

# Smart Garbage Management System

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## **LITERATURE REVIEW**

Swacch Bharat Abhiyan and digital India is a campaign by the government of India to keep infrastructure of the country clean and to make the cities smarter. Day by day the population of India is growing rapidly. At the same time, the garbage also is growing at the same rate. As a result the garbage management is a problem that is quite hectic issue to solve. All Citizens of India are aware about the process followed to collect the garbage in the society. The Brihan Mumbai Municipal Corporation (BMC) sometimes fails to collect the garbage in some area. It may cause pollution which leads to sanitary issues and disease. Therefore, some of the major steps have to be carried out to solve the management of waste. The existing system is collection of garbage arbitrarily. So, some of the areas get left sometimes which may lead to unodoured smell and hence public health gets affected. The smell of the garbage can also be fatal to some of the little ones in some areas. The proposed system describes the solution to the existing drawback. The proposed system monitors the garbage bin. While monitoring the garbage bin it sends the notification to the authority about the level of garbage filled. If the lower authority ignores the notification, the next notification goes to the higher authority. The proposed system will help them to actually know that where and when to go to collect the garbage.

The proposed system manages the effort to check the area by visiting there. The proposed project is quite helpful for both the Brihan Mumbai

Municipal Corporation (BMC) and the citizens in that area by time to time interaction between Brihan Mumbai Municipal Corporation (BMC) and the proposed system. Hence the proposed system makes a better way to manage garbage.

In the project title “Smart Dustbin-An Efficient Garbage Monitoring System,” have proposed a idea of between the existing dustbins and their population. This study and first part and the distribution of dustbins in some areas were taken palace of Dhaka city using averaging function and then the nearest neighbour functions of GIS . Remarkably, the procedure of the dustbins used today is one of the concern that is concentrated on the smart dustbin. The insufficient of the existing dustbins will have the number of number which will be calculated in it.It has measure the extent of pollution which is caused by the existing dustbins was also one of the level of the research part. It is found that the dustbins are burnt with wastes and has disturb and has cause pollution to the environment.

In the project titled "IoT Based Waste Management for Smart City" , it is being proposed in the project that has the introduction and the combination of the integrated system combined with an RFI, IGPS, GPRS, GIS and web camera which will solve the problem of waste They will help us to analyzed the actual performance of the system.To the study. In the project titled "IoT Based Waste Management for Smart City" , it is being proposed in the project that has the introduction and the combination of the integrated system combined with an RFI, IGPS, GPRS, GIS and web camera which will solve the problem of waste They will help us to analyzed the actual performance of the system.To the study of the project we determine that the characterization of the waste and the current system of management activities. The project gives us the highlights and a overview of the municipal solid waste management (MSWM) system of Municipality and it concludes with a few suggestions, which may be beneficial to the authorities to work towards further improvement of the current management system.

In the project titled "Pawar2International Journal Of Engineering And Computer Science " is being proposed system in that novel prototype of solid waste bin monitoring system using network. The architecture will

uses Zigbee and GSM(global service module) it has the communication technology as well and a set of chosen sensors it will monitor the status of garbage bins in real time. The project is divided into three parts lower tier, middle tier, upper tier. The low tier will have the sensor installed into the garbage bins, the middle tier will have the collection and then it that will give the information to the control station .In the upper tier we will store the data for future use. An algorithm of an energy is used in the first tier operation to collect the bin level.

In the project “A Survey on Smart Garbage Management in Cities using IoT” has proposed a dustbin which is interfaced with a microcontroller system in which we will having wireless systems along with central system showing the updated status of garbage, on web browser with html page by Wi-Fi Module. Hence the status will be updated on the html page. we have to reduce human efforts along with the enhancement of a smart city vision. Considering the modern technology, then we have a smart garbage bin can be costing but considering the amount of dustbin we all need in India, so there for then we have used sensors to reduce the cost and make it efficient in applications. And they used only a Wi-Fi module to send and receive data. But the consideration of weight sensor will have the detection of garbage level which was there in the dustbin. It will only detect the weight of the waste. The message can be sent directly to the cleaning vehicle instead of the contractor's office.

In the project title “Garbage Monitoring System for Smart Cities,” proposed a model for which there is the collection of garbage in real time. There is a network which established using the sensors, which are placed into the garbage bin and have set at a level. Sensors will send a signal to the nearest vehicle driver if the level of garbage is crossed to empty the bin and hence the bin gets updated from time to time. Fig. 3 shows the Architectural Diagram, which consists major three modules; Sensor Module, in which sensors are used to sense the garbage levels once and connected to the Arduino board, Communication Module, in which Bluetooth is used for communication between the sensors and Arduino Uno board, and last module is Analysis and Monitoring Module, in which collected is sent to the admin for analysis.

In the project title “MATEC Web of Conferences 97, 01098,”

, the level of the garbage in each bin is measured by using the sensor. The information of the sensor is then received and processed by the Arduino Board. It will determine whether the garbage level has been reached to the threshold. For the research part, two marks have been made as a reference. The first is at the 70% and the second is at 90 % of the total bin height. If the garbage level in the bin is crossing the first reference level, then the first warning message is generated and sent to the municipality. Besides, the green LEDs responds to alert all the residents at every floor. Next, if the garbage level in the bin is crossing the second reference level, then the second warning message is generated and sent to the municipality. In that case, all the people will be alert when the red LEDs are at the high at their data pins.

