Automatic Urinal Sprinkler System for Odor Reduction

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Abstract:-

A flush urinal disposes human urinals by using water through a drainpipe to another location. A series of urinal are fitted in offices, malls, multiplexes, educational institutions, bus railway stations, airports, commercial complexes, stadia and other public places. Most have manual flushing systems like push button, trigger, pull chain, etc. However, use of such manually operated flush can spread germs and bacteria .when contacted and thus users avoids to flush or lead to wastage of water if used. Now a day laser or infrared sensor also ultar sonic sensor operated flushes is also used in the places of high commercial value and importance but are expensive and required continuous O and M. Therefore, the sanitary facility may remain un-flushed leading to unhygienic conditions and foul smell. Thus need for a low cost automatic flushing apparatus which can flush the right-controlled amount of water and avoid direct contact thus conserving water as well as maintaining personal hygiene and sanitation.

Keywords—Internet of Things, Sanitary Hygiene,8051 Microcontroller, Ultrasonic Sensor.

I .INTRODUCTION

In response to the persistent issue of unpleasant odors in public restrooms, particularly emanating from urinals, the implementation of an Automatic Urinal Sprinkler System presents a promising solution. This innovative system aims to tackle the root cause of malodors by automatically dispensing a controlled amount of odor-neutralizing solution after each use, effectively reducing and eliminating foul smells. By incorporating advanced

sensor technology, this system can detect usage and respond promptly, ensuring a continuous and efficient odor management process. Through this project, we seek to enhance restroom hygiene, improve user experience, and create a more pleasant environment for all patrons.

Motivation:-

As our project is related to a specific direct problem in our college, so we came up with an idea to resolve this problem? We are referring to the problem in public toilets. Also in our college we observed in some toilets its the same problem of flushing which is ignored by some students which leads to bad odor. Hence this technology may help resolve this problem.

II.LITERATURE REVIEW

I. Configurable automatic smart urinal Sprinkler based on MQTT protocol This paper investigates one possible way to reduce the wastage of clean water used in a public toilet. The study focuses on saving clean water from the use of an automatic urinal Sprinkler system in a toilet. The automatic urinal Sprinkler is set with different water Sprinkling duration parameter. This is to find the most satisfied parameter for users while spending clean water as less as possible. In order to adjust the parameter, an automatic smart urinal Sprinkler system is developed. The system uses MQTT as an underlying communication protocol. The protocol is used in collecting, controlling, commanding and debugging the system. The results in the testing environment show that using a flushing duration for 2.5 seconds is enough to satisfy most users while wasting clean water as less as possible. potential for system complexity and maintenance challenges. Implementing IOT technology in restroom facilities involves integrating various sensors, devices, and communication protocols like MQTT, which can increase the complexity of the system setup and maintenance.

2. Development of Environmentally Friendly Urinal Automatic System The authors of this paper have implemented the design and development of IOT based Sprinkler automation systems employ HC-SR04 ultrasonic sensors, YL-83 as a detector, and ESP8266 WIFI module connected to an android-based mobile phone. The urinal Sprinkler automation system is designed with an Microcontroller capable of detecting someone who will urinate and provide sufficient Sprinkler watering to clean

it. The test results are carried out on the effectiveness of distance detection, the adequacy of water discharge, and monitoring of the availability of water. The test results are also compared with a similar type of commercial urinal system.

3. DEVELOPING SMART TOILETS USING IOT This paper has mentioned that Existing system, they are focused only on identifying the dirt in the toilets .In our proposed system, we have determined on keeping clean toilets, observing the sweeper's working activities. It can dodge many syndromes. It may create the consciousness amongst people about the toilet management. Therefore, our development is to use safe and hygienic toilets. This paper is based on IOT and image-processing concepts using different sensors like smell sensor, IR sensor, sonic sensor, RFID reader .By using these sensors, we can create the smart toilets.

