SMART PUBLIC RESTROOM
USING IOT

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Components required:

1. Automated Flush and Faucet Systems
2. Smart Toilet Seats
3. Occupancy Sensors
4. Hand Sanitizer Dispensers
5. Paper Towel and Soap Dispensers
6. Odor Control Systems
7. Smart Lighting
8. Environmental Sensors
9. QR Code or Mobile App Access
10. Emergency Alert Systems
11. Maintenance and Cleaning Alerts
12. Digital Signage
13. Toilet Seat Sanitization Systems
14. Occupancy Tracking
15. Water and Energy Efficiency Features
16. User Feedback Systems

The specific components may vary based on the restroom 's design, location,and intended user base.smart public restrooms aim to provide a more comfortable, efficient,and hygienic experience for users while facilitating maintenance and resource management for facility operators.

Purpose of project:

The purpose of this project is to enhance the user experience, improvehygiene and streamline maintenance and management.The key purpose is to ImproveHygiene,User convenience,WaterandEnergyConservation,Accessability,MaintenanceEfficiency,Sustainability, Datacollection,Improveduserexperience,ModernAesthetics,Costsavings,Publichealth,Customer Satisfaction and these are the purpose to create a more pleasant,convenient and sustainable restroom experience for users while streaming operations for facility managers

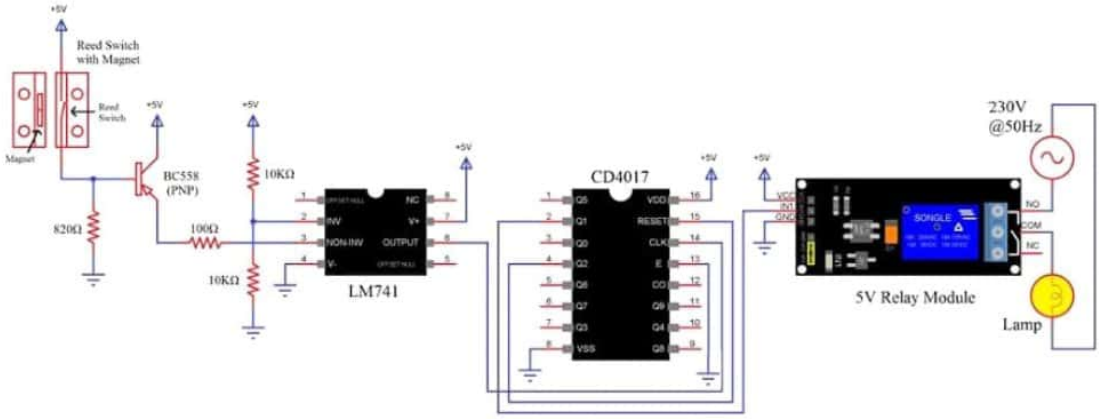
ABSTRACT

In the cutting edge world, the advances are definitely grown, yet at the same time the cleanliness in our nation is under risk.The abstract of this paper is to deliver clean and hygiene toilets. All the public toilets should be clean and hygiene. In our country, our government has introduced the scheme called "Swachh Bharat" (Clean India). Keeping the toilets uncontaminated is the one of the objective of Clean India scheme. Thispaper can be helpful to encourage the clean India project. In future, it can show the major part in clean India scheme. In an 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 consciousnessamongst 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.

INTRODUCTION

In our country, people do not have enough knowledge of using toilets. This leads to several diseases, such as Malaria, Hepatitis, Flu, Cholera, Streptococcus, Typhoid, etc. Hence we introduce the concept in the IOT called "**Swachh Shithouse**" The term Swachh means 'Clean'. Then the term Shithouse means 'Toilet'. It is introduce to use and maintain the toilets in the clean and hygienic way. The project is based on IOT concepts using different sensors like smell sensor, dirt sensor, sonic sensor, RFID reader, Database. Using these materials we are trying to provide the clean toilets and create the awareness among the people.

Circuit Diagram for project:



Program for smart public restroom:

1. User Interface:

Develop a user-friendly interface for selecting restroom options (e.g., men's, women's, accessible).

Implement touchless controls to minimize contact.

2. Occupancy Management:

Use occupancy sensors to monitor restroom usage.

Display real-time occupancy information on a digital sign outside the restroom.

3. Entry Control:

Use QR codes or RFID cards for secure access.

Implement automatic doors or touchless entry mechanisms.

4. Sanitization:

Integrate automatic hand sanitizers and soap dispensers.

Schedule regular cleaning and maintenance based on usage data.

5. Health Monitoring:

Add air quality sensors to monitor CO2 and humidity levels.

Alert staff if conditions are unfavorable.

6. Water Conservation:

Install smart faucets and toilets with sensors to control water flow.

Implement leak detection systems.

7. Energy Efficiency:

Use motion sensors to control lighting and ventilation.

Optimize energy consumption based on occupancy.

8. Feedback System:

Provide a way for users to rate the restroom's cleanliness and report issues.

Use this data to improve maintenance.

9. Security:

Implement surveillance cameras for security.

Secure data to protect user privacy.

10. Data Analytics:

Collect and analyze data on restroom usage and maintenance needs.

Use this data for predictive maintenance and improvements.

11. Mobile App:

Develop a mobile app for users to check restroom availability and receive notifications when it's their turn.

12. Accessibility Features:

Ensure the restroom is ADA compliant with features like accessible stalls and height-adjustable fixtures.

13. Maintenance Scheduling:

Create a system to schedule and track routine maintenance tasks.

14. Emergency Procedures:

Include safety features and protocols in case of emergencies, such as fire alarms and emergency exits.

15. Payment System:

If applicable, implement a payment system (e.g., pay-per-use or subscription-based) for premium public restrooms.

Coding :

```
import time


class SmartRestroom:
    def _init_(self):
        self.occupied = False
        self.light_on = False
        self.fan_on = False

    def presence_detected(self):
        self.occupied = True
        self.turn_on_light()
        self.turn_on_fan()
        print("Restroom is occupied.")

    def no_presence(self):
        self.occupied = False
        self.turn_off_light()
        self.turn_off_fan()
        print("Restroom is vacant.")

    def turn_on_light(self):
        self.light_on = True
        print("Light is ON.")
```

```
    def turn_off_light(self):
        self.light_on = False
        print("Light is OFF.")

    def turn_on_fan(self):
        self.fan_on = True
        print("Fan is ON.")

    def turn_off_fan(self):
        self.fan_on = False
        print("Fan is OFF.")

if _name_ == "_main_":
    restroom = SmartRestroom()

    while True:
        presence = input("Is there anyone in the restroom? (yes/no): ")
        if presence.lower() == "yes":
            restroom.presence_detected()
        else:
            restroom.no_presence()
        time.sleep(1)
```

CONCLUSION

Our proposed project will create awareness among the people about the proper sanitation. It makes use of Internet of things, which is a rapidly growing technology. Our proposed system will make everyone to strictly follow the cleanliness and proper sanitation in the toilets. It prevents the many new contagious diseases that spread due to improper sanitation of the toilets. Thus by using technologies in the smarter way, we can maintain the cleanliness which is next to the godliness. Keep Clean, Be Safe.