Smart Water Level Leakage Detection System

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Abstract: **Water is one of the most important natural resource essential for survival. This paper focuses on leakage detection in over-ground pipes as well as sprinkler pipes and location method based on vibration sensors to overcome the problems of water dispersion in water distribution networks. Bearing in mind that water leakage is a big issue that has already grown to become a critical issue in agricultural area. The main objective of the paper is to show the work which is done on a water monitoring and leakage detection system using some basic components: Flow sensor, GPRS module, Solenoid valve, Microcontroller, Solenoid valve and relays.**

Keywords: **Leakage detection, vibration sensor, General Packet Radio Service (GPRS).**

1. Introduction

Water is vitally important to every aspect of our lives. Leakage in general takes an international attention because it causes serious fluid shortage. That Water represents a primary necessity for living things and is essential for agriculture etc. In modern world, water leakage is considered as one of the largest and most serious problem in agriculture. This paper deals with the leakage detection and location of water pipes which is one of the main concerns in the water management field. Leakages can be classified into reported, unreported leakage or background leakage. Reported burst event is usually visible on the ground as they can be easily detected by maintenance personnel or the public. Unreported burst event exhibits the same type of leakage as the reported burst event without surfacing to the ground. On the other hand, the background type leakages are small leakages that are difficult or cannot be detected through normal methods such as leakage through creeping joints. Leaks in water pipes may allow contaminants to enter water systems thereby reducing water quality and threatening the health of water users. Water level controller is equipment used to control the water level in a field. The level of the water is controlled by using a microcontroller. Main components are PIC microcontroller, sensor, motor etc. The sensors sense the presence of water and give indication to the microcontroller.

2. Related Work

Water pressure, pipe material and diameter have a significant impact on the detection accuracy due to the interference of frequency. In this paper we will show the whole system ideas,

procedure, benefits, devices and apparatus used to accomplish the whole system in technical way with high efficiency. The main idea talks about how to detect the leakage which occurs in water distribution pipes. This problem causes many difficulties for farm and its owners.

A. Water level detection in well

This paper talk about GPS, GPS stands for Global Positioning System is a worldwide radio navigation system formed from the planet of 24 satellites and stationed in low earth orbit. The Global Positioning System is especially funded and controlled by the U.S Department of defence (DOD). The GPS system was firstly designed and created for the United State for military use. But nowadays, it's available for civilian, with none quite charge or restrictions. Global Positioning System tracking may be a method of understanding precisely the position of GPS sensor's holder supported an easy mathematical principle called trilateration or triangulation. A GPS tracking system can add various ways i.e., active and passive tracking. In passive tracking, the position is typically stored in internal memory or on a memory card along the ride, while within the active tracking, also refers to a true time duration, data is to be circulated to main database beyond a modem within the GPS unit.
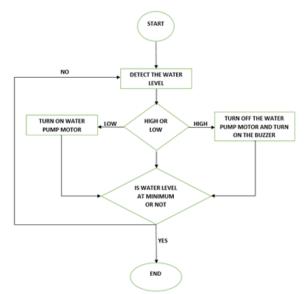

Fig. 1. Flowchart of water level detection system

B. Smart water leakage detection using Wireless Sensor Networks (SWLD)

Fig. 2. Leakage in pipes

By using water monitoring system SWLD, we avoid the water wastage, power consumption and easily prevent the water. If our idea applied in fully technical true way, this will be very useful for agricultural. This experimental system will save money for owners and will detect the leakage in water distribution pipelines and helps the owner to be familiar with the problems early to make the required maintenance. In our system we make a home model to be a prototype for SWLD system. We arrange water pipelines and put water sensors on points which have high probability for water leakage. A microcontroller also required (Arduino) to control and process the actuators on its output ports, also to receive data from water sensors. The Arduino connect to GSM to detect the water leakage and decreasing in water level rapidly and remotely and then send SMS to the owner. And we use the Android application to receive these data from GSM and control on pump. The goal of this system is to design and manage a Wireless Sensor Networks (WSN) that helps to monitor the location of water leakage with the help of information sensed by the sensors located above water hoses, so as to keep the water resource within a standard described for domestic usage and to be able to take necessary actions to restore the health of the degraded water quantity. We use Arduino mega2560 microcontroller to design and build a water leakage detection & wireless control system which provides the user with new features such as water leakage detection and water level control in tank by mobile application. The purpose of the system is to bring comfort and energy saving to our lives.

3. Conclusion

This paper was intended to design a simple and low-cost water level and leakage detector. To design this system, we can use transistor as a platform and local materials for low cost. We can de-sign a system in such a way that its components will be able to prevent the wastage of water. The whole system can operate automatically. So, it does not need any expert person to operate it. It will be cost effective. This design has much more scope for future research and development. Though it is a just a concept, we hope some modification in this concept will lead to a reasonable diversity of usage.

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