4. TOILET MANAGEMENT SYSTEM USING IOT The proposed system "Smart Toilet" is based on IOT, smell sensor, IR sensor, sonic sensor, RFID sensor. The smart toilet will take care of opening and closing of the toilet seat, the IR sensor tracks the dirt present on the toilet seat and raise an alarm, the cleanliness of the toilet will be improved by monitoring the sweeper's activity to maintain the hygiene of the toilet, it also will deal with water conservation. The toilet management system using IOT technology involves integrating sensors and devices to enhance restroom operations. These systems can monitor various aspects like occupancy, cleanliness, supply levels, and maintenance requirements in real-time.

5. Water efficient toilet: Setting a suitable automatic Sprinkler duration This paper investigates on how much clean water should be used to clean a toilet bowl in college Washroom. The data of an automatic toilet bowl Sprinkler system is collected and used to avoid wasting clean water and yet still provide enough water flow to clean a toilet bowl. The results of experiments conducted for several months. It shows that duration of 3.8 seconds is sufficient for Sprinkler clean water in the sample environment

METHODOLOGY:-

Traditional methodology

Figure 6. Traditional Methodology

When cleaning a urinal traditionally, start by flushing the urinal to rinse down interior surfaces and remove any debris. Apply a bowl cleaner by squirting it along the top inside flushing edge of the urinal, allowing it to run down the inside surface while wiping down the exterior with a disinfectant. Scrub the interior surface of the urinal thoroughly with a bowl brush, ensuring all surfaces are cleaned. Replace any urinal screens or blocks after cleaning and wipe clean all external surfaces, including walls and baseboards that may have caught overspray. Properly dispose of cleaning materials and sanitize your equipment

Proposed methodology

In today's life, most people fail to flush the urinal system after using it. It creates bad odor and an unpleasant environment especially in public restrooms, which affects the health of the people when using it. And typically in some cases, people fail to close the faucet/tap properly after using it, which leads to the wastage of water. This causes various problems to the environment. Water is an important resource, which we own the responsibility to pass to future generations. The wastage of excess water, as well as the unpleasant conditions in the surrounding, is a threat to the environment

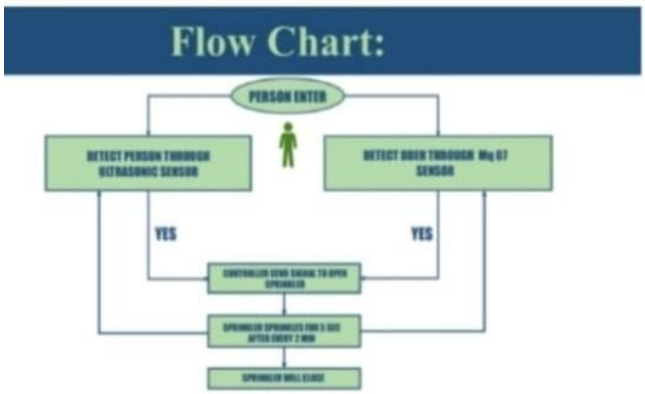

Figure 8. Flow Chart

Work Flow:-

In this system when a user is enter the washroom ultrasonic sensor situated exactly above the seat gets activated and when person leaving then the sensor sends signal to Microcontroller and through the Microcontroller automatic Sprinkler take place. The odor sensor senses continuously if any odor is detected it will send the signal to the Microcontroller based on the density automatically Sprinkler takes place and activates the fragrance system.

