

## Design and Constitution of Smart Public Sanitation System

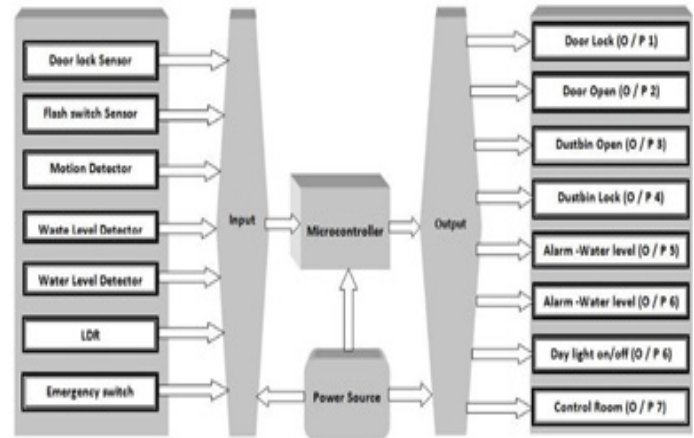
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**Abstract:** A sanitation technology is 'smart' when adapted to local conditions and changing environment. This paper describes the design and construction of a smart public sanitation system to create human behavior by using flash. The system has been constructed based on Artificial Intelligence using the Micro- controller series Arduino UNO. Push buttons has been used to operate servo mechanism for door lock operation to lock and unlock the door according to the user interface. This project has been designed with experimental methodology to fulfill the vision of sustainable world from third world countries. A smart dustbin has been used in the system. The dustbin is developed using ultrasonic sensor technology to operate the servomotor. To abate the electricity cost, automatic day light controlled sensor technology is also used. To make the system user friendly an emergency button has been also used for emergency exit. Moreover a water level indicator has been set up to measure the water level inside the flush tank and an alarming system has been also built to monitor the total process of this system. This is a revolutionary invent to ensure the health safety in public sanitation.

**Introduction:** As the world population is increasing, the safety and health issue is one of the most alarming sectors. Our project aim is to develop of a smart public sanitation system for health safety. It means that –“as if, for flushing we need to press button”, but in government or public toilets we found that; a lot of people uses public toilet for their regular purpose. But most of them are not pressed the flush after using the toilet. The number of people is out of habitation and they are not conscious about their health. Due to this mind set, lot of dirty waste is kept itself in those toilets and slowly from those toilets various viruses and bacteria get released in the nearby area which is responsible for various types of diseases. More ever, People living in the area surrounding the toilets start suffering from various diseases. This takes place only because of improper sanitation and inhabitation. As a solution of this problem, first time for ever in the world we have generated an idea to design and construction of a smart health safety system for public sanitation. Thousands of life will be safe from toilet hygienic and billions of dollars will be saved by proper implementation of this project. In this system when a user entered into the toilet, the system will be activated and the door will be locked automatically. After using the toilet, if the users don't use flash he/she will not be able to come out because door lock mechanism based on flushing system. When he/she will use the flash then the system will be re-activated and the door will be open. As this project is represented as a smart technological sanitation system so that we have added some advanced features. We have used automatic day-night light control system where as a sensor will take data from sunshine and light will be operated according to this data. In an addition we also used water level indicator to measure water level in the flush tank. We also used a smart dustbin which will be automatically operated. For an emergency situation user an emergency exit button have used and all output operational result will be send to the control room through some signals . After all, this initiative innovation can bring revolution for human being and be great achieve each and forever in the history of Bangladesh also other countries by proper implementation in public sanitation system. The aim of this project is to design and construct a smart sanitation system to improve human behavior using flush system and reduce toilet related diseases.

