TOILET MANAGEMENT SYSTEM USING IOT

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Abstract - *In today's world with the ever increasing growth in the population of India, the hygiene of our country is endangered. Our Prime Minister Sir Narendra Modi has introduced "Swachh Bharat Abhiyan" Scheme to improve cleanliness in the country. Our project will definitely be a help to improve hygiene condition in India. It will create awareness among people in terms of "Toilet Management". 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.*

*Key Words***: IoT, toilet, sensor, hygiene, dirt**

1. INTRODUCTION

The biggest source of transport in India is Trains. Lakhs of people travel in trains daily and the most important facility in trains is "TOILETS" which unfortunately are not at all clean, safe and sanitized which leads to unhygienic surrounding. With so much being spent on the Swachh Bharat campaign it's a pity that trains, which carry lakhs of passengers daily, do not have modern toilets. The current system of toilets in Indian railways is very unhygienic and foul to use and is downtrodden. There is no any cleaning system rather than by doing it manually, which requires lots of human efforts and still have more possibility of spreading the unhygienic and contagious diseases which are very dangerous and even life taking. Our Indian railways have the rail lines of 115000km approx. due to anaesthetic system of toilets leads to corrosion of rail lines. It is a need of time that we move forward and take the initiative of clean India. To reduce human efforts, a step towards "VISION 2020". Logic comes from the lesser number of logic gates than the Full Adder (FA) structure. As a solution to all this problems we are developing our system which cleans the toilet automatically. Our system will work on basis of sensor like PIR Sensor, Gas sensors. Robotic arm which will clean the toilets and an android application which will give current status and all updates of working system to the authorities/station master.

1.1   MOTIVATION OF THE PROJECT

The smart toilet can sense your presence as soon as you approach it. The moment it will detect your presence it will open the toilet seat automatically. Once you are done using it, you don't even need to cover the toilet seats manually it will be done by smart toilet automatically.

1.2   PROPOSED SYSTEM

In India there is lack of awareness about how to use public toilets and the inability to manage toilets with cleanliness. The word "Smart" is itself enough to attract the attention of public which will encourage them to use the smart toilet. It also facilitate smart management of public toilets with the hygiene level maintained up to public satisfaction. As shown in Fig User Detection, Dirt Detection, Smell Sensing, Monitoring Sweeper's Activity, Water Conservation are the various modules of Smart Toilet.

2.   LITERATURE SURVEY

It is known in the literature survey to provide that there is no existing technology for automatic cleaning of Indian toilet to clean rather than manually; labors or cleaners are appointed by the contractors to clean the toilets. As mention in IJIERE vol-4 Special Issue 1, NCIAR2k17 of 'Automatic Lavatory Cleaning Robot' e-ISSN: 2394-3343. According to mentioned paper the washing and cleaning facility for public usage in schools, colleges, offices and public places by the scissor mechanism. So the locations in mentioned paper for cleaning the lavatory are static. As proposed system can be applied to dynamic location like toilets in railway as well as static toilets also. As mentioned paper is only for cleaning the lavatory but proposed system not only clean but also make it hygiene; as used proposed system consist of use of liquid disinfectant that leads to hygiene toilets or lavatory. The advantages of the proposed system are as: It can reduce human efforts, protect human beings from harmful & contagious diseases, can reduce the foul smell in toilets and finally it would maintain the quality of toilet cleaning. For further cleaning issue is quite basic the Indian railways on tender basis. To which tender holder firm decides the cleaning basic according to primary and secondary. On sight basis like dirtiest toilet is primary stage for cleaning and moderate cleaned toilet on secondary basis. As it depend on contractor to contractor how the periodicity of cleaning the toilet is to be maintained. Cleaning also depend on journey distance as contractor proposed to clean the toilets in intervals of 250km to 650km depend on how long is the journey and train resting time on particular station if train stops 20minute to 40 minute then and then only toilet cleaning will be done. On all these cleaning mechanism of Indian railways lack of periodicity for cleaning the toilets is concern a matter. Varies the proposed system not only cleans the toilets but also maintained uniform hygienic toilets throughout the journey.
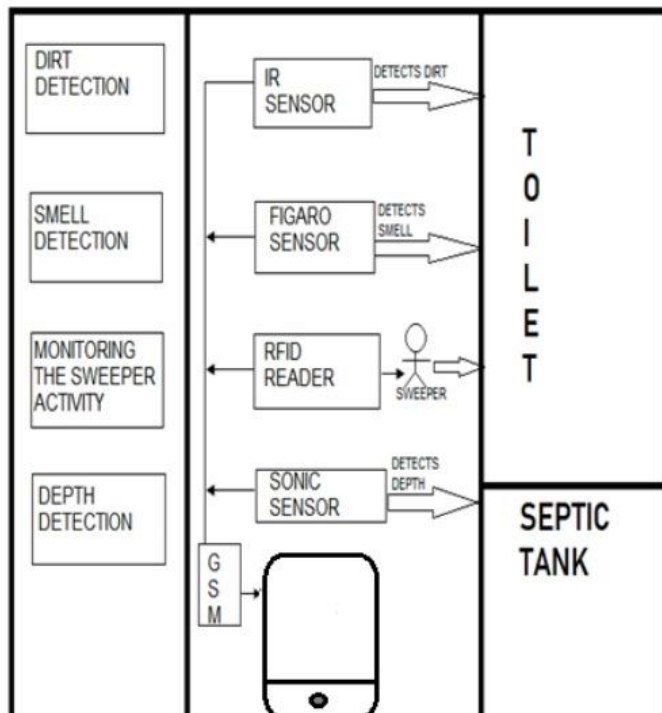
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3. SYSTEM ARCHITECTURE

Fig -1: Architecture diagram

(a) User Detection

The presence of user will be detected by the smart toilet. The moment it will detect your presence it will open the toilet seat automatically. Once you are done using it, you don't even need to cover the toilet seats manually it will be done by smart toilet automatically.

