

Smell Detection and Automatic Flushing System

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Abstract— Today water is a scarce & precious commodity and it is emerging as a demand everywhere. Most of the water is wasted when people do not turn off the flush after use out of laziness or negligence. People leave water running, which consumes 13 -16ltrs of water for every flush. Moreover, sometimes people leave the urinals unflushed, which creates bad odour and unpleasant environment, thus affecting the health of the people using it. An efficient solution to this problem is the use of urinals with automatic flush controller fitted with sensors that controls the wastage of water and provides a hygienic [1] environment near the urinals thereby reducing the risk of diseases. Our mission is to recommend this technique in public institutions and colleges in order to have economical water system.

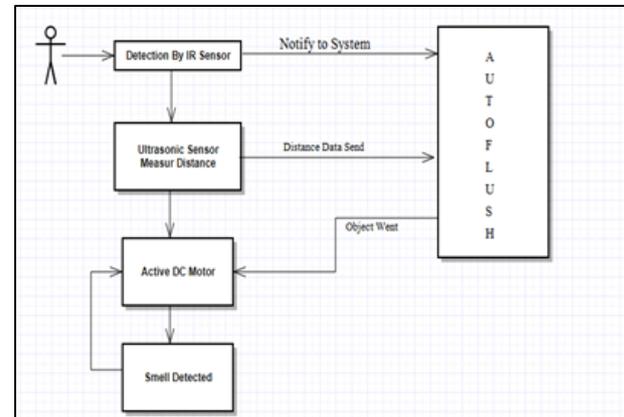
Keywords: Urinal, IR sensor, Ultrasonic Sensor, Water Level Sensor, Arduino Uno, Smell Sensor

I. INTRODUCTION

In recent years, an automatic urinal flusher becomes common in a public toilet. It has been replaced the traditional urinal flusher not only its ease of use but there are also other reasons. From time to time, when a traditional urinal has been used, some users may not press the flusher button to clean a urinal after using it. The user may simply forget to press the flushing button because they are in a rush. Some users may deliberately does not want to press the flushing button because of the hygienic reason. These can cause a urinal to be smelly and getting dirtier. Even worse there can be more bacteria glowing inside the urinal. From these reasons, an automatic urinal flusher become popular in a public toilet.

Every time when an automatic urinal flushing is using, it means clean water has to be flushed. As clean water is required some sort of energy to acquire, it should be used efficiently. If it has been flushed without any consideration, more energy can be burn in order to recycle them. Here, one of the most important parameter, that should be considered while using an automatic urinal flusher, is to decide how long the clean water should be flushed. If the water has been flushed for too long, the clean water could be wasted. On the other hand, if it is flushed for too short, it might not be cleaned. Our aim is to flush urinal according to odor smell.

II. AUTO FLUSH TOILET



The system shown in above fig. is designed to clean public toilets automatically upon using it up by people. Here we are using different sensors like ultrasonic sensor and smell sensor. IR sensor is used to detect if any person is there in front of it or not. If it detects any person then ultrasonic sensor is used to detect the exact distance of that person from it. Ultrasonic sensor is used to detect exact distance and IR sensor is used to detect obstacle or object.

After detection of person smell sensor will be used to detect whether toilet has been used. If smell level increases beyond a predefined limit then cleaning system will be activated with the help of DC water pump which will be turned on using a relay. Relay is a device used to ON or OFF any electrical or electronic load like bulb, fan, DC pump, AC pump etc. Here we are using a small DC pump for demonstration purpose. DC pump will be turned ON or OFF using relay which is connected to arduino. Arduino is used as the brain of system.

Arduino takes input from sensors and performs controlling action. LCD is used for visual indication.

III. LITERATURE SURVEY

A. D. Kadge, A. K. Varute, P. G. Patil, P. R. Belukhi (2016) has proposed "Automatic Sewage Disposal System for Train", Indian railways have 14,500 km of total track over a route of 65000 km and 7500 stations. While travelling by the train everyone expect healthynand hygienic surrounding. Feel uncomfortable due to the waste on the platform and the allied foul smell. Creates bad impression on foreign tourist .sanitation problem cause due to system in which train toilets dispose human waste openly on to tracks. In this system, they are using two mechanisms. They are sewage disposal mechanisms and track changing mechanisms. In the sewage disposal mechanisms, the ultrasonic sensor and position sensor is used. The ultrasonic sensor can detects the depth of the sewage tank and the position sensor detects the proper place to dispose the sewage. After the proper detection of

particular place, the solenoid valve on. Then the sewage disposal is done.

K. Hantrakul, Paween Khoenkaw [2016] :- proposed an automatic faucet. The proposed faucet uses infrared sensor to detect user's hands while using the faucet. The paper study on the relationship between turning off delay time and the repeat rate of washing. If the repeat rate is high, it means the turning off delay time is too short. This is because users may not finish washing their hand, but the water has already been stopped running. However, if turning off delay is set for too long, clean water might be waste as users might finish washing their hand and left the faucet. The study shows that the turning off delay of 0.3 seconds can meet users' contentment while it can also use less clean water than using other turning off delay time.

IV. HARDWARE MODULE

A. Ultrasonic-Sensor-HC-SR04

- The Ultrasonic Sensor is used to measure the distance
- High accuracy and stable readings.
- It can measure distance from 2cm to 400cm or from 1 inch to 13 feet.
- The RX pin works on 3.3V



B. IR Sensor

- An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings.



C. MQ-135

Sensitive material of MQ135 gas sensor is SnO₂, which with lower conductivity in clean air. ... MQ135 gas sensor has high sensitivity to Ammonia, also to other organic amine. The sensor could be used to detect different gas which contains Ammonia, it is with low cost and suitable for different application.



V. ADVANTAGES OF PROPOSED SYSTEM

A. Improved Sanitation

Public restrooms receive much more foot traffic than a domestic toilet, meaning that more excrement and urine is deposited. A faulty or subpar flushing system could mean that odors and germs are left lingering in the facilities. This increases the risk of spreading germs that can cause serious illnesses and diseases. Having auto-flush on toilets and urinals ensures that all waste is disposed of quickly and having an automatic faucet means that hands can be washed without touching the faucet surface, so fewer germs are transferred around the room.

B. More Economic

Auto-flush facilities are very reasonably priced and are designed to consume much less water and energy than a traditional unit, this means that, over time, you can pay off the price of the unit and save money in water and supply costs. Furthermore, the reduced need for maintenance and cleaning will save you the cost of wages and repairs, making the initial cost a worthwhile investment.

C. Prolonged Lifespan

Having a hands-free system can prolong the lifespan of your facilities due to less wear and tear and clumsy handling; the fewer people that are touching your facility, the less chance of potential damage. It is common practice for people to use their feet to try and kick the flusher, rather than use their hands, so having an automatic system will cut out this behavior completely.

D. Water Conservation

Although there has been evidence to the contrary, the main advantage of sensor systems is the reduction in water wastage. The sensors on toilets and urinals are sensitive to movement, flushing when needed. There is usually a timed delay before this process can be activated again, meaning that users can't re-flush the toilet several times with ease. This is intended to cut down on unnecessary water usage.

E. Ease of use

Another benefit of a hands-free unit is the ease of use, most notably in young children, the elderly or those with joint or muscle complaints such as arthritis. Older systems can be quite difficult to work, often leading to incomplete flushing; this more modern system eliminates the issue and allows all capabilities to use the facilities with ease.

ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

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