

SMART TOILET SYSTEM

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Abstract: :- SWACHH BHARAT Abhiyan is a national campaign by the Government of India. In a country like India, where 60 percent of the world population do open defecation public toilets play a integral role. Nevertheless now a days open desertion is reducing by the open toilets constructed by the government, maintaining these toilets in hygienic manner is still an issue. The usage of the public toilets is low due to the improper maintenance of the toilets and offense smell from it. Moreover, the users started using the open area which leads to many health problems. One of the health issue caused is the diarrhea. In India, these diseases kills one children per minute. Hence, the issue of maintaining of the public toilet has to be dealt seriously. In the revolutionary world, the advances are definitely grown, yet at the same time the cleanliness in our nation is under risk. The abstract is to deliver clean and hygiene toilets. All the public toilets should be tidy and hygiene. In our country, our government has introduced the scheme called “Swachh Bharat Abhiyan” [Clean India]. Maintain the toilet uncontaminated is the one of the objective of Clean India scheme. The system can be helpful to encourage the clean India project. In future, it can show the major part in swachh bharat scheme. In an Existing system, they are focused only on analyze the dirt in the toilets. In our perspective system, we have determined on keeping clean toilets, monitoring the level of water in tanks. It may create the sentient amongst people about the toilet management. Therefore, our dilate is to use safe and hygienic toilets. This paper is based on IOT concept using different sensors like smell sensor, IR sensor, sonic sensor. So we can create the smart toilets using sensors.

Keywords: Smell sensor, IR sensor, sonic sensor, Internet of Things (IOT), IOT applications, wireless sensor networks (WSN)..

I. Introduction

The improvement of health of a country's population is the outcome of its improved economy and vice versa. This is true because improvement of the citizen's health can be directly related to positive economic growth as more number of healthy people will be engaged to conduct effective activities in the workforce. At the same time supervisor healthcare also influence quality of life more than any other service zone. In today's scenario, people around the world are healthier, wealthier and live longer than three decades ago. Noticeable changes have taken place in approach to clean water, convenient sanitation and healthcare facilities. The quickly developing white collar class, with its expanding obtaining power, has made a very well documented growth in the demand for healthcare services in emerging markets especially like India [2]. Moving towards our acclaimed goal of vision 2020 as a developed and prosperous nation. Cleanliness is one of the biggest needs of our nation. 'Swachh Bharat Abhiyan' being our adage the invention 'Smart Toilet' is the upswing to-wards the cleanliness of our prestigious Indian Public Toilets. Our prospective project will create realization among the people about the convenient sanitation. It makes use of Internet of things, which is a speedily growing technology. Our prospective 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 agile way, we can keep the cleanliness which is next to the godliness. Keep Clean, Be Safe. 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 has 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. In an existing system, they concentrate only on organizing runoff from public toilet system. They perform medical tests, considering how much toilet was being used. They are focused on reducing water wastage on toilets, by the implementation of automatic flusher. They are not focused on providing cleaned and

hygienic toilets. 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 [1]. Introduce the IOT based System SMART TOILET. This system present to facilitate SWACHH BHARAT with idea of smart toilet it is introduce to use and maintain the toilets in the clean and hygienic way. The clean environment without germs and organisms is the aim of this project. To avoid bacterial infections in common toilets. To create a bacteria-free toilets in fu-ture. Toilets in public areas like airport, Universities, colleges, schools, Of-fices, etc. May look clean and fragrance-free but the bacteria level increases as people use it. Dirty or unclean toilets cause contagious diseases which are dangerous for human life. In this system there is least usage of water electricity.[4] Auto door locking system is provided meanwhile the working of this system to avoid the human efforts. Area based development will modify existing areas (retrofit and redevelop); along with public squalor, into better planned ones, there by improv-ing live facility of the whole City. Stability of smart cities can be ensured through renewal of water bodies and other open spaces which will reduce the urban heat effects in Areas and generally promote eco balance. Supply and Installation of E-Toilets is one of the projects identified under smart city motion of smart cities. This project aims to improve the ideal of living of the citizens and commuters who frequent the city by providing state-of-the-art sanitation facilities making use of smart technology. Primary and secondary exploration were done on the project site to under-stand the existing situation. Preliminary Development plans beneficial for the locations were framed as a part of the site visits.

