Air Water Pollution Sensing System: Survey

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Abstract - Air and water pollution are the one of the causes of global warming. The first step towards stopping pollution is to be able to measure it. People need to know the exact pollution level they are standing in so that they can respond to it. In this age of smart watches, we have watches to track our own health and fitness, but what about environmental health. If environmental health degrades so will the health of all humans and future generations too. With this people will no longer special equipment to measure pollution levels, they can monitor pollution levels anywhere and anytime desired. In this paper, we have presented an in-depth look at current advances in air and water pollution sensing system.

Keywords: Air pollution sensing system, Water pollution sensing system, Smart watch.

1. INTRODUCTION

Air pollution and Water pollution is the biggest problem of every nation, whether it is developed or developing[1]. Health problems have been growing at faster rate especially in urban areas of developing countries where industrialization and growing number of vehicles leads to release of lot of gaseous pollutants[1].

Harmful effects of pollution include mild allergic reactions such as irritation of the throat, eyes and nose as well as some serious problems like bronchitis, heart diseases, pneumonia, lung and aggravated asthma[3]. According to a survey, due to air pollution 50,000 to 100,000 premature deaths per year occur in the U.S. alone[3]. Whereas in EU number reaches to 300,000 and over 3,000,000 worldwide[3].

IOT Based Air Pollution Monitoring System monitors the Air quality over a web server using Internet and will trigger an alarm when the air quality goes down beyond a certain threshold level, means when there are enough harmful gases present in the air like CO_2, smoke, alcohol, benzene, NH3, LPG and NOx[2]. It will show the air quality in PPM on the LCD and as well as on webpage so that it can monitor it very easily[2].

Drinking water is becoming more harmful and contaminated due to urbanization, industrialization and increase in population[4]. Hence there is need of better methodologies for monitoring the water quality[4]. For examining the water quality manual efforts were required for testing. Such approaches take longer time and no longer to be considered efficien[4].

2. LITERATURE SURVEY

As proposed by A.Kumar and N.P. Pathak [1] The worrying state of the environment has affected the quality of rivers, seas and ponds. The shameless act of disposing trash into the sea has impacted their quality negatively deeply. Smokes

from factories rose and soon form acidic rain that will pour on the land and water (Samsudin, Salim, Osman, Sulaiman, & Sabri, 2018). It's absolutely no wonder the quality of the sea is plummeting.

As proposed by N Vijaykumar, R Ramya [4] where the system consists of 3 wireless sensor sub-system. All communicate with each other wirelessly and send information to gateway connected to a computer which hosts the GUI.

As proposed by I. Hussain, M. Das, K.U. Ahamad, and P. Nath [3]The limitation to that system was that Due to wireless transfer of data sometimes delivery of data is not ensured. There are chances of loss of data.

As proposed by Sayali Wadekar, Vinayak Vakare, Ram Ratan Prajapati [10] Water level sensor will provide the level of water present in the water tank and according to the level of water, water motor will automatically turn ON and OFF. Data is displayed on android application. The limitation to that system was that No quality monitoring is performed, so even if water is available in tank, without performing quality check, water will be supplied. The application needs to be downloaded and updated from time to time.

As proposed by Jiang, P [8] The drawbacks of the conventional monitoring instruments are their large size, heavy weight and extraordinary expensiveness. These lead to sparse deployment of the monitoring stations. In order to be effective, the locations of the monitoring stations need careful placement because the air pollution situation in urban areas is highly related to human activities (e.g., construction activities) and location-dependent (e.g., the traffic chokepoints have much worse air quality than average).

As proposed by [2] It states that the implementation of an integrated system is for the purpose of monitoring of the aquatic ecosystems that are absorbed on a set of tools that will recognize the environmental circumstances and it will make a tactical conclusion aimed at the administration of lakes, rivers or coastal areas. The system, called Water Environmental Mobile Observer had been made up of low-cost and standard components as the physical and chemical parameters are on condition that with a segmental collection of sensors are performed a bathymetry. Data analytics utensils had also presented in directive to advance a comprehensive observing ecology awning all the importance of data gathering, repository and examination.

3. METHODOLOGY

3.1 Basic Working:

Many of the water and air quality monitoring devices and automatic water saving devices are facing a lot of problems. The fresh water can be appraised through the benefit of pH sensor. The system will show the air quality in PPM on the LCD so that it can be monitored very easily. Temperature and Humidity is detected and monitored in the system.

LPG gas is detected using MQ6 sensor and MQ135 sensor is used for monitoring Air Quality as it detects most harmful gases and can measure their amount accurately.

These sensors are connected to the microcontroller Arduino Uno board. And this device is made more adaptable, the real time data is collected, processed and stored.

Data are collected through the sensors that are been used and then these data are sent to the watch and displayed on the LCD Screen.

