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Domestic Smart Waste Management Using IOT

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Abstract: ***The concept of smart waste management is implementable in urban areas and era, waste production is domestically high but the effort put to control it is relatively very low. This idea is compatible mainly with the concept of smart cities. The smart waste management mainly avoids the congested collection of waste generated domestically which creates difficulty to manage its disposal. All cities, regardless their size, their geographical location or their economic level, spend huge amount of money every year for waste collection. With utilization of Internet of Things (IoT) devices such as sensors & Smartphone, this paper describes an efficient way of separation of dry, wet and plastic dirt collection using Embedded System and provides proper analysis of weight of each and every kind of waste material .The system also provides notifications according the status of dustbins which are situated in the cities and vehicles used and it will generally estimate based on the number of citizens as bins can be emptied. It is intended that the paper has provided effective monitoring and guidelines for waste management policy decisions in accumulated cities.***

Keywords*:* ***IoT , Sensor, Microcontroller, smart dustbins, Ardunio processor.***

I. INTRODUCTION

Proper Management is important factor for today's society. In order to that it is necessary to make it is easy to maintain and control waste material by providing smart dustbins at each floor of the building and analysis can be done effectively. Technological elevations and massive research follow up to the origin of two important desires of internet, IoT and Cloud computing. This system provides reliability over waste collection or management. Proposed system is going to generate notifications on android application so that it reduces efforts and effective management can be done .Proposed system is going to provide an innovative approach for waste management as it can commit for numerous analysis of collection of waste separately. It will help to develop a real time and automated system. These bins are included with hardware which consists of micro controller, GSM, and sensors. Micro controller is kind of a mini computer that handles the functioning of system. The sensors will sense the level up to which the bin is filled. Upon completion it will give a notification to the server, according to the status of bins action can be taken by remote controller. Arduino UNO is programmed in such a way that when the garbage reaches this particular level, intimation is given to the central hub through IoT. An efficient method to monitor the waste has been designed with some sensors and the output will display onto android application. Data can be shared, transferred, retrieved by using cloud computing which provides feasibility to user while accessing the status regarding waste collection. Page Layout

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II. LITERATURE SURVEY

A. IoT Based Waste Management for Smart City

Prakash and Prabu,[1] describes, the System in which Smart dust bins are connected to the internet to get the real time information of the smart dustbins located throughout the city or the Campus, which are provided with low cost embedded device having an unique ID so that it is easy to identify which garbage bin is full i.e. it becomes easy to track the level of the garbage bins which are loacated in the city. Smart dustbins are interfaced with micro controller based system with IR Sensors and RF modules. When the level reaches the commencement level and device will transmit the status of that dustbin along with the unique ID provided. These details can be accessed by the concern Authorities from their place with the help of Internet and an immediate action can be made to clean the dustbins. In this system, effective usage of smart dustbins or Managing and monitoring can be done by the status of it and accordingly help to take the decision. By taking the reference of IoT based detection of microbial in raw milk system we studied about various gas sensors such as TGS 813,TGS 822,TGS 2620 and electromagnetic sensors. They had used Intel Galilo Gen II Board which distributes it's information to different systems by using cloud computing and user can fetch information from that particular system. [16].

B. Smart Waste Management System

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Dr. S. Anand 1, Pradeep.R2, Ahamed Sathik.3[2] describes, the problem of manual work done by the human being which is the present situation of India .As the population is going to increase and modernization happened ,though people migrate from one place to another and way of life are expanding well. So in this paper they reduced the work of humans as well as tried to save energy.so in order to save energy and human work they concentrate power savings on the garbage issue which could save energy that may be useful for some other purposes. Based on research of WHO 22 types of diseases can be controlled by improving solid waste management in India. Hence, people who live in India and local municipal bodies should change their casual attitude to waste management. So, they also said that waste management is a mandatory process in order to face the challenges in day to day life. The entire management includes three parts: 1) Users who generate waste,2) Waste collectors 3) stack holders. Before proposing this system existing waste management systems are difficult to handle and not user friendly their system is very attractive and aids in many effective ways to make environment friendly. The waste bins are equipped with sensors and connected to cloud with push mechanism. Hence the stack holders are able to get the all data from the cloud. Advancements in latest technology in different sector of life and with the increasing population and changes in the lifestyle , waste management is another sector need to be maintained properly. So monitoring of the Trash bins with the use of sensors, it's a possible way to monitor and clean the dustbin and more efficient system than the current existing. Their idea of "Embedded based Smart waste management system "mainly focuses on monitoring the waste management.

