



Automatic Urinal Flusher by Using Aurdino

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ABSTRACT :

The automatic urine flusher is a smart and innovative solution that enhances the functionality and hygiene of public restrooms. By leveraging Arduino technology and integrated sensors, this system provides a hands-free, water-efficient, and user-friendly experience for all users.

The public washrooms remain perpetually dirty because the users don't flush water after using the toilet. In this Paper we are implementing the automatic washroom cleaning system, which based on electronics as well as software programs with different algorithms for the automatic system. When the public toilets remain perpetually dirty then the system clean the toilets automatically with the help of various sensors and arduino controller.

Keywords: Washroom Cleaning System, Micro-Service, Arduino UNO

1. Introduction

Whether rich or the poor, tribe or countrymen, Indian or any living organism, the very common thing that everyone does daily, is the intake of food and water, along with the excretion of waste through various forms. In public restrooms, due to the improper flushing of the toilet and maintenance, bad odor and unpleasant environment are common to be found in most public restrooms. This unhygienic environment creates discomfort to the users along with diseases such as Nausea, Asthma, etc. On the other hand, people who use the urinals at the public restrooms, fail to close the faucet (tap) after using it, as they feel uncomfortable to touch the Unhygienic parts of the urinal.

This leads to the wastage of the water continuously for hours until another person who willingly closes it and in most cases the water is continuously made to flow non-stopped. Due to this large amount of water has been wasted. To overcome this problem, the smart urinal mech automatic flushing system is the best option for us. This paper exactly is about the automatic flush system. It means that as if for flushing we need to press the flushing button, but in government or public toilets we found that; lot number of peoples use toilets for their use, but only one percent out of them flushed in that toilets. The mindset of people is that, if we touch the flush button or tap our hands will get infected or will become dirty or most of the peoples ignore to flush. Due to this mind set, lot of dirty waste material is kept itself in that toilets and slowly from these toilets various viruses and bacteria gets released in the nearby area which generates various types of diseases. This takes place only because of improper sanitation. People living in the area surrounding the toilets starts suffering from various diseases.

As a solution of this problem we have developed an idea of smart mech automatic flush system. This device helps to control the amount of clean water running in urinals in the toilets while ensuring that the urinals are always flushed after it has been used. It also prevents the chances of any infection from pushing flushing button. And if there is a no water the system will send message to the caretaker and with the help of message the caretaker can refill the water to the storage tank for time to time. In this paper, a smart urinal mech automatic flushing system is proposed. It is implemented using Arduino Uno, water level sensor, ultrasonic sensor and odor sensor, relay, submersible water pump and GSM module. This Paper can be applied in Government, private, public, municipalities and any kind of offices. Schools, Colleges, Hospitals, railway stations and bus stands. Social and religious gatherings places, tourist places. Public municipalities, remote areas with urinal toilets.

As the world's population is increasing, more of the water supplies have been used and polluted leaving less fresh water available. This makes it necessary ensure that adequate and sustainable water supplies can still be made available for this and future generations. This paper exactly is about the automatic flush system. It means that –“as if for flushing we need to press button” but in government or public toilets we found that; lot number of peoples uses toilets for the their use, but only one percent out of them flushed in that toilets.

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suffering from various diseases. As a solution of this problem we have developed an idea of automatic flush system. In this system when an user sits on a seat of kamods; the sensor situated signals to flush tank and the tank gets flushed automatically . As well as if person sits on a seat for more than five minutes the exactly above the seat gets activated and when person stands or moves away, the sensor sends some flush system will get automatically activated and will start working.

1.1 Problem Statement :

The public washrooms remain perpetually dirty because the users don't flush water after using the toilet. It is also because of reason that regular cleaning isn't done properly When the public toilets remain perpetually dirty then the system clean toilets automatically with the help of various sensors and arduino controller.

