SMART PUBLIC RESTROOMS

PHASE 2: INNOVATION

HITECH eSmart knows that smart toilets restrooms are a severe need of the public. By bringing the highly advanced and most intelligent toilets in Saudi Arabia, we step forward in the world of innovation.

Due to covid-19, public restrooms demand becomes more crucial. But it is not less than a challenge to keep the public toilets clean all the time. Our automatic cleaning made these public restrooms spotless and disinfectant for every person. Our smart toilet is the only system in the markets offering concealed arms over the bowl to clean and dry the bowl and surrounding walls up to 80cm. High-pressure ejecting water is mixed with disinfectant; a floor-integrated high-pressure nozzle system ejects water and disinfectant on the floor. It works like magic and cleans the bathroom within 1 minute after every use.

Our Smart Toilet restroom is phenomenally designed to be installed in outdoor areas such as parking lots, markets, bus terminals, parks, squares, etc. The smart and intelligent toilet is also installed in indoor regions of buildings, for instance, historical buildings, palaces, malls, etc. Our smart toilet is equipped with more than 17 systems for better efficiency, optimizing the latest technologies

SCOPE OF THE PROJECT

These features of the sensor can be used to automate several functions of a smart toilet such as: Smart Lighting - automatic turn ON/OFF light and exhaust fan. Smart Hygiene Maintenance - auto flush and floor cleaning. Water Conservation - Decide optimum water to dispense based on time spent.

A smart toilet Cleaner will automatically flush when the user moves away. Some models have a nightlight and can play music. Other models have a heated seat, automatic dryer, automatic toilet tank cleaners and deodorizer. Some even have a water-saving feature.

LITERATURE REVIEW

The system uses MQTT as an underlying communication protocol. The protocol is used in gathering, governing, powerful and correcting the system. The results in the testing environment show that using a flushing duration for 2.5 seconds is enough to satisfy most users while wasting clean water as less as possible. There are two part are involved here. They are

1.Automatic flusher part [AFP]

2.Server part

The AFP detects if there is an object in front of its infrared sensor. When a user stands in front of the urinal, an infrared sensor can detect the user. If the user keeps staying in front of the sensor for 3 seconds continuously, it is considered that a user is currently using a urinal. After the urinal has been flushed AFP unit also sends a MQTT message about it usage data to the server part. In server part, it receives the usage data from AFP unit. The usage data will be stored into a database for a future use.

Most systems available today depend on a high degree of interaction between the user and the device. Especially for people relying on advanced levels of care, this scheme is impracticable. In this paper we are presenting an “intelligent toilet” performing an extensive health check while being as simple to use as a conventional toilet. Main focus of the system is to support the treatment of diabetes and chronic heart failure, but additional applications are possible . smart restrooms in airports are technologically advanced restrooms facilities that uses various sensors ,automation, and data analysis to improve hygience, maintenance ,and user experience. It helps track a project's progress, resource requirements, workforce delegation, etc. It defines a project's objectives, performance metrics, and expectations.

WORKING PRINCIPLES

In the first phase, IR sensor is used to discover the dirt present in the toilet. Here the set of sample images are given as input. After using the toilet, the sensor senses the basin of the toilet. Then it relates the sensed image with the input image. If the dirt present, it increases the alarm. Then the user wants to be clean the waste. Through this activity, people can get the awareness about the toilet management. In the second phase, Figaro sensor is used to perceive the unwanted gases present in the toilet. In the Figaro sensor, a particular range is to be stable earlier manner. If the range gets extended, it can send the alert message to the sweeper. Then they cleaned it by using proper fragrant. In the third phase, RFID reader (Radio Frequency Identification) is used to observe the sweeper’s activities (absence and presence in the toilet cleaning). Initially, the sweeper wants to show his/her individuality tag in front of RFID reader. It can be shown before and after cleaning the toilet. Then the first phase gets initiated and senses for the dirt presence in the toilet. If the dirt gets noticed, it raises the alarm. Through this monitoring activity, the sweeper can realize their roles and responsibilities. Then they protect the people by disposing all the unwanted materials (dirt, unwanted gases) present in the toilet. In the final phase, the sonic sensor is used to detect the depth of the septic tank. Here, the range of septic tank is fixed prior manner. If the sewage reached with the range, then it directs message to an organization. All the message transfer can be done by the GSM (Global System for Communication)

HARDWARE REQUIREMENTS:

 Microcontroller

 Power supply

 LCD display

 Buzzer

 Infrared sensor

 Sonicsensor

 Gassensor

 RFID

 GSMmodem

MICROCONTROLLER:

A microcontroller is a small computer on a single combined circuit holding 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.

POWER SUPPLY:

A power supply unit converts mains AC to low-voltage regulated DC power for the internal components of a computer. Modern personal computers universally use switched-mode power supplies. Some power supplies have a manual switch for selecting input voltage, while others automatically adapt to the main voltage.

A **Power Supply Unit (PSU is an internal IT hardware component.** **Despite the name, Power Supply Units (PSU) do not supply systems with power - instead they convert it.** Specifically, a power supply converts the alternating high voltage current (**AC**) into direct current (**DC**), and they also regulate the DC output voltage to the fine tolerances required for modern computing components.

LCD DISPLAY:

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. Figure 3: LCD Display For this, if a command is inputted then a certain arrangement 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 line then an another combination of 0s and 1s has to be applied to the control lines to require it is Data.

BUZZER :

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

INFRARED SENSOR:

The IR sensor is used to detect the dirt present in the toilet. Here we nourish the image models into the sensor. It can perceive 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 responsiveness among the people.

SONICSENSOR:

The Sonic Sensor is used for computing 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 communications 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.

RFID:

The RFID stands for Radio Frequency Identification. It can be used for monitoring the Sweeper. The Organization wishes to provide the identity tag for the Sweeper. The Sweeper desires to International Journal of Pure and Applied Mathematics Special Issue 3064 show the tag before the cleaning process is going to start and after it is finished.

WORKING MODEL

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

1.DIRT DETECTION:

It shows the dirt detection in the toilets.

2 SMELL AND DEPTH DETECTION:

It shows the smell detection and depth detection.

3 MONITORING SWEEPER ACTIVITIES:

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 “Swachh Bharat” scheme.

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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