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A Self-Sufficient Reservoir Directorate with Capacity-Velocity Sensing Using Android App.

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ABSTRACT

Nowadays the rate of rainfall is increasing in an irregular rate. Rain water can be treated and used efficiently for various purposes. So, the rainwater can be stored in the dam as backwater and can be used later. For this, wireless sensor network is used in which the water filling level is designed with level sensors to measure water levels in DAM. When the level is high, the water will be released from the dam. The speed of the water being released will also be monitored. Another device on the river bank will monitor the level of the water in the river. The details of the level and speed are sent to the server wirelessly. This paper overcome the oldest method of finding water contamination and water quality by providing the present water level in the dam and nearest safest area even before any emergency occurs. A civilian can request the server for the details with his android application. All these data are sent to the server via ZigBee wireless communication. A ZigBee connected the user mobile through OTG cable can communicate to the server to get the details in case of emergency such as natural calamities like flood, heavy rainfall, cyclone, Etc.

Keywords: level sensors, speedsensor, androidapplication, ZigBee, OTG.

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INTRODUCTION

Water level in a dam needs to be sustained in such a manner to avoid issues. This paper deals with the making of automatic intimation of the water level that is being released from the dam. The exterior water environment can be differentiated to water bodies like rivers, lakes, reservoirs, oceans, glaciers, springs, and shallow or huge below the surface water. The water environment, as well as other environmental elements like soil, organism and atmosphere, etc. constitute an organic complex. As mentioned in [1], due to the speed of China's economic development, we can also witness the growing-up of contamination and harm to the water environment. In this sense, water environment monitoring, water resource management and water contamination control, is found to be more and more indispensable. Water quality refers to the chemical, physical and biological conditions of water.



Figure 1: Water level measurement of dam present days

It is a measure of the condition of water relative to the need of one or more living species and or to any human need or purpose. Water is basically used for agriculture, industry, and domestic needs. Therefore, efficient use and water monitoring are probable damper for home or office water management system. Last few years more monitoring system desegregated with water level detection have become witnessed. The existing automated method of level detection is reported that can be used to make a device on/off. Moreover, the usual method of level control for home appliance is simply to start the feed pump at a low level and allow it to run through a specific water level is reached in the water tank. This is not properly carried for ample controlling system. Besides this, liquid level control systems are widely used for track of liquid levels, reservoirs, silos, and dams etc. Generally, this kind of systems provides various level as well as continuous level indication. Audio visual alarms at specific levels and mechanic control of pumps based on user's need can be included in this management system. Proper monitoring is needed to ensure water sustainability is actually being stretched out, with payment linked to pick up and automation. Such programmatic view point entails microcontroller based automated water level sensing and controlling.

RELATED WORK

Water environmental monitoring system based on wireless sensor networks which is suitable for large scale water bodies and complex water bodies [1]. This paper is focused on a statement for our new water environment monitoring system design. The system had successfully expert the online auto-watching of the water temperature and pH value environment of an artificial lake. The Important Parameters of water such as Temperature, Turbidity & salinity are responsible for water contamination. [2] And also we can control or reduce water contamination as well as allocate water resource governing using WSN Technology. This system provides the reading automatically. This gives the details only about the water contamination properties but by using micro controller [3] gives the details even about the motion of water level governing within the concept of electrical conductivity of the water as mentioned in figure 2.

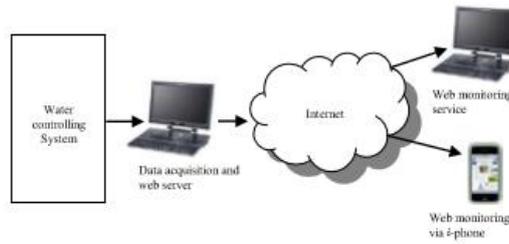


Figure 2: Water level monitoring network

More particularly, they give the details about the microcontroller based water level sensing and controlling in a wired and wireless environment. When the water level is more, levelling of water is compulsory, thus the [4] does leveraging on wireless sensors in noticing the water standard and Short Message Service (SMS) technology in delivering alert to the farmers upon detection of degradation of the water quality as mentioned in figure 3.

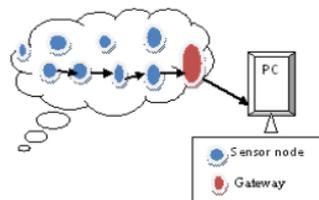


Figure 3: Typical multi hop wireless sensor network.

METHODOLOGY USED

In order to control the flood, level sensors and speed sensors are used. The DAM water filling plant consists of a level sensor to monitor its level, water flow sensor for monitoring the speed of the water being released from dam and a ZigBee module for communicating with the server. If the level is low, then microcontroller automatically sends the information about the water level to server. The server is automatically updated the level of water. If the level exceeds from the limit; automatically send the message to the server through ZigBee. Also, for checking the speed of the water, level sensor is used for monitoring their levels. Another device that is placed on the banks sends details about the level of water on the river. All these values are sent to the server via ZigBee transceiver. A civilian, who wants to know about the status of the water being released and the status of the water level in the dam, can send request message to server through ZigBee via OTG connection. If the water flows in danger level, the android mobile automatically make emergency call to hospital and police station and also send alert message to friends, doctor, guardian etc. Flow sensor sit in line with the water line, and uses a pinwheel sensor to measure how much liquid has moved through it. Level sensors detect the level of substances that flow, including liquids, slurries, granular materials, and powders. The micro controller displays the level and the connection for the android application on mobile and ZigBee for the entire process is given in the block diagram as shown.