II. CONCEPTUAL DESIGN OF SYSTEM:

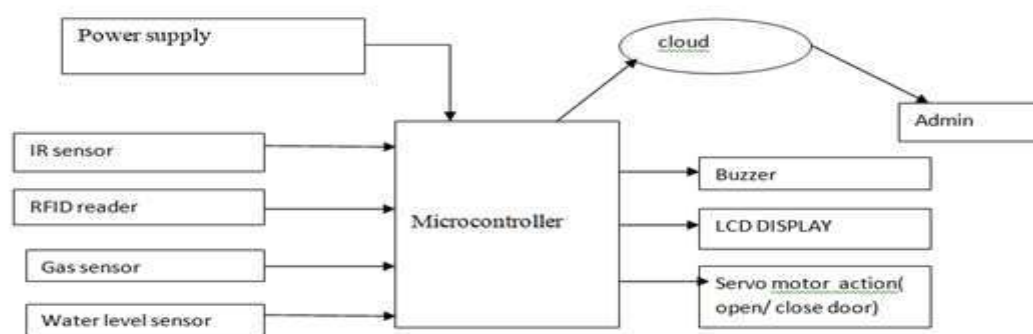


Fig1. Block Diagram

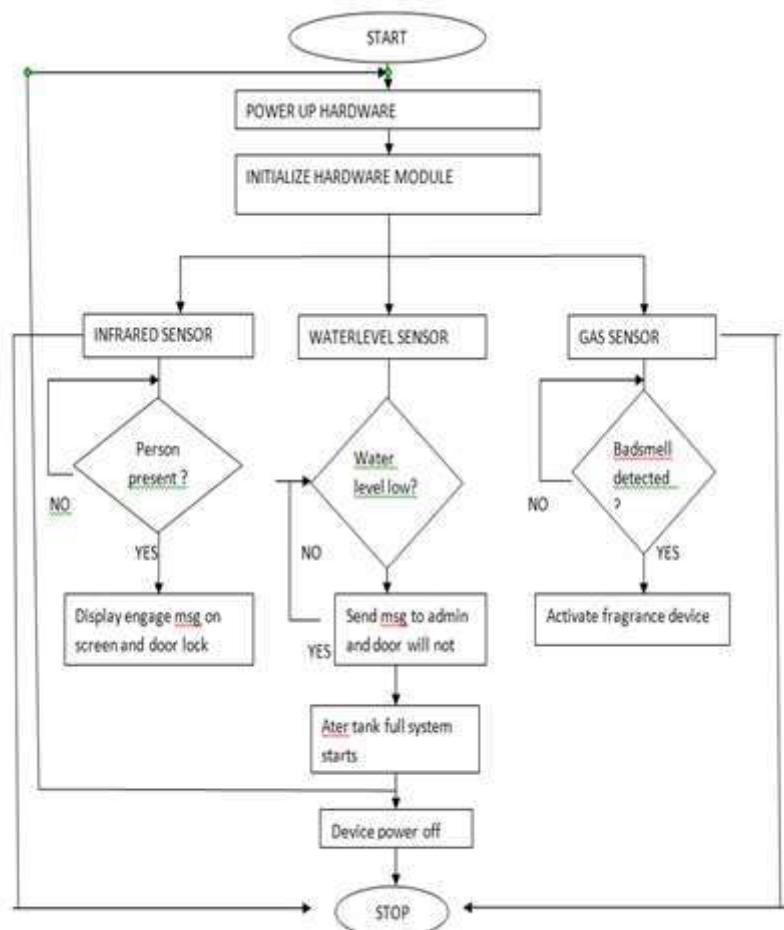
The above fig1 shows the architecture of system. Devices used in this system are ,Arduino UNO ,Node MCU wifi model, GAS sensor, RFID Reader, smell sensor, buzzer, LCD Display ,flush motor,.our prpspective system consist of power supply which gives require voltage to microcontroller. We use Arduino microcontroller and NodeMCU wifi module in our system. Arduino received data to extract user commands Arduino can operate at a hugeer speed . Flush motor is also known as AC motor or DC motor. A motor converts its mechanism from electrical energy to mechanical energy. Buzzer is an audio signaling device. From LCD display displays the output or messages .Expecting that the control unit is fueled and working appropriately, that the way towards controlling a gadget associated with the interface will continue through the concomitant advances. Arduino issues directions to the machines and gadgrt associated will be exchanged (On/Off).In the wake of getting directions it shows on LCD. At that point, it switches heap on-off dependent on got directions to accomplish client wanted yield.