In this project, it can monitor the pollution level from anywhere using your watch. This system can be installed anywhere and can also trigger some alert when pollution goes beyond some level

The air quality sensor is used to detect the amount of air pollution in the air as ppm levels. This data is processed by microcontroller to get the current air quality. The watch also monitors for any flammable gases in the vicinity to detect any flammable gas leakages using flammable gas sensor. This sensor is constantly monitored by controller.
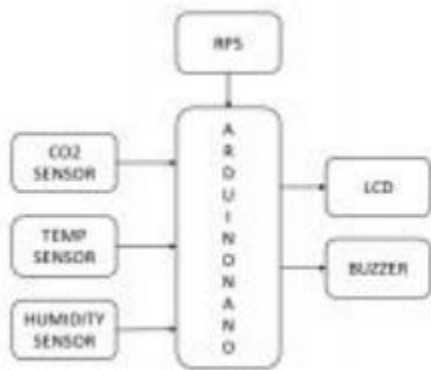

Fig. Block diagram of Air Quality Monitoring System[7]

Now we have a ph sensor that is used to detect the ph level of any water body. The user can just dip the ph sensor on his/her smart watch to get ph level. The sensor data is processed by controller and displayed on the display module
.
Similarly, we here have a turbidity sensor attached to the smart watch as well. The sensor is used to transmit the water turbidity value to controller which is displayed on display.
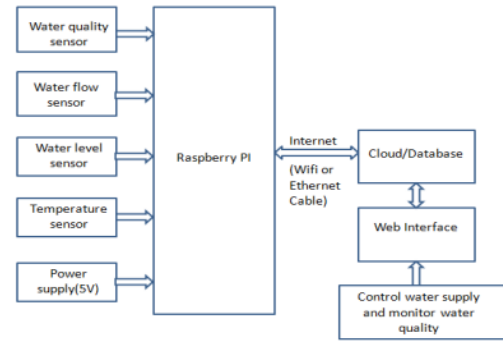

Fig. Block Diagram of Water quality Monitoring System[10]

Ph and turbidity are used to display water quality of any water body (lake, pond, canal, sea). The smartwatch allows to set high and low acceptance values of each parameter using push buttons. If any of the values scanned shows up higher/lower than set limits it sounds a buzzer alert as well displays the alert message on display to the user.
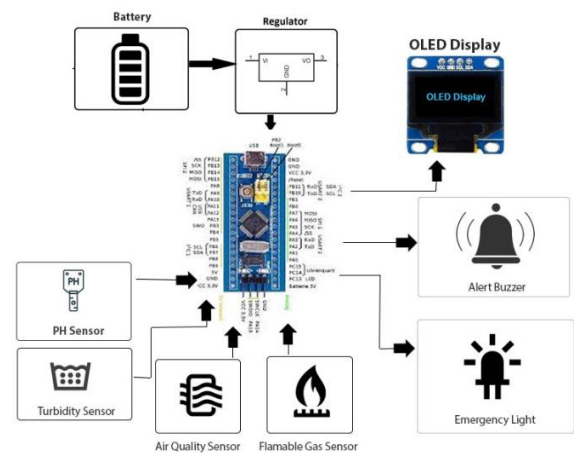

Fig. Block Diagram of air and water pollution sensing watch[1]

4. SMART WATCH APPLICATIONS

A smartwatch is a wearable computer in the form of a watch; modern smartwatches provide a local touchscreen interface for daily use, while an associated smartphone app provides for management and telemetry. While early models could perform basic tasks, such as calculations,

digital time telling, translations, and game-playing, smartwatches released since 2015 have more general functionality closer to smartphones, including mobile apps, a mobile operating system and Wi-Fi/Bluetooth connectivity.

The Gaia smartwatch:
A smartwatch with strong ecological accents. Since pollution has become a great problem in the world we live in, Gaia proposes that the watch could help you diagnose the levels of contamination on the Planet. while you're doing something outside, the smartwatch will be able to detect the levels of contamination in your environment.

Fitbit Sense:
The Fitbit Sense adds a whole slew of sensors to the Fitbit lineup to track everything from stress to blood oxygen levels, temperature, sleep and even has an FDA-cleared electrocardiogram (ECG or EKG). The Series 6 also measures SpO2 levels at night.

5. CONCLUSION

Water and Air are part of life and are also a very important source. Awareness in the safeguard and the cleanliness of the water and air should be enhanced among the community at large. Development of tools that can measure the level of index water, this can increase knowledge and awareness in maintaining life. There are various systems developed but very few provides portability and efficient results. Challenge is to develop a system which is portable and easy to setup in all environments.

In this paper we have studied various approaches and identified drawbacks. Hence, we can suggest implementing Air and water pollution sensing system on a smart watch using Arduino and its sensors.

As technology is getting updated rapidly the base of the systems are getting smaller and portable which is easy to use and more efficient.

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