(b) Dirt Detection

Firstly, we will be using IR sensor. It is basically used for detecting the dirt present on the toilet seat. If dirt found an alarm will be raised. This will give users an indication that the toilet is dirty and it has to be cleaned. A responsible user will then clean the toilet after hearing the alarm and thus it will maintain the hygiene. And also this system will handle the irresponsible user as the alarm sound will be too high that even other people will hear it so in order to safe himself from embarrassment it will be a kind of compulsion for him to clean the toilet.

(c) Dirt Detection

This module senses the dirt in gamut's through alarm sound. Here the sensor is the IR sensor it will sense the dirt by comparing the image that will be provided by the IR sensor with the default image (gamut with no presence of dirt) that is stored. If dirt found an alert beep will raised. This will give users an indication that the toilet is dirty and it has to be cleaned. A responsible user will then clean the toilet after

hearing the alarm and thus it will maintain the hygiene. And also this system will handle the irresponsible user as the alarm sound will be too high that even other people will hear it so in order to safe himself from embarrassment it will be a kind of compulsion for him to clean the toilet.

(d) Smell Sensing

In this module, the unwanted gases will be detected by Figaro Sensor. This sensor senses smell of gases like ammonia and other gases which are unwanted, it will raise the alarm if it is sensed which will be removed by the sweeper with the help of particular cleaning agent. In this module, the unwanted gases will be detected by Figaro Sensor. This sensor senses smell of gases like ammonia and other gases which are unwanted, it will raise the alarm if it is sensed which will be removed by the sweeper with the help of particular cleaning agent.

(e) Monitoring Sweeper's Activity

RFID reader is basically used to detect the sweeper's activities such as presence or absence of sweeper. Initially the sweepers wants to show his or her presence in front of the RFID (Radio Frequency Identification). Even though it is cleaned by the user the sweeper needs to clean the toilet. It could be before or after the toilet is used. Then the dirt sensing phase gets initiated and dirt is detected. It is when the sweeper's role comes into action, he needs to dispose all the waste products present in the toilet.

(f) Water Conservation

It detects the depth of the septic tank which is fixed within some specific range. If the sewage reach with the range then it will send message to an organization. All the messages are sent by GSM. The smart toilet also talks about water conservation. It saves water compared to ordinary toilets. There are two options for flushing, type1 and type 2. Urination requires less water. Type 1 flush is for urination and otherwise type2

4. FUTURE SCOPE

In future Smart Toilet provides hygienic, clean and smart management of public toilet. But the hard fact of today's society is that the condition of the public toilets have not changed from years. Although many of us are aware of using toilets that saves water. This results in conservation of water by every individual. Various syndromes can be detected with the help of smart toilet by analyzing users waste. This will be done by sensors. The harmful content in the waste can be analyzed and a report will be generated that gives information like toxicity, blood-sugar-level. Smart Toilet could provide a much better treatment options.

5. CONCLUSIONS

This project will raise a method of using toilet that is smart, hygienic and healthy. It will develop a sense of responsibility

among people about how to use toilets in a way that mandates the user to follow rules of cleanliness which will encourage the use of public toilets.

This mission is to clean India and remove its dirt and dust. India at that time became very much unhygienic. So, this mission was a need for this country. Its conclusion was this that – This project help people to maintain better hygiene in the country.

6. REFERENCES

[1] "India ranks low on sanitation"[online] Available:https://www.indiawaterportal.org/articles/india-ranks-lowsanitation-index-report[accessed on 31st January, 2019].

[2] "Microcontroller" [Online]Available:https://tinyurl.com/ycs95lz4[accessed on 2nd February, 2019].

[3] "IR Sensor"[online] Available:

https://tinyurl.com/y7f66ksf[accessed on 2nd February,2019].

[4] "RFID Reader"[online] Available: https://tinyurl.com/ya89gsj7[accessed on 2nd February,2019]

[5] "Smell Sensor"[online] Available: https://tinyurl.com/y7pvesss[accessed on 2nd February,2019]

[6] "GSM Modem"[online] Available: https://tinyurl.com/y7u3ytqy[accessed on 2nd February,2019]

[7] "Hygienic conditions of the public toilets"[online]
Available:
https://www.cdc.gov/healthywater/global/sanitation/toilets[ac cessed on 2nd February,2019].

[8] "Overall management of public toilets"[online] Available:
https://forum.susana.org/ [accessed on 2nd February, 2019]

[9] "Smart Toilet which is based on IoT"[online] Available: https://www.facilityapps.com/smart-washroom-toilet-room-sensors-iotfuture/[accessed on 2nd February,2019]

"Lack of awareness about how to use toilets"[online] Available: https://www.hindustantimes.com/india-news/ [accessed on 2nd February,2019]