

## TRASH CLEARANCE MANAGEMENT SYSTEM

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**Abstract :** To make the cities greener, safer, and a lot of economical, Wireless Communication can play an important role. The implementation of correct waste management system can avoid the spreading of such sickness. A good mechanism for rising the management of wastes in cities. This technique monitors level of the garbage and rain proof and eliminates pollution. The dustbins square measure properly managed and data is seen oftentimes and additionally the municipality officer makes immediate response by intimating to truck driver. The trucker can go directly and collect the waste kind the trash bin. Multiple dustbins area unit connected through the cities. The dustbins area unit integrated with ultrasonic sensor, rain sensor, gas sensor and microcontroller. As a significant application field of Wireless Communication, waste management has become one such issue. The absence of economical waste management causes the intense environmental issues and price problems.

**Keywords:** Wireless Communication, Waste management, Garbage, Microcontroller.

### 1. INTRODUCTION

In India about 60 million tonnes of waste is being generated once a year. Ten million tonnes of garbage is generated in metropolitan cities. The landfills of most of those cities area unit overflowing with no space for garbage waste. The philosophy of "waste management hierarchy" has been adopted by most nations because the step for developing municipal solid waste (MSW) management methods.

According to a sanitation survey called "Swachh Survekshan-2016" conducted by the ministry of urban development under the Swachh Bharath mission, it was found that about 50% people in India face the problem of improper waste collection and management. The innovative disposal and recycling methods must be introduced instead of landfill sites. Thus a cost effective "Automatic waste segregator and monitoring system" for

proper management of waste. The monitoring system monitors the waste collection process. The common method of waste disposal are unplanned and uncontrolled dumping at landfill areas. This method is hazardous to human health, plant and animal life. The waste are segregated into basic streams such as plastic, metallic and organic, the waste has a higher potential of recovery, and then, recycled and reused. The metal waste could be reused or recycled. Even if there are large scale industrial waste segregators present, it is always feasible to separate the waste at the source itself. The advantages of doing therefore is that the peril for waste staff is reduced. Also, the separated waste can be directly sent to the recycling.

### 2. RELATED WORK

Balramdu et al (2014) proposed that the Plastics and electronic materials are widely used non-biodegradable materials which have to be recycled economically and efficiently. Dhaarani et al (2018) proposed that the dustbins are provided with sensors which help in tracking the level of the garbage bins and an unique ID is provided for every trash bin within the town, in order that its straightforward to spot that garbage bin is full.

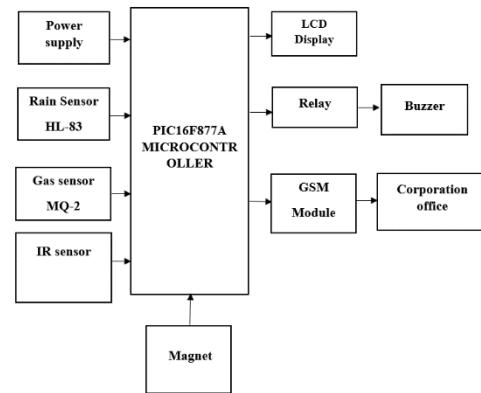
Hannan et al (2010) proposed the solid waste monitoring and management system using radio frequency identification (RFID) associate with intelligent systems. The system consists of RFID system, mobile communication like (Global system for mobile) GSM and Geographical Information System (GIS) for tracking vehicle position. The system would be able to monitor the solid waste collection process and management the overall collection process. Parkash et al (2016) proposed that the Management of the waste and trip management is done. It creates insanitary condition for the individuals and creates unhealthy smell around the surroundings this leads in spreading some deadly diseases & human malady. Pushpa et al (2015) proposed the collection,

transportation and disposal of MSW are unscientific and chaotic. Uncontrolled merchandising of waste on outskirts of cities has created overflowing landfills that aren't solely not possible to reclaim thanks to the haphazard manner of merchandising however also has serious environmental implication in terms of ground water pollution and contribution to Global warming.

Kanchan Mahajan et al (2014) proposed that there are a number of techniques which are purposefully used and are being build up for well management of garbage or solid waste. ZigBee and Global System for Mobile Communication (GSM) area unit the newest trends and area unit one among the simplest combos to be employed in the project. Monika et al (2016) proposed a system built on a microcontroller based platform Aurdino Uno board which is interfaced with GSM modem and Ultrasonic sensor. Ultrasonic sensor is placed at the top of the dustbin which will measure the stature of the dustbin. The threshold stature is set as 10cm. Aurdino are programmed in such how that once the trash can is being stuffed, the remaining height from the threshold height will be displayed. Once the garbage reaches the threshold level ultrasonic sensor will trigger the GSM modem which is able to incessantly alert the specified authority til the garbage within the trash can is press.

### 3. PROPOSED SYSTEM

This project proposes smart garbage which monitors the level of the dustbin along with avoids the air pollution. The ultrasonic sensor uses to detect the level dustbin and sends signal to corporation office to replace that. The garbage holds the rain sensor used to detect the rain fall on the garbage and the door of the garbage will be closed based on rain to avoid air pollution. Inside garbage, the gas monitors the hazardous gas. This project also enhances the public awareness to avoid plastics through speaker. This project works under renewable energy i.e. solar energy.

