

E-Bin for Waste Segregation

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Abstract— An E-BIN 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. This employs parallel resonant impedance sensing mechanism to identify metallic items, and capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the E-BIN. 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. . In India, rag pickers play an important role in the recycling of urban solid waste. Dependency on the rag-pickers can be diminished if segregation takes place at the source level. Currently there is no system of segregation of dry, wet and metallic wastes at a household level. 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.

Keywords---Sensor, Microprocessor, Motor.

I. 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. The economic value of the waste generated is not realized 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 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. Currently there is no system of segregation of dry, wet and metallic wastes at a household level. J.S. Bajaj has recommended that a least cost, most appropriate technological option for safe management should be developed. 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.

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. The mixed waste is sorted based on the following methods at the industrial level. Larger items are removed by manual sorting. Then the refuse is sorted based on its size by using large rotating drums which is perforated with holes of a certain size. Materials smaller than the diameter of the holes will be able to drop through, but larger particles will remain in the drum. For metallic objects electromagnets or eddy current based separators can be used. Near infrared scanners are used to differentiate between various types of plastics based on the ability of the material to reflect light. X-rays

can also be used to segregate materials based on their density.

II. PROBLEM STATEMENT

The main sources of waste are industrial and domestic waste. This project mainly concentrated 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 send 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

III. HARDWARE REQUIREMENT

- Microcontroller (AT89S52)
- IR sensors
- Moisture sensor
- Metal (Proximity) sensor
- DC Motor
- Stepper motor
- DC Motor driver
- Stepper motor driver
- Conveyor belt
- LCD
- Buzzer

VI. SOFTWARE REQUIREMENT

- Keil - μ Vision 3
- Embedded C
- TopWin

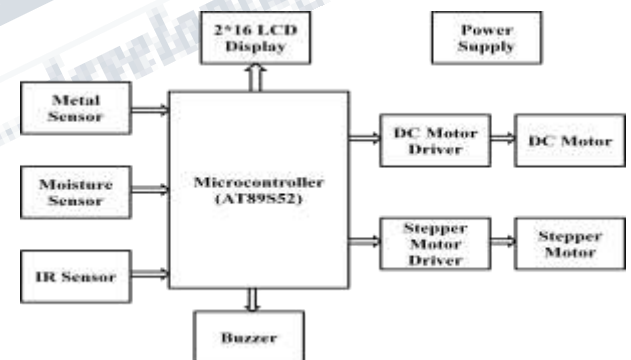
V. PROPOSED SYSTEM

The authors have made a quantitative analysis between existing dustbins and their serving population. The study first analyses the spatial distribution of dustbins in some areas of Dhaka city using average nearest neighbor functions of GIS. Remarkably, the spatial circulation of the current dustbins has appeared to be dominantly in

clustered pattern. Next, an optimal number of additional dustbins were calculated. It is shown that the number of existing dustbins is insufficient in the study area. The extent of pollution caused by the existing dustbins was calculated using spatial analyst functions of GIS. It is found that all the dustbins are burnt with wastes and causing pollution to the environment. The results thus obtained would help to understand the present situation of the waste management of Research Article Volume 6 Issue No. 6 International Journal of Engineering Science and Computing, June 2016 7114 <http://ijesc.org/> Dhaka city and to optimally place the required number of dustbins to prevent further pollution to environment. The authors in have equipped the smart bins with ultrasonic sensors which measure the level of dustbin being filled up. The container is divided into three levels of garbage being collected in it. Every time the garbage crosses a level the sensors receives the data of the filled level. This data is further sent to the garbage analyzer as instant message using GSM module. Placing three ultrasonic sensors at three different levels of the container may be a disadvantage as the cost of the dustbin increases due to the sensors and also the sensors can be implemented.

VI. BLOCK DIAGRAM

Segregating waste



VII. CONCLUSION

Be wise Using "E- BIN". 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 economical, environmental 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.

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