To create an automatic washroom flusher using an Arduino Uno, you'll need to design a system that detects when someone is finished using the toilet and triggers the flushing mechanism. Here's a general outline of how you could approach this Paper:

1. Components Needed:

Arduino Uno (or compatible microcontroller)

Ultrasonic sensor or infrared sensor for detecting presence

Servo motor or solenoid valve for flushing mechanism

Power source (battery or adapter)

Connecting wires

2. Optional:

LED indicators for status display

3. Steps to Implement:

Setup Arduino Uno: Begin by setting up your Arduino Uno board and ensuring it's properly connected to your computer for programming.

4. Connect Sensors:

Connect the ultrasonic or infrared sensor to the Arduino Uno. These sensors will detect when someone is present in front of the toilet bowl.

5. Connect Flushing Mechanism:

Connect the servo motor or solenoid valve to the Arduino Uno. This mechanism will be responsible for flushing the toilet.

6. Write Code:

Write the code for your Arduino Uno. This code will include instructions for how the system should behave when someone is detected in front of the toilet and when to trigger the flushing mechanism. You'll need to include logic for detecting when someone has finished using the toilet.

7. Test the System:

Once the code is written, upload it to the Arduino Uno and test the system. Make sure the sensors are detecting presence accurately and that the flushing mechanism is triggered appropriately.

8. Refine and Debug:

Debug any issues you encounter during testing and refine your code as necessary. This may involve adjusting sensor sensitivity, fine-tuning timing, or troubleshooting any electrical connections.

9. Mount and Install:

Once everything is working correctly, mount the sensors and flushing mechanism in the washroom according to your design. Make sure everything is securely installed and properly aligned.

10. Final Testing:

Perform a final round of testing to ensure that the system operates reliably in real-world conditions.

11. Power Source:

Ensure that your system has a reliable power source, especially if it will be installed in a location where access to electricity may be limited.

12. Waterproofing:

Depending on the location of your washroom, you may need to waterproof certain components to protect them from moisture and humidity.

13. Safety:

Be mindful of safety considerations, especially when working with electrical components and water.

14. User Interface:

Consider adding features such as LED indicators or buttons for manual override to enhance the user experience.

1.2. Proposed System:

To overcome the limitations of the above system, an Automatic Washroom Cleaning System based on software and hardware technologies is proposed. Here Embedded C technology is mainly used. The Paper mainly aims in designing completely automated cleaning with the help of this system by using sensors to maintain cleanliness in toilets. There is no need of a person to ON/OFF the tank or flush. The arduino is a microcontroller which controls all the devices or sensors. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to other circuits. The board has 14 Digital pins and 6 Analog pins.

The proposed system for the automatic washroom flusher using Arduino Uno aims to provide a convenient and hygienic solution for flushing toilets without the need for manual intervention. Here's an outline of the proposed system:

1. Presence Detection:

The system incorporates sensors such as ultrasonic or infrared sensors to detect the presence of a person in front of the toilet bowl. These sensors will continuously monitor the area and trigger the flushing mechanism when someone is detected.

2. Flush Mechanism:

A servo motor or solenoid valve is used as the flushing mechanism. When triggered by the presence detection sensors, the servo motor or solenoid valve activates to flush the toilet automatically. The flushing duration can be adjusted based on user preferences.

3. Arduino Uno Control:

The Arduino Uno serves as the central control unit of the system. It receives input from the presence detection sensors and sends signals to activate the flushing mechanism accordingly. The Arduino Uno also handles any necessary logic, such as debounce routines for sensor inputs and timing adjustments for flushing.

4. Power Supply:

The system can be powered by a stable power source, such as a battery pack or a mains power adapter. It is essential to ensure that the power supply can adequately power all components of the system and provide uninterrupted operation.

5. User Interface (Optional):

Optionally, a user interface can be integrated into the system to provide feedback to users and allow for manual control. This interface can include indicators to show when the system is active or when a flush has occurred. Additionally, buttons or switches can be included to enable manual flushing if desired.

6. Safety Features:

Safety considerations are paramount in the design of the system. Components should be properly insulated and waterproofed to prevent electrical hazards. Additionally, mechanisms should be in place to prevent accidental flushes, such as delay timers or manual override options.

