

Review paper on Smart Dustbin: The Waste Segregation and Alert System.

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Abstract:

Technology always helps mankind in making life easier. The prime need of a smart lifestyle begins with cleanliness and cleanliness begins with dustbin. A society will get its waste dispatched properly only if the dustbins are placed well and collected well. Present scenario in the public places is that, there is no proper disposal of waste being done. To properly manage the waste, it has to be handled, segregated, transported and disposed so that it reduces air pollution and also prevents spreading of diseases caused by unpicked waste. A smart dustbin can be designed to sort the trash into metallic waste, wet waste and dry waste. These wastes can be used based on their needs such as, wet wastes can be used as fertilizers, metal, papers and plastic wastes can be recycled. Wireless sensors can be used for the segregation of different types of waste. Using embedded technology to continuously monitor the status of the dustbin and to send an alert message automatically to the concerned authorities once the level of waste in the dustbin crosses the threshold as set by the authorities. It also guides the garbage-trucks to collect the garbage only from those areas where the bin is critically filled. This would save time and money of the authorities considerably.

1. Introduction

In recent times, garbage disposal has become a huge cause for concern in the world. A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life. This harmful method of waste disposal can generate liquid leachate which contaminate surface and ground waters can harbor disease vectors which spread harmful diseases and can degrade aesthetic value of the natural environment and it is an unavailing use of land resources. In India, rag pickers play an important role in the recycling of urban solid waste. Rag pickers and conservancy staff have higher morbidity due to infections of skin, respiratory, gastrointestinal tract and multisystem allergic disorders, in addition to a high prevalence of bites of rodents, dogs and other vermin. Dependency on the rag-pickers can be diminished if segregation takes place at the source of municipal waste generation. 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 fertilizers, and biogas can be used as a source of energy. The metallic waste could be reused or recycled. 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. We are implementing a smart dustbin which is a cheap, easy to use solution for a segregation system at households, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste.

2. Motivation:

The increase in population in today's world has increased the garbage. To keep the environment clean and healthy, there is a requirement of proper garbage disposal. Improper garbage disposal brings up pollution, health issues, various hazards and as a result it affects the environment. Pollution severely affects the growing and populated cities as it contains contaminants which results in instability, disorder and discomfort to ecosystem. Ignorance and lack of cleanliness is spoiling the environment. The proper waste removal and management is greatly effective to improve the health and well-being of city's population.

The key motivation is in achieving efficiency in waste management sector at the national level. There is no community participation towards management of waste and sanitation. An effective guideline must be provided to the public according to the regional requirements and constraints. This job can be done by NGOs present in the area. In order to maintain clean and hygienic environment in the area around us. It is necessary to use the technology for better garbage monitoring system. The main goal of this project is to work on environmental issues due to improper waste disposal and solve them for better health and hygiene of the people. The proposed system fits into the category of IoT applied to external and public environments and it fulfills the following necessary requirements of IoT services.

3. Issues:

The main sources of waste are industrial and domestic waste. This project mainly concentrates on domestic waste whose value is unrecognized since people don't spend time on segregating waste into their basic streams. The wet waste generated can be used to generate biogas, metallic and dry waste can be sent for recycling, if metallic waste is left untreated then it becomes a threat to animal and plant lives. If waste is separated at household level then they can be directly sent for recycling instead of sending them to industries first for segregation which becomes a huge task and the waste does not get segregated accurately. The methods adopted for

waste segregation in industries is hazardous to human health since it makes use of x-rays and infrared rays. The environmental risks associated with poor waste management are well known and understood. The main aim of the project is to segregate waste at source level to wet, dry and metallic such that waste is not wasted but their value is understood and can be converted to a source of energy, in a cost-effective way.

4. Objectives:

1. To separate the metallic waste such as Safety pin, Paper clip, Battery, Nail etc.
2. Organic waste separation such as Kitchen waste, Leftover food, Vegetable peel/Fruit peel, rotten fruits and Vegetables, etc.
3. Dry waste separations such as papers, small bottles, milk covers, dry leaves, cloths etc.
4. Dustbin doesn't open once it is filled then the message will be sent to local municipal authorities about the status of the dustbin once it is filled.

5. Literature Survey

Mukherjee et al [1] reviewed the various technological advancements. These advancements have given rise to more energy consumption. Smart Cities and Smart Waste Management Systems employ a network of sensors and devices; these devices require power. Hence to implement the idea of smart city a huge amount of energy is required. The Smart bin in the waste management system contains a number of sensors like Passive Infra-Red Sensor temperature sensor, ultrasonic range sensor, a servo, a proximity sensor, a RFID card reader, a Wi-Fi shield and a microcontroller.

Siddappaji et al [2] study says that, the solid waste management system is one of the important problems in the present world. Proper collection of waste can be done by using techniques like RFID along with intelligent systems. This system consists of RFID, GSM and GIS techniques. Segregation of different

varieties of materials present in the waste can be done by using different methods like Fourier Transform Infra-Red (FT-IR) spectroscopy, Near Infrared Spectroscopy, Hyper spectral Imaging, Eddy current separator etc.

Nehate et al [3] studied that, sometimes in various areas dustbins were overload and it cause viral diseases. To avoid these kinds of situation the smart dustbin in which GSM board sends message by detecting the level of garbage with the help of Infrared Rays (IR) in the dustbin. To display status of the dustbin that is low, middle, high, empty or overflow they have used LCD also. When garbage cross 70% of the dustbin level, GSM modem sends registered message to the particular mobile number

Jain and Bagherwal et al [4] have studied about the problems faced by the developing countries. In this proposed system, the completeness of waste in the dustbins is checked with the help of sensors used in the system and information is sent to the required control room through GSM/GPRS system.

6. Conclusion and Summary.

Waste Segregation using smart dustbin has been successfully implemented for the segregation of waste into metallic, dry and wet waste at root source. One of several environmental problems is bad waste management practices which can result in land and air pollution and can cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body. The method presented provides a fruitful way to come out of this problem by making entire system automated. The components used in smart dustbin are economic, environmentally friendly and gives accurate results for separating three different types of wastes which are generally produced at places like shopping malls, offices, houses, schools/colleges etc.

Presently there is no device/product available for segregation of waste at root source other than manual separation. Probably the biggest advantage of smart dustbin is the safety it provides. This device carefully separates all three types of waste and not only increases the economic value of waste but also gives a healthy and beautiful environment at lesser cost.

Segregating waste manually is not accurate and many of us don't like to do that. Due to open dumping of solid waste, it emits bad smell due to presence of dead animal waste and biodegradable components. Rodents and dogs are feeding on such dumping place and they may bite peoples present in those areas. Such dumping sites are spoiling environment of the nearby villages surrounding the dumping site.

7. References

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