FULLY AUTOMATIC GARBAGE COLLECTION FOR SMALL SCALE AND LARGE SCALE INDUSTRIES

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Abstract- Now this is the modern era of technology where life is becoming simple and easier in all aspects of the advancement of technology. The new world is adopting automatic systems. In various areas of the city, the garbage dumpster is keep in different public places and along the roads where there are overflowing because of increasing wasting system and lack of monitoring. It creates an unhealthy environment and unpleasant conditions for the industries and bad aroma inside environment. Therefore, many diseases spread around the environment that have dangerous for our health. So, it needs to investigate to solve the problem of overflow garbage dumpsters. In this paper, there are sensors are kept to monitor the overflow of the garbage dumpsters So that it is easy to determine which dumpster is full. When the garbage level reaches the threshold limits, controller will send RF signal to the vehicle. Once Vehicle receives the RF signal then it will starts and moves towards the garbage dumpsters and stops below that and controller activates the dumpster motor to fall garbage inside the vehicle then vehicle moves to next dumpster. The whole process is completely automatic but for the safer side in manual mode also given to control the vehicle via Bluetooth.

Keywords—Garbage, **Automatic garbage collection, IoT, IR sensors**

I. INTRODUCTION

The Garbage is a destructive and harmful factor for our surrounding environment. It deceptions the hazardous threat to our land, air, and water. Land that is overfilled with garbage, destroy profitable land and take many years to recover the nutrients and the land spoiled. With the total amount of dissipating produce globally predictable to boost by nearly 60% over the next decade. For Smart Cities and municipalities in particular areas of the world, people enjoy the world-class waste management service. There is no any confusion about the collection of the dumpster by avoiding smells and any type of noise, air and land pollution [1]. Basically, it is the responsibility of private collector or a local authority municipality, to collect the garbage and all wastes material on time. Unfortunately, there is no such mechanism in which the collection of containers and bins at the right place and on time. They have a compulsion to the citizens and clients to provide the finest waste management service [2].

A Geographical Information System (GIS), transportation model for a hard waste compilation collection and removal have been proposed in for the city of Asansol in India [3]. Many steps intend to provide an efficient system specializing in waste collection needs. In an improved routing and preparation for the Eastern Finland [4], city of Porto Alleger in Brazil there some proposed a vehicle-scheduling model for rock-hard waste compilation. In the normal routine as the dumpsters are getting overflow and concern authority does not aware the collection on time and due to which unhygienic state shaped in the background. At the same time, unpleasant smell spread out due to waste material and presents a dreadful glance of the city that causes air and land pollution. According to the current system of collecting the wastes material and garbage from dumpsters, there are some limitations like time-consuming and less effective, trucks come and go and does not watch the containers whether they are full or not, inflated cost with respect to the route of the city.

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While collecting the garbage, unhygienic environment creates the bad smell that further leads to several diseases of the human normal health. Fig. 1 presents the current situation of the dumpsters inside the cities [5].

With the increase in population and all the products used by them, the circumstances of big dumps of wastes and garbage are at the critical stage so there must be an efficient thing that serves us in an effective way to get rid of this problem. The adoption of innovative technologies will consequence in more included waste organization solutions that move further than the traditional use of work, diesel trucks and conventional landfills. Recent advancement in the production of mobile computers, smart phones, smart sensors and sensor system unlock vast chances for researchers of various systems and application in the fields like Smart Homes and Smart Cities. In a Smart City compilation of waste is a vital point for surroundings and its quality should be measured gravely. The implementation of ground-breaking technologies will result in more integrated waste management solutions.

II. LITERATURE REVIEW

Integrated system to monitor waste bins

In order to determine the waste bins monitoring several systems are deployed with the help of recent technology like GSM, ZigBee and ARM7 [8]. All these systems are used to monitor the waste bins via some GSM technology. SENS dumpsters in are also used for this purpose than to maintain the number of dumpsters. To check the filling level of dumpsters with the help of volumetric sensors is able to detect the required amount of wastes material inside the dumpsters. It is fully ZigBee wireless device. The smart wastes management level architecture basically consists of internet cloud, Google map service, and GSM networks. By GSM communication it is easy to implement anywhere. This architecture was used for transmitting the required data to the data server. In practice, there are three possibilities of dumpsters with respect to filling level by mean the probability of dumpsters is empty 0% and the dumpsters is half and the full usually normal routine is 60% and 90%. By using IOT it is the best strategy when dumpsters are not cleaned the notification is sent to the concerned authority. With the help of IOT, the fake report can be judged so the chances of corruption in this department have been reduced there are some solutions that are commonly used in practice like GPS based route optimization for municipal authorities; the geographic information system of wastes management, RFID tagged wastes bins and US sensor-based smart system. Guerrero et. all visits almost 24 countries in 3 continents and come in conclusion of about wastes management system. There is no proper scheduling for wastes collecting from dumpsters. In [9] and [10] the author indicates that the major components of solving the problem of solid-wastes such that GIS, GPS, sensors, camera, and IOTs. This paper presents the issue of existing wastes management system and provides the IoT based solution in which smart dumpster are deployed under the selected populated areas of the city. Through this system, the garbage is filling inside the dumpster and when it exceeds its defined limit the automatic message is sent to the concerned authority. With the enable GPS system the location of the dumpster is also sent with its proper coordinates and optimized route map.

Smart wastes collection system based on location intelligence

With the help of location-based intelligence [11], the timeframe has been set for dumpsters between 8-24 hours. If the dumpster is empty the status is sent to the municipal authority. On the contrary, the dumpsters are not empty between proposed timing and the status of dumpsters is full then the related vehicle collects the wastes material between duty hours.

