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# A New Model for Smart Garbage Monitoring

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## ABSTRACT

Garbage Monitoring is a huge problem in maximum cities all over the world, without proper management of waste which in cause a major factor for environmental pollution resulting in several health issues. In the traditional system, the garbage use to be collected in a manual way. The workers who have to collect the garbage are unable to get proper information when would the bins are filled with a particular area, so they use to fix some timings for collecting the wastage. Due to this sometimes the bins may be filled and overflowed and causes unhygienic conditions leading to pollution. A New Model for Smart Garbage Monitoring is introduced with replacing the bins with smart bins attached to an ultrasonic sensor which will detect the levels of waste in the bin, time to time and forward the information to Arduino board attached to a GSM module, the messages to the central monitoring system, showing the levels of bins in real time scenario with android app.. Along with this segregation of waste is done with a moisture sensor which will sense the type on the moisture level and segregate atomically. Then trucks are attached to the particular industry so that they are also aware of the information of wastage that they are going to receive. With the invention of this system, there will be awareness making a healthy city with smart inventions.

**Keywords:** IoT - Internet of Things, Smart Garbage, Smart Bin, Android

## I. INTRODUCTION

In the traditional system where the municipalities use to follow the manual way for collecting the garbage from the particular cities, transportation and segregation of waste and disposal of wastage. As the increase population day to day it is also reflected on the waste dumped by them. Due to improper maintenance of the garbage bins and the disposal of wastage is not done on time which is reflected in major health issues in the cities. Next, a lot of fuel is wasted by the transportation if the truck frequently visits the bin if the bin is not completely filled. As all the waste is dumped into a single bin, there would be different types of materials which cause in chemical reactions with one another and causes severe pollution around the bin. Some of the useful items such as metals and so on are also wasted because of these chemical reactions that go on in the bin. Due to a lot of pollutions is taking place in air, land, soils and water, which in cause reflected in the health issues of the human where a lot of people are getting infected with several diseases caused due to the environmental pollution every year. For all these problems a new method is developed with the Internet of Things. A new model is developed with incorporation of new technologies such as Internet of Things and also the Smart bins along with Android application.

## II. LITERATURE SURVEY

Literature survey is the most important step in software development process. Before developing the tool it is essential to determine the time factor, economy company power. Once these things are satisfied, then next steps are to resolve which operating system and language can be used for developing the tool. Once the programmers start constructing the tool the programmers need lot of external support. This maintains can be obtained from senior programmers, from book or from websites. Earlier than building the system the above consideration are taken into account for developing the proposed system. How sensors work and how do actuators respond to the input from sensors and IOT is basically a machine-to- machine communication [1]. Figuring out the functionality of machine-to- machine (M2M) communications are discussed. Machine-to- machine (M2M)

communication network link multiple devices for sharing of information and allow remote monitoring of various machines [2].

The solid waste monitoring and management system using radio frequency identification (RFID) associate with intelligent systems. The system consists of RFID system, mobile communication like GSM and geographical information system (GIS) for tracking vehicle position [3]. The demonstration of system architecture here is based on sensor nodes and makes use of Data Transfer Nodes (DTN) in order to provide to a remote server the retrieved data measurements from the garbage bins filling [4]. How GSM modem is used to communicate with devices like cell phones that are forwarding us the details related to the quantity of product in our smart system [5]. Dustbin can be interfaced with the central System showing status of garbage in Dustbins on GUI.IF the dustbin are loaded with garbage the status will display on screen[6]. The idea of IoT subject and addition details about IoT. The proper smart environment and various applications [7]. The additional details and designs needed for flow and management of garbage while collection [8]. The overview working of the IoT based smart garbage bin and the food management 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. The comparison is done with help of microcontroller. After analyzing the image an idea about level of garbage in the can and from the load cell sensor, weight of garbage can be known. Accordingly information is processed that is controller checks if the threshold level is exceeded or not. This is convenient to use but economically not reliable

## III. Methodology

A new model is proposed with introducing of IoT-Internet of Things, where the world is stepping towards the Automation of devices with smarter technologies extending in every sector right from health, industries, agriculture, educational institutions, homes, vehicles and parking and so on. In this model here we are going to replace the bins with smart bins and the vehicles are tracked with a GPs technology and the users are attached with a RFID TAG. The complete model is represented in the below figure 1. Along with a Central Garbage Monitoring is attached which send the information of garbage to the Android app which shows the levels of the garbage in the form of levels and also the forwarding of messages from time to time and the complete architecture is shown with figures below and also with the results next to it.

