

Intelligent Remote Monitoring Waste Segregation Smart Bin

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Abstract: In present time developing country are still using man resource for segregation of wet and dry waste that causes number of health diseases . These smart dustbin are still using in the smart way. The age and transfer of waste in enormous amounts has made an incredible worry over the ideal opportunity for the world which is influencing the human lives just as ecological conditions. These waste are just grows like the way of growing the country. Segregation of waste is important for proper disposal of big amount of garbage in a modern society, which is produces in an environmentally sensible mode. People are never realize the consequences of the their action. In present time most of the diseases increases because of this reason. The fluid creates as a result of ill-advised transfer of the trash assortment and blended waste pollutes land, water and ground that gets wellspring of unsafe. Diseases and degrades value of environment and the other natural resources. In the existing system, the process of segregation by the smart dustbin is for bit complex, but it helps the whole world. The process of this cleaning process is more reliable.

Keywords: Remote monitoring, smart bin, waste management, waste segregation.

1. INTRODUCTION

Due to rapid population growth, disorganization of city governments, a lack of public awareness and limited funding for programs, garbage management is becoming a global problem [1] . Now-a-days, we can also see garbage spilled out of the garbage bins in the locality and also it becomes extremely difficult for the local garbage authority to locate the garbage bins that are overflowing [2]. Also there is a major concern regarding the segregation of different waste. As we know there are different types of waste like dry waste, wet waste, non-biodegradable, etc and the process of segregating these waste into different dustbins is a tedious work [3-4]. Our project focuses on segregating different waste as well as monitoring of the dustbins. The hardware part of the project will comprise of separating different types of waste that are put into the Smart bin in different bins [5]. The software part of the project is based on IOT (Internet Of Things) where we will be monitoring the garbage based on the data we receive from the hardware part[6-7]. Here in monitoring we will be continuously checking the level of garbage in the bins, getting the location of the garbage bin situated in the locality and also sending a text message to the local garbage stating the overflowing of the garbage bin along with its location.

2. SOFTWARE REQUIREMENT ANALYSIS

A software requirements specification (SRS) is a representation of a software system to be developed . It's a combination of functional and non- functional requirements. Software requirements specification captures the complete document description about the system that how system to be perform . it is end off engineering requirement phases.

TABLE 1: software requirement analysis

No.	DESCRIPTION	NOTES
1	User(public, maintenance)	A) They can put the waste material into the smart dustbin. B) When the dustbin get full with the waste maintenance incharge Come and empty the dustbin.
2	Functional requirements	A) It provide the services how dustbin will open. B) Check the behaviour how sensor detect the waste .

		C) It checks that all the components are work properly. D) When we put the waste into the dustbin it verify that which one is bio-degradable waste or which one is non bio-degradable waste . E) When the dustbins are full it checks sms function-work according to time or not .
3	Reporting requirements	A) When the dustbin gets full it generate the sms . B) In a large scale,we can see that when the dustbin is used in what time, at what location, and in which area the most use of the dustbin .
4	Security requirements	A) How to secure dustbin ,that no one can steal our dustbin. B) So we can track on it by the location.
5	Non-functional requirements	A) It being available all the time. B) So simple to use anyone can use it. C) When the waste in front of the dustbin, sensor detect that dustbin led is open correctly, according to the waste or not .

3. Design of propose system

Dustbin representation when anyone throws the garbage of heavy material then the sensor perform according to the real demo or not . If someone tries to an experiment to warp the plastic garbage into paper or the vice - versa. In such a condition our module is perfectly shows the correct output , and also when checks it divide the garbage into correct form(bio- degradable and non bio- degradable) or not. Figure 1 displays flow chart of propose system.

Software emphases many architecture styles, it is as follows :

- A set of components that will perform the all function based on the system requirements.
- The set of connector will helps to communication and cooperation between the components.
- The next level is, that how components can be integrated to form of the system .

