated based on the parameters that we have discussed earlier, and d) so that if any area detected with contamination an SMS need to be generated so that actions can be done accordingly. All the flow that was discussed in the points will see in the *Fig. 3*.

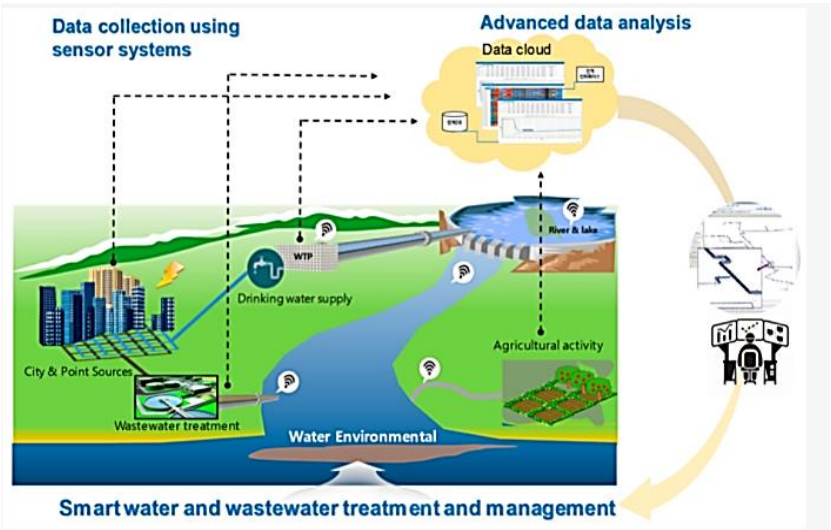

Fig. 3. Architecture sensor will be attached to every water level.

3.1 | Results

In *Fig. 1*, we are displaying the content that was detected about various parameters. It consistently gets the information related to the various things that is shown in the *Fig. 1*. If the gained value is over the threshold value remarks will be shown with some red color. If the gained value is lower than the limit esteem remarks will be shown with some green color. A bar chart will likewise be shown for wonderful agreement. The time series portrayal of sensor information with choice is displayed in *Fig. 2*.

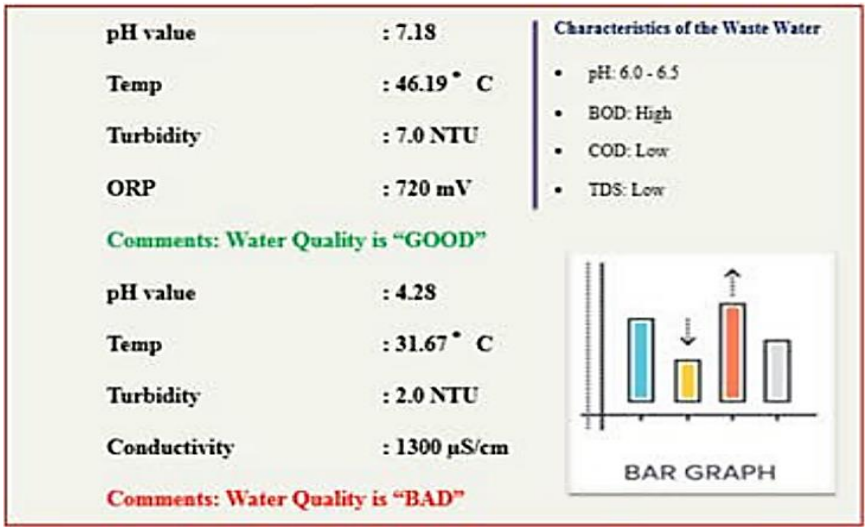

Fig. 4. Results of various sensors.

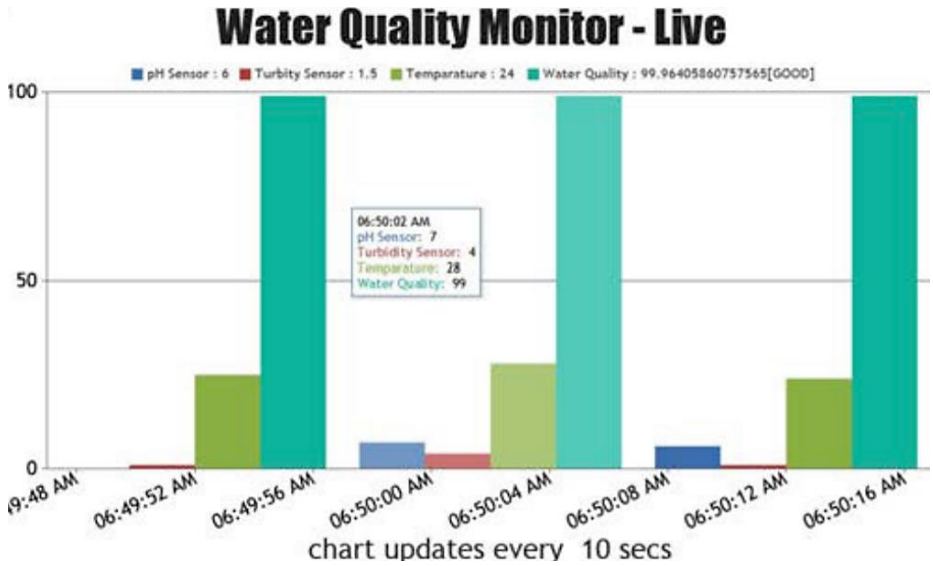

Fig. 5. Bar graph representation of sensor data.

4 | Conclusions

In this paper we have discussed the disadvantages of the manual method and how it works less than the automated real-time monitoring system also discussed the advantages of the real time river water monitoring system. And also how the data is collected from the sensor which is placed below the water and how the data is processed after getting the data. The detailed analysis of data points will be done and useful information will be taken. Monitoring of river water quality which is real-time neural network thing by IoT the big data analytics will helps human life effectively by sending the data through sensors that were placed in side water. The IoT neural network things give better solution for the water contamination. Through the process of water monitoring project we have analysed all the parameters in detail and data visualization is also used for the visualization of the data from the sensors

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