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Waste Management using Smart Dustbin based on IoT

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ABSTRACT-With the population increasing day by day, the environment must be clean and healthy. In most cities, overflowing garbage containers create an unhealthy environment. This will lead to the emergence of various types of diseases. This will lead to a deterioration in the standard of living. To overcome these situations, an effective smart waste management system must be developed. As the scope of IoT is developing day by day, effective methods can be easily discovered. So we take advantage of the Internet of Things to develop a waste management system using a smart dustbin. The smart litter box plays an important role in the system.

Index Terms – Arduino, Smell Sensor, Rasberry pie microcontroller.

I. INTRODUCTION

The main issue of pollution today is garbage flooding. It creates unhealthy condition for people and creates unpleasant odor around the ocean which leads to the spread of some deadly diseases and human diseases. Waste collection has become an important aspect for service providers. The traditional method of manually controlling waste in waste containers is a complex and cumbersome process and uses more human effort, time and cost that is not compatible with current technologies. Irregular management of waste usually from domestic waste, industrial waste and environmental waste is a root cause of many human problems such as pollution and disease and has adverse effects on the health of living organisms. To avoid all these situations, we are going to implement a project called IoT-based Waste Management using a smart dustbin.

The concept of waste management based on IoT using smart litter box can be applied in cities where waste production is locally high but the effort to control it is relatively low. This idea basically corresponds to the concept of smart cities. Smart waste management essentially avoids the crowded collection of locally generated waste which creates difficulty in managing its disposal.

Implementation is accomplished with the assist of IoT idea. The Internet of Things (IoT) is a ideawherein surrounding gadgets are linkedviawired and wireless networks with outperson intervention. Objects communicate and trade information. In this devicemore than one dustbins are placedfor the duration of the town or the Campus, thosedustbins are furnished with a sensor which enables in monitoringthe extent and weight of the garbageboxes and a completely unique ID will beprovided for each dustbin withinside thetownin order that it is simple to discover which garbage bin is full. When the extent and weight of the bin reaches the edge limit, the tool will transmit the analyzingalong side the particular ID provided. In order to keep away from the decaying odoracross the bin harm-less chemical sprinkler is used that allows you to sprinkle the chemical as quicklybecause theodor sensors locate the decaying odor.

Once the bins are full then consumer will now no longer be capable ofaccess the containers. In such instances the bin shows the route of the close bybins on LCD showadditionally generate the voice messages if the consumerarea the waste at the floor. The status of the bin is accessed through the concernedauthorities from their area with the help of Internet and a right awayactioncan be taken to update overflowing containers with the empty bins.

II. OBJECTIVES

Smart waste management is an conceptin whichwe are able tomanipulateplenty of troubles which disturbs the society in pollutants and

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diseases. The waste managementmust beachievedright away else it results inabnormalcontrolin an effort to have damagingimpact on nature. The Smart waste management is well suitedparticularly with concept of smart cities.

The fundamentaltargets of our proposed system are as follows:

1. Monitoring the waste management.
2. Providing a smarttechnology for waste system.
3. Avoiding human intervention.
4. Reducing human time and effort.
5. Resulting in healthful and waste ridden environment.

The above goalsmay beexecutedwith the aid of usingpresent processa fewlayoutprocedurethis is as follows: the goalright here is to layout and construct a prototype for anautomated open dustbin which couldautomatically open the lid while it detects the individuals whoneed to throw out their trash. It can alsolocatethe extent of the trash that withinside the dustbin. If the dustbin is complete of trash on thecertain level, the lid will now no longer open even if there are individuals whoneed to throw out their trash. Dustbins are furnished with a sensor which allows in monitoringthe level and weight of the garbageboxes and a completely unique ID could beprovided for each dustbin withinside themetropolisin order that it is straightforward to perceive which rubbish bin is full. In order to keep away from the decaying scentacross the bin harm-less chemical sprinkler is used a good way to sprinkle the chemical as quicklyas theodor sensors locate the decaying odor. Waste Management is all of theactivities and actions required to manipulate waste from inception to its very last disposal. So this will be performedthroughimplementing IoT primarily based totally waste managementusingsmart dustbin.

III. LITERATURE SURVEY

[1] Parkash, Prabu Proposed systemincorporatesgarbagecontainers with embedded device and particular ID. When the extent reaches the threshold limit, the device will transmit the extenttogether with the particular ID provided. [2] P. R. Naregalkar, Krishna Kishore Thanvi, Rajat Srivastava posted the paper which objectivesto explain the implementation of a taskknown as IoT Based Smart Garbage Monitoring System. The proposed deviceincorporates dustbins which might be interfaced with microcontroller primarily based totallysystem having Ultra sonic sensors with wi-fi systems together withcriticaldevicedisplayingmodernreputation of garbage [3] Sneha Patil, Snehal Mohite, Aishwarya Patil, Dr. S.D.Joshi proposed devicewhich is composed a ”Smart Garbage Bin”, if you want to alarm and tell the legalpersonwhilethe garbage bin is set to overflow. The message then will beship to the authorizedperson to acquirethe garbage from the specific area. [4] Prasad Kulkarni, Vivek Patil, Amey Chavan, Rajaram Powar, Vishal Dhaygude posted the paper which objectives to describe a GSM Based Waste Management for Smart Cities. In the proposed designed System there are multiple dustbins placedall through the city, those dustbins are furnished with ultrasonic sensor which enables in stage of the rubbishcontainers and an in order that it is straightforward to pick out which rubbish bin is full. [5] P M. Palkar, T. Pathan, Ankita P. Hedaoo, Kalyani A. Harode, Nutan M. Petkule, Pranjali P. Kakade , Pranita D. Kolhe have proposed a Smart City Garbage Collection and Monitoring System, wherein a clever bin is constructed on a microcontroller primarily based totally platform Arduino Uno board that is interfaced with GSM module and ultrasonic sensor. GSM module is used to ship message to rubbish depot if the Garbage stage exceeds threshold.

