ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 9, March 2018

IMPLEMENTATION OF SMART TOILET (SWACHH SHITHOUSE) USING IOT EMBEDDED SENSOR DEVICES

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ABSTRACT

In the modern world, the technologies are drastically developed, but still the hygiene in our country is under threat. The abstract of this project is to provide 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 clean is the one of the objective of Clean India scheme. My project can be helpful to promote the clean India project. In future, it can play the major role in clean India scheme. In an Existing system, they are concentrated only on detecting the dirt in the toilets. In our proposed system, we have concentrated on keeping clean toilets, monitoring the sweeper's working activities. It can avoid many diseases. It may create the awareness among people about the Toilet management. Therefore, our project is to use safe and hygienic toilets. The project 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.

***Keywords*:Smell sensor, IR sensor, sonic sensor, RFID reader**

1.1 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 project 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.

1.2 SCOPE OF THE PROJECT

In this project we are going to provide the clean toilet. This project can create the awareness among the people about the clean and hygienic toilets. This project can ensure the responsibilities of the sweeper. Finally, this project is the one of the stepping stone to the "Clean and disease free India".

1.3 EXISTING SYSTEM

In the existing system, they concentrate more on disposing sewages from the railway system. They are trying to taking all the medical tests through the usage of toilets. They are concentrated on reducing water wastage on toilets, by the implementation of automatic flusher.

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Disadvantages:

They are not concentrated on providing clean and hygienic toilets.

The medical test can have chance to produce fault results.

2.1 METHODS AND MATERIAL

In this project, IR sensor is used for detecting the dirt present in the toilets, while toilets are not use in proper manner. Then it raises the alarm sound until it is be cleaned.

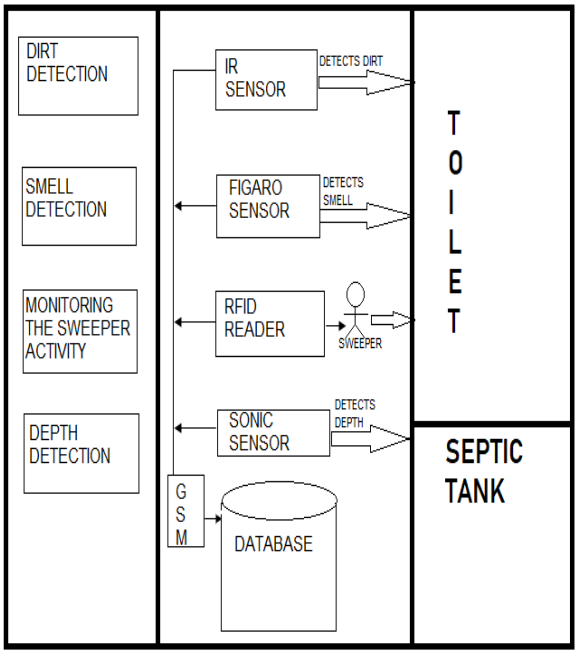
Then, Figaro sensor is used to detect the smell or gases in the toilets. If it detects the gases like Ammonia and other unwanted gases, it will raise the alarm until it is be removed by the sweeper using cleaning agents.

Then, Sweeper wanted to clean the toilets by the periodical manner. The Sweeper is given with the identity tag with the bar code. It is shown in front of the RFID reader, before and after the cleaning process. The details are stored in the database.

If he/she not cleaned properly, it can detect and raise the alarm.

If he/she is not cleaning the5 toilets on that particular time, their absence in cleaning the toilet is send as the message to the particular organization and stored in the Database.

2.2 ARCHITECTURE OF THE PROPOSED SYSTEM



2.3 DESCRIPTION OF THE ARCHITECTURE

HARDWARE REQUIREMENTS:

- Microcontroller
- Power supply
- LCD display
- Buzzer
- Infrared sensor
- Sonicsensor
- Gassensor
- RFID
- GSMmodem

SOFTWARE REQUIREMENTS

- Embedded C

2.3.1 MICROCONTROLLER

A microcontroller (sometimes abbreviated µC, µC or MCU) is a small computer on a single integrated circuit containing a processor core, memory and programmable input/output peripherals. Program memory in the form of Ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general-purpose applications.

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PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. It is ideal for applications such as machine control applications, measurement devices, study purpose, and so on. The PIC 16F877 features all the components which modern microcontrollers normally have.

2.3.2 LCD

LCD stands for Liquid Crystal Display. By using the LCD, all the outputs are displayed. LCD doesn't know about the content (data or commands) supplied to its data bus. It is the user who has to specify whether the content at its data pins are data or commands. It can sense the dry gases present in the toilets such as NH_3, CO_2, CH_4, H_2S, etc. By taking those gases leads to Nausea, Drowsiness, immediate loss of Consciousness, etc The RFID stands for Radio Frequency Identification. It can be used for monitoring the Sweeper. The Organization wants to provide the identity tag for the Sweeper. The Sweeper needs to show the tag before the cleaning process is going to start and after it is finished.

