MICROCONTROLLER BASED SMART DUSTBIN WITH GSM MODULE

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ABSTRACT

Rapid increase in population. We see present day, many times Dust bin are placed near public places in the cities/villages are filled due to increase in the waste every day. So efficient method to dispose the waste has been designed with GSM system. If the disposal of waste is not proper done it creates unhygienic condition for the people and it creates ugliness to that place. At the same time bad smell is also spread this leads in causes some deadly diseases & human illness, to avoid such a situation we are planning to design "Microcontroller based smart dustbin by using GSM module". In this proposed designed System only one big dustbin is located beside the building or society because from building a pipe is connected to dustbin through building. Where garbage is easily can thrown in the dustbin. These dustbins are provided with IR sensor which helps in level of the garbage bins and so that it is easy to identify which garbage bin is full. When the level reaches the Maximum limit, the IR sensing device will transmit the level along with the message of dustbin these details can be accessed by the concern authorities or garbage van driver of that particular area from their place with the help of GSM Module and an immediate action can be made to clean the dustbins.

Keywords: GSM Module, Microcontroller

I. INTRODUCTION

Nowadays there are tons of flats and apartments which have been built in the rapidurbanization area. There are several issues faced by the inhabitants of the flats. One of them is the issue of the domestic solid waste disposal, which cause pollutions.Thus, an unsystematic and inefficient disposal waste management may cause the bins to be always full with of garbage, and further littering from the residents will cause the garbage piles to be scattered outside thebins.Therefore, there will be a question of sanitary as those garbage piles may become theroot cause of illness and diseases like dengue, diarrhea, and cholera.There are cases where some irresponsible residents, who normally live at the higher levelsof the building, and simply threw their domestic waste directly from the floorwhichthey live into the bins. This may cause injuries to people downstairs if they fell onto them.The waste disposal can be managed more properly and efficiently by constantlymonitoring the bin status and the garbage level. In addition, the municipality can bealerted when the bin is full or almost full, thus

promoting dynamic scheduling and routingof the garbage collection. By comparing to the conventional scheduling and routing,

This dynamic scheduling and routing are said to allow operational cost reduction, byreducing the number of trucks, the manuallabour cost and the transport mileage savings. This paper presents an alternative in managing domestic waste especially in flat areasvia a smart garbage monitoring system. This system will automatically monitor the garbage level at each bin and will alert the municipality or garbage van driver in the case where the bins are almost full.

II, BLOCK DIAGRAM
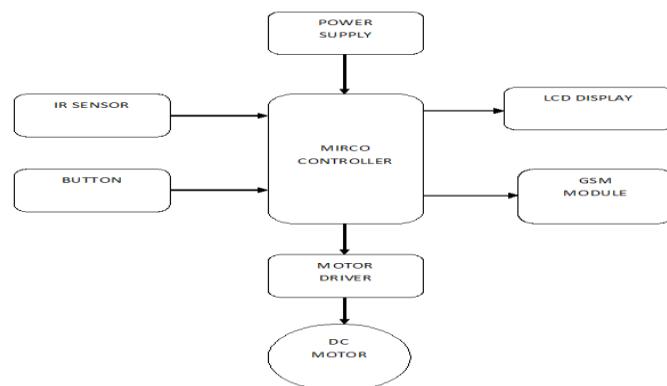
1.POWER SUPPLY

We use 12v and 5v power supply in our project. It is mainly used to provide DC voltage to the components on board. 5V is required for buzzer, LCD display, IR sensor microcontroller applied from power supply. And 12v is required for GSM module, motor.

2. PCB

We use Copper clad PCB(Printed Circuit Board) to connect electronic component or electrical component are soldered on PCB by using conductive tracks and other features etched from one or more sheet layers of copper laminated onto and between sheet layers of a non-conductive substrate.

3. MICROCONTROLLER

The AT89S52 is a low power high performance 8-bit microcontroller with 8K byte of flash programmable manufactured using Atmel's high density non- volatile memory technology. It is powerful microcontroller which provides a highly flexible and cost effective solution to many embedded control applications

4.MOTOR DRIVER
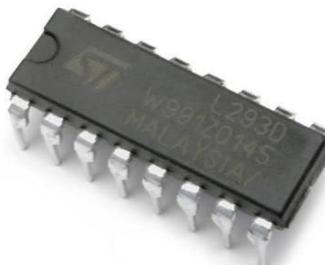
A motor driver is an integrated circuit chip which is usually use to control motors. Motor driver act as an interface between microcontroller and motors. The L293D motor driver is most commonly used and it designed to control 2 DC motors simultaneously. L293D has 16 pins.

