Automatic Waste Segregator

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ABSTRACT

Increment in the amount of waste and improper way of dumping of waste has become a matter of concern because it is very hazardous to the environment. There comes important role of an automated waste segregator is to dump the waste in proper way and reduce the problems of recycling waste. It is necessary to consider it when segregating and transporting waste to ensure the minimal risk to the environment and human health. Economic value of waste can be brought to the limelight by the segregation of waste in proper way. In India, the traditional method used for segregation of waste is through rag pickers which is time consuming and it effects the health of the people who are exposed to such waste. Therefore we propose an idea of Automated Waste Segregator which can be used at household level to segregate the waste in easy way which is also cheap and affordable. It can be used to segregate the waste in three different categories namely metallic, dry and wet waste. This model uses moisture sensor for the segregation of dry and wet waste and inductive proximity sensor or metal sensor is used for the detection of metal waste. It is also proven from experimental reports that automated waste segregation can be done successfully.

1. INTRODUCTION

Presently, the waste disposal is a serious cause of concern. The method used for disposal of tremendous amount of waste is very harmful to environment. Common method of disposal of waste by municipal in India is open dumping at landfill sites. Due to improper open dumping the human health, plant and animal life are affected. Because of this harmful methods used for waste disposal generates harmful chemicals which contaminates surface and ground water. This results in the rise of various harmful disease and also degrades the aesthetic value of natural environment.

In recycling of urban solid waste in India garbage collectors play an important role. Because of improper waste collection method, the garbage collectors can get skin infections and various diseases . If segregation takes place at the main source of garbage collections, the dependency on the garbage collectors can be reduced.

The waste can be easily recovered and consequently recycled and reused when it is segregated into three basic categories such as wet, dry and metal. The wet waste is processed into compost or methane gas. The bio gas can be used as a source of energy and chemical fertilizers can be replaced by compost. The metallic waste can be recycled and reused. It is always better to segregate the waste at household level or source itself other than depending on the large-scale industrial waste segregators. By doing the waste segregation in this way the higher quality of material is obtained from recycling which results in better recovery of the waste. The occupational hazards caused by waste for waste workers is reduced. The segregated waste can be directly sent to the recycling plant.

1.1 LITERATURE REVIEW

Sidhanth Pandey, Sairam Makkena, Shippu SachdevaWaste et.al.[1] states that segregation and recycling are effective ways of reducing trash. Segregation at the source is the key in solid waste management especially when we have limited economical resources. Segregation of waste and creating awareness of different types of waste is new boom. We divide solid waste into three categories Wet, Dry and hazardous waste.
April Erika P. Carpenteros, Ellysa Mae P. Capinig, Mary Jane C. Samonte et.al.[2] aims to determine the effectiveness, identify the advantages and disadvantages, and the most suitable automated waste segregation system implemented using 14 studies with systems of automated waste segregation, with publication years of the studies from 2011-2020.
Dr. A. Radhika et.al.[3] states that the problem of real-life smart waste management system can be solved using automatic waste segregation. In particular, the focus of the article is on the problem of detection (i.e., waste classification). In these five classes of waste are taken and segregated them into five categories namely dry, wet, recycle, electronic and medical.
Archana Babu S1, Arunima SJ2 , Athira J3 , Bhavana Chandran4 ,Naveen S5 et.al.[4] states that Efficient waste management is one of the major problems of the present era. The segregation, handling, transportation and disposal of waste are to be properly managed so as to minimize the risk to the environment. The economical value of waste is best realized when it is segregated.

After reviewing the papers, we came to know that there is no such system for segregation of wastes into categories such as dry,wet and metallic wastes at the household level. From the research papers we gained information about the technologies used for segregating particular waste like dry, wet and metal with the help of the different types of sensors like metal sensor and moisture sensor. We saw different waste segregating models which helped us in designing our model.

1.2 OBJECTIVES

The objective of this project is to design a system which can be used at household level to segregate the household waste into three different categories namely dry, wet and metal waste.

1.3 COMPONENTS

Lists of Components are:-
1.Arduino UNO.
2.IR Sensors.
3.Metal Sensors.
4.Moisture Sensors.
5.DC motor.
6.Motor Drive Circuit.

2. WORKING

Step 1:- When the waste enters it rest on the flapper then the IR sensor detects waste and turns on the motors and sensors.
Step 2:-The waste is sensed by the inductive proximity sensor to detect if it is a metal or not.
Step 3:-If the waste is metal waste then M1 is turned off and M2 is turned on and the waste is pushed into the metal waste bin.
Step 4:-If not a metallic waste, M1 is turned on when it comes in contact with the moisture sensor that decides whether the waste is a wet waste or dry waste by checking the moisture content of the waste.
Step 5:-If the waste has some humidity it is detected as wet waste and M1 is turned on and M2 is turned off and the waste is pushed into the wet waste bin.
Step 6:-If not a wet waste M1 and M2 is kept off and then the waste is dropped into the dry waste bin.
Step 7:-Finally the wastes are dropped into the respective bins and the segregation process is completed.

Fig -1: Model Diagram

3. CONCLUSIONS

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 IR sensors and some more, but using some modification we try to make the system as reliable as possible but not completely perfect.

4. REFERENCES

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