Smart Garbage Cleaner

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Abstract: *Now-a-days, management of waste from its collection to dumping and disruption has become one of the greatest challenging and arduous chores for municipal corporations, all around the globe. To make this tedious job facile, a new concept of SmartDustbin has been taken into consideration for Smart buildings, hospitals, schools and railway stations. The "Smart GarbageCleaner for Smart City" thought is an advancement of traditional garbage collector by levitating it to become smart inculcating sensors and some form of logics. This smart collector is a revolutionary idea of application of line following garbage car and pole fixed garbage part on predesigned locomotive path. The fixed bin makes use of ultrasonic sensors for level of garbage detection and updates the coeval level of the bin to the garbage car, using RF Module. This is thereby a fully automated system, making small contribution towards the theme of "Clean India Green India".*

I. INTRODUCTION

In today's Era as we know that where countries are developing at a rapid rate a lot of unwanted waste is being generated like electronics, plastics and many biodegradable products. With increasing population in our country, urbanization has increased which has led to the generation of waste. Tons of trash are generated every year. Ten million tons of garbage is generated inthe cities. This leads to deterioration of public health, environmental pollution, impact on quality of life of the citizens. Thus, waste management has been a crucial issue. Waste management being the utmost spurned factors in developing countries creates an urgency to address this problem. In metropolitan or city areas, the clearance of waste management has been a grind task for the majority of the country all over the world.

There is need of a well- organized waste clearance system is mandatory by keeping green environment. There are many existing expertise mechanisms are available for handling as well as managing waste. But, the lacking for gathering information is a major challenging task. This flounder will perturb the quick nationwide rate of growth in heaped urban areas as well as its growing demand for the citywide ecological and environmental protection. This is a major challenging in waste management system to create a prototype because of the paucity of planning and systematization among government, people and local authority for shipping and processing waste. Currently the waste gathering is conventional which acquire a lot of labors and is time overwhelming process.

Considering a city like New Delhi, India, there is 8,360 metric tons of garbage generated per day (Government report). Almost half of this waste gets accumulated on roads due to negligence and poor storage. This can be accounted to the poor resources offered for managing waste. it increasing problem for national and local Government to ensure effective and sustainable management of waste it is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02BILLION Tones representing 7% annual increase since 2003 (Global waste management market report 2007) The Smart garbage collection bin also works in the same way with the amalgamation of sensors including ultrasonic sensor and IR sensor that predicts and gives a signal for its garbage level and determines the absolute path respectively.

1.1 Problem Statement:

As we identified the problem in our society that cleaning of the garbage by using garbage collecting vehicles with manpoweris very difficult and even are causes the human health, so we have made a model by which we can clean garbage and dusteasily with the help of automation. If we are collecting the garbage by using garbage collecting vehicles with manpower, involvement, may cause following problem:

1. Health impact
2. More manpower

3. Time consuming
4. Accident chances
5. Imperfect timing of garbage vehicle
6. Improper handling
7. It can only carry home wastage

1.2 Solution Statement:
Over that, we have decided to make a smart garbage cleaner for the smart city as stated, in which can remove almost all the problem.
1. No contact between human and garbage, that's why no health issues create and doesn't required manpower.
2. Less time consuming.
3. No accident chances.
4. Automatic control and handling of garbage.
5. It can use for both the handling home wastage and road cleaning.
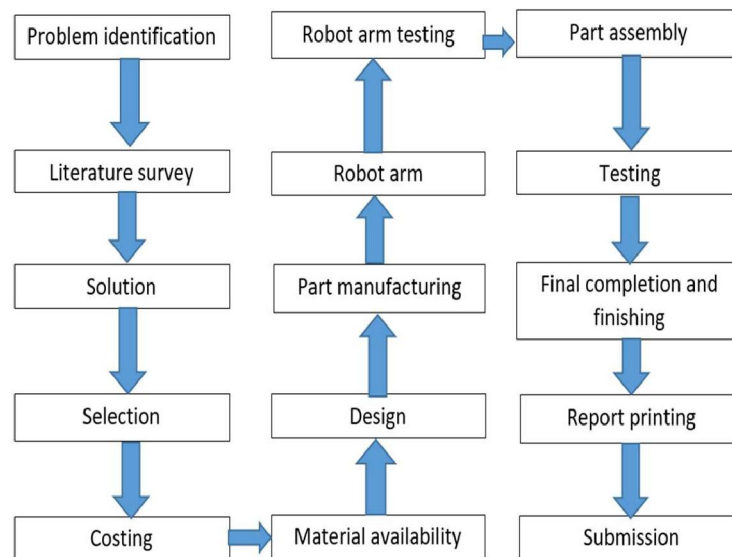
1.3 Methodology of the Project

Fig 1. Block diagram for methodology of

1.4 Objective of Project
- Providing automatic control to collect the garbage.
- Use sensors to automatic detection the dustbin.
- To reduce manpower.
- Collect municipal solid waste and transport it to a solid waste treatment facility.
- Protect the human health.