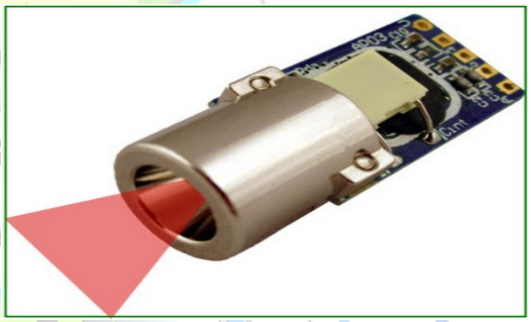
For this, if a command is inputted then a particular combination of 0s and 1s has to be applied to the Control lines so as to specify it is a Command on the other hand if a data is inputted at the data lines then an another combination of 0s and 1s has to be applied to the control lines to specify it is Data.

2.3.3 BUZZER

Buzzer is also called as Beeper. It is a sound signalling mechanical device.

2.3.4 INFRARED SENSOR

The IR sensor is used to detect the dirt present in the toilet. Here we feed the image samples into the sensor. It can detect the dirt by comparing the images we feed into it, after using the toilet. If it can detect the dirt, it raises the alarm, and the users may get embraced and they clean it. This system can create the awareness among the people.



2.4.5 SMELL SENSOR

The Smell Sensor is used to detect the unwanted smell and gases in the toilet. For this purpose, we are going to use the sensor called Figaro sensor.

figure 3.3.1.2 Smell sensor(figaro sensor)

. After sensing the unwanted gases, it can blink the red light. Then the sweeper can clean it by using particular Cleaning Agents.

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2.3.6 RFID READER

The RFID stands for Radio Frequency Identification. It can be used for monitoring the Sweeper. The Organization wants to provide the identity tag for the Sweeper. The Sweeper needs to show the tag before the cleaning process is going to start and after it is finished.

figure 3.3.1.3 RFID reader

Then the CR4 sensor can detect the presence of dirt. If it is present, it can blink the red light. If it is clean, it can blink the blue light. It helps to understand the responsibilities of Sweeper by his/her own. If Sweeper is not clean the toilets for period of time, his/her absence in cleaning the toilet also reported to the consistent organization. These all the details are stored in the database.

2.3.7 SONIC SENSOR

The Sonic Sensor is used for measuring the depth. Here it is used to measure the depth of the septic tank. The Sonic Sensor is fixed into the Septic tank. Then the Septic tank get filled means, it can sends the messages to particular organization. Then they will allot persons to clean the septic tank. Then septic tank cleaners will clean the tank. After cleaning it, the sensor can detect the level, and send messages to consistent organization.

figure 3.3.1.4 sonic sensor

2.4 BLOCK DIAGRAM:

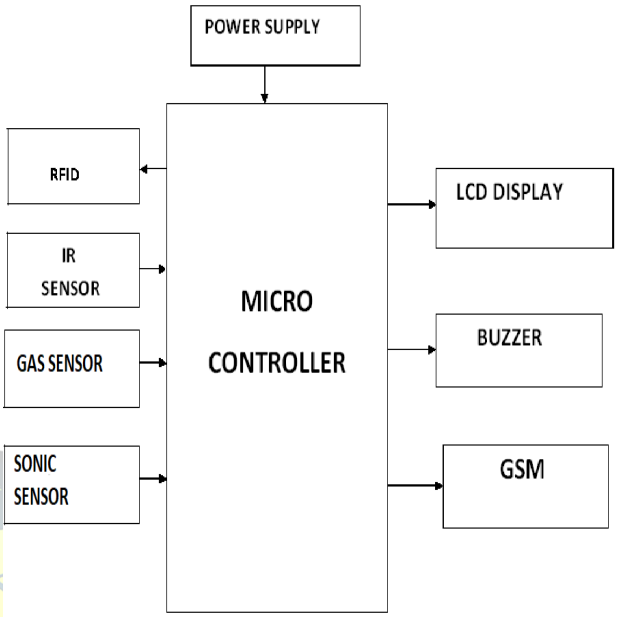

Figure 3.2.1 Block Diagram of the Architecture

2.4.2 GSM

GSM stands for Global System for Mobile communication. It establishes the mobile communication from one place to another place.

It transfers the information from main circuit to operator. It uses Time Division Multiple Access (TDMA).

3.1 RESULTS AND DISCUSSION

3.2 PROPOSED SYSTEM

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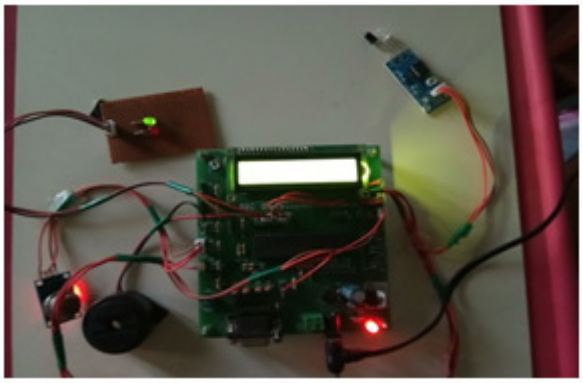

Figure 3.2.1 The proposed system

This is the module of the proposed system. Here the sensors are connected with the microcontroller.

3.2.1 MODULE 1

It shows the dirt detection in the toilets.

3.2.2 MODULE 2

It shows the smell detection and depth detection.

3.2.3 MODULE 1

It shows the sweeper activities.

ADVANTAGES

- It can creates an awareness among the people about the proper toilet management
- It can prevents the many contagious diseases like malaria, typhoid, cholera, streptococcus, asthma, etc..
- It can promotes the "Swachhbharat" scheme

4.1 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.

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