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Design & Development of Automatic Washroom Cleaning System

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ABSTRACT: Design and development of automatic washroom cleaning system is based on an innovative concept using technology to keep washroom clean. Many issues are raised in our country regarding the issue of hygiene, the importance of hygiene is recognized in the country but still in some rural and urban areas hygiene is not given importance. There are many plans in our country for cleanliness but still some places like public toilets and malls are not cleaned because of some careless organization and limited number of resources it is not possible to maintain all the cleaning assemblies from all areas so because of this we lag to maintain cleaning. But today considering the prevalence of covid-19. It is very important that we give importance to cleanliness to prevent many crises and diseases. For facing these crises and diseases we have come up with a concept in which public washrooms will be cleaned by the help of artificial intelligence. Our main aim to develop the automatic toilet cleaner without risking human's life, so there is no role of carelessness.

KEYWORDS: Artificial Intelligence, Automation, Washroom Cleaning, Public Toilets, Hygiene.

I. INTRODUCTION

One of the India's most pressing problems the state of public toilets are facing is Public Sanitation and Hygiene. Despite vast spending on Toilets, the usage and hence success rate, remains abysmal Why? Because they require 24 hours running water and sewage facilities extensively. Both of which are almost impossible to deliver consistently. From last decade cleanliness and hygiene are the major part of discussion in India. And we have taken major steps to overcome from these problems by creating Clock room in various public areas. But still the questions had been rose regarding the hygiene in the toilets. Several steps have been taken but those are not up to mark as compared to the current scenario. Current situation is demanding for such contactless cleaning technology which is going to operate without any human effort. And this project is an epitome of this idea. We are living in the modern era and world is progressing towards the development in terms of technology so as India. Not only in terms of technology but also in the field of hygiene and Sanitation which is the need for an hour.

The government has launched several schemes on sanitation in India. One of the purposes of this system is to keep the toilets clean at all time. But due to lack of proper equipment in India, maintenance and utilization is not enough. Public washrooms get dirty easily. This spreads extremely harmful diseases. So the concept of this technology in this paper is high pressure nozzle that will go to different areas in just a few minutes to clean the toilet. Using this we are trying to create hygiene awareness among the people. And the main purpose of this project is to keep the toilets clean and hygienic. How to use less water to clean the toilets effectively and to keep them free from harmful bacteria which leads to stop the hazardous diseases.

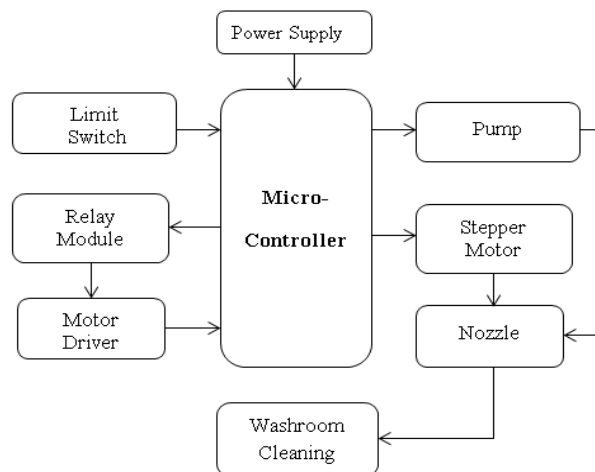
II. IMPLEMENTATION

Components:

1. Cutter Nozzle
2. Centrifugal Pump
3. Motor driver

4. Relay module
5. Stepper motor
6. Arduino NANO
7. Limit switch

III. BLOCK DIAGRAM



IV. WORKING

The main motive of our project is to clean the whole area of the toilet using the single cutter nozzle. For this purpose we have mounted the nozzle on top Centre. This also saves the water and energy also the cleaning time. These things are really important to control to make this concept practically implementable.

Power is supplied to all the components. This power is supplied to microcontroller, stepper driver, and nozzle pump. We implemented program in micro-controller for cleaning. The program will work after being used by certain number of people or specific interval time period. Microcontroller is programmed to turn the water pump on and off and also to control the stepper motor. Movement of the nozzle is controlled by mechanism with the help of stepper motor. This nozzle is rotated 360 degrees to cover all the corners of the washroom or toilet. Through the force of gravity the water goes down with cleaning and frequent cleaning through our system. While using the washroom or toilet operation should be completely off or should not turn on by mistake if the person is inside the room. For that we have used one door position sensor to check whether the place is vacant or filled. If the frequency is sensed and place is vacant then our cleaning operation begins.

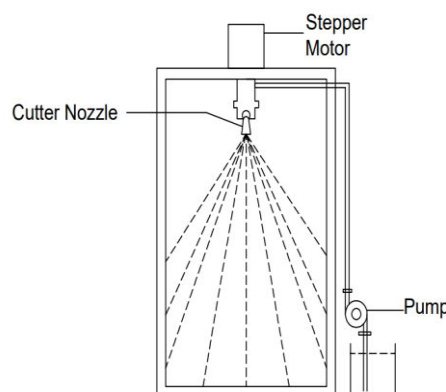


Figure of Working System



➤ **Advantages**

- Uses of public washroom will increase, therefore increase in hygiene.
- 24 hours automatic cleaning.
- Reduces smelling problems in nearby area.
- People will avoid use of public places.
- Energy & water savings.
- Lead to the automation

➤ **Drawbacks**

- If errors lead in circuit, switches and program then working of pump will uncontrolled. Pump activates while using washroom accident will occurred.
- If Electricity problem occur cleaning will not be proceeds.

V. CONCLUSION

In this system we developed automated washroom cleaning system which will be promoted as a low cost and water saving, automated alternative for the cleaning of washroom without use of any manual operations. This system will now become a useful innovation in the entire public washroom cleaning system of any municipalities as it needs no manual operation for cleaning. If system is ever used in the future, it will shed some light on the problems that occur in public toilets and will help solve the problems there.

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