PIPELINE WATER QUALITY MONITORING AND CONTROL

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Abstract:
Water Pollution is one of the biggest fears for the green globalization. In order to ensure the safe supply of the drinking water the quality needs to be monitor in real time. In this paper we present a design and development of a low cost system for real time monitoring of the water quality in IOT (Internet of Things).The system consist of several sensors is used to measuring physical and chemical parameters of the water.
Key Words: Water Quality Monitoring Sensors, Arduino Controller, IoT and Wi-Fi etc..,

1. Introduction:

In the 21st century there were lots of inventions but at the same time were pollutions, global warming and so on are being formed, because of this there is no safe drinking water for the world pollution .Nowadays ,water quality monitoring in real time faces challenges because of global warming limited water resources ,growing population, etc. Hence there is need of developing better methodologies to monitor the water quality parameters in real time. The water quality parameters pH measures the concentration of hydrogen ions. It shows the water is acidic or alkaline. Pure water has 7pH value less than 7pH has alkaline. The range of pH has alkaline; the range of pH is 0-14 pH for drinking purpose it should be 6.5-8.5pH.

2. Objective of the Proposed System:

The objective of water quality monitoring is to obtain quantitative information on the physical and chemical characteristics of pipeline water. The system also detects the pipeline leakages. It is very useful to monitor and control the water quality parameter variations by using Arduino controller and IoT.

3. Methodology:

The system composed of solar photovoltaic cell to generate electricity from solar radiation. Solar photovoltaic cells are made up of semiconducting material. The persons from anywhere if they know user authentication Id they can visit the parameter variation through mobile phone or computer. Based on the measured water parameter variation, the embedded controller used in the mobile can automatically transfer control signal to the pipeline to add compensative chemical composition to the pipeline water. The set point value pH, temperature, turbidity, conductivity pressure and water flow sensors are programmed into the embedded controller using embedded C programming. The controller makes a comparison between set point value and measured value of water quality parameters.Based on the variation between them, the embedded controller issues a control signal to open or close the control valve of chemical injector. The chemical injector injects water purifying chemicals such as chlorine,chlorine dioxide and ozone into the pipe-line to control the water quality with appropriate level. Depending upon the measured parameter the embedded controller provides control signal to inject proper water purifying chemicals into the pipe-line water.
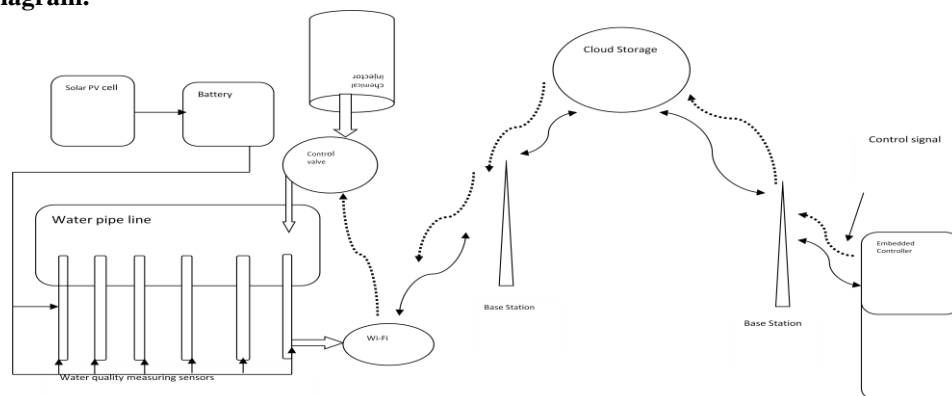
4. Block Diagram:

Figure 1: Block diagram of water quality monitoring and control system
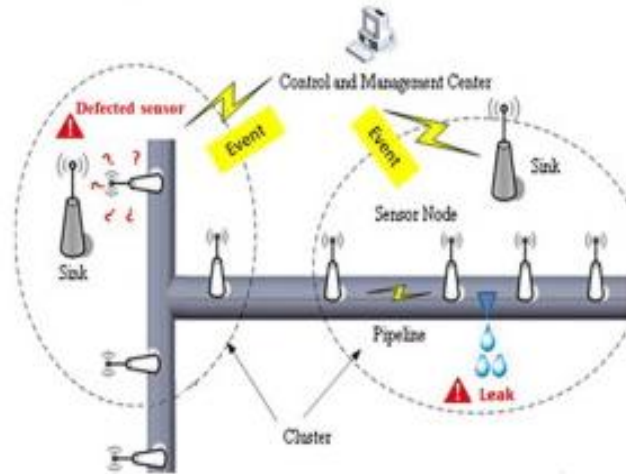
5. Hardware Implementation:

Figure 2: Prototype model

The proposed system is useful to water distribution system of government. They can monitor and control the water quality parameter variation using mobile phone or computer with internet facility.

6. Simulation Results:

The simulation outputs of pipeline water quality monitoring system using Mplab software is given in figure 3.
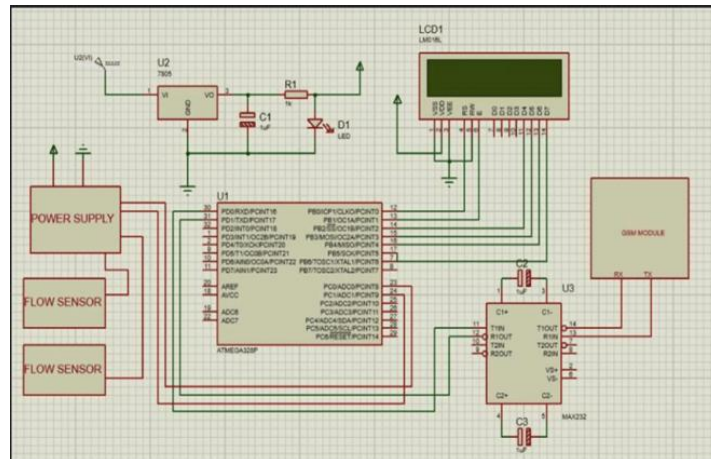

Figure 3: MP Lab simulation output

7. Conclusion:

The Monitoring of turbidity, pH& Temperature of water makes use of water detection sensor with unique and existing GSM network can monitor water quality automatically, and it is water quality testing is likely to be more economical, convenient and fast .The system has good flexibility .only by replacing the corresponding sensor and changing the relevant software programs, this system can be used to monitor other water quality parameters. The operation is simple. The system can be expanded to monitor hydrologic, air pollution, industrial and agricultural production and so on. It has widespread application for monitoring and extension value. Then the collected data and analysis results will be available to the user through the Wi-Fi.

8. References:

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