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Smart Toilet Feedback System

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Abstract - Moving *towards our glorious goal of vision 2020 as a developed and prosperous nation cleanliness is one of the biggest needs. The abstract of this system is to deliver clean and hygiene toilets. In our country government has introduced the scheme called Swachh Bharat (Clean India). Keeping the toilets uncontaminated is the one of the objectives of Clean India scheme. 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 proposed system, we have determined on keeping clean toilets, observing the sweepers working activities. It can cause many syndromes. It may create the consciousness amongst people about the toilet management. Therefore, our development is to use safe and hygienic toilets. This system is based on IoT concepts using different option like good, better, excellent, bad. By using these options, all feedbacks are saved into cloud. we can create feedback of the smart toilets. 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 the toilets automatically with the help of various sensors and Node MCU controller.*

Key Words– **Cloud, Ethernet, Internet of Things (IoT), Smart Toilet System**

1. INTRODUCTION

The project" Smart Toilet Feedback System" deals with automatic cleaning of Indian toilets without requiring any human assistance. 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 introducing 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 awareness among the people.

Most of the public toilets are not unhygienic due to the irresponsible peoples who often forget to flush the toilet after using it. In India all central government are allotting numerous funds for constructing public toilets. The central government under "SWACH BHARAT MISSION" has built a vast number of new toilets to provide the citizens a healthy and clean environment. Therefore, cleaning of public toilets is equally important as cleaning of household toilets. So, we have developed a system to flush the toilets automatically. 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 citizen 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 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.

2. LITERATURE SURVEY

In 2017 Kitisak Osathanunkul, Kittikorn Hantrakul, Part Pramokcho has proposed Configurable Automatic Smart Urinal Flusher based on MQTT Protocol, this paper examines one probable way to cut the wastage of clean water used in a public toilet.

In 2018 Mrs.K.Elavarasi1, Mrs.V.Suganthi2, Mrs.J.Jayachitra3 has proposed "Development Smart Toilet Using Iot",This paper examines the various ways through which we can use automation using IOT sensors to provide hygiene or sanitations in the toilet and to reduce several diseases caused due to unhygienic environment in the toilet and prevent wastage of water.

In 2018 Dharmesh Katariya, Pratik Parik, Akashay Pinche, Gauri Lodha, Anita Borse has proposed "Smart Toilet", This paper examines The sensors used are PIR sensor , gas sensor, Robotic arm which will clean the toilet and android app which will give the current status. A. D. Kadge, A. K. Varute, P. G. Patil, P. R. Belukhi 2016 has proposed "Automatic Sewage Disposal System for Train", Indian railways have 114,500 km of total track over a route of 65000 km and 7500 stations. While travelling by the train

everyone expects healthy and hygienic surrounding. Feel uncomfortable due to the waste on the platform and the allied foul smell. Creates bad impression on foreign tourist. sanitation problem causes due to system in which train toilets dispose human waste openly on to tracks The summary of the above literature survey is shown in table 1. Also, the difference between our system and other system is shown in table 2.

TABLE 1

SUMMARY OF LITERATURE SURVEY

Sr.no	Author	Publication	Year	Advantages	Disadvantages
1	Kitisak osathanunkul, Kittikorn hantrakul, Part pramokchon, Paween khoenkaw, Nasi tantitharankul	Configurable automatic smart urinal flusher based on MQTT Protocol	2017	By reducing human efforts to flush water by the use of an automatic urine flushing system in a toilet	Nothing use to save water wastage i.e., timing for the automatic flush (too long indicates waste of water, too short indicates no reduction in smell.
2	Mrs. K. Elavarasi , Mrs. V. Suganthi , Mrs. J. Jayachitra	Developing smart toilets using IOT	2017	By using IoT ,system is making everyone to strictly follow the cleanliness and proper sanitation in the toilets.	Use of robotic arm leads to huge amount of data generation and complex algorithms for obstacle detection and is too expensive.
3	Dharmesh Kataria ,Pratik Parik, Akshay Pincha, Gauri Lodha, Anita Borse	SMART TOILET	2018	The system is working on basis of sensor like PIR sensor , gas sensor, Robotic arm which will clean the toilets and an android app which will give the current status.	Use of too many sensors can be reduced and cost expensive.