7. Installation and Maintenance:

The system should be designed for easy installation and maintenance. Components should be securely mounted in the washroom, and wiring should be organized to prevent tangling or damage. Routine maintenance tasks, such as sensor calibration and battery replacement

2. Literature Survey:

Definition of Micro-Service Bad Smell was proposed. In this Paper the bad smell is decided with the help of scale with range from 0 to 10. Where 0 says that "The bad practice is not harmful" and 1 says that "The bad practice is extremely harmful". Here multiple scaling factors values are used to decide the range of bad smell with the help of the micro-service. If anyone Device or service has damage it affect the whole system. Saving Water with Water Level Detection in a Smart Home Bathtub Using Ultrasonic Sensor and Fuzzy Logic was proposed. In this system, fuzzy logic Volume 5, Issue 2, March-April -2019 | Pinki Banait et al Int J Sci Res CSE & IT. March-April-2019; 5(2) : 37-3938 was used in making decision to turn off or turn on the water tub or it can be responded based on timer setting

By user and water level detection. Water tub can also be opened or closed by manually. Robust Estimation of Simulated Urinary Volume from Camera Images under Bathroom Illumination was proposed. In order to determine the appropriate approximate curve they proposed a binarizing method using background subtraction at each scanning row

3.Objective:

- To provide clean and hygienic environment near the urinal at the public restrooms by making it to get flushed automatically.
- To use less amount of water for flushing purpose.
- To prevent scarcity of water while flushing.
- To prevent the condition of bad odor resulting in various diseases due to unhygienic environment.

3.1 Component:

- Aurdino UNO
- Electric Valve
- Relay

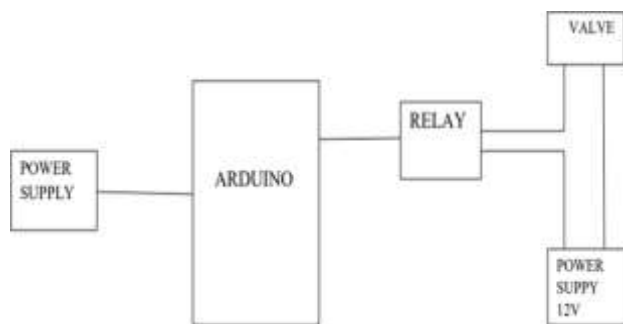
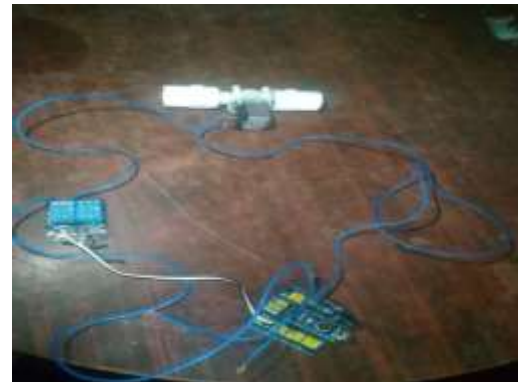


Fig.1. automatic washroom flusher using aurdino
2Experimental Setup



Fig

3.2 Scope of the System:

The feature scope of an automatic washroom flusher using Arduino encompasses the functionalities and capabilities that the system can offer to enhance hygiene, convenience, and efficiency in washroom environments. Here's a breakdown of the potential features and their scope:

1.Presence Detection:

Utilize sensors such as ultrasonic, infrared, or capacitive sensors to detect the presence of a user in front of the toilet bowl.

Scope: Reliable detection of user presence to trigger the flushing mechanism accurately.

2.Automatic Flushing Mechanism:

Implement a mechanism, such as a solenoid valve or servo motor, to flush the toilet automatically upon user departure.

Scope: Hands-free flushing operation to promote hygiene and convenience.

3.Adjustable Flushing Parameters:

Allow users to adjust flushing parameters such as flushing duration or intensity based on personal preferences or water-saving requirements.

Scope: Customizable flushing settings to cater to different user needs and environmental considerations.

5.Energy Efficiency:

Incorporate energy-efficient features to minimize power consumption during standby mode and optimize flushing operations.

