

Design and Implementation of Smart Sensing Garbage System Using Arduino

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Abstract— Waste disposal is a huge cause for concern in the present world. Unplanned open dumping at landfill sites made by municipal is a common method of disposal of waste. The harmful method used for waste disposal generates harmful chemicals which contaminate surface and groundwater. The economic value of the waste generated is not realized unless it is recycled completely. The main purpose of this project is compact, low cost and user friendly waste segregation system for urban cities the streamline the waste management process. In this paper the designing and implementation of smart sensing garbage system using Arduino is discussed.

Keywords: Arduino, Ultra-sonic sensor, capacitive sensor, Servo motor, LCD Display

I. INTRODUCTION

The most of common method of waste disposal is unplanned and it is dumped at the landfill Sites this method causes ill effects to all living beings. This method can generate liquid leachate and other fungus which pollute the surface and underground water also accelerates harmful diseases which lead to the degradation of an aesthetic value of environment. In India recycling of solid waste is done by the rag pickers who play an important role in this process while doing the Rag pickers get affected with many health problems such as skin infections, respiratory problems.

The dependent of rag pickers can be reduced if the automatic waste segregation takes place in the dustbin. The wastes are segregated into basic main streams such as metallic, dry and wet these waste has a large potential of recycled and reused as shown in figure 1. Even though there are multiple industrial waste segregators present, it is always better to segregate the waste at source itself. The advantage of doing this type of segregation is, there is no need of rag pickers to segregate the waste. In addition to it the segregated waste can be directly sent to the recycling plant, instead of sending the waste to segregation plant and then to recycling plant. Currently there is no such system for the automatic segregation of waste into dry, wet and metallic waste. 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.

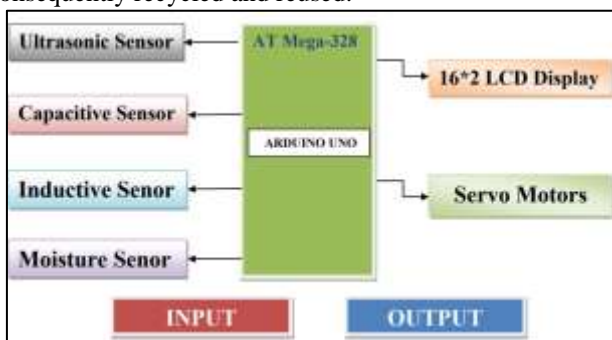


Fig. 1: Circuit layout of Smart Sensing Garbage System

II. METHODOLOGY AND WORKING

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 are perforated with holes of a certain size as shown in figure 2. 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 as shown in figure 3. The methodology adopted in this paper to resolve the issue of waste segregation is by making the entire process automated and to the reduce cost such that it could be adapted in a household level.



Fig. 1: Designed and implemented Smart Sensing Garbage System

Flow Chart

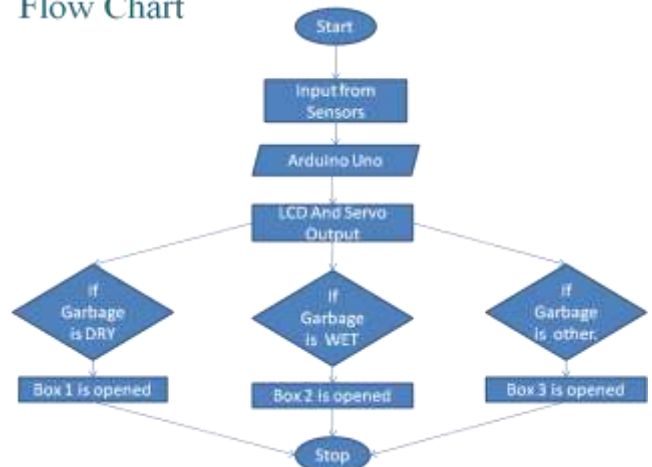


Fig. 3: Flow Chart

III. RESULTS

This system creates the positive influence in our environment and also save the time to separate the garbage from the dustbin. This system helps to recycle the things like plastic, iron, steel cans etc.

The proposed smart bin is an efficient waste segregation system that requires no human intervention to

separate dry and wet waste and the path for timely collection and disposal.

Main feature of this system is that it is easy to use and fully automatic, user not need to open the box of the dustbin to put garbage in it. The box is open automatically according to the type of garbage.

IV. SCOPE OF SMART SENSING GARBAGE SYSTEM

This type of product can be used in housing societies, offices, etc. Since it is cost effective, it can be implemented on a large scale as well with some modifications. Using a robotic arm along with a conveyor belt will make the process of segregation easier. Also, more sensors can be used to segregate bio-degradable and non-bio-degradable waste, plastics, recyclable waste, e-waste, and medical waste.

The smart sensing garbage has been implemented for the secretion of waste into dry, wet and metallic waste. Smart dustbin is an innovative step in the direction of bringing a change in the current garbage disposal system.

V. CONCLUSION

Implementation of this system at a local level like societies, educational institutes, etc. can reduce the burden on the local authorities. The automatic waste segregator is one small step towards building an efficient and economic waste collection system with a minimum amount of human intervention and also no hazard to human life. Using a conveyor belt makes the system far more accurate, cost-effective and also easier to install and use at a domestic level. Segregating all these wastes at a domestic level will also be time-saving. While implementing our system we came across many problems like the sensing range of inductive proximity sensor, the accuracy of the moisture sensor, adjusting the range of Ultrasonic sensors and some more, but using some modifications we tried to make the system as reliable as possible but not completely perfect. The proposed smart bin is an efficient waste segregation system that require no human intervention to separate dry and wet waste and the path for timely collection and disposal. The proposed system can be deployed a domestic scale in households or on a large scale in public places.

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