A Survey on Smart Water Detector

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Abstract—In this paper we introduce the notion of water level monitoring and management within the context of electrical conductivity of the water. More specifically, we investigate the microcontroller based water level sensing and controlling in a wired and wireless environment. Water Level management approach would help in reducing the home power consumption and as well as water overflow. Furthermore, it can indicate the amount of water in the tank that can support Global Water types including cellular data loggers, satellite data transmission systems for remote water monitoring system. Moreover, cellular phones with relative high computation power and high quality graphical user interface became available recently. From the users perspective it is required to reuse such valuable resource in a mobile application. Finally, we proposed a web and cellular based monitoring service protocol would determine and senses water level globally.

Index Terms — GSM ,TDS Sensor, Hardness Sensor, Microcontroller

I. INTRODUCTION

World has changed manifolds during the last fifty years or so. Sustainability of available water resource in many region

of the word is now a dominant issue. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Water is commonly used for agriculture, industry, and domestic consumption. Therefore, efficient use and water monitoring

are potential constraint for home or office water management system. Safe water is primary condition for health and also a basic human right but yet it is not accessible to all human kind. Due to which water related diseases increases day by day which causes 3.4 million deaths a year, mostly among children. Since there are many efforts made by government but still many people do not have access to improved water sources. In many developing countries contaminated water is being used for drinking without any proper former treatment. One of the reasons for

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this is unawareness in public and administration and the lack of water quality monitoring system which creates serious health issues. As water is the most important factor for all living organisms it is necessary to protect it and water quality analysis is first step taken in rational development and management of water resources. Water quality is measure of suitability of water for particular use. It depends on various physical, chemical and biological parameters. Generally measured water quality parameters are temperature, turbidity, pH, conductivity, dissolved oxygen (DO) and total dissolved solid (TDS). These parameters are measured routinely in order to maintain the good water quality.

II. RELATED WORK

Early warning systems (EWS) for water quality are becoming more frequently used by drinking-water purveyors and water- quality monitoring agencies. .Most water-quality EWS detect water contamination events based on water-quality criteria. In other words, a water contamination event is declared when real-time water quality data are outside the expected range of allowable water-quality criteria, at which point an alert is issued. Such exceedance criteria event detection method, however, may overlook implicit information present in the water quality measurements and may cause a high false alarm rate[1]. Water-contamination events relies on the times series of residuals of water-quality parameters predictions and the use of weighted-averaging and time-dimension information to resolve conflicts or ambiguities that arise when attempting to detect water-contamination events. Such conflicts or ambiguities are named herein evidence conflicts. Simulated and experimental water-contamination events of different severity are used to test the proposed approach for detecting water-contamination events[2]

Electronic Tongue and Electronic nose system provides more services in various fields such as environmental monitoring, food science, and point of care business. The concept of electronic tongues is more recent, and much less research has been undertaken on the development of liquid sensors and classification algorithms. A sample of water or milk has too high concentration of bacteria so to analyze bacterial growth is an important task since the bacteria can cause diseases and make the liquid unusable. Electronic tongue can be used to identify and recognize specific components in a solution. In this approach, experiments are conducted using an electronic tongue to virtually monitor the quality of liquid like drinking water, juice and oil.

For example, in [3] a four electrode conductivity probe is used and in [4] thick film based sensors are used for

determining the quality of water .In [5] a lipid membranes designed sensor are used to detect pollutants in water and in [6] an optical fiber sensor system is used to detect particle concentrations in water. Multi sensor system is used as water quality instrument [7, 8] in few applications. Many available modeling approaches are able to simulate water quality using 3D mathematical model [9], artificial neural networks [10] and fuzzy probability [11]. The concept of electronic tongue [12,13] has been developed to attract the needs of on-line monitoring of aqueous samples. Principal Component Analysis(PCA) is a mathematical transform, which is used to explain variance in exponential samples. After collecting the samples the appropriate tests were conducted using the sensor system. After PCA analysis it is examined that there exists a clear distinction of the resulting cluster from the raw water and the purified water[14], such result would confirm the chemical change that occur in raw water. The Paper is basically focus on impurity in water and Milk. Water is a natural resources abundantly available in nature. Water is a universal solvent which is never available in pure form. It doesn't matter how isolated it is with the sources of contamination, it will always have some or the other impurities dissolved in it. There are many causes of dissolved impurities in water which may either be natural or human. Natural causes are gases or minerals in the air, soil or rock dissolved by the water. Human causes are disposal of garbage or sewage or industrial chemicals in water causing water impurities. Image enhancement has became a very popular field in image processing . The main aim of Enhancement is to improve the visual quality of image and this is achieved by reinforcing edges and smoothing the flat areas. Several researches have adopted various techniques in past such as simple filtering , adaptive filtering, wavelet de-noising , homomorphic enhancement etc.,[26-31] and all these techniques concentrate on reinforcing the details of the images to be enhanced. Apart from all these techniques mentioned above , a new technique that is Infrared image processing has emerged for the evolution of night vision cameras.

This technique has various advantages such as this technique has applications in thermal medical imaging [15-25]. With the evolution of night vision cameras , more researches are being performed in infrared image enhancement for information extraction from these images. Due to the absence of appropriate amount of light required for imaging , these images have a special nature of large black areas and small details . Hence , the main objective is to reinforce the details to get as much details as possible.

III. ISSUES AND CHALLENGES

Constructing smart water detector based on the microcontroller and GSM based technology involves various issues and challenges which are discussed below.

A. User controlled device: **The challenge is to effectively use the device in every surroundings by the user. So that the device is available to every place and can be operated by user in a most simple way.**

B. Quality of service: **the device should check the hardness and tds of water. It should be accurate and it should possess long life time. It should be reliable and cheap. The mantinence requirement must be less.**

C. Perfection in Design : **The top-level design is imperfect. The system should be used anywhere by anybody . It should be adaptable by all regins**

IV. CONCLUSIONS

In this paper, research works are discussed presenting various approach to understand the need of pure water for health and the methods that have been introduced to purify the impure water and the challenges that are yet to be faced. The paper discusses he need to innovative the water purification system.

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