# SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

BATCH NO:1
1905083
1905094
1905111
1905119

| NAME | PAPER TITLE AND AUTHOR | SOURCE AND YEAR OF THE PAPER | METHODOLOGY | ADVANTAGE | DISADVANTAGE |
|---|---|---|---|---|---|
| MEERADEVI  1. | **"Efficient IOT Based Smart Bin for CleanEnvironment "**  Muruganandam. S, Ganapathy. V and Balaji. | Conference Paper - April 2018 | This smart bin system is very useful in preventing overflow of dustbins and accumulation of wastes around the dustbin. This "prototype model" monitors the bins and provides details about the level of garbage collected in the garbage bins via sensors & Internet. This system uses an Arduino device with a power supply | This System is used to indicate the level of wastages filled and also it is used to identify the waste thrown around the bin and warn the person who has done it. Entering of Rain water into the bin is prevented.Dust bin can be Easily Monitored through Webpages. | This is a prototype developed for two bins. But,we are using and developing this project using numerous bins. |
| 2. | **"Efficient Technique for Smart Waste Management System (SWM) by using DFS Algorithm "** B.Lalitha Devi, Saurav Chaurasia, Avinash Singh, Abhijit Kumar Sanu, Vishal Agrawal Assistant Professor, Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, Chennai, Tamil Nadu. | Journal of Network Communications and Emerging Technologies (JNCET) www.jncet.org Volume 8, Issue 4 - April (2018) | In this paper the authors have illustrated the top-k query primarily based dynamic scheduling for waste collection they added top-k query to denote the range in bin,turn to start dynamic scheduling.They used adaptive big neighborhood seek set of rules to determine the value greatest routes for the vehicles to empty the packing containers. | The main advantage is, when smart bins that are allotted to one collector are not being collected as the collector's collection vehicle is full , then it will be redirected to another nearest collector. Allocation of collectors for the remaining smart bins is done using the Depth First Search algorithm. | No need for calculating distance to send message |
|  | **"Arduino Based Garbage Monitoring System** | International Research Journal of Engineering and Technology (IRJET) - April 2020 | The methodology used in this implementation is "waterfall methodology".It will give the real time information about the level of the dustbin. It will send | The system will thus provide accurate reports, increasing the efficiency of the system. The real-time monitoring of the | There is no accurate location of where the dustbin is actually located using GPS in the respective dashboard which leads to lots of human work. |

| # | Author | Title | Publication | Methodology | Advantages | Disadvantages/Overcome |
|---|---|---|---|---|---|---|
| 3. | | **using IoT"**<br><br>Amit Sinha,Somesh Kumar Saxena,Abhishek Kumar Maurya,Nitin Kumar | | the message immediately when the dustbin is full. | garbage level with the help of sensors and wireless communication will reduce the total number of trips required of GCV and thus, will reduce the total expenditure associated with the garbage collection | |
| 4. | | **"Smart Garbage Meter for Garbage Quantity Detection Using IoT"**<br>Dr.Pandiaraj 1 , A.K.R.N.Supreeth 2 , K. Somesh 3 , A.Hruday Kumar 4 1 Assistant Professor, Department of Computer Science and Technology, SRMIST, Chennai, Tamil Nadu, India. | Journal of Network Communications and Emerging Technologies (JNCET)Volume 8, Issue 10 - October (2018) | Threshold Methodology is used to fix the level to indicate the level of the bins and send it to the app using blynk software as a message to the respective authority. | The container contains the whole working module in it. The container is used to protect the module from water, rats, insects.The metal used for making the container is galvanized steel. | Load sensors are used to measure the weight of the bin.But there is no need to use the load sensors. And also there is no need to develop an app to send messages to the authorities. |
| 5. | | **"Integrated Sensing Systems and Algorithms for Solid Waste Bin State Management Automation"**<br>VALLAKONDA MANASA , RAVI BABU , DR. V.S.S.N SRINIVAS BABA, PG Scholar, Dept of ECS, ACE Engineering College, JNTU University, Hyderabad, TS, India. | International Journal of Advanced Technology and Innovative Research, ISSN 2348–2370 Vol.08, Issue.14, October-2016. | The developed automatic system offers the real time bin status data from four sensing systems: level sensing, weight sensing, gas sensing, Acceleration sensing. | The advantage is to determine the stakeholders action/behavior that have a role in the waste management process and to analyze influential factors on the system, in more than thirty urban areas in 22 developing countries. | No need to use level sensor to detect the level of the bin and sometimes the level detected is not accurate.We overcome this by using Ultrasonic sensor to detect the level |
| THENDRAL S<br><br><br><br>1 | | **SMART DUSTBIN USING ARDUINO**<br>MamtaPandey , AnamikaGowala MrinalJyoti Goswami, ChinmoySaikia And Dr. Dibyajyoti Borah School of Computing Sciences - Information Technology The Assam Kaziranga University,Jorhat, Assam, India | International Journal of Scientific Research in Engineering and Management (IJSREM) Volume: 04 Issue: 08 \| August -2020 | Servomotor is used to open the lid and HC-SR04 Ultrasonic sensor is use to detect the level of bin and lid will opens automatically whenever any object comes near to it | A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions, fuel use and traffic congestion.<br>    A reduction in the number of waste bins needed.<br>    Maintain environment hygiene (i.e. no overflowing of waste and less unpleasant odor). | No message to municipality regarding level of bin<br><br>Location of the bi will not be detected |
| | | **Design and Development of IoT based Garbage Monitoring and Management System**<br>**W M** Nooriman, R Y Lim, | International Conference on Man Machine Systems (ICoMMS 2021) Journal of | In this project, ESP-32 had been used as the single-board microcontroller to receive input signals,process signals and control the output devices.A servo | Garbage collection is made easy.<br>The GPS integrated makes it easier to collect the garbage. | Using a servo motor is not needed. |