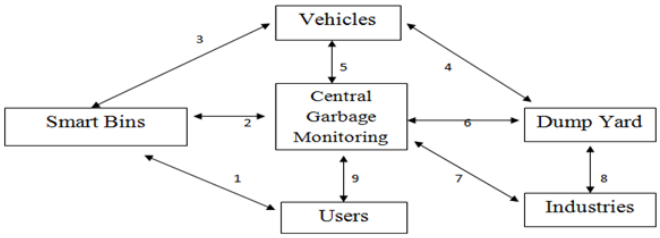



**Figure 1:** The New Model of Smart garbage monitoring

The above Figure shows the different entities such as Users, Smart bins, Central garbage Monitoring, Vehicles, Dump Yard and Industries which are going to communicate each other in the following steps.

Smart Bins: A smart bin is an advanced bin which is attached with an ultrasonic sensor for detecting the level of wastage shown in figure 2, and it is also attached with a RFID Reader for identifying the particular user it is connected with CGM for communication with the CGM and also to the Vehicle, whenever it get filled it will send an alert to the CGM and Vehicle, so the garbage will be disposed on time into the vehicles [9].

**Figure 2:** Smart Bin

Vehicles: The vehicles are attached with a GPS enables and also they are connected with smart bins, CGM and industries. Whenever they get an alert from the smart bin from a particular area they get into the ready state, when they got the instruction from the central monitoring the go and pick up the garbage before the bin is filled and also request from industries

and instruction form CGM. The Vehicles are also attached the automatic segregation, whenever the bin posts the waste in vehicle it will segregate using a moisture sensor which is attached in the vehicle into different types, so that it will dump to different industries. [10]

Figure 3: Smart Garbage Truck

CGM: Central Garbage Monitoring, it plays a major role for controlling all the entities that are connected to such as retrieving the information from the Bins that the details of the particular user how much the user dumped and also controlling the bin wherever it is filled sending an alert for the nearby vehicle.

Android App: The details are forwarded to Android application which will show the level of garbage levels as shown in the results

**SYSTEM ARCHITECTURE**

The Complete system Architecture is shown below with an Arduino Board and the ultrasonic sensors along with a LCD display with all connections and also the GSM tracking devices attached to the trucks which are shown in the figure 4

