



Reward Based Intelligent Garbage Management System

Sandeep Bhatia¹, Deepak Kumar², Atul Pundir³, Saurav Kumar⁴, Shashank Kumar Mishra⁵,
Pankaj Kumar Sharma⁶

Assistant Professor, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, UP, India¹

Assistant Professor, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, UP, India²

Student, Dept. of ECE, Raj Kumar Goel Institute of Technology, Ghaziabad, UP, India^{3,4,5,6}

ABSTRACT:With the increasing population, the scenario of cleanliness with respect to garbage management is degrading. The overflow of garbage may provoke some serious diseases or may create unhygienic conditions in the cities and various public areas. Thus, garbage has become a major concern for all of us. To avoid such conditions, “Reward Based Intelligent Garbage Management System” is planned, which will alert and set up the maintained person when the garbage compartment will fill. Because proper garbage management ensures the healthy being of people. This paper gives the discussion about how a major problem of garbage management can be solved in a smart way using Wireless sensors, GSM and Wi-Fi module. Using these sensors and IoT together, the various challenges of proper garbage management can be properly optimized.

KEYWORDS:Wireless sensors, IoT, cleanliness, unhygienic, Wi-Fi, GSM.

I.INTRODUCTION

Due to rapid population growth, problems related to garbage collection and its management has become a very critical issue. Moreover, since day by day people are moving towards technology and in upcoming years most of the population will shift to urban lifestyle, there is an increase demand for an efficient waste management, in the absence of which will arise some serious environmental problems and cost issues. This paper proposes a design and an implementation of an effective intelligent garbage management system based on RFID in perspective of developing cities. The details of each trash bins are monitored by the authority with the assistance of WIFI through webpage. The decomposition of the waste is done through the use of motor and blades. Thus, the fifty percent of the transportation is reduced by crushing the wet waste into useful manure. And if rain occurs, the bin closes so as to avoid the chance of it being crammed with water with the implementation of a mechanism through rain sensors and servo motors. The implementation of intelligent garbage system using motors, GSM, and WIFI modules, and sensors assures the cleaning of trash bins soon when the garbage level reaches its maximum. Consequently, this paper joins the cutting edge of the diverse strategies with an emphasis on the structure and use of a talented waste gathering framework, the inclinations and their confinements.

II.LITERATURE SURVEY

This section discusses about the existing approaches in the field of intelligent garbage management.

Many intellectuals have done enormous work on the garbage management system as some of the paperwork introduced by them are as mentioned as below.

Kumar et al. [1] in their work proposed an IoT-basedunbelievable waste clean association structure wheresensor frameworks are utilized to steadily checking the waste component of the garbage canisters. In this methodology, when the waste estimation over the dustbins is recognized, the framework along these lines cautions theembraced individual by strategies for GSM/GPRS.Theirstructure works by utilizing microcontroller which gives interface between the sensor and the GSM/GPRS framework.Thisframework can be improved bysetting two holders to self-rulingly collect dry and wet squanders.

Abdullah et al. [2] built up a sharp reject watching framework which is utilized in the estimation of deny level ceaselessly and cautions the fitting expert through SMS writings. The framework is required to screen the waste holder and send the messages as alerts when perceived to be full or in every way that really matters full to help its evacuation of the compartment on time. The centrality of the structure is to improve the ability of strong waste trade the executives dependably.



Chaware, et al. [3] proposed a waste get-together structure considered imaginative to help with keeping urban domains clean. The structure works by watching rubbish stores and tell the experts and the waste collection vehicles about the part of garbage set away or contained in the reject holder through a web application. Regardless, the framework utilizes ultrasonic sensors in which their distinctive precision can be affected by changes in temperature. In addition, it utilizes WiFi which is inherently a short-range alliance instrument. From this time forward, these disadvantages sway the ideal execution of the structure.

Prajakta et al. [4] proposed a garbage storing up framework that is adjusted having data gathering structure subject to the arranging of pictures taken and GSM module. To accomplish this point of confinement, the framework utilizes a camera which is set at each position where rubbish is amassed close to a stack cell sensor orchestrated at the base of the waste holder. For this situation, the camera will constantly take surveys of the reject holder while the stack cell sensor takes the weight to pick whether full or not. Besides, an edge level is set which is utilized to separate the result of the camera and weight sensor. Exactly when the edge is practiced, the controller transmits a message by strategies for the GSM module to the suitable master urging them that the junk holder is full and ought to be engineered. As requirements be, the use of camera is senseless or unessential.

Kalpana, et al. [5] proposed a sharp canister the authorities' framework which stores the majority of the bits of information concerning the dustbins and their district on the server. In this framework, the clients are responsible for checking the segment of the misfortune in the holder correspondingly as sending such data to the server. The subtleties are gotten to by the proper experts at the not actually charming end by techniques for the Internet and quick reaction can be started to arrange the vault of the waste. In this structure the canister must be washed down when a client sends the status of the holder to the server through an adaptable application. Thusly, the damage is that concerned masters can't screen the waste estimation unendingly yet rather need to monitor things for messages. In like way, if a client is unfit to send the message it proposes that nature will be verified with waste when the holder is full.

Dario Bonino et al [6] has suggested that it provides end-to-end security and privacy that is built upon dynamic federation smart city platform. Its benefit is that it has good dependability and has resilience on failure of a system over a particular month.

Insung et al [7] has suggested that replacing Smart Garbage Sensor instead of RFID garbage collecting system helps to improve their energy efficiency up to 15% and can reduce the food waste reduction.

Lilliana E. Marshall et al [3] outlines that the smart waste management system in the high salaried countries and developing countries.