2.1 Objective:

1. To protect human health.
2. To provide sanitation and feedback system.
3. To keep the management of sweepers.
4. To promote “Swachh Bharat” scheme.
5. To provide the clean toilet.
6. To create the awareness among the people about the clean and hygienic toilets.
7. Finally, this concept is one of the stepping stone to the “Clean and disease-free India”.

3. SYSTEM ARCHITECTURE

The proposed system aims to provide hygiene and sanitation in the public toilet by providing time to time maintenance in the public toilet with the help of feedback system provided by the users of the public toilet.

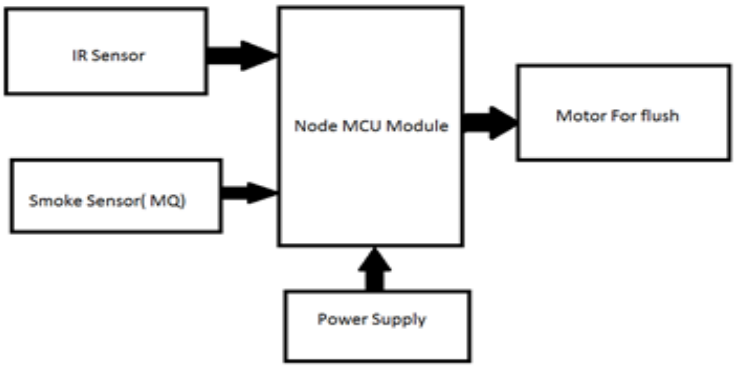

Fig 1: System architecture

The basic process as follows:

Step 1: The system gets initialized by an entry of a person.
Step 2: IR sensors are used to detect the presence of the person.
Step 3: Smoke sensor are used to detect the dirt. If dirt is still there, then an alarm is raised.
Step 4: In instant of time, the flush motor will be on automatically for 2.5 sec.
Step 5: After 2.5 sec delay the flush motor will be turned off.
Step 6: QR code scanner will be made available where the user has to scan the QR code with his cell phone using any online code scanner.
Step 7: Feedback system will be opened where the user can give the feedback in terms of good, bad, excellent, better.
Step 8: The feedback will be stored at the cloud i.e. the admin side.
Step 9: The Admin then using his Login credentials will access the feedback and thereby after reviewing and analyzing the feedback can take necessary action to maintain proper hygiene in the toilet.

3.1 Node MCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espress if Systems, and hardware which is based on the ESP-12 module. The term" NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espress if Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.

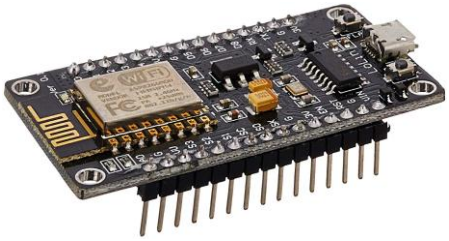

Fig 2: Node MCU

3.2 Smoke Sensor

A **smoke detector** is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a alarm control panel as part of a alarm system, while household smoke detectors, also known as smoke sensors.

Fig 3: Smoke Sensor

3.3 IR Sensor

An **infrared sensor** is an electronic device, that emits in order to sense some aspects of the surroundings. The response time and sensitivity of photonic detectors can be much higher, but usually these have to be cooled to cut thermal noise. The materials in these are semiconductors with narrow band gaps. Infrared thermal-imaging cameras are used to detect heat loss in insulated systems, to observe changing blood flow in the skin, and to detect overheating of electrical appara.

Fig.4 IR sensor

3.4 Feedback System

The feedback system aims to get the feedback from the user. The four responses that is the excellent, very good, good and better will help the admin side panel to analyze the data and thereafter decided the actions to be performed by the government.