IV. METHODOLOGY

In this projectmethodversion takes the essentialprocedureactivities of Project Plan, specification, Analysis, Design, improvement, validation and evolution and represents them as separate procedure phases. Using a waterfall model as a projectimprovementtechnique. Due to Specific system models, systemstructure and distinctivelayout of the project, to implementation procedurethe use of Eclipse JUNO device and Arduino device with java language for developing the modules in windows platform. In the smart dustbin hardwareincorporates motor-driving force 16*2 LCD Display, Arduino UNO, Load cell, Playback IC, Speaker, IR Sensors, Smell Sensors, Bread Board, Power Supply and Raspberry pi. In the smart dustbin IR sensors will constantlyreveal the status of the bin. If the bin reaches more than certain weight, the load sensors will trigger the message to the concerned authority.

Also whilecertain threshold stage is reached, the level sensors will cause the message to the concern authority. Here while the bin is crammedit's going tosupply the person the information of the empty containersthat areclose by with the assist of LCD display, those dustbin will generate voice messages with the assist of playback IC and speaker. In order to keep away from the decaying odor produced within the dustbin harm-

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less chemical sprinkler is used. By the usage of motor driver (12v), chemical may be sprayed. Here the chemical used is Baking Soda, with a purpose toprevent decaying odor spreading across the dustbin.

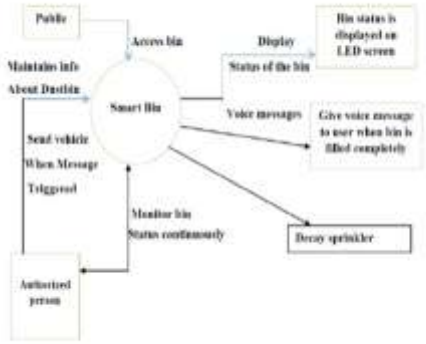


Figure1:Context level diagram

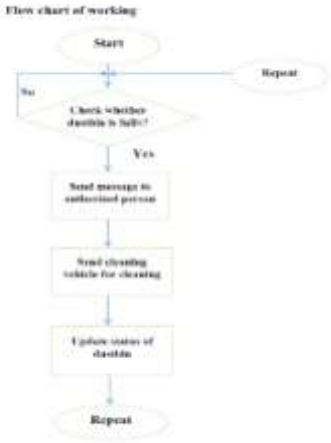
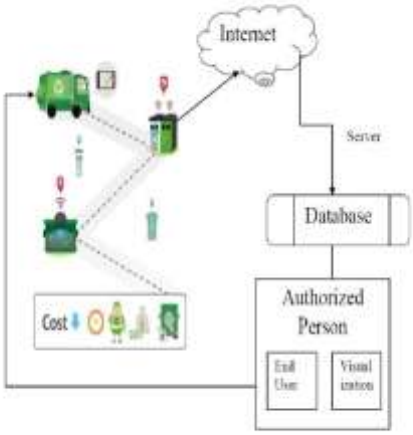


Figure 2: Flow Chart



System Architecture

V. RESULT AND CONCLUSION

This implementation of smartgarbage Bin indicator receptacle, offersan answer for unsanitary environmental situation in a metropolis. This implementation of Smart Garbage collection bin using internet, IR sensor, and raspberry pi. This machine assures to send mail notification and status on dashboard of dustbins whilethe garbagelevel reaches its maximum. If the dustbin isn't alwayswiped clean in particular time, then the document is despatched to the better authority who can take suitableactionin opposition to the involved contractor. This deviceadditionallyenables to screen the fakereviews and consequently can lessen the corruption withinside thebasiccontroldevice. This reduces the fullrange of journeys of garbageseriesautomobile and consequently reduces the general expenditure related tothe garbagecollection. It ultimatelyenables to hold cleanness withinside the society. Therefore, the smartgarbagemanagementdevice makes the garbagecollectionextragreenthe usage ofsolar panels in such structuresmight also additionallylessen the energy consumption. Such structures are susceptible to plundering of additiveswithinside thedevice in one-of-a-kindmethods which desires to be labored on. These dirt bin versionmay beimplemented to any of the smarttownsacross the world. A waste accumulating and trackingcrewthat is deployed for collection of garbage from the metropolismay be guided in a nicelyway for collection.

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