| | | | | | |
|---|---|---|---|---|---|
| 2 | M N Rudzuan, Y Sofi, M M Fauzi, and A H Abdullah | Physics: Conference Series 2107 (2021) 012002 | motor is used to open the lid of the dustbin. The servo motor that was chosen for this project Servo Motor SG90.Blynk App is used to deliver messages and a web page is also developed. | | |
| 3 | **Smart Garbage Monitoring System using Internet of Things (IOT) Prof.** Dr. Sandeep M. Chaware1 , Shriram Dighe2 , Akshay Joshi3 , Namrata Bajare4 , Rohini Korke5 Faculty, Computer Engineering Dept, TSSM'S BSCOER, Narhe, Pune, India1 Student, Computer Dept, BSCOER, Pune, India2,3,4,5 | International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering ISO 3297:2007 Certified Vol. 5, Issue 1, January 2017 | The system makes use of Arduino family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. They used zig bee and Global mobile communication system (GSM) for sending messages. | Monitors the garbage bins and informs about the level of garbage collected in the garbage bins. To keep our Environment clean & green. The cost & effort are less in this system. Using GSM for sending messages is made easier. | Using LCD and Buzzer was not needed,sending a message is satisfactory. |
| 4 | **IOT BASED GARBAGE MONITORING SYSTEM** Akash k t, Dinesh Choudhary S Y, Sandeep C U, Prof. Rashmi P M Department of Electronics & Telecommunication Dr D.Y.Shool of Engg,Pune,India. | International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 6, Issue 4, April 2017, ISSN: 2278 – 1323 | The ultrasonic sensors are used for detection of the dustbin status. The fire sensors are used for detection of fire in the dustbins. When the level of the dustbin reaches the threshold limit, the device will transmit the level along with the unique ID provided to that dustbin. These details can be accessed by the concerned authorities from their place with the help of the internet and an immediate action can be made to clean the dustbins. | This project presents cost effective monitoring solution with ATmega16A microcontroller Sending message to authorities is also an needed Each bin is given with a unique id which is more useful to find the location. | Shortest path for the driver is not included. implementation for the number of bin is done. |
| 5 | **Garbage monitoring system using IoT** Anitha A School of Information Technology and Engineering, VIT University, Vellore632014, Tamil Nadu, India. | 14th ICSET-2017 IOP Publishing IOP Conf. Series: Materials Science and Engineering 263 (2017) 042027 doi:10.1088/1757-899X/263/4/042027 | Ultrasonic sensor is used to detect the depth of the bin,Arduino UNO and ESP8266 is used as a wifi module is integrated to transfer the real time data. The transferred data will be shared to the BLYNK app to give alert to the authority. | Transferring the message to higher authority will be successful. | There is no information regarding location of the bin.Using a separate WIFI module is difficult because it may cost more. |
| Hari Prasath M | **Design and Development of Smart Waste Management System: A Mobile App for** | International Journal of Advanced Trends in Computer Science and Engineering | This module consists of a prototype of an Android mobile application and IoT based dustbin.The trash collection workers can | Only authorized users can view the information about the location and waste levels.The system can | The mobile application proposed can be used only in android phones This application have not tested with large group of people |