C. Garbage Collection System Using Iot

Ashiya Malak1, Pallavi Bhoyar2, Samir Atkar3, Abhishek Aryan4 [3] describes, the present day scenario, many times we see that the garbage bins or Dust bin are placed at public places in the cities are overflowing due to increase in the waste every day. It creates unhygienic condition for the people and creates bad smell around the surroundings this leads in spreading some deadly diseases & human illness, to avoid such a situation we are planning to design "Garbage collection system using IoT". In this proposed System there are number of dustbins located throughout the streets or the Campus, these dustbins are provided with low cost embedded device which helps in capturing the level of the garbage bins and an unique ID will be provided for every dust bin which are placed in the city so that it is easy to identify which garbage bin is full or not. When the level reaches the threshold limit, the device will transmit the level along with the identification ID provided for each placed dustbins. These details can be accessed by the concern authorities from their place with the help of Internet and an immediate action can be made to clean the particular dustbins. This paper shows the smart garbage management system using GPS, ultrasonic sensor, micro controller and GSM module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in coherent time, then the record is sent to the higher authorized person who can take correct action against the concerned contractor. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system and keeps environment clean. It minimizes the total number of trips of garbage collection vehicle and hence it also minimizes the overall expense associated with the garbage collection. It ultimately helps to keep cleanliness in the society.

M.S.Kaliyan 1 , Raval Nisha 2 , Pragna Makwana 3,IOT Based "SMART DUSTBIN" In this paper they had designed IoT based smart dustbin which were cost effective as made with minimum cost embedded device which guides in tracking the limit of the garbage into bins with the help of unique ID, provided for every dustbin and situated in the cities so it becomes easy to recognize particular garbage bin is full or not and according to that status of the dustbin it will generate reports and sends messages to concerned authorities which results into an action can be taken by authorized person. They had provided android application so that system can be monitored from remote location easily can trace particular area i.e. nearby dustbins .By using andriod app various feedback can be collected for complain or request for extra dustbins. They had also mentioned future duties as three various slots for garbage accordingly like decomposable, non-decomposable and recycle results into separate waste.

D. Solid Waste Management for Smart City

Mayank Agarwal1*, Kalpana Jareda2 and Mohit Bajpai3[4] describes, Solid waste management (SWM) is a great concern for public health and environment of rural as well as urban parts of smart cities. Now-a-days solid waste management has become a major problem due to increase economic activities and rapid urbanization. We face many issues and difficulties associated with weakly managed solid waste operations. Government is also taking too much interest in these areas to resolve the issues in a safe, hygienic and productive manner. In that present time solid waste disposal in landfills and open dump sites was considered more economical and these methods are most widely used methods in smart cities. Using published data on solid waste management techniques, the paper has examined that there is high capability of composting in the solid waste stream from cities in developing countries. Municipal and industrial solid industrial waste management is an important issue worldwide .particularly there should be

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best practices for successful public participation and consultation on SWM projects (SWMPs). It is hoped that the paper has provided useful information and guidelines for wastes management policy decisions in developing countries. There is a very little focus on control mechanisms on SWM which is adversely effecting on safety, health and the environment of smart city. Regulations for SWM are not properly enforced and SWM seem considered of low priority . In some cases, wastes generated from industries which are highly hazardous are treated as very ordinary and normal wastage. Rising number of illegal dumpsites, landfills and the much uncollected waste throughout the city poses serious health hazards. Community participation in SWM, also have positive contributory role. Reduce, reuse, and recycle (3R) should be promoted by government as well as citizens for making a city as smart city.