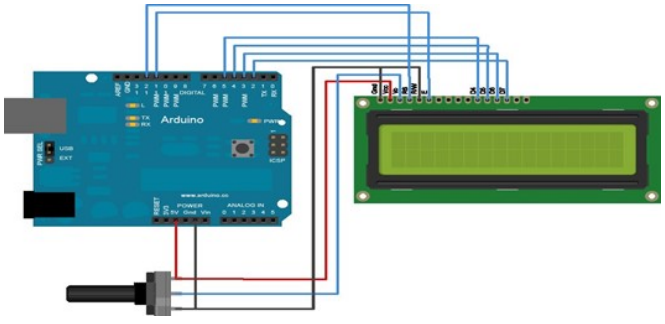



Figure 4: Smart Garbage Truck

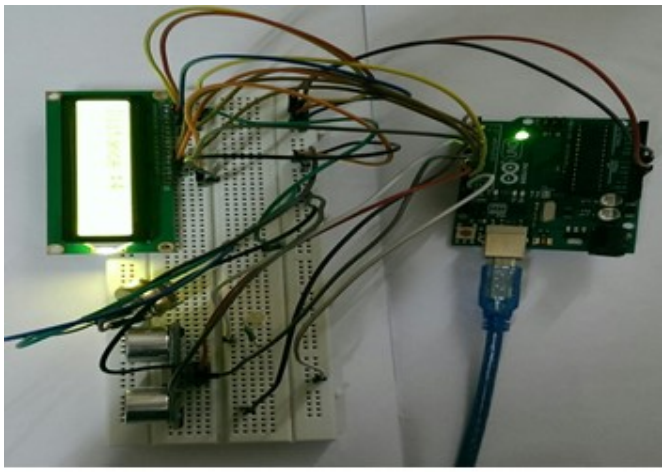
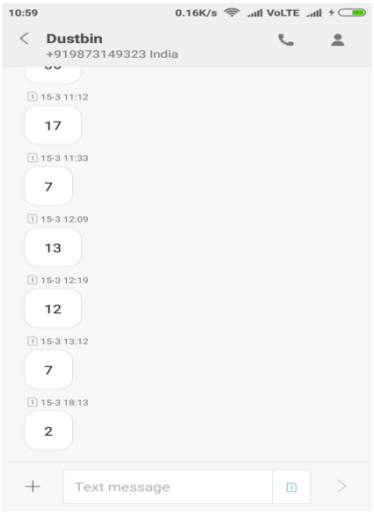


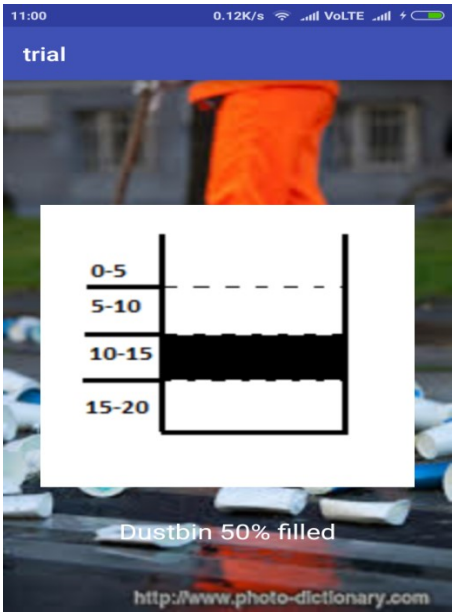
Figure 5

## IV. RESULTS AND DISCUSSION

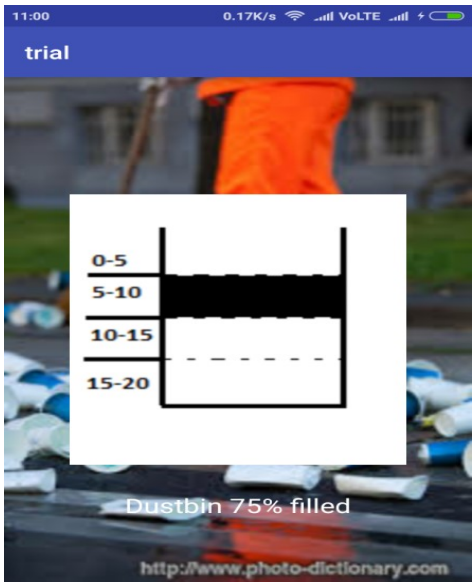
1. Messages Received



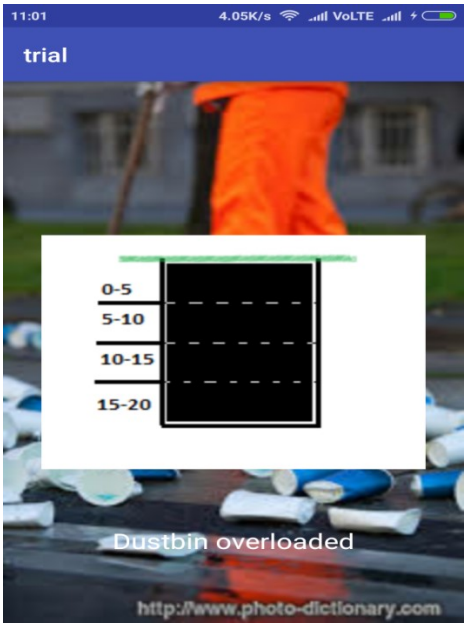

2. Dustbin LEVEL : 12cm



3. Dustbin LEVEL : 7cm




4. Dustbin LEVEL : 2cm




## V. CONCLUSION

The Smart garbage monitoring in the above model shows the complete architecture with configuration of ultrasonic sensors, Geo tracking systems and the Android application for showing the levels of Garbage. With the invention of this system, there will be awareness making a healthy city with smart inventions.

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