COMPONENTS:

- **IR sensor** :- Here Infrared Sensor is use for person detection.The smart toilet can sense your presence as soon as you ap-proach 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.
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- **RFID Reader** :- Radio waves are used to transmission data from the tag to a reader. Radio-frequency identification uses electromagnetic fields to automated drive and trail tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's examine radio waves. Unlike a barcode, the tag need not be within the line of scorn of the reader, so it may be embedded in the tracked object. RFID is one method of automatic testimony and data capture (AIDC).
- **Gas sensor** :- In this module, the undesirable gases will be detected by Figaro Sensor. This sensor senses smell of gases like ammonia and other gases which are undesirable, it will raise the alarm if it is sensed which will be removed by the sweeper with the help of particular cleaning agent.
- **Water level sensor** :- Sensor wires in the overhead tank will detect the level of water. Single stranded wire is used as sensor. Sensing will be done by operating the transistor in switch mode. When a particular water level will be sensed and the corresponding level will be send to the ARM cortex M-4 microcontroller in the CC3200 Launch pad, it will upload the

corresponding level of water on the cloud. This data on the cloud will be fetched by the android application and will be displayed to the end user

- **Microcontroller:** - microcontroller is. Here we use arduino Uno. Arduino Uno is an open-source microcontroller board based on the microchip atmega328p microcontroller and developed by arduino.cc.the board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.
- **LCD :-** An lcd is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in diys and circuits. The 16×2 translates o a display 16 characters per line in 2 such lines. In this lcd each character is displayed in a 5×7 pixel matrix.
- **Servo Motor:** - Servos are used in radio-controlled airplanes to position control surfaces like elevators, rudders, walking a robot, or operating grippers. Servo motors are small, have built-in control circuitry and have good power for their size.
- **Cloud:** - A cloud server is a logical server that is built, hosted and delivered through a cloud computing platform over the Internet. Cloud servers possess and exhibit similar capabilities and functionality to a typical server but are accessed remotely from a cloud service provider
- **Admin:** - When water level low is detected by system, the system sends notification to the higher authority.
- **Buzzer:** -Buzzer is also called as Beeper. It is a sound signaling mechanical device. These buzzers can be used to alert a user of an event corresponding to a switching action in the surroundings, counter signal or sensor input. They are also used in alarm circuits and others



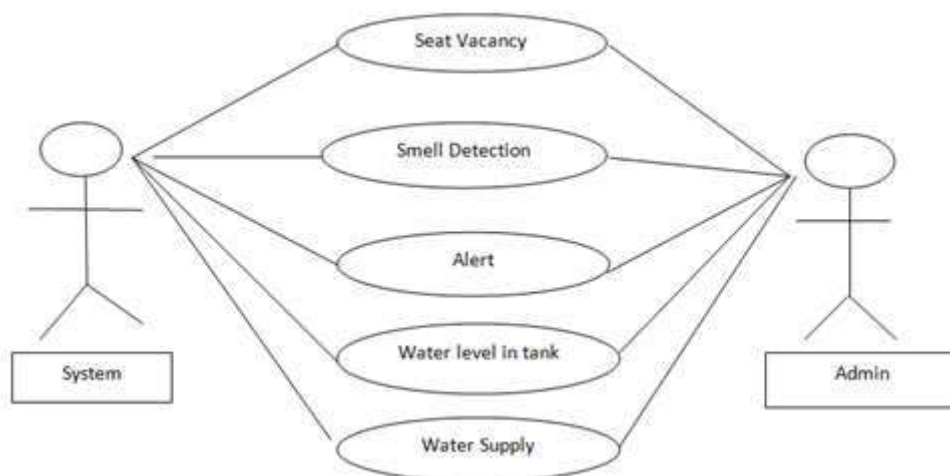


Fig2.ER diagram

III. SYSTEM IMPLEMENTATION:

A prototype of the system was developed to test the working process of the system in an academic environment. The sensor circuitry, a processing unit and a database to store data. The sensor circuitry includes all the sensors that are necessary to detect dirt present in toilet, and if dirt found for clean that dirt. The processing unit processes all the data and takes decision of sending alert to the authority and storing data in the database. The database keeps information about all the variables to keep the authority updated about the current status of the water level in tank. The total system consisted of two major parts.

1. Database and Web Interface
2. Hardware Implementation

A. Database and Web Interface:

All the data from the sensor circuitry are read, processed and stored in the database. Then all the necessary decisions are taken based on the data. The database keeps all the information about all the variables to keep the authority updated about the current status of the water level in tank. The data is then imported from the database and shown in the implemented sample web interface in real time. A web interface has also been created to demonstrate how proper authorities can check the status of any water level at any point of time. The website fetches data from the database and shows it to the user in a simple and understandable manner.