Scope: Reduced energy usage while ensuring reliable operation of the automatic flusher system.

6. Manual Override Option:

Provide a manual override option, such as a button or switch, to enable manual flushing when needed.

Scope: Backup mechanism for users to manually control flushing in case of system malfunction or preference.

7. User Feedback and Indicators:

Include visual or auditory indicators to provide feedback on flushing status or system errors to users.

Scope: Clear communication of system status to enhance user experience and troubleshooting.

8. Waterproof and Durable Design:

Design the system with waterproof and durable materials to withstand washroom conditions and ensure longevity.

Scope: Robust construction to maintain functionality and reliability in humid and wet environments.

9. Integration with Smart Systems:

Enable integration with smart home or building management systems for remote monitoring, control, and data collection.

Scope: Connectivity features to facilitate centralized management and optimization of washroom facilities.

10. Hygiene Enhancements:

Implement features such as automatic lid opening/closing or antimicrobial coatings to enhance overall hygiene in the washroom.

Scope: Additional functionalities to complement automatic flushing and promote cleanliness.

4. Design Methodology:

In India the local authorities or commercial businesses may provide public toilet facilities. A public toilet is accessible to the general public. The toilet is available for use by the general public, customers, travellers, employees of a business, school etc. It may be municipally owned or managed entered directly from the street. Local authorities or commercial businesses may provide public toilet facilities. Railway stations, filling stations and long distances public transport vehicles such as trains, ferraries and planes all are generally provide toilets for general use.

A public toilet is accessible to the general public. Where toilets are available people can enjoy all physical activities. It may be within a building that, while privately owned, allows public access, such as a department store, or it may be limited to the business's customers, such as a restaurant.

1. Finding Related Papers - 5
2. Literature Survey
3. To Identify Comparison of obtain results with existing result
5. PaperOutcome

The methodology for developing an automatic washroom flusher using Arduino involves several key steps, including planning, design, implementation, testing, and refinement. Here's a general outline of the methodology:

1. Define Requirements:

Identify the specific requirements and objectives of the automatic washroom flusher Paper, considering factors such as user needs, environmental considerations, and system constraints.

2. Research and Planning:

Conduct research on existing automatic flusher systems and Arduino-based Papers to gather insights into design considerations, component selection, and implementation strategies.

Develop a detailed Paper plan outlining the hardware and software requirements, timeline, budget, and resources needed for the Paper.

3. Hardware Selection and Setup:

Select appropriate hardware components, including Arduino board, sensors (e.g., ultrasonic or infrared), actuators (e.g., solenoid valve or servo motor), power supply, and any additional

Research Gap

Set up the hardware components according to the Paper requirements, ensuring proper connections and compatibility between components.

4. Software Development:

Write the software code for the Arduino board using the Arduino IDE or other compatible development environments.

Develop algorithms and logic for detecting user presence, triggering the flushing mechanism, adjusting flushing parameters, and handling user interface interactions.

Test the software code on the Arduino board, debugging and refining as needed to ensure correct functionality.

5.Integration and Assembly:

Integrate the hardware components with the Arduino board, ensuring proper wiring and connections between sensors, actuators, and other peripherals.

Assemble the components into a cohesive system, considering factors such as ergonomics, accessibility, and aesthetic design.

6.Testing and Validation:

Conduct comprehensive testing of the automatic flusher system to verify its performance, reliability, and compliance with the defined requirements.

Test the system under various scenarios and conditions to identify any potential issues or areas for improvement.

Validate the system against user feedback and real-world usage to ensure it meets expectations and user needs.

7.Optimization and Refinement:

Optimize the system's hardware and software components to improve efficiency, energy consumption, and overall performance.

Incorporate user feedback and lessons learned from testing to refine the system's design, functionality, and user experience.

Iterate on the design and implementation as needed to address any identified issues or areas for enhancement.

8.Documentation and Deployment:

Document the Paper's hardware setup, software code, design considerations, testing results, and any other relevant information.