Ala Al-Fuqaha et al [8] proposed that sketch of the IoT with a stress on technology, application, and protocol concern. It explains about the differences between IoT and developing technologies like cloud computing and data analytics.

III. SYSTEM DESCRIPTION AND ASSUMPTIONS

Reviewing the weaknesses of the previously proposed frameworks, we are proposing an intelligent garbage management system. The proposed system is a subtle yet a major improvement over the existing system. This system adds few more sensors that provides information about garbage like moisture in the garbage, gases produced by the garbage over time and their level of toxicity. This project model uses WIFI module which consumes low power, RFID module and various sensors. An Android Application or a web page will be maintained for the status of the trash bins and other related information. Every registered individual will be notified in time for every action that takes place and they will be able to keep track of the garbage level in the bins. The best thing about this system is that in case an individual relocates to an another locations, the application maintained will switch to this new location and will show the status of nearby bins, if empty or not.

Moreover, the system will encourage people to dump the garbage into the bins by providing reward points, on every use of the bins for dumping the garbage, which can be turned into money and be transferred to the bank registered.

IV. SYSTEM ARCHITECTURE AND DESIGN

The architecture of the proposed system is quite simple and not so complicated. The architecture consists of several layers, each serving a different purpose.

The proposed system is categorised into three layers:

- *Dustbin Layer* which contains Wi-Fi enabled trash bins with a sensor.



- Server Layer* which collects the location of trash bins and their fill up status.
- Client Layer* which is designed for various clients to request the nearest location of trash bins using a mobile app designed for the same.

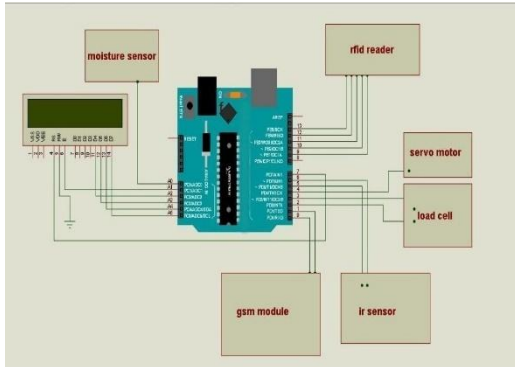


Fig 1: The proposed system design

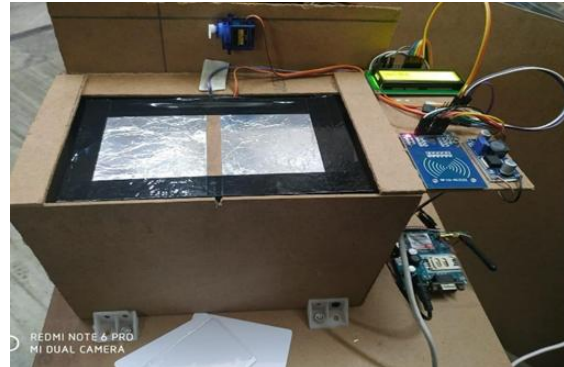


Fig 2: The Proposed Garbage Management System Model

V.HARDWARE DESCRIPTION

A. ARDUINO UNO MICROCONTROLLER

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input-output pins of which 6 can be used as PWM output, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.



Fig 3: ARDUINO UNO

B. INFRARED SENSOR

An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings. It does this by either emitting or detecting infrared radiation. Its PIN1 works as Output, PIN2 as Ground, and PIN3 as Power Supply.



Fig 4: Infrared Sensor



C. MOTOR

A servo motor is an electrical device which can push or rotate an object with great precision. It is just made up of simple motor which run through servo mechanism. The Supply to the motor is 5 V to 12 V, Torque is 6 Kg-cm at 12 V and RPM is 30 at 12 V.



Fig 5: Servo Motor

D. 16 X 2 LCD DISPLAY

An LCD (Liquid Crystal Display) Display is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.



Fig 6: 16 X 2 LCD Module

E. BUZZER

This is a piezoelectric buzzer. It is a type of electronic device that is used to produce a tone, alarm or sound. It is lightweight with a simple construction. It gives a maximum output of 30 V.



Fig 7: Piezo-electric Buzzer

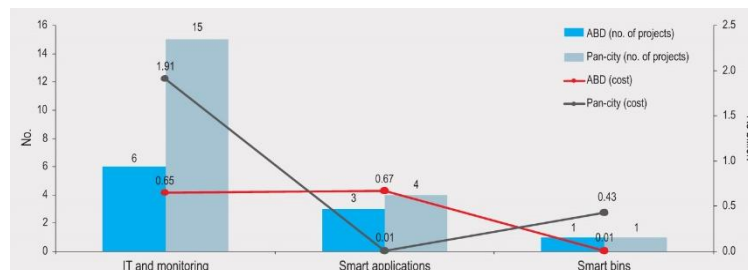


VI. ADVANTAGES

1. It reduces environmental pollution
2. It saves time and fuel using appropriate route planning.
3. Relocation of trash bins automatically registers with the server at new location.
4. This system encourages people to dump the garbage into the trash bins only as it usually provides reward points which can be made into money.

VIII. RESULT AND DISCUSSION

Intelligent Garbage Management System is successfully explained and implemented. The project model ensures to create awareness about how hygiene of trash bins in our cities is important. It helps check the toxicity level of garbage and maintains to segregate the wet and dry waste.



VII. CONCLUSIONS

This project work is implementation of smart garbage management system using ultrasonic sensor, GPS, GSM and WIFI module. This model assures the cleaning of trash bins in the cities when the garbage level reaches the maximum level. It ultimately helps in keeping the society clean.

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