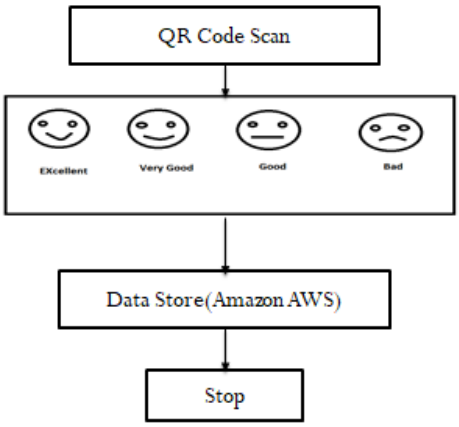

Fig 5: Feedback System

4. Experiment and Result

The complete project implementation was successfully completed. The objectives defined for the system was achieved. The execution of the project follows some basic steps as follows

4.1 Barcode

The barcode Sticker is made available at the exit of the restroom. The user has to scan the barcode using his device.

Fig 6: Barcode with a hidden link inside it.

4.2 Review system:

The user submits his response after using the restroom with any of the one response as Excellent, Very good, Good, Bad. The user responses get recorded at the admin side panel.

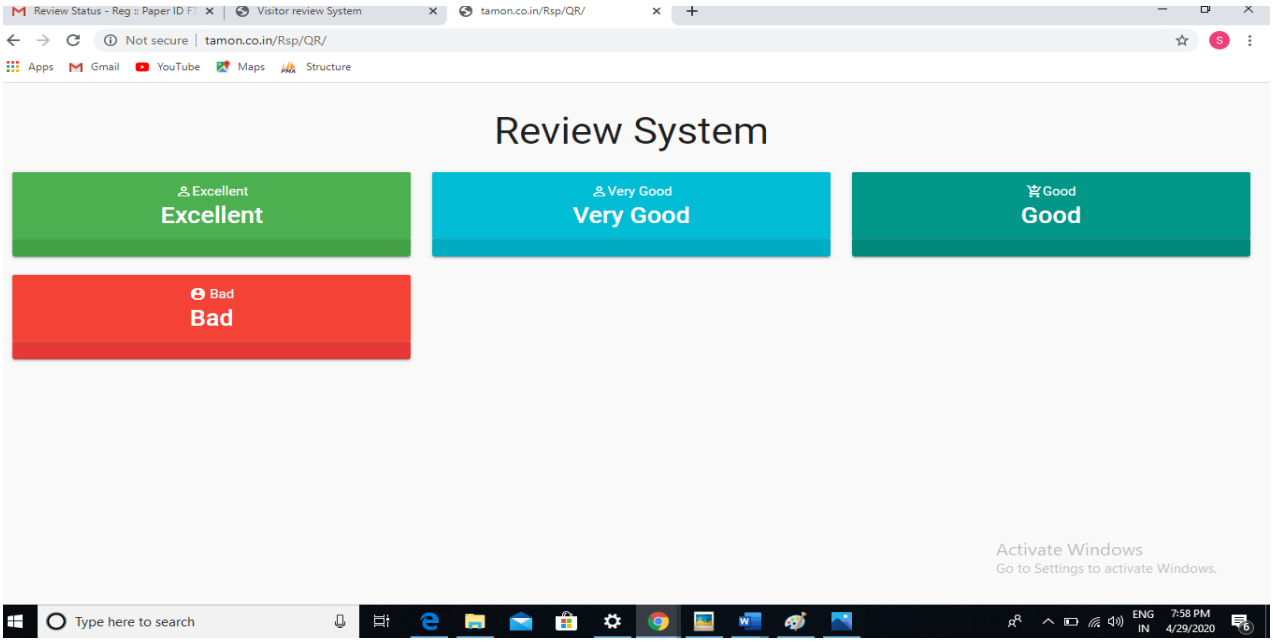

Fig 7: System Dashboard

4.3 Admin Panel:

The below image shows the Admin side login to the Smart Toilet Feedback System.