### c) Block Diagram



**Discussion:** Smart public sanitation system is the fastest way of making peoples habit due to its improving technologies and security purposes. This system has its unique impacts when this system applied to public washrooms due to its programmed security and the natural issue. Smart Sanitation system makes habit among peoples who use public toilets but do not press the flash button. In recent years, making sure the health is becoming an increasingly threat for human and many countries like us where peoples are not conscious about their health. Now a day, technology is being used in every sector of life. In health and sanitation system many new technology are being involved. This micro-controller (Robotics) programmed device could be a revolution in cleaning sector. It'll help to maintain a systematic way. No one can leave that place dirty and unhygienic. This kind of project is not made previously and we are the first team trying to develop this kind of project. This project will make huge changes in human behaviour. But in developed countries some smart technology has been used in the sanitation system. Smart public sanitation system is less expensive than the other way. No matter who uses the toilet have to press the flash button otherwise; he will stuck inside of the toilet. Smart public sanitation system makes sure that inner surface of the toilet will always be clean, non-polluting and safe when it will use by peoples. According to the Daily Star, more than 100 public toilets in Dhaka city (both north and south) but most of them are nasty lack of human source. Both DNCC and DSCC spend almost 3,750000TK for every month for make the toilets clean. But they failed because of people's behaviour. Government of developing country like us spend a lot money for sanitation system but they most of the time are unable to reach the desired goal. Even though the cost of sanitation has decreased dramatically in the past 10 years, but peoples are still un-habited using flashing toilets. The technology requires a lower initial investment than human analog cleaning process, requires huge manpower and money .Where this technology is almost free. Roughly 95% of the cost is the machinery, with the balance being site preparation and installation. Smart Sanitation costs are much more competitive with other technologies because there is no fuel/manpower needed once it setup. In December 2017, Kitisak Osathanunkul and Part Pramakchon designed and implemented an idea titled "Design and implementation of an automatic smart urinal flusher" It is designed and implemented to provide the usage information to a caretaker.

With the smart system, a caretaker will be able to use the usage information to estimate or to analyze the number of users in each day, or each week. The proposed system is tested under different scenarios. The results show that in a normal circumstance, the proposed system is working as expected.

**Conclusion:** In July 2017, Mayank Midha started a plan GARV Smart Public Toilets ensure that the primary reasons for failure of public toilets are negated through incorporation of Smart Design, Smart Technology and involvement of a Smart Community. Indestructible stainless steel toilet structures, integration of RFID/IoT sensors for real time monitoring, Bio-Digester tanks for waste disposal and extension of community services are USPs of the project. GARV envisions free to use, eco-friendly, hygienic, and sleek toilet facilities for underserved communities as a sustainable alternative to the existing public sanitation services that can be scaled up through its innovative PPP business model. In Nov 2015, Parth

M. Sarode designed and implemented an Automatic flush system for sanitation in public toilets titled "Design And Implementation Of Automatic Flush System For Sanitation In Public Toilets". A smart toilet flushing system using a sensor technology and a microcontroller was introduced. A solenoid means a coil of wire acts as electromagnet when current passes through it is used to actuate the flush system from a 6 volt power is passed through it. It also contains a backup battery which helps to provide power to sensor circuit. The flush system is completely based on a microcontroller. This flush system will also be activated even if user does not depart after five minutes. To implement the idea of automatically flushing the toilet with just enough water to clean it, a water purity sensor is attached to the bottom of the toilet bowl. If the sensor detects change in water purity from a present value, it will activate a controllable flushing system using

a microcontroller based circuit which stops immediately whenever the sensor detects the initial water purity value back. In order to make the system work only when the person finishes using the toilet, the flushing mechanism is activated either manually or automatically when the impurity level of the water reaches a stable value over a short time. In 2015, Mohamed Aamir and Kamalanathan.P designed and construct a project titled "Automatic Urinal Flushing System". The automatic flushing of the urinal is proposed with the action of kinematic mechanical link with the actuation and deactivation of the ball valve, with the help of spring. The fabrication has been done by welding process. An automatic urinal flushing system that also ensures hands free flushing and conservation of water is proposed which is made of a delta DVP-I4SS2 programmable logic controller (PLC), in 2015, Akparibo Richard Awingot and Joyce Apanga in Ghana. This type of automatic urinal flushing system do not require external power source. Wastage of water in the urinal would be greatly prevented. This system is comparatively less expensive than the electronic urinal flushing system. But the main disadvantage of this problem is the maintenance of this system is higher than that of the electronic urinal flushing system. The lubrication process is required for the spring, levers. This type of urinal flushing system is accessible only by men.

In 2015, Ankit Jain, Dr.Anita Shukla, and ChanchalK.Vishwakarma proposes to designed a model by using Arduino Mega 2560 to overcome the problem defined and also to add other useful features. The hardware to be used in the present work provides a technique which allows the toilet to convert into storage type automatically while the train is standing on the platform and disposal of the faecal matter after particular speed is achieved by the train.