B. Hardware Implementation:

The hardware part includes sensor circuitry and processing unit. Micro controllers were used as processing units. Standard A prototype of this exact size would not have been feasible so the size of the toilet in the prototype was reduced proportionately and the sensors and equipment were placed accordingly. Several test cases were experimented to check the results of the implemented system. To implement the prospective system, it required the following main components

1. IR sensor
2. Gas sensor
3. Water level sensor
4. wifi module
5. RFID Reader
6. Servo motor

To maintain public toilets clean, when user used toilet sensors sense the toilet if dirt found then automatic cleaning if done and room freshner is on. So, when the water level is low then the said system sends an message to the authority to take action to fill motor in the previously mentioned manner.

IV. SCREENSHOTS:

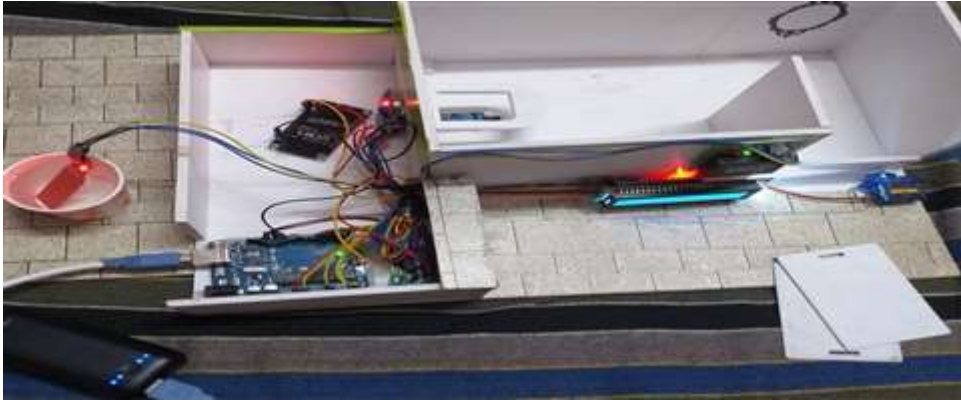
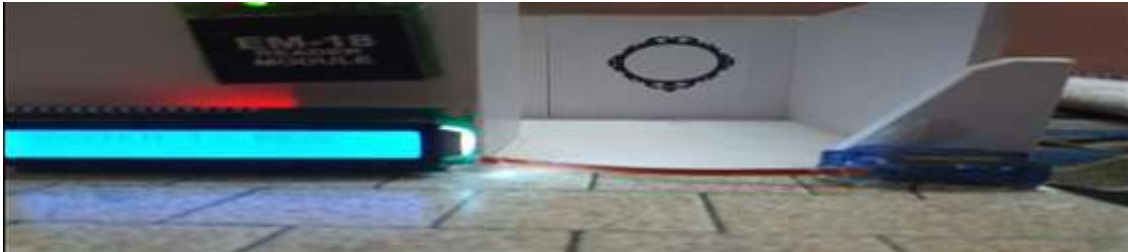


Fig3. SMART TOILET SYSTEM PROTOTYPE



- After system initialization the message “SMART TOILET Please Scan Card” is display on LCD screen.
- Then user have to scan smart card [RFID reader scans the card]



- After scanning smart card door is open ,for 5 sec



- When user enters in toilet and till user present in toilet door is lock and “Engage, please wait..!” message is display on LCD. [person is present in toilet is detect by IR sensor]
- If toilet is already engage, at that time another person scan card, then RFID scans the card but door is not open.
- After using toilet user move to door, door opens automatically.
- After person leave toilet automatic flush is on for 10 sec.
- When bad smell detects by gas sensor auto flush is on for 10 sec.
- Again same message display on screen i.e. “SMART TOILET Please Scan Card”



- When water is not present in water tank then “NO WATER!!, Contact Helpline” message is display on screen.
- When no water present in tank at that time if user scans card then door is not open.

CONCLUSION

Our perspective system will make everyone to strictly follow the cleanliness and proper sanitization in the public toilets. our system will create awareness among the people about clean toilets and proper sanitization of using toilets. It makes the use of Internet of things, which is speedily growing technology. It can reduce the human efforts by automatic cleaning. It allows for better maintenance of the hygienic level of public toilets. It prevents many contagious diseases that spread due to improper sanitization of toilets. thus by using technologies in smarter way, we can maintain cleanliness which is next to godliness.

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