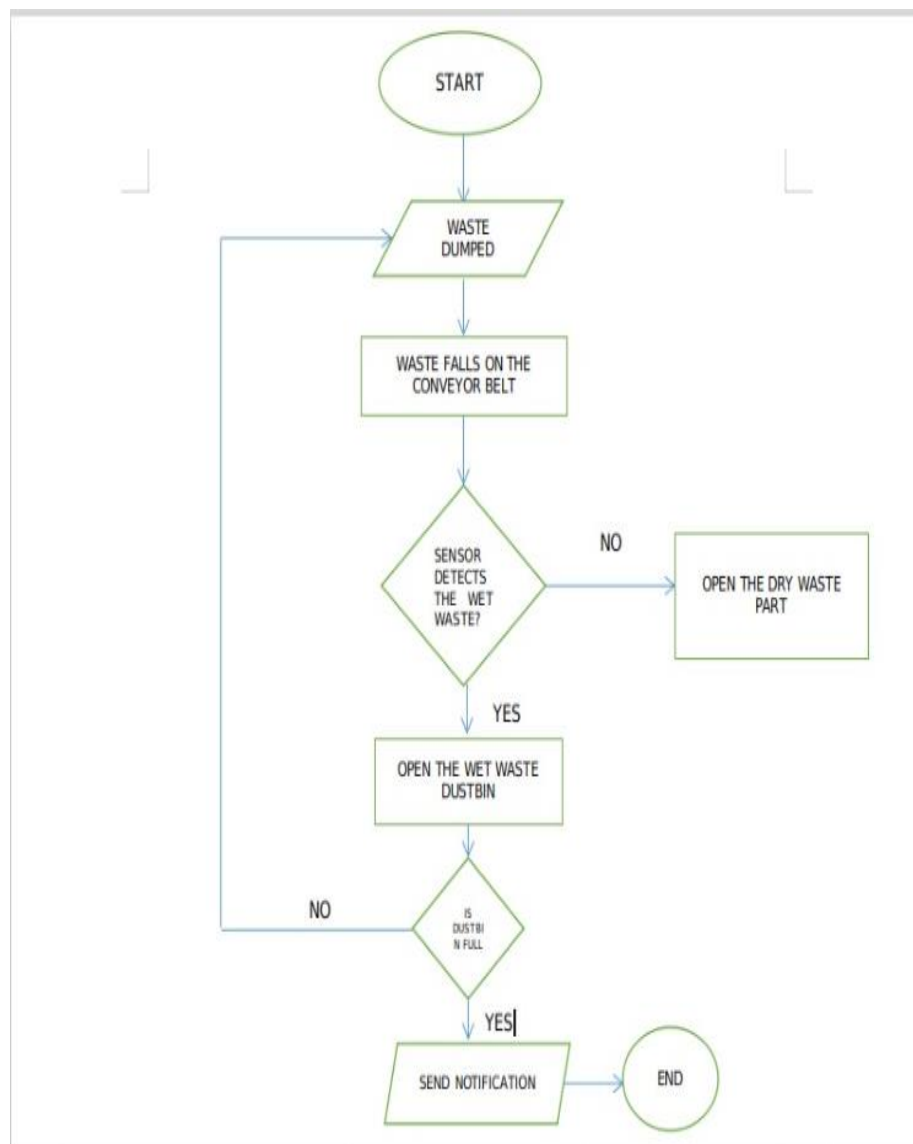


FIGURE 1: flow chart of propose system

3.1 Physical design

Physical design related to the actual input and output processes of the system. It basically focus on that how data is entered into a system and then verified all the processes and last to display the real output .

In our module, when the person close to dustbin and show the garbage in front of the sensor it detects that the garbage is bio- degradable or non bio-degradable ,when the initial process has been done it separated the garbage into two forms and last process when the dustbin has been full it send the message to clean or empty the dustbin .

3.2 Interface design

Interface design is the specification of the interaction between the system and the environment . This phase proceed a high level abstraction with the working of the system, during the interface design .

When the dustbin has been full it remotely access to the maintenance incharge, and time -to- time send the message or not . ER diagram for public use and maintenance incharge has been explained in figure 2 and 3 respectively.