| | | | | | |
|---|---|---|---|---|---|
| 1 | **Connecting and Monitoring Dustbin Using IoT** Jong Shen1, Azham Hussain, Yuhanis Yusof | Volume 9, No.5, September - October 2021 | login to the application and get details of the Dustbin volume and map view to locate the dustbin | be used 24/7 as the module is connected to internet | |
| 2 | **IoT-Enabled Solid Waste Management in Smart Cities** S. Vishnu 1 , S. R. Jino Ramson ,Samson Senith, Theodoros Anagnostopoulos, Adnan M,,Abu-Mahfouz ,Xiaozhe Fan 2, S. Srinivasan and A. Alfred Kirubaraj | MDPI Published: 14 July 2021 | The work process is achieved by using Hybrid network architecture to monitor the household and public trash bins, Solar energy harvesting facility to extend the life time of the end nodes,A GPS module is embedded to evaluate the Geo-location of the trash bins, An intelligent GUI is employed to view the status of every trash bin. | The life expectancy of the model is approximately 70 days and it doesn't require an external power source as it is powered by solar panels. | Optimum routes for waste collection trucks is not included in the module |
| 3 | **Smart Waste Management System using IOT** Tejashree Kadus, Pawankumar Nirmal , Kartikee Kulkarni Department of Mechanical Engineering MIT Academy of Engineering,Pune. | International Journal of Engineering Research & Technology (IJERT) Vol. 9 Issue 04, April-2020 | The system uses a microcontroller based platform Arduino Uno board interfaced with Load sensor and Wi-Fi module. It consists of a shredder to shred the trash and the load sensing plate and electric components such as  Arduino Load Cell, LCD Display screen, IR Sensor, Amplifier, Relay module, Wi-Fi Router. | Low implementation cost Shredder reduces the volume of the waste | While using Shredder moisture sensor can be used for segregating the dry and wet waste which could have solve the issues related to waste segregation |
| 4 | **Smart garbage management system for a sustainable urban life: An IoT based application** Minhaz Uddin Sohag, Amit Kumar Podder Department of Electrical and Electronic Engineering, Khulna University of Engineering & Technology, Khulna 9203, Bangladesh | Elesvier journal Published on 5 July 2020 | The system consists of an identification system, an automated lid system using Servo Motors , a display system using LCD and an ultrasonic sensor to monitor the garbage level inside the bin continuously, and a communication system using a GSM module | No physical contact with a garbage bin,by using GSM sending of messages is made easier. | Optimal paths for the waste collection trucks not included |
| 5 | **Smart Waste Management: Garbage Monitoring Using Iot** Mrs Sarmila SS , Siva Kumar V, Vasanth Kumar P K Assistant Professor ,Department of Computer Science and Engineering K.L.N. College of Engineering Madurai, India. | SSRG International Journal of Computer Science and Engineering (SSRG-IJCSE) – Special Issue ICETSST – April 2018 | In this project, the Smart bin system that identifies hazardous gasses and fullness of bins.These data are passed through a wireless mesh network. With such information, wastage bin providers and cleaning contractors are able to make better decision | Cleaning contractors can identify and decide whether a particular area needs extra litter bins to be placed nearby or removal and relocate existing litter bins to other places where they are needed. Gas sensor will detect hazardous gasses and alert the people using buzzer | An android application would be better compared to web application |
| SANJAI V | **Smart Bin That Segregates and Measures the Waste** | International Research Journal of Engineering and | In this paper, several proposed frameworks have been compared for | A reduction in the number of waste bins needed. | System requires more number of waste bins for separate waste collection |