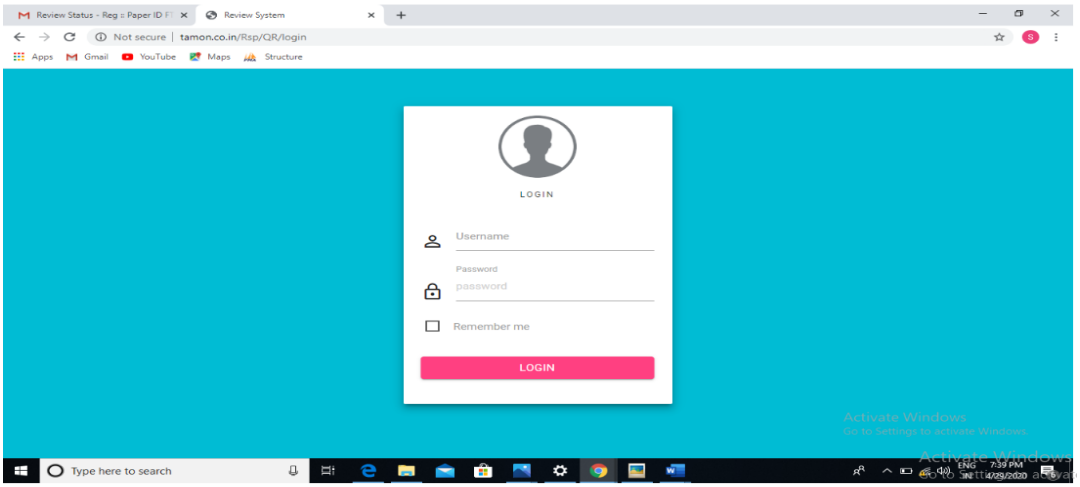

Fig 8: Admin Login Page

4.4 Data for Review:

The following image shows the review of the various user who have submitted their responses by scanning the barcode. The admin has the access to this data but privileged with only read access. The admin has no rights to delete or update the data.

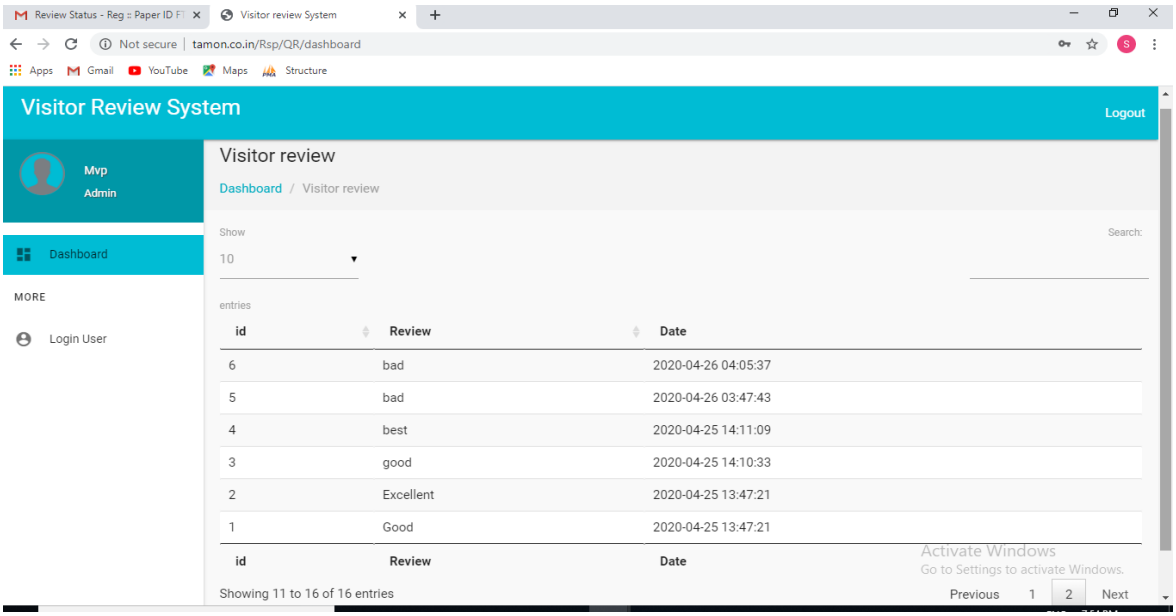

Fig 9: Data for Review and Analysis

5. CONCLUSION

This paper presents a system which create awareness among the people about the proper sanitation. It makes use of IoT, which is rapidly growing technology. It 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 goodliness. Keep Clean, Be Safe.

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