



SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES – LITERATURE SURVEY

- With the increasing number of world population and the rapidly expanding globalization of the world, waste is one of the main issues that concerns many parties. The World Bank estimates that in 2025, the population of the world's urban population will reach 4.3 billion and the rate of waste production is about 1.42 kg per day for every resident. Based on World Bank reports, there is a positive relationship in which waste generated is directly proportional to the level of economic prosperity and the level of industrial growth achieved. Today a smart solid waste management system uses Internet-of-Things (IoT) technology in order to automate several traditional waste management processes. It is proven in several smart cities such as Nottingham, England and Hamburg, Germany that implementation of this system in the right way gives many benefits. In this paper, a systematic literature review methods is used to collect and analyze related works on smart solid waste management systems .Literature has been compiled based on five major databases including, IEEE Xplore, Google Scholar, Springer, Web of Science (WOS) and ACM Digital Library. Literatures were searched based on several relevant keywords and the ones selected were the ones that satisfy selection criteria defined. A total of 25 literature met the requirements set, and 12 of them are reviewed in this paper. Research gaps from an existing works have been concluded, based on the results of the study.

TITLE OF THE SURVEY:

"IOT-BASED SMART SOLID WASTE MANAGEMENT SYSTEM"

PUBLISHED ON JUNE 2019,

AUTHOR: NOR AZMAN ISMAIL, NURUL AIMAN AB MAJID,SHUKUR ABU HASSAN

- The Smart bin system that identifies hazardous gases and fullness of bins. The system is designed to collect data and to deliver the data through wireless mesh network. To collect data and to obtain bin utilization and bin daily information, With such information, wastage bin providers and cleaning contractors are able to make better decision. In our system, the Smart dustbins are connected to the internet to get the real time information of the smart dustbins. In the recent years, there was a rapid growth in population which leads to more waste disposal. So a proper waste management system is necessary to avoid spreading some deadly diseases. Managing the smart bins by monitoring the status of it and accordingly taking the decision. There are number of dustbins are located throughout the city or the Campus (Educational Institutions, Companies, Hospitals etc.). The aim of the mission is to cover all the rural and urban areas of the country to present this country as an ideal country before the world. With the proliferation of Mobile network devices such as smart phones, sensors, cameras. It is possible to collect massive amount of garbage.

TITLE OF THE SURVEY

"A SURVEY ON SMART GARBAGE MONITORING USING IOT"

PUBLISHED ON APRIL 2018

AUTHOR: SARMILA SS , SIVA KUMAR V, VASANTH KUMAR U

- With rapid increase in population, the issues related to sanitation with respect to garbage management are degrading immensely. It creates unhygienic conditions for the citizens in the nearby surrounding, leading to the spread of infectious diseases and illness. To avoid this problem, IoT based “Smart Waste Management” is the best and trending solution. In the proposed system, public dustbins will be provided with embedded device which helps in real time monitoring of level of garbage in garbage bins. The data regarding the garbage levels will be used to provide optimized route for garbage collecting vans, which will reduce cost associated with fuel. The load sensors will increase efficiency of data related to garbage level and moisture sensors will be used to provide data of waste segregation in a dust bin. The analysis of ceaseless data gathered will help municipality and government authorities to improve plans related to smart waste management with the help of various system generated reports.

TITLE OF THE SURVEY

"SMART WASTE MANAGEMENT SYSTEM USING IOT"

PUBLISHED ON APRIL 2017

AUTHOR: PROF. S.A. MAHAJAN, AKSHAY KOKANE, APOORVA SHEWALE

- The Internet of Things (IoT) paradigm plays a vital role for improving smart city applications by tracking and managing city processes in real-time. One of the most significant issues associated with smart city applications is solid waste management, which has a negative impact on our society's health and the environment. The traditional waste management process begins with waste created by city residents and disposed of in garbage bins at the source. Municipal department trucks collect garbage and move it to recycling centers on a fixed schedule. Municipalities and waste management companies fail to keep up with outdoor containers, making it impossible to determine when to clean them or when they are full. This work proposes an IoT-enabled solid waste management system for smart cities to overcome the limitations of the traditional waste management systems. The proposed architecture consists of two types of end sensor nodes: PBLMU (Public Bin Level Monitoring Unit) and HBLMU (Home Bin Level Monitoring Unit), which are used to track bins in public and residential areas, respectively. The PBLMUs and HBLMUs measure the unfilled level of the trash bin and its location data, process it, and transmit it to a central monitoring station for storage and analysis. An intelligent Graphical User Interface (GUI) enables the waste collection authority to view and evaluate the unfilled status of each trash bin.

TITLE OF THE SURVEY

"IOT-ENABLED SOLID WASTE MANAGEMENT IN SMART CITIES"

PUBLISHED ON JULY 2021

AUTHOR: SAMSON ZENITH, THEODOROS ANAGNOSTOPOULOS

- *Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of an Internet of Things (IoT).*
- *Things (Physical Devices) that are connected to Internet and sometimes these devices can be controlled from the internet is commonly called as Internet of Things. Now a days, there are a number of technique which are purposefully used and are being build up for well management of garbage or solid waste. Sensors and IOT module i.e. Wi-Fi are the latest trends and are one of the best combination to be used in the project. Hence a combination of both of these technologies issued in the project. Here we are using raspberry pi. A threshold value is set in the IOT. In these we use ultrasonic sensor .When that value is met then will be sent to the officials through module about the over load and also to clear the garbage as soon as possible. The same thing is displayed on the LCD, which is connected to the output port of the controller. IOT through data available on web portal about all area dustbin*