The related dumpster agent sends the two relative messages like "emptied" and "request" when the dumpster is empty and full respectively. The color scheme is also used for this propose like all empty dumpsters are in green color and all full dumpsters denoted by red. To identify the dumpsters the color scheme is efficient. By the smart wastes collection system, the results point to that below the same states, waste compilation policy on the real- time implemented system. All the dumpsters filling status get better the waste collection competence by collecting its proper time. When the container becomes full then it collected on the same day otherwise it collected by the fourth reducing factor.

There are some terms and conditions in the garbage collection department when and where the container needs to be clean first and later respectively. So its depend upon the nearby location and the current status of a dumpster, to reduce the optimized route cost there is need to make a plan for collecting it at least as minimum cost for the whole path where all the same status of dumpsters are located.

IOT based waste management system for smart system

In this modern era of technology where the population is increased in some gradually ascending order that simply means to increase the wastes material inside the city. It is essential for today community to adopt the proper wastes collection system. For example, to monitor the IoT based smart system of dumpsters there are several dumpsters needs to be kept around the city. With these IoT based dustbins, the micro sensors are used with IR sensor so that the communication between the dumpster and its concern authority is easy. Initially, the record of the dumpster is monitor and through IR bases sensor its value is sent to be the nearby collection system. After it, the appropriate action is needed to be taking and analyzed through some cloud server in which all the related information is stored about the location and the current status of dumpsters. Through some GUI based environment, all these things are easily being handled via some mobile application on web browser.
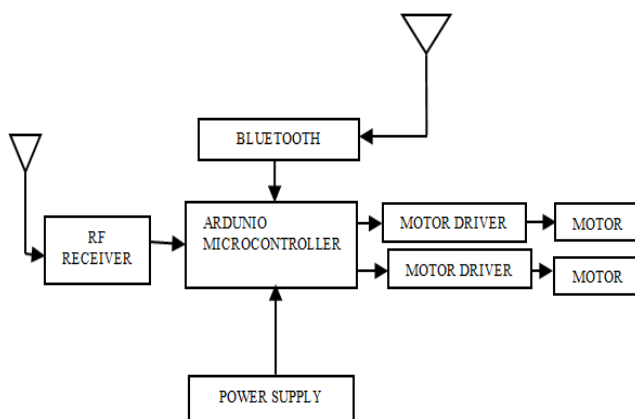
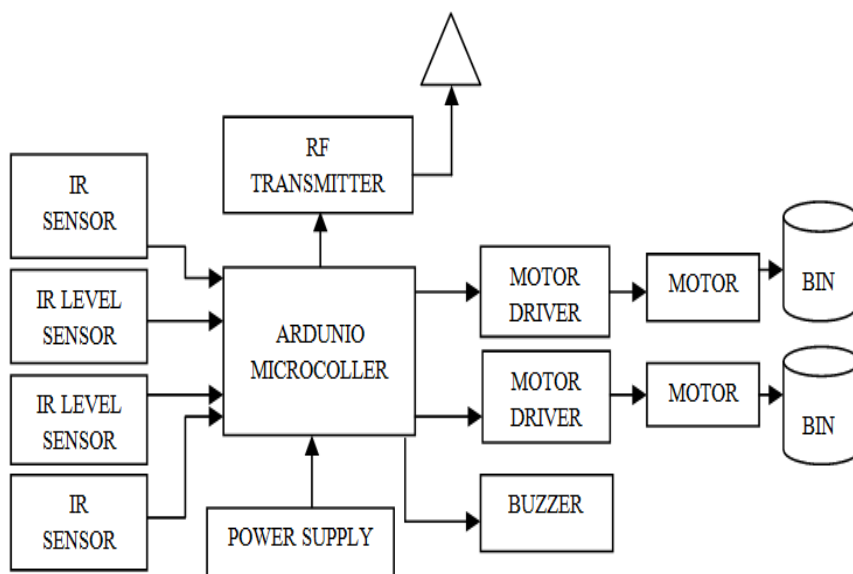### III. BLOCK DIAGRAM

Fig.1 Vehical setup

Fig.2 Garbage monitoring unit

In the Proposed System there are two units. One is Garbage collection unit and other one is garbage monitoring unit. In both the units Aurdino Uno is used to monitor as well as to control the system. In monitoring Unit Aurdino microcontroller is interfaced with RF transmitter, three IR sensors, Gas sensor, relays to activate motors. One IR sensor and gas sensor is used to detect the level and bad smell present in dumpster. If IR or Gas sensor detects the full of garbage in dumpster then controller sends RF signal to the vehicle and at the same time buzzer starts Beeping to indicate vehicle is coming to collect the garbage from dumpster.   IR sensors are kept near dumpster to detect the vehicle when vehicle arrives near dumpster only when dumpster is full vehicle starts moving using line following method and stops automatically below dumpster then dumpster poured into vehicle then vehicle moves to next dumpster. The entire vehicle is controlled by monitoring system using RF technology. Vehicle can be controlled by Bluetooth in manual mode.

IV. APPLICATIONS

The main application of this system is to efficiently collect the garbage automatically. The automatic approach makes the system work in real-time and thus reducing the possibilities of failure of the system. This also helps in reducing man power. The system collects the garbage on time which controls overflow of dumpsters. The proposed system can be used in all type of industries to keep industry environment clean. It can be used in apartments. This application can be used in university college campus for collection of garbage from dustbins.

V. CONCLUSION

As we have implemented real-time Smart Dumpsters Monitoring and Garbage Collection System by using the level sensor to identify the condition of dumpster either the dumpsters are full. In this proposed system, all the related information of smart dumpsters can be access to the vehicle from anytime. With the help of this proposed concept the cost reduction, resource and route optimization, effective usage of smart dustbins can be done.

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