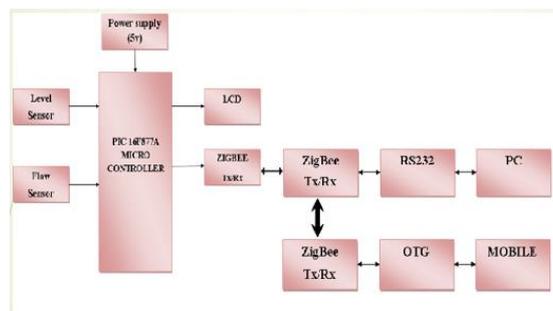


Figure 4: Block diagram of pic microcontroller

All such substances flow to become essentially level in their containers (or other physical boundaries) because of gravity. ZigBee is one of the global standards of communication protocol formulated by the relevant task force under the IEEE 802.15 working group.

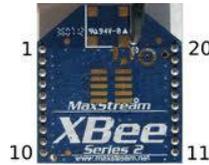


Figure 5: ZigBee module of 802.14.5

Next generation automated manufacturing allowing for communication between devices to a central computer. The PIC16F87XA devices have a 13-bit program counter capable of addressing an 8K word x 14 bit program memory space. LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.

EXPERIMENTAL RESULTS

The android application is created, checked and the micro controller displays the readings of the water level as shown in the figure 6.

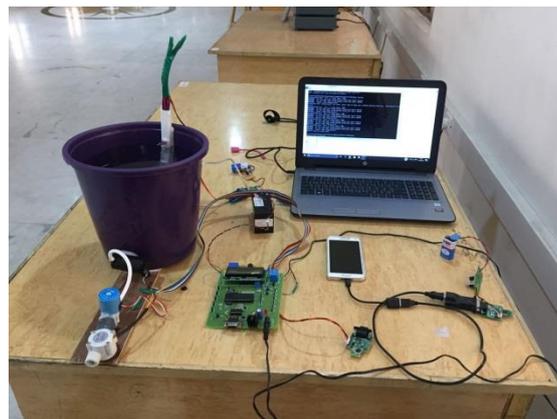


Figure 6: Total review of hardware kit

The water level in the dam is measured and displayed. Fig 7.1, 7.2, 7.3 shows the reading of level and safety in hardware kit android application and server when water level is high



Figure 7.1: Reading of water level at the LED

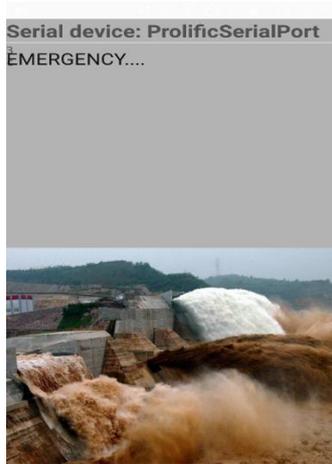


Figure 7.2: Reading of water level at the application

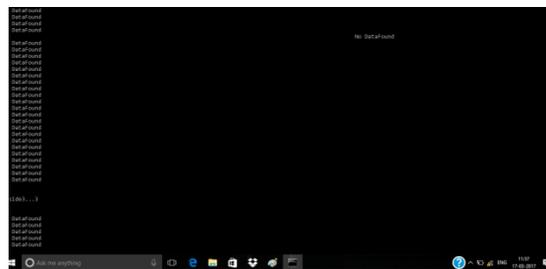


Figure 7.3: Reading of water level at the server

Figure 7.1,7.2,7.3 shows the reading of level and safety in hardwarekit android application and server when water level is medium



Figure 8.1: Reading of water level at the LED

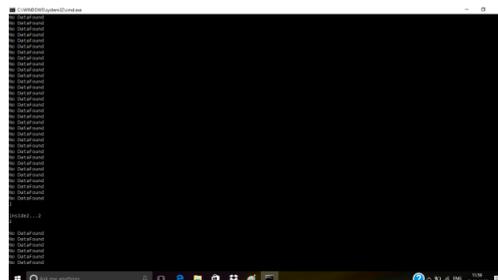


Figure 8.2: Reading of water level at the server



Figure 8.3: Reading of water level at the application

The android application is created with help of a android studio using java c compiler program, which consists of information such as name, address, contact number, doctor number..Etc,that are stored in the server which can be used in the emergency situations in a quicker time.



Figure 9: The "Flood" app.

CONCLUSION

DAM water filling plant consists of a level sensor and flow sensor for monitoring the level and speed of the water flow. The level of water is sent to server via the microcontroller. The server automatically updates the level of water to the application user through ZigBee, which is connected to the mobiles via OTG (USB On-The-Go) for communication, when network is not present. This event will happen with Network presence or without network presence. The major advantage of this method is that the user can know the details of the present water level in the dam by using the application and also able to know the nearest safest places during emergency situation. A user can also intimate the people by giving warnings about the water level in the dam before any emergency occurs.

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