E. IOT based Garbage Management System for Smart Cities

Mohamed Asif Hassan A.H, Jagannathan Srinivasan, L. Keshav Bharadwaj, Harish Ganesan[5] describes IOT based Garbage Management System for Smart Cities. Smart cities should be equipped with basic infrastructure and technological advancements to provide better ambience and comfort for living. As an important thing for better life much clean environment should also be assured. To ensure fresh and clean environment they designed the " IOT based Garbage Management System for Smart Cities" with the help of internet of things and cloud computing. For making this system they focus on implementing a smart garbage management using the internet of things. Often, they find dustbins with overflowing wastes and garbage thrown on the sides of the roads. Even though they find garbage vehicles having visits, it is impossible to predict the amount of waste that can be accumulated in a day. The scope for future work is the implementation of same system with less complex boards at affordable costs.

F. Garbage monitoring and alert system using IoT

pranita aher, sampada kokane, sandhya korade[6] describes the IOT based system in which number of dust bins situated troughout the city so in order to that it will take less time and efforts to clean the dustbins as control system is going to send the messages through GSM and updates of dustbins whether its full or not onto webpage pervasively. To design the system they are had used PIC microcontroller and Arduino Ethernet Shield. Ubiquitously data could be captured from anywhere and anytime so utilization of resources happened. Whatever the sensors provided it will detect garbage level in percentage and status can be displayed or uploaded on web accordingly action can be taken by particular co-ordinator.

G. IOT Based Smart Garbage alert system using Arduino UNO

Dr.N.Sathish Kumar#1, B.Vijayalakshmi#2, R. Jenifer Prarthana#3, A .SHANKAR#4[7]they had designed intelligent system with alert alarm for a proper management of garbage. The proposed smart alert system with alert signal to municipal web server for garbage clearance in short periods. In this system level of garbage can be detected with provided ultrasonic sensor which is interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the signal to the municipal web server once if garbage is full . Driver confirms the task of emptying the garbage with the aid of RFID Tag after cleaning the dustbin as RFID is a computing technology that is used for verification process. This whole process is done with the help of an embedded module integrated with RFID and IOT Facilitation. This system also provided real time status of dustbin and helps to take an action according to it . Remote monitoring can be easily done with the help of an Android application which is developed and linked to a web server to intimate the alerts from the microcontroller to the urban office that notifications can be sent through Wi-Fi module. This is an embedded based system which devised for the proper monitoring and maintenance of the garbage as well as averts irregular cleaning of the dustbins by sending alerts to the concerned individual within regular intervals. Future scope of this system is to improve by endorsing the status of cleaning in real time and measure the performance of the team so the system comes in handy as an admirable solution in environmental maintenance.

H. Smart Waste Management using Internet-of-Things

Gopal Kirshna Shyam1, Sunilkumar S. Manvi2, Priyanka Bharti3 [8]They had designed system based Internet of Things (IoT) which can be helpful in safety and quality of life achievement by connecting devices, vehicles and infrastructure all around in a city. In this paper they also proposed technological solutions and it can be achieved in smart cities by making various stakeholders to work together, They had used an IoT prototype with sensors which is able to read, collect, and transmit huge data over the Internet. Such data, when put into a spatial-temporal context and processed by intelligent and optimized algorithms, can be used to dynamically manage waste collection mechanism. They try to replicate the scenario using Open Data from the cities, they presented waste collection system is based on IoT sensing prototype which is responsible for measuring the waste level in the waste bins as well as to send this data to a server for storage and processing through internet. This data helps to compute the optimized collection

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routes for the workers. Future scope would be enhancing the existing system for different kinds of waste such as solid and liquid wastes. All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

III. IMPLICATIONS OF THE SURVEY

This inquisition assists to literature on improving waste management techniques for high performance by removing adversities in the actual model. Now-a-days number of techniques is going to introduce to optimize IOT concept by using different techniques of connection of digital devices. In that basically IR Sensors and RF modules are used .Waste collection is a part of the process of waste management. It is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill. Now-a-days waste management has become a major problem for cities and also for rural areas. We face many problems associated with waste management. This paper shows us that there is high efficiency of composting in the solid waste stream from cities. This survey shows us IoT based system can be influenced to create smart system for waste collection in that various sensors can be used to capture real time environment's data which will help to analyze kind of waste. So we can extend the system for separating the collected waste into dry, wet and plastic in the respective dustbins by using the Artificial Intelligence and Robotics.