This system also helps to avoid bad odor in toilets

Block Diagram:-

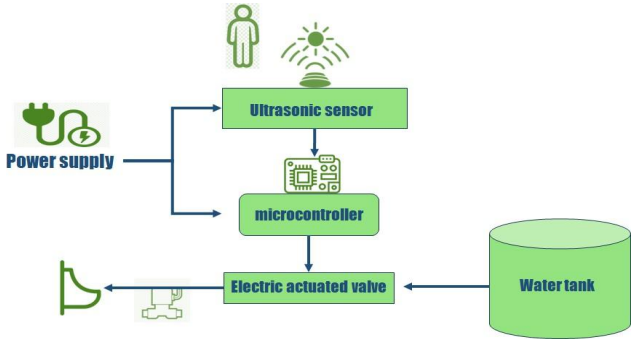

Figure 9. Block Diagram

To create an automatic urinal sprinkler system for odor reduction using a Microcontroller 8051, ultrasonic sensor, and electric actuated valve, the system can be designed as follows: The Microcontroller 8051 serves as the central control unit, receiving input from the ultrasonic sensor to detect presence for activation. Once triggered by the sensor, the Microcontroller sends a signal to the electric actuated valve to release water for flushing. This system ensures efficient and automatic operation based on user proximity, enhancing hygiene and odor control in urinals

ANALYSISAND APPROACH

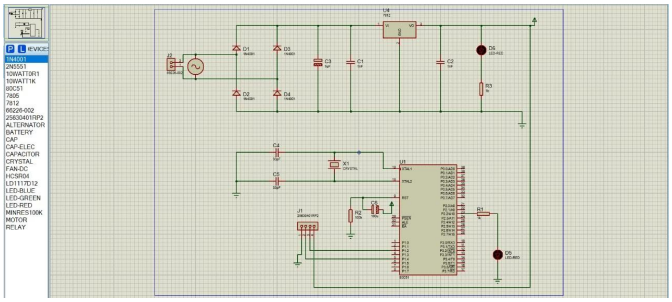

Figure 10. Circuit Diagram

RESULT

Schematic diagram

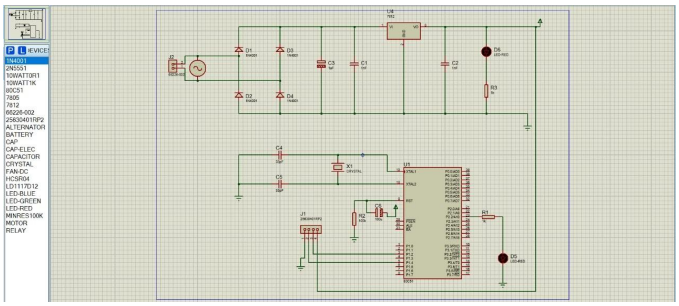

Figure 11. : Schematic Diagram

Prototype:-

Figure 16. Module.

I. IMPACT / BENEFITS

1. Odour Reduction: These systems automatically flush urinals to assist get rid of unpleasant odours that can come

from standing urine, making the toilet more aesthetically pleasing.

2. Water Conservation: They guarantee effective flushing only when necessary, cut down on needless water use, and support environmentally friendly practices to reduce water waste.

3. Better Hygiene: Touchless operation reduces interaction with surfaces, raising standards of cleanliness and slowing the transmission of germs in public lavatories.

4. Environmental Sustainability: Automatic urinal sprinklers drastically cut down on water use, helping to conserve water and lessening the negative effects of excessive water waste on the environment

5. Odour Elimination: By efficiently getting rid of unpleasant smells at their source and stopping the growth of dangerous bacteria and pathogens, these systems guarantee a clean and hygienic lavatory environment. the environment

Simplified Maintenance: They require little hardware modification and are made to be simple to install and maintain, providing a hassle-free way to keep urinals clean and odor-free.

VII. CONCLUSION

This innovation certainly has the potential to bring the paradigm shift in the operation and functioning mechanism of the Urinal-Toilet Flushers. As till date almost all of the Urinal Toilet flushers are mainly manually intentionally operated by hand,S with an exception to infrared/ laser sensor operated flushers, the limitations of which are already discussed. The present innovation will certainly shift the focus of the toiletries and sanitary equipment manufacturing companies from hand operated flushers towards the more convenient paddle or leg operated flushers. Moreover it will be helpful in providing better sanitation and improving the health hygiene of the society at a low and affordable cost. More importantly by avoiding the water wastage during flushing, it will surely help in environmental protection by conserving the precious natural resource like water and contributing the country towards the goal of sustainable Development.

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