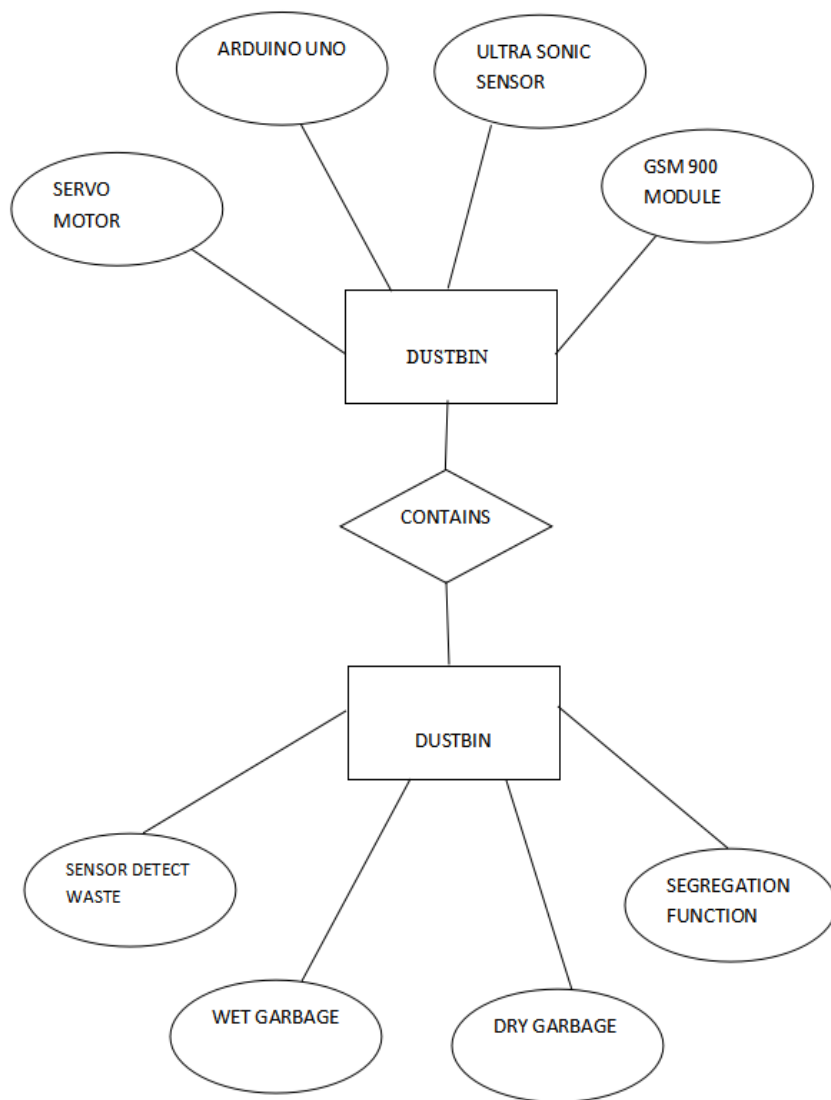


FIGURE 2. ER Diagram design for public use

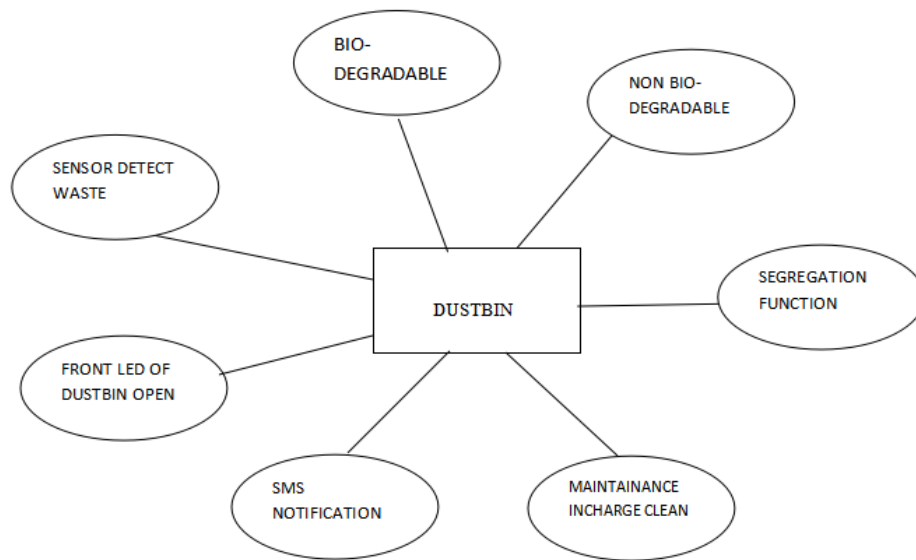


FIGURE 3. ER diagram for maintenance incharge

4. Testing the project

The application has gone through alpha testing. This test happens at the designer's side. Engineers watch the application and note issues.

Table 2. Testcase execution of project

Test case id	Test cases	Pre Conditions	Input test data	Steps to be executed	Executed results	Actual result	Pass/fail
1.	Successfully dustbin led open	Person in front of the dustbin and shows the garbade front of the sensor	Garbage whether it is bio-degradable or non bio-degradable	Show the garbage in front of the Sensor	It is open	It should be open	Pass
2.	Unsuccessfully	Person in front of	Their is no garbage	Show the garbage in	It is not open	It should be not	Pass

	dustbin led open	the dustbin and shows the garbage front of the sensor		front of the Sensor		opened	
3.	Sensor detect garbage at day time	Sensor work properly	Light is required	Show the garbage in front of the Sensor	All components work well and sensor detect the garbage at initial stage	All components should be work well and sensor should detect the garbage at initial stage	Pass
4.	Sensor detect garbage at night time	Sensor work properly	No light is required	Show the garbage in front of the Sensor	All components work well and sensor detect the garbage at initial stage	All components should be work well and sensor should detect the garbage at initial stage	Pass
5.	Check the dry garbage in day time	Dustbin led open on time when sensors detect The waste	Dry garbage like Food item,dead plants etc stuff is require	Show the garbage in front of the Sensor	Dry waste (garbage) is separated according to the sensor And also it	Dry waste (garbage)s hould be separated according to the sensor And also it	Pass

					is not working at night time	should not be working at night	