IV. CONCLUSION

After this survey we come to know that lot of work has been done in field of waste management and IOT based Smart collection. We get that Waste Management is implemented with various techniques also Waste management is done by using IoT techniques. To keep effectiveness of work IoT technique is used. There is a very little focus on control mechanisms on SWM which is adversely effecting on safety, health and the environment of smart city. We can extend this work which will work on the doing separation of waste into type- dry, wet, plastic etc with the help of robotic arms.

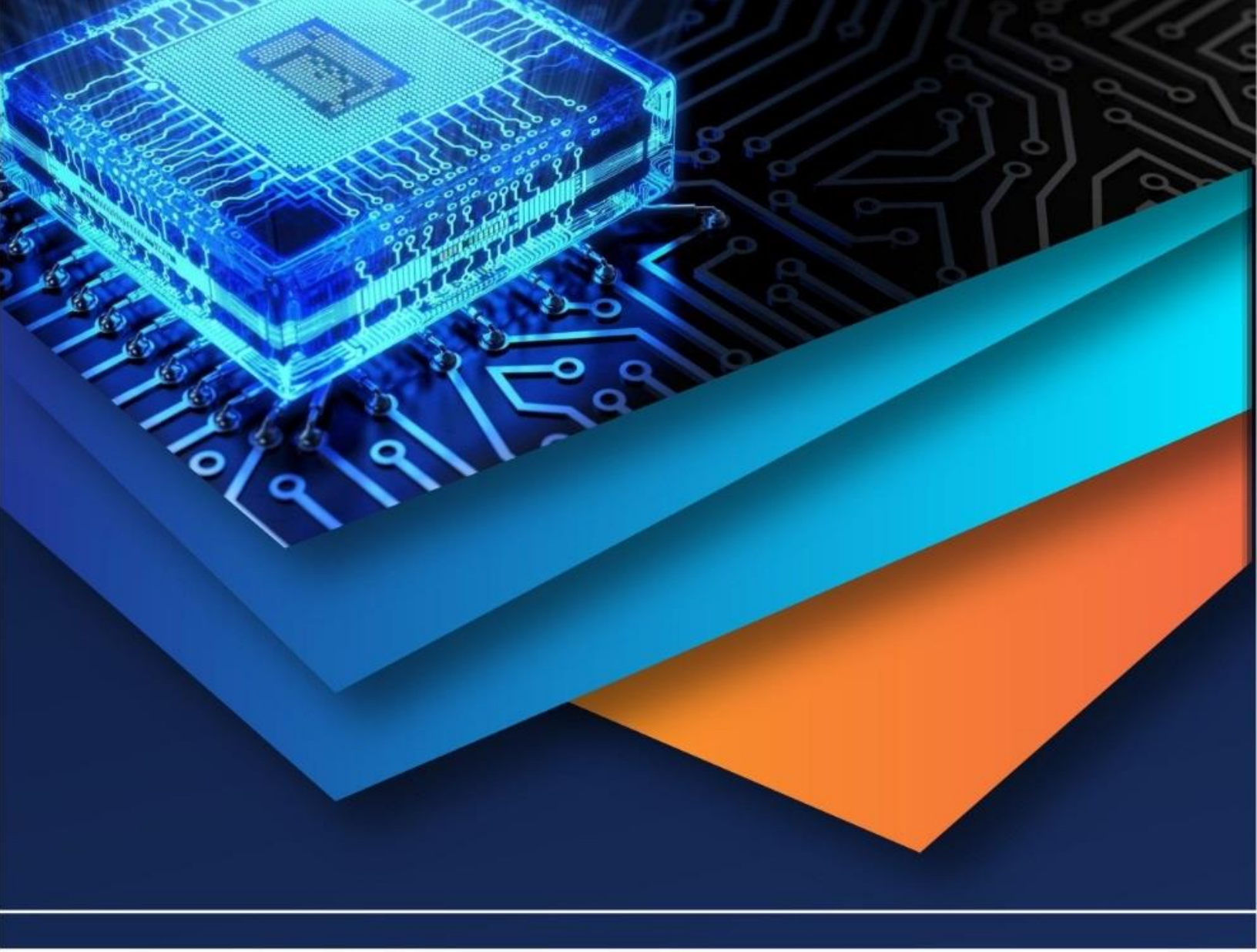
V. ACKNOWLEDGMENT

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