In project title “Multipurpose Garbage Monitoring System Using IoT” which project have consideration of waste management issues been solved by smart bin, interface of GSM and ultrasonic sensor with the help of microcontroller based arduino people get best solution to management of waste this is replacement of traditional dust bin into smart bin one. ARM 7 have been used for controlling Zigbee and global communication, it gives the indication and sending the message using GSM. Sensors are placed in the bin. This bin made and wireless sensor node attached to dustbin send the signal to road side unit real time show status of the bin. Other same signal from RSU reaches the Garbage Collecting Vehicle (GCV) which arrives the particular place to collect garbage. Many technology uses to recycling the garbage. For unhygienic condition people face more problems regarding to health Such situation is control by providing unique ID to garbage bin and identify ID number is given to each can if bin is fill then send SMS to the server. In this project uses microcontroller ATMEGA 16 and certain sensors like PIR sensor, Hall Effect sensor, solar sensor, and LDR sensor. These sensors are connected to microcontroller through an interfacing circuit and an amplifier. The output could view in LCD display, sensor is sense the light and presence sensor sense car or human so light turn on . This project is based on efficient of automatic street lighting system based on low cost microcontroller controlling LED based on street automatically lighting

levels control and light sensor, rain sensor, laser sensor and a set of the light emitting diode (LED) have been used brightness in of light will be directly proportional to number of traffic light Operate like ON or OFF accordingly during night and heavy raining or bad weather.

In Hiransahi Akminand we are using two ultrasonic sensors which sense the level of garbage bin and two gas sensors which detect the harmful gases in the air .This sensors are connected to the avr family microcontroller which is interfaced with LCD display which shows the status of bins .We also used Wi-Fi module which is used to transmit data for webpage applications .We are using one buzzer which gives beep whenever any dustbin is full. The whole system is powered by 12V transformer. Here, we are indicating Four levels Low, Medium, High and Full by using Embedded C programming. In first case when both the dustbins are empty webpage and LCD will display Low level. Then according to the different levels of garbage it will show Medium, High or Full level on LCD as well as webpage. When any of the dustbin is full it gives beep and when both the dustbins are full it gives loud beep. Along with this the web page and LCD will display the level of harmful gases in the surrounding. In this way Authority can collect the garbage whenever dustbin is full.

In project titled “Bio-hydrogen, bio-methane, bioelectricity as crucial components of biorefinary of organic waste” , the aim of the work was to critically assess selected bioenergy alternatives from organic solid waste, such as biohydrogen and bioelectricity, to evaluate their relative advantages and disadvantages in the context of biorefineries, and finally to indicate the trends for future research and development. Biorefining is the sustainable processing of biomass into spectrum products viz. energy, materials, chemicals, food and feed. Series systems show a better efficiency than one-stage process regarding substrate conversion to hydrogen and bioenergy

The dark fermentation also produces fermented by-products (fatty acids and solvents), so there is an opportunity for further combining with other processes that yield more bio energy. Photo heterotrophic fermentation is

one of them: photosynthetic heterotrophs, such as non-sulphur purple bacteria, can thrive on the simple organic substances produced in dark fermentation and light, to give more  $H_2$ . Effluents from photo heterotrophic fermentation and digestives can be processed in microbial fuel cells for bioelectricity production and methanogenic digestion for methane generation, thus integrating a diverse block of bioenergies. Several digestates from bio energies could be used for bio products generation, such as cellulolytic enzymes and saccharification processes, leading to ethanol fermentation (another bioenergy), thus completing the inverse cascade. Finally, biohydrogen and similar products came up to contribute in the improvements for solid organic waste management worldwide.

In project titled, “Municipal Solid Waste Characterization and quantification as a measure towards effective waste management” the aim of the study was to generate a comprehensive data at the regional and national level for use in planning and implementation of relevant waste management activities in Ghana. The study will also assess how well households in three different socioeconomic areas are able to separate their wastes into organic and non-organic wastes labeled on the bins as biodegradables, except project (food waste, yard waste, wood and manure) and other wastes (project, plastics, metals, textiles, rubber and leather and any other waste). Sorting and separation of waste using a one way separation system which basically sorted into ‘biodegradable (except project)’ and all ‘other wastes’ was tested in this study and the outcome averaged for each study area. From the questionnaire administration results, out of 1000 respondents from all the study areas, 924 (92.4%) were willing to separate their waste while 4.8% were unwilling and 2.3% did not respond. The reason for their willingness to separate waste was because it had the potential for a cleaner environment, it was a good waste management practice and good for recycling but for those not willing to separate waste it was because there was no motivation to do it. Sorting and separation into the correct bins was effective in most of the areas as it averaged above 80% for the “biodegradables except project waste” and above 75% for the “other waste”. In the municipality however all the

sorting and separation were below 60%. A nationwide average of 84% was obtained for separation into the biodegradable waste bin/bag and 76% for the other waste bin/bag. The high separation efficiency is an indication that the one way separation system employed was convenient for the participating households. This simple sorting and separation system could be recommended for communities learning to separate waste. It is therefore imperative for the MMDAs or city authorities or planners to start rolling out a source sorting process in the various cities. The organic fraction in the waste was the highest in the waste stream and ranged from 48% to 69%.