II. LITERATURE REVIEW
A number of different research papers have been surveyed to gather the related information regarding the project. A Smart Dustbin was presented, based on It that contained the smart bin which was being made on a platform, based on Arduino Unoboard that had been linked with ultrasonic sensor and a GSM modem. Some researchers also made a conclusion that numerous issues like durability perpetuation and affordability were seen during the designing of these bins.

The scientists also suggested the technique for management and disposal of garbage, in which the garbage bin hadbeen made to interface and connect with a system which was based on microcontroller and also had IR systems along with amain system that clearly displayed the current weight and level of the waste in the bin. In other systems the present status ofdustbin was made to see on a web page that was mobile based, by using the Wi-Fi. The author also suggested a way formanaging the picking up of garbage from different location of the cities and common living area. In this system, the amountof trash in the dustbin was sensed by the ultrasonic sensor that will thereby report the present situation of the trash bin torecommended authority via GSM module. Some systems also developed a GUI that was MATLAB based.Some researchers also analyzed Decision System that may also be warned by trash collection in the urban regions.

This system was made to handle the impotent collection of waste in the city areas that are too inaccessible. Some of themplaced a camera in those areas of the urban regions that were facing severe Problems. A number of bins had been placedthroughout the city that were governed by an embedded device, low in cost and which helped a lot in estimating about the filllevel of waste in the dustbins. Information onto the control room, with the use of the RF Transmitter, A unique ID had beengiven to each been so as to detect and analyzed that which among the all bins has been filled and is ready to be dumped oremptied.

This was predominantly categorized into two areas: one that is the transmitter section and the rest one was the section of thereceiver. The first area was composed of a sensors and microcontroller that will keep track of the level of waste and sends theconcerned after that the RF Receiver collects and receives the sent information and again moves it to the concerned person, tomake the bin devoid as fast as it can.The mobile software application has been designed to indulge people in the task of collecting and dumping the solidand other types of waste. A number of detailed ways associated to the view from persons about the current situation of the areawith allusion to hygiene and cleanliness, classes of taking shots and then uploading it to computer server application, are beinggiven that will make the computer applications far more useful and helpful so as to earnestly dower in a course of wastemanagement.

III. COMPONENTS USED

1) Aluminum composite panel
2) Sun board sheet
3) Aluminum U- channel
4) Arduino Mega 2560
5) DC motor
6) BO motor
7) Motor driver L298N
8) Wheels
9) Jumper wire
10) HC-05 Bluetooth module
11) 15-T gear
12) 12V 2A Battery pack

IV. MAJOR SYSTEMS AVAILABLE

1) Vacuum system
2) Sweeping system
3) Sliding system
4) Robotic arm

System Details

1. Vacuum system: - Vacuum systems consist of vacuum pumps and container mounted on a truck. The vacuum pump creates a vacuum in the tank and the garbage moves directly through a hose or pipe to the container from the road. It is used to suck the garbage and dust particles on the road. This system mounted on the container.

2. Sweeping system: - Sweepers are a mechanical device for cleaning several types of surfaces such as carpets, floors,and roads. Sweeper machine was famous before the vacuum cleaner was invented. Therefore, most vacuum cleaner tasks are replaced by sweeper machines. It is work to clean the road with the help of sweeper brush. It is mounted on the front of the vehicle.

3. Sliding system: - In this inner compart to move outer side with the garbage and clean the container inside. It is work automatically. It is inner part of the container.

4. Robotic arm: - Robotic arms are robotic systems that are designed based on human arms. Robotic arm function similar to a human arm. An arm system consists of different joints connected to each other forming a kinematic chain. The actuators positioned in the connection point of joints determine the motion characteristics of the robotic arm. Robotic arms have end effectors suited for the intended operation. It is work to collect the garbage dustbin on the road. Arm mounted on the left side chassis of the vehicle.

V. ADVANTAGES AND LIMITIONS

1. No contact between human and garbage, that's why no health issues create and doesn't required manpower.
2. Less time consuming.
3. No accident chances.
4. Automatic control and handling of garbage.
5. It can use for both the handling home wastage and road cleaning.
6. No need to more man power
7. Totally automation base
8. One time to task will be perform

VI. APPLICATION

Collect garbage from city and crush it inside the vehicle only without dumping, no human being involvement in collecting.Multifunction in one vehicle swiping, garbage collection with robotic arm, crushing, separation etc.

VII. FUTURE SCOPE

Due to many of the advantages our project idea has excellent future scope. There will be fully automation in garbage collector.No need of human efforts and time of the particular person will be saved.as we are observing today that there is usage requirement of dumping yard which will be not required in future and time of the citizen will be saved.As there are having three sections while crushing so particularly dry garbage will directly crushed and can use for further processes. Where the wet garbage can be directly used as a fertilizer after crushing. And electronic garbage will be separateout. By observing all above points our project has well future scope.

VIII. CONCLUSION

A simple but useful project called SMART GARBAGE CLEANER FOR SMART CITY using Arduino is designed and developed here. Using this project, the lid of the dustbin stays closed, so that waste is not exposed (to avoid flies and mosquitos)and when you want dispose any waste, it will automatically open the lid.We also conclude that our project can help the environment and society by having cleanness. As the several activities are beingperformed at a time with one vehicle which save worker cost.

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