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Solid Waste Management System

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Abstract: The project "Solid Waste Management System" deals with the design & development of a system, which is being used to keep the cities clean. It is an IOT based system. Here, we are using waste bin integrated with the sorting for the sorting of the waste into different class. The amount of the waste in waste bin is uploaded into website, where the municipal authority can able to see it. Depending on the amount of the waste the worker only need to go to that specific waste bin for the collection of waste .If the waste is not collected the authority can observe this by using the website.. Hence optimizing a shortest route and saving time and fuel and the collected waste is segregated. Therefore system can lead to effective collection of waste from cities. Thus preventing overflowing of bin and as a result the foul smell, diseases can be reduced due to waste dumped and making cities clean.

Keywords: Segregation, Route, level, IOT.

I. INTRODUCTION

Rapid increase in volume and types of solid and hazardous waste as a result of continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003 (Global Waste Management Market Report 2016). The segregation, handling, transport and disposal of waste are to be properly managed so as to minimise the risks to the health and safety of patients, the public, and the environment. The economic value of waste is best realized when it is segregated. Currently there is no such system of segregation of dry, wet and metallic wastes . This paper proposes an solid waste management system which is a cheap, easy to use solution for a segregation system ,level and location sensing, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste. This employs parallel resonant impedance sensing mechanism to identify metallic items, and capacitive sensors to distinguish between waste. The economic value of the waste generated is not realised unless it is recycled completely. Several advancements in technology has also allowed the refuse to be processed into useful entities such as Waste to Energy, where the waste can be used to generate synthetic gas (syngas) made up of carbon monoxide and hydrogen. The gas is then burnt to produce electricity and steam; Waste to Fuel, where the waste can be utilized to generate bio fuels. When the waste is segregated into basic streams such as wet, dry and metallic, the waste has a higher potential of recovery, and consequently, recycled and reused. The wet waste fraction is often converted either into compost or methane-gas or both. Compost can replace demand for chemical fertilisers,Even though there are large scale industrial waste segregators present, it is always much better to segregate the waste at the source itself. The benefits of doing so are that a higher quality of the material is retained for recycling which means that more value could be recovered from the waste. The occupational hazard for waste workers is reduced. Also, the segregated waste could be directly sent to the recycling and processing plant instead of sending it to the segregation plant then to the recycling plant. The purpose of this project is the realization of a compact, low cost and user friendly segregation system for urban households to streamline the waste management process.

II. EXISTING SYSTEM

India has the largest population of any country in the world other than China, housing 17.4 percent of Earth's population ,and it's expected to soon overtake the land of the panda. It grows ever more powerful, along with other BRIC countries (Brazil,Russia,India and China).One small problem is that ,we are drowning in our excreta. India is rapidly transforming it in to the largest rubbish dump in the world. Every rise in income of INR1,000,however leads to another 2.2 pounds of waste ,which is much more toxic and less biodegradable, containing as it does more plastic and electronics waste. The Energy and Resources Institute estimated that waste generation in the cities of India will increase five-fold by 2047.India is on way to becoming the largest producer of rubbish in all the world. Managing waste can be challenging for Industrial, Commercial and Institutional (ICI) sectors. Organizations must deal with a wide variety of materials, large volumes of waste, and behaviours of many customers, visitors, and/or students from within and outside of the province. In many cases, the most efficient and cost effective way to manage waste is to not have to deal with it at all; therefore waste diversion and waste minimization are often a primary focus for most integrated waste

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management plans. Municipal Solid Wastes (MSW) is often described as the waste that is produced from residential and industrial (non-process wastes), commercial and institutional sources with the exception of hazardous and universal wastes, construction and demolition wastes, and liquid wastes (water, wastewater, industrial processes). The three R's are commonly used terms in waste management; they stand for "reduce, reuse, and recycle". As waste generation rates have risen, processing costs increased, and available landfill space decreased, the three R`s have become a central tenet in sustainable waste management efforts.

