

Water Supply Pipe Alert System

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Abstract

In many residential and community areas, water is supplied by government or municipal bodies at fixed times. However, due to irregular schedules or lack of timely notice, users often miss the supply period. This results in either unfilled storage tanks or wastage of water. To address this issue, a Water Supply Pipe Alert System has been developed. The system uses a flow sensor to detect water movement in the pipe and automatically alerts users via a buzzer and LED indicator when the water supply begins.

Introduction

Water scarcity and inefficient utilization of supplied water are common problems in both rural and urban regions. Since municipal water is often supplied at specific hours, residents must manually monitor its arrival. Missing the supply not only causes inconvenience but also contributes to water wastage. This project introduces an automated alert mechanism that detects the start of water flow and immediately notifies users through visual and sound signals.

Problem Statement

In many areas, especially where water is supplied at fixed times by the municipality, people often miss the time when water starts flowing. As a result, water is wasted, or the storage tank is not filled properly. The proposed system solves this problem by automatically detecting water flow and alerting users.

Objectives

- To develop a compact, low-cost water supply alert system.
- To detect the beginning of water flow using a flow sensor.
- To provide real-time alerts to users via a buzzer and LED.
- To promote efficient water management in households.

Methodology

The project is based on a flow detection mechanism controlled by a microcontroller (Arduino Nano). The flow sensor generates electrical pulses when water passes through it. These pulses are processed by the Arduino, which determines the presence or absence of flow. Once flow is detected, the system triggers a buzzer and illuminates a red LED to notify the user.

Components Used

SR. NO.	Component Name	Quantity	Expected Price (INR)
1	T Joint	3	300
2	L Joint	3	250

3	PVC Pipe (10 m)	1	500
4	Battery	3	800
5	Solar Panel	2	1000
6	Solar Panel Driver	2	300
7	Arduino Nano	1	300
8	Big Buzzer	1	100
9	Red LED	1	10
10	Water Flow Sensor	1	500
11	Metal Pipe	1	300
12	Wire	-	150
13	Air Tight Box	1	140
14	Pipe Cutter	1	200
15	Feviquick	-	250
		Total	₹5100

Working Principle

The water flow sensor contains a small turbine that rotates as water passes through. The turbine's rotation generates pulses proportional to the flow rate. These pulses are sent to the Arduino Nano, which analyzes the data. If the sensor output exceeds a threshold, indicating active flow, the Arduino activates the buzzer and LED. When water stops flowing, the signal ceases, and the alert turns off.

Design

The system integrates the sensor with the main water supply pipe using PVC joints and connectors. The Arduino and power components are enclosed in an airtight box for protection. The design is modular, making it suitable for both household and community use. Power is supplied through a battery system supported by solar panels for sustainability.

Results and Discussion

Initial testing demonstrated that the system accurately detected water flow and immediately provided both audio and visual alerts. The sensor responded within seconds of water flow initiation, and the buzzer was audible from a reasonable distance. The use of solar energy made the system independent of the main electrical grid.

Advantages

- Automatic detection and alert without manual monitoring.
- Simple, low-cost, and energy-efficient design.
- Suitable for rural and urban environments.
- Reduces water wastage and ensures timely tank filling.

Applications

- Domestic and community water supply monitoring.
- Municipal water distribution systems.

- Small commercial or agricultural water lines.

Future Enhancements

- Integration with mobile notifications via IoT (Internet of Things).
- Addition of a real-time water flow rate display.
- Cloud-based data storage for usage monitoring.
- Voice alert or app-based control system.

Conclusion

The Water Supply Pipe Alert System provides a practical and efficient solution for water management challenges faced in timed-supply regions. Its automated detection and alert mechanism minimizes water wastage and enhances user convenience. With further integration of IoT technology, the system could serve as a model for smart water management systems in the future.