Intelligent Water Leakage Controller using Raspberry PI

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ABSTRACT
In water supply network system, the major problem is water leakage. This system contains two sections, first part is leakage detection and automatically closes the solenoid valve to prevent the over leakage of water at the time it will send SMS to the corporation using GSM module which is according to sensor information. GPS location is used to detect where the leakage takes place. A prototype of suggested system was implemented and tested with various scenarios and the results are presented in this paper. Water source management is one of the key goal, so any country in the world of water requirement is increasing presently; involving automation is such systems will reduce human errors and will increase the efficiency and thus decreasing the supply demand gap.

I. INTRODUCTION
Water plays an important role in our everyday life. In day-today life people don't realize the scarcity of water. In water management system, the water consumption and water monitoring are efficient mainly in home or office. Therefore, efficient use and water monitoring are potential constraint for home or office water management system. For survival of things water is most essential one. Surface water will also help for our future needs. Water is synonymous to life, as living objects cannot live without it. This information is very useful for the better management for farmers to improve their lands and crops. Pipeline networks are the most economic safety, reliability and efficiency. If properly maintained, pipelines can last indefinitely without leaks. Pipeline systems are responsible for transport water, oil and gas. The financial losses and environmental damages are caused due to leakage in pipes.

II. METHODOLOGY
Our idea is to take necessary action to restore the water leakage in underground pipelines with the help of raspberry pi. Based on GSM, the pipe monitoring system is located and then the hardware and software design of the system is analyzed, the real- time monitoring of Leakage-Detection in underground water-pipelines is improved by means of the effective design. At the same time, the modem monitoring system managements easily and flexibly for the requirement of this mode. The real-time monitoring for the traditional detection method by using this technology, the real time monitoring of underground water pipe is detected and overcome the shortcomings can be achieved. It also has the advantages like manpower is less; and it promotes the efficiency of the system and locating the leakage pipe timely. These data are sent to a flow sensor and it evaluates the problem if it is water leak or not. If the water leakage is detected, it alerts the buzzer alarm and sending a short text message (SMS) to the particular concern using a GSM module.

Fig.1.GSM Modem

III. WORKING

This system contains two sections, first part is leakage detection and automatically closest solenoid valve for to prevent the over leakage of water and send SMS to the corporation using GSM module according to sensor information. By using GPS location to detect where the leakage takes place. The second part is that to fill the water tank by using Raspberry pi. GPRS module enables data logging with the existing cellular network infrastructure.
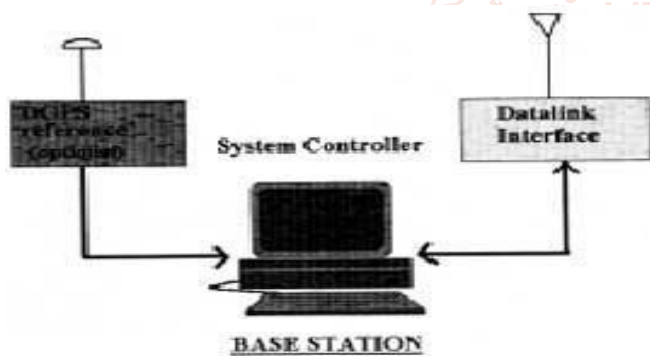
Fig.2.Base station
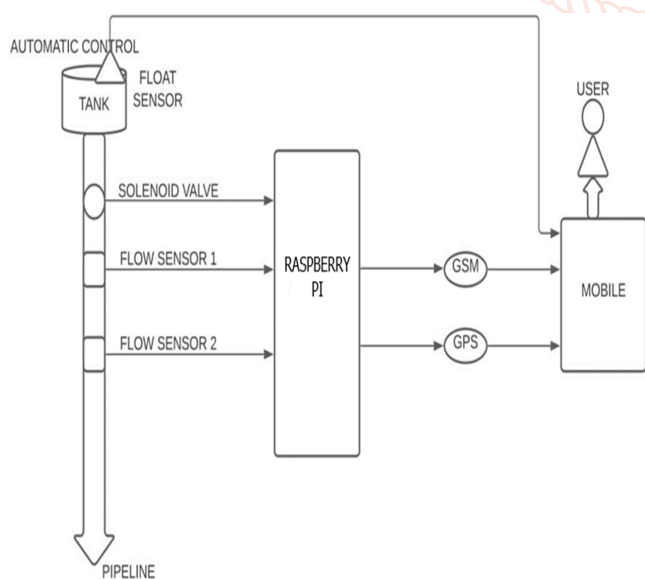
Fig.3.Block diagram

IV. CONCLUSION

Smart sensor networks are a viable solution for monitoring the condition in particular the pressure and hence leaks, of buried water pipelines. Their advantage over other commonly used leak detection methods is that they have a degree of redundancy as individual faulty nodes do not render the whole system obsolete and allow for continuous monitoring without operator intervention. This might be used to determine the location of the leak. The sensor nodes were successful deployed in field trials and they collected temperature and relative pressure data.

This water leakage detection can readily use to prevent the leakage in underground pipelines. To identify the leaks and rectify it by this system. This project aims at reducing leaks which has many benefits for the corporation as well as the consumer including greater reliability through an efficient water system and also preserving water for future use.

V. LITERATURE SURVEY

Monitoring the underground water pipelines is more difficult than monitoring the water pipelines located on the ground in open space. This situation will cause a permanent loss if there is a disturbance in the pipeline such as leakage. Therefore, a solution is required to detect and to determine the location of the damage when there is a leak. The detection of the leak location will use fluid mechanics and kinematics physics based on harness water flow rate data obtained using flow liquid meter sensor and Raspberry-pi as a microcontroller. The results show that the proposed method is able to work stably to determine the location of the leak which has a maximum distance of 2 metres, and it's able to determine the leak location as close as possible with flow rate about 10 liters per minute.

VI. REFERENCES

[1] Ali M.Sadeghioon, Nicole Metje, David N.Chapmanand Carl J.Anthony "Smart Wireless Sensor Networks for Leak Detection in Water Pipelines" Journal of Sensor and Actuator Networks ISSN 2224-27082014 February 20(2014).

[2] Jihoon Choi, Joonho shin, choonggeum song, suyong han, Door II park "Leak Detection and Location of Water pipelines using vibration sensor" MDPI journals on September 13,2017.

[3] Jyotirmayal jaradar, Subhasish Chatterjee ''Real-Time Water Quality Monitoring System" International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 03| Mar- 2018.

[4] R F Rahmat, I S Satria1, B Siregar, R Budiarto" Water pipeline monitoring and leak Detection using flow liquid meter sensor" IOP Conf. Ser.: Mater. Sci. Eng. 190 012036, October 19 (2020).