Table 2.1:Advantages and disadvantages of waste management methods in India

OCEAN DUMPING	
Advantages: • convenient • inexpensive • source of nutrients, shelter and breeding	**Disadvantages:** • ocean overburdened • distruction of food sources • killing of plankton • desalination
SANITARY LANDFILL	
Advantages: • volume can increase with little addition of people/equipment • filled land can be reused for other community purposes	**Disadvantages:** • completed landfill areas can settle and requires maintenance • requires proper planning, design, and operation
I INCINERATION	
Advantages: • requires minimum land • can be operated in any weather • produces stable odor-free residue • refuse volume is reduced by half	**Disadvantages:** • expensive to build and operate • high energy requirement • requires skilled personnel and continuous maintenance • unsightly - smell, waste, vermin
OPEN DUMPING	
Advantages: • inexpensive	**Disadvantages:** • health-hazard - insects, rodents etc. • damage due to air pollution • ground water and run-off pollution

III.PROPOSED SYSTEM

The main aim of this project is to keep cities clean. The system is IOT based one and it monitors the garbage bin and informs the level of garbage collected in garbage bin.The system will update the status of the bin.It will show the shortest route to the trucks.The waste is segregated to bio and non biodegradable.

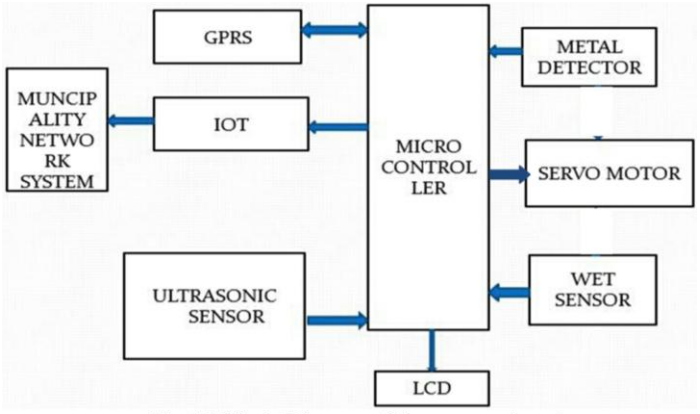

Fig 3.1 Block Diagram of the proposed system.

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The current waste disposal techniques existing are rag picking, incerination, land fills which are in effective. This is a major ecological concern due to pollution and diseases. The current bins in our cities are overflowed due to improper collection techniques.The gps module gives location. The ultrasonic sensor detects the level of garbage and updates using iot in the website of municipality. So authorities can sent workers to collect waste before overflowing..The wet sensor and metal detector detects the metal and bio degradable waste and servo motor rotates and waste is sorted. The Gprs gives the location of each bin.

IV. SOFTWARE DESCRIPTION

The programming language used in this system is Python. Python is a widely used high-level, general purpose, interpreted, dynamic programming language. Its syntax allows programmers to express concepts in fewer lines of codes than possible in languages such as C++ or Java. The language provide s constructs intended to enable writing clear programs on both a small and large scale. Python features a dynamic type system and automatic memory management and supports multiple management and supports multiple programming paradigms, including object-oriented, imperative, functional programming, and procedural styles. It has a large and comprehensive standard library. Python interpreters are available for many operating systems, allowing python code to run on a wide variety of systems.

V. RESULTS

Thus we obtained the result of our project Solid Waste Management system.

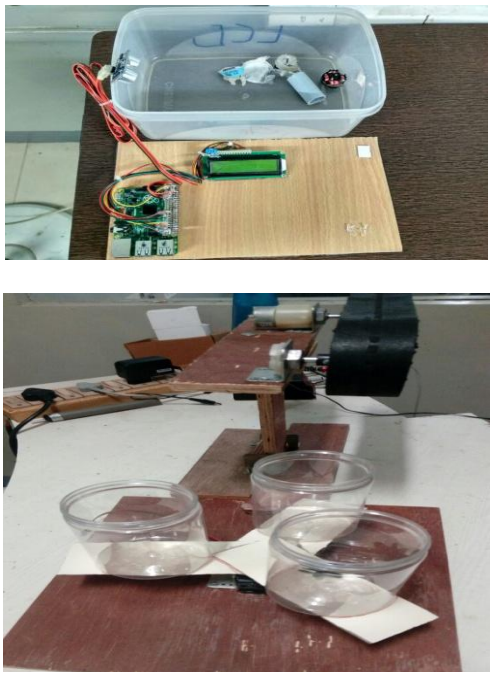

Fig 5.1 System prototype

VI. CONCLUSION

The literature survey for the proposed method was completed by studying and analysing the papers and the relevance of the project was also found out .on the basis of the study, new and innovative ideas were included to project with greater efficiency and low cost. New ways to improve the existing methods and technologies were also analysed.The output of the system is obtained with new technologies such as IOT.

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