TITLE OF THE SURVEY

"GARBAGE MANAGEMENT FOR SMART CITY USING IOT"

PUBLISHED ON MARCH 2017

AUTHOR:ANKITA KEDIKAR, NIKITAMAHADULE, MONIKA KHOBRAGADE

- Increasing waste generation has become a significant challenge in developing countries due to unprecedented population growth and urbanization. From the literature, many issues have been investigated that signify direct connection with the increase in waste material generation and related difficulties to handle it in a smart city. These issues are the resultants of an improper collection and disposal mechanism used for waste material, the increase in moving trends of peoples toward big cities and lack of intelligent technology used to support the municipal solid waste management system. Consequently, the management of waste material has become a challenge due to a large amount of waste littered everywhere. This system helps to solve the problems associated with management of waste material and the IoT-based waste collection for the smart city as discussed above. The proposed system is capable in the collection of waste effectively, detection of fire in waste material and forecasting of the future waste generation. The IoT-based device performs the controlling and monitoring of the electric bins. These devices are wirelessly connected with the central hub to transmit the information about the bins filling level with the existing location. The significant advantage of the system is to collect waste material on time in order to avoid the overflow of bins that would help in saving the environment from pollution.

TITLE OF THE SURVEY

"IOT-BASED SMART WASTE BIN MONITORING AND MUNICIPAL SOLID WASTE MANAGEMENT SYSTEM FOR SMART CITIES"

PUBLISHED ON JUNE 2020

BY

TARIQ ALI, MUHAMAD IRFAN, ADAM GLOWACZ

- At present waste management is a major concern in the metropolitan cities of the developing and developed countries. As the population is growing, the garbage is also increasing day by day. Garbage management is becoming a global problem. Due to the lack of care and attention by the authorities the garbage bins are mostly seem to be overflowing. It has to be taken into care by corresponding authorities and should think what method can be followed to overcome this. This huge unmanaged accumulation of garbage is polluting the environment, spoiling the beauty of the area and also leading to the health hazard. To overcome this situation an efficient smart municipal waste management system has to be developed. In this era of Internet, Internet of Things (IOT) can be used effectively to manage this waste as many effective methods can be found out easily. This is the survey paper which involves the various ideas to solve this problem using some algorithms that can be easily implemented. So a survey was done among different proposals and this survey paper includes survey among different methods for smart garbage management in cities using IoT. This section discusses about the existing approaches in the field of smart waste management.

TITLE OF THE SURVEY

"SURVEY ON MUNICIPAL WASTE COLLECTION MANAGEMENT IN SMART CITY"

PUBLISHED ON JANUARY 2018

AUTHOR: MAYA CHAVAN, T.R PATTANSHETTI

- Along with the development of the Internet of things (IoT), waste management has appeared as a serious issue. Waste management is a daily task in urban areas, which requires a large amount of labor resources and affects natural, budgetary, efficiency, and social aspects. Many approaches have been proposed to optimize waste management, such as using the nearest neighbor search, colony optimization, genetic algorithm, and particle swarm optimization methods. However, the results are still too vague and cannot be applied in real systems, such as in universities or cities. Recently, there has been a trend of combining optimal waste management strategies with low-cost IoT architectures. In this paper, we propose a novel method that vigorously and efficiently achieves waste management by predicting the probability of the waste level in trash bins. By using machine learning and graph theory, the system can optimize the collection of waste with the shortest path. *is article presents an investigation case implemented at the real campus of Ton Duc Thang University (Vietnam) to evaluate the performance and practicability of the system's implementation. We examine data transfer on the LoRa module and demonstrate the advantages of the proposed system, which is implemented through a simple circuit designed with low cost, ease of use, and replace ability. Our system saves time by finding the best route in the management of waste collection of Ton Duc Thang University (Vietnam). Therefore, the advantages of employing smart trash bins for the trash collection task can be illustrated. Our algorithm has applied the results to implementing various filling height thresholds for determining the assembly of a garbage can, increasing profits, and optimizing the number of workers to be used

TITLE OF THE SURVEY

"WASTE MANAGEMENT SYSTEM USING IOT-BASED MACHINE"

PUBLISHED ON FEBRUARY 2020

AUTHOR :CAO HOANG PHUC, PHAM DUC LAM , LE MAI BAO NHU

- Waste is a crucial issue, which needs to be addressed smartly. we segregate the waste at our homes for ease at processing and recycling. We observed trash vans come irregular to homes creating a despoliation of households. Due to this many civilians empty their overloaded dustbins in open spaces. This in turn increases environmental pollution. This is not an original idea, IOT based dustbin was implemented and effectuated much before. Some authors presented systems where the sensors in the bin checked if the bin are filled up to the brim or not. If it was filled an automated message was sent to the server end of the system, through the Arduino SIM module, which used the application of the Arduino board. Once the server received the message it forwarded the message to the worker in charge, if the worker was available, he would notify his/her presence by accepting the work and would reach the required destination. If the worker was not available, the work would be transferred to another worker. If the dustbin was not cleaned in specific time, then the records were sent to the higher authority who took appropriate action against the concerned contractor. This system also helped to monitor the fake reports and hence helped to reduce the corruption in the overall management system. It ultimately helped to keep cleanliness in the society.

TITLE OF THE SURVEY

"SMART WASTE MANAGEMENT SYSTEM USING IOT"

PUBLISHED ON APRIL 2020

AUTHOR: TEJASHREE KADUS, PAWANKUMAR NIRMAL, KARTIKE KULKARNI

THANK YOU