| 1 | **using Machine Learning** Mekhla Tiwary1, Ashish Kumar2, Kaushal Kumar3, Kavyashree Nayak K4, Dr.Rajeshwari J5 Student, Department Of Information Science and Engineering, Dayananda Sagar College Of Engineering, Bangalore, Karnataka, India | Technology (IRJET) Volume: 07 Issue: 03 | Mar 202 | powerful programmed isolation of the waste. These frameworks depend on ideas of Machine Learning. By reviewing existing systems better algorithm can be developed for segregation of waste. | Maintain environment hygiene.The system can be used 24/7 as the module is connected to internet | as per population in the city. This results into high initial cost due to expensive smart dustbins compare to other methods. |
|---|---|---|---|---|---|
| 2 | **Garbage Collection and Monitoring System for Smart cities using IOT** Neha shinde1, Sayli Bhambre2, Shraddha Thakur3, Varsha Devkule4 1,2,3,4Dept of Computer Engineering, Terna Engineering College,Nerul,Navi Mumbai | International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 02 | Feb-2018 | This system maintain a dry waste and a wet waste separately. This will help to reduce the overflow of the garbage bin and thus keeping the environment clean. | It decreases traffic flow and consecutively noise due to less air pollution as result of less waste collection vehicles on the roads. This has become possible due to two way communication between smart dustbins and service operators. | It reduces man power requirements which results into increase in unemployments for unskilled people. |
| 3 | **IOT based Smart City Bin** Roshni Bhandari Assistant Professor Computer Department, S.S. Agrawal Institute of Engineering & Technology Navsari Singh Nidhi Student B.E. Semester-VII Computer Department S.S. Agrawal Institute of Engineering & Technology Navsari Rathod Swapnil Student B.E. Semester-VII Computer Department S.S. Agrawal Institute of Engineering & Technology Navsari | International Journal of Computer Applications Volume 177 – No. 11, October 2019 | The concept of bringing all the general equipments into a single eco-system and transferring data over them is what it basically means. To bring "Waste Management " to an optimal solution we bring concept of IOT based Smart Dustbin because Waste Management is a major issue in today's world. | Applying smart waste management process to the city optimizes management, resources and costs which makes it a "smart city". | Sensor nodes used in the dustbins have limited memory size. |
| 4 | **Automated Garbage Monitoring System Using Arduino** Fetulhak Abdurahman1 , Sileshi Aweke2 , Chera Assefa 3 | IOSR Journal of Computer Engineering (IOSR-JCE) Volume 20, Issue 1, Ver. I (Jan.- Feb. 2018), PP 64-76 | In solid waste bin monitoring system garbage bin set the public place t hen Camera set for garbage bin location. The camera captured image for garbage bin. Radio Frequency Identification (RFID), GPS and GIS send image for work station. The RFID reader and camera are mounted in the truck, when truck comes closer to the bin RFID reader communicated RFID tag. & send all information. The System is use controlling Hut. This Controlling Hut is SMS Technology | It helps administration to generate extra revenue by advertisements on smart devices. | Based on the residence number and their consumption some garbage bins might get full before a week and others might get full in two weeks and so on as a result it is being a cause for time dissipation and an appropriate economic expenditures. |
| 5 | **IoT Based Garbage** | Journal of Network Communications | Garbage squander administration is one of the | It keeps our surroundings clean and | Wireless technologies used in the system such as |

| | **Monitoring System** Adarsh Malav 1 , Alankrit Yadav 2 , Manjeet Kharb 3 , R.B .Sooraj Department of Computer Science and Engineering, SRMIST, Chennai, Tamil Nadu, India. | and Emerging Technologies (JNCET) Volume 8, Issue 10, October (2018) | essential issues that India is confronting with real territories or under creating states . More often than not wet and dry squanders are not independently gathered with the goal that legitimate handling like treating the soil, reusing, cremation can't be connected to various types of waste. | green and free from bad odour of wastes, emphasises on a healthy environment and keeps cities more beautiful. | zigbee and wifi have shorter range and lower data speed. In RFID based systems, RFID tags are affected by surrounding metal objects (if any). |