6.LCD DISPLAY

LCD (Liquid Crystal Display) is an electronic display. A 16*2 and 24*4 is very basic and commonly used in various devices and circuits. We used 16*2 LCD display to show indication of "GABAGE BIN FULL". We give 5v supply to LCD display.

7. GSM MODULE

It is used to send message to the garbage depot if the Garbage Can exceeds the set threshold level. With the help of GSM module interfaced, we can send short text messages to the garbage van driver. GSM module is provided by sim uses the mobile service provider and send message to the respective authorities as per programmed. It operates at either the 900 MHz or 1800 MHz frequency band. We give supply 12v DC.

8. PIPE

Pipe is connected to the floor of building. Garbage leave from pipe and this pipe is connected to the trolley. when bin is full then IR sensor sense, and send message to garbage van driver

COMPONNTS USED

1. BUZZER

A buzzer is an audio signaling device which may be mechanical or electro-mechanical. Uses of buzzer is to indicate the bin is full. We give 5v supply to buzzer.

2. CRYSTAL OSCILLATOR

A crystal oscillator is an electronic oscillator circuit that uses mechanical resonance of a vibrating crystal to create an electrical signal. We use 11.0596MHz.

3.CAPACITOR

We use 2 types of capacitor-

1.Ceramic Capacitor

2.Electrolytic capacitor

1.Ceramic Capacitor-

A ceramic capacitor is a fixed value capacitor in which ceramic material act as dielectric.

2. Electrolytic capacitor-

An electrolytic capacitor is a polarized capacitor whose anode is made of a metal. We use 1micro farad elctrolytic capacitor.

4. BUTTON-

It used to turn OFF the buzzer till garbage van is coming. When the buzzer gets off, trolley enter into garbage van. And trolley gets open.

Components	Microcontroller ports
LCD display	PORT 0
IR sensor	PORT 1
Crystal oscillator	PORT 1
L293D Motor driver	PORT 2
MAX 232	PORT 3

WORKING PRINCIPLE

The garbage will be thrown from the each floor of the building where it occupied in a SMART DUSTBIN .

The smart dustbin will sense whether the garbage is full with the help of (IR) Sensor Its function is light radiating from objects in its field of view. But the IR Sensor is connected to Port 1 of MICROCONTROLLER Its contains one or more ports and along with Memory and Programmable INPUT / OUTPUT Peripherals it contains supply of 5v to each and every component of electronic device .

LCD is connected to Port 0 of microcontroller and its function is to display whether the message is displaying or not appropriately as per the given instructions.

CRYSTAL OSCILLATOR is connected to Port 1 and its use for Mechanical Resonance of a vibrating crystal of Piezoelectric material to create an electrical signal with precise frequency .Which helps in the flow of supply .

MAX232 is connected to Port 3 and its main function is to connect MICROCONTROLLER and GSM MODULE

L293D MOTOR DRIVER is connected to Port 2 its function is to take a low current control signal and then turn it into a high current signal that can drive a motor which is connected to smart dustbin to rotate the dustbin in Clockwise as well as Anticlockwise rotation .

GSM MODULE is connected to Port 3 because in port 3 having pins of such as TXD (TRANSMITTING) and RXD (RECEIVING) commands .It will help to send SMS to the garbage van driver to know that whether dustbin is full or not of a particular building .

III. CONCLUSION

In this project, an integrated system of GSM, IR Sensor is introduced for efficient and economic garbage collectionby implementing this project we will avoid over flowing of garbage from the container in residential

area which is previously either loaded manually or with the help of loaders in traditional trucks. It can automatically Sense the garbage level & send the information to collection truck. The technologies which are used in the proposed system are good enough to ensure the practical and perfect for solid garbage collection process monitoring and management for green environment.

IV. VADVANTAGES

1.Less time and fuel consumption.

2.city optimizes management, resources and costs, and makes it a "SMART CITY".

3.Maintenance cost of this service reduce by upto 30%.

APPLICATION

1.It is best for Municipal Corporationto collect garbage.2. It alsohelp the "SMART CITY"project and "DIGITAL INDIA".

V. FUTURE EXPANSION

1.We can use solar based smart dustbin.

2.We can provide WIFI system with GSM.

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