6.	Check the dry garbage in night time	Dustbin led open on time when sensor Detect The waste	Dry garbage like food item,dead plants etc stuff is Require	Show the garbage in front of the Sensor	It is not working at day time	It should not be working at day time	Pass
7.	Check the wet garbage in day time	Dustbin led open on time when sensor Detect The waste	Wet garbage like plastic ,metals.and toxic chemicals etc stuff is Required	Show the garbage in front of the Sensor	Wet waste (garbage) is separated according to the sensor And also it is not working at night time	Wet waste (garbage)s hould be separated according to the sensor And also it should not be working at night	Pass
8.	Check the wet garbage in night time	Dustbin led open on time when sensor Detect The waste	Wet garbage like plastic ,metals.and toxic chemicals etc stuff is Required	Show the garbage in front of the Sensor	It is not working at day time	It should not be working at day time	Pass
9.	When dustbin full sms work	Successfully segregate the	Dustbin full with the garbage	Show the garbage in front of the	Sms generated on time	Sms should be generated on time	Pass

	properly on time	garbage at the initial stage		Sensor			
10.	When the phone switch off then sms comes after to on the phone	Successfully segregate the garbage at the initial stage	Dustbin full with the garbage	Show the garbage in front of the Sensor	Sms comes when the phone is getting on	Sms comes when the phone is getting on	Pass

5. Conclusion and Future Work

The main objective of the Internet of Trash is to detect the object and evaluate whether it is dry waste or wet waste with timely information flow in the serial monitor of arduino IDE and accurate performance without any errors with high precision. The following objective was successfully implemented and tested. There is scope of improvement for proposed methodology where we can consider weight of grebes, electronic waste etc.

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