Prepare user manuals or instructions for installation, operation, and maintenance of the automatic flusher system.

Deploy the system in the intended washroom environment, ensuring proper installation, calibration, and functionality.

9.Monitoring and Maintenance:

Monitor the automatic flusher system in operation to ensure continued performance and reliability.

Establish maintenance procedures for periodic inspections, troubleshooting, and repairs as

5. Result:

The result of implementing an automatic washroom flusher using Arduino can vary depending on the specific design, hardware components, and programming used. However, in general, a successfully implemented automatic washroom flusher can provide several benefits:

1.Hygiene Improvement:

By eliminating the need for manual flushing, an automatic washroom flusher reduces the risk of germ transmission and promotes a cleaner and more hygienic washroom environment.

2.Convenience:

Users no longer need to manually flush the toilet, offering greater convenience and ease of use, especially in public washrooms or high-traffic areas.

3.Water Conservation:

By allowing for precise control over flushing parameters such as duration and frequency, an automatic flusher can help conserve water by avoiding unnecessary flushes.

4.Energy Efficiency:

Automatic flushers can be designed to operate efficiently, minimizing power consumption and reducing energy costs over time.

5.User Satisfaction:

Providing a hands-free and reliable flushing experience can enhance user satisfaction and contribute to a positive overall washroom experience.

6.Maintenance Alerts:

Some automatic flusher systems may include diagnostic features to detect and alert maintenance personnel of any issues or maintenance requirements, ensuring continued operation and reliability.

Applications

Application of an automatic washroom flusher using Arduino extends to various settings where hygiene, convenience, and efficiency are paramount. Some key applications include:

1. Public Restrooms:

Automatic washroom flushers are commonly used in public restrooms, including airports, train stations, malls, restaurants, and office buildings. They offer a hands-free solution for users, reducing the risk of germ transmission and promoting a cleaner environment.

2. Healthcare Facilities:

In hospitals, clinics, and other healthcare settings, maintaining hygiene is critical to preventing the spread of infections. Automatic washroom flushers help ensure that toilets are flushed promptly and efficiently, contributing to overall cleanliness and patient safety.

3. Educational Institutions:

Schools, colleges, and universities often install automatic flushers to maintain hygiene standards in washrooms frequented by students, faculty, and staff. They provide a convenient and sanitary solution for busy restroom facilities.

4. Commercial Establishments:

Restaurants, hotels, shopping centers, and other commercial establishments prioritize cleanliness and customer satisfaction. Automatic washroom flushers enhance the washroom experience for patrons, reflecting positively on the establishment's image and reputation.

5. Industrial Settings:

In manufacturing plants, warehouses, and industrial facilities, automatic flushers offer a hygienic solution for restroom facilities used by employees. They help maintain cleanliness in high-traffic areas and contribute to a healthier work environment.

6. Smart Buildings:

Automatic washroom flushers can be integrated into smart building management systems for centralized monitoring and control. This allows facility managers to track usage patterns, optimize water usage, and perform proactive maintenance.

7. Residential Use:

Automatic washroom flushers are increasingly being adopted in residential settings to enhance convenience and hygiene in home bathrooms. They offer a modern and efficient alternative to traditional manual flushing mechanisms.

Conclusion:

Water is the universal resource and every living being has the right to access clean and hygienic water. It is our responsibility to pass this natural resource to the future generations. Measures have to be taken by everyone to save water by all possible means. Public places, banks, schools, restaurants and bus stop terminals can give a consideration to this design as a means of conserving water and keeping the urinals in a good hygienic condition.

A smart toilet flushing system using a sensor technology and a microcontroller was introduced. The circuit was designed, implemented. The preliminary results of the implemented circuit shows that an amount of water as low as LPF is enough to flush the toilet. The system is fully automated. It will reduce the dirtiness of the public toilets. A smart toilet flushing system using a sensor technology and a microcontroller was introduced. The circuit was designed, implemented. The preliminary results of the implemented circuit shows that an amount of water as low as LPF is enough to flush the toilet. The system is fully automated. It will reduce the dirtiness of the public toilets.

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