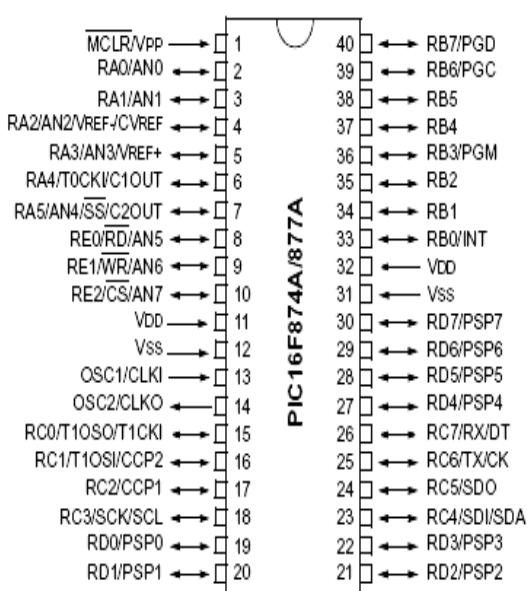


**Fig-1** Block Diagram

#### 3.1 Microcontroller (PIC 16F877A):

The PIC microcontroller PIC16F877A configuration is shown in Figure 2. It is a one of the most renowned microcontrollers. Because it is very easy to use the **PIC16F877A** and use of FLASH memory technology so that can be write-erase until thousand times. The superiority this RISC Microcontroller compared to with other microcontroller 8-bit especially at a speed of and his code compression.

**PIC16F877A** perfectly fits many uses, from automotive industries and controlling home appliances to industrial instruments, remote sensors, electrical door locks and safety devices. It is ideal for smart cards as well as for battery supplied devices because of it is low power consumption. EEPROM memories are easy to apply in microcontrollers to the devices. The microcontroller is low cost, low consumption, easy handling and flexibility. The System Programmability of this chip makes the flexibility of a product, after assembling and testing have been completed. The capability is used to create assembly-line production, to store calibration data available only after final testing and it can be used to improve programs on finished products.



**Fig-2** PIC16F874A/877A

### 3.2 GSM modem

A GSM modem in Figure 3 is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. A GSM modem is an external device or a PC Card / PCMCIA Card. An external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card/ PCMCIA Card slots of a laptop computer.

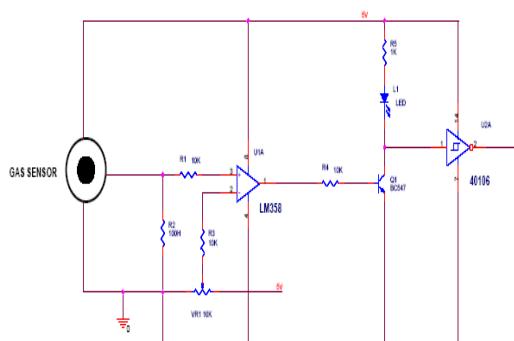


**Fig-3** GSM modem

Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem.

### **3.3 Gas Sensors**

Ideal sensor to be used to observe the presence of a dangerous gas leak in your automotive or in a service station tank atmosphere. This unit will be simply incorporated into associate alarm unit, to sound associate alarm or provides a visual indication of the toxic gas. The sensor has excellent sensitivity combined with a fast time interval. The sensor can even sense iso-butane, propane, LNG and cigarette smoke.

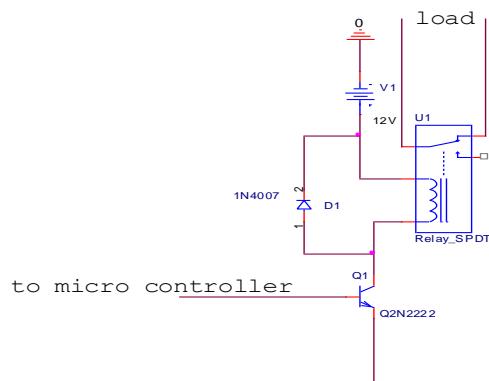


The gas sensor circuit is shown in Figure 4 is the special sensor which designed for sense the gas leakage. In the gas sensor the supply voltage is given to input terminal. The gas sensor output terminals are connected to non inverting input terminal of the comparator.

Here the comparator is constructed with operational amplifier LM 358. The reference voltage is given to inverting input terminal. The reference voltage depends on the desired gas intensity. When there is no leakage the non inverting input is greater than inverting input so the output of the comparator is positive voltage which is given to the base of the switching transistor BC 547. Hence the transistor is conducting. Here the transistor acts as switch so the collector and emitter will be closed. The output is taken from collector terminal. Now the output is zero which is given to hex inverter 40106.

When there is gas leakage the inverting input voltage is greater than non inverting input. Now the comparator output is -12V so the transistor is cutoff region. The 5v is given to hex inverter 40106 IC. Then the final output data is directly given to microcontroller to determine the gas leakage.

### 3.4 Relay Control



**Fig-5** Relay circuit using bc547

In the circuit diagram shown in Figure 5, transistor BC547 is used as a switch. The control signal is given to the base terminal of the transistor. The collector is attached to the relay coil. Relays are electromechanical devices and normally opened type. When the controller output from the PC is high the transistor will be in the ON state, so relay is energized. When the controller output from the PC is low the transistor will be in the OFF state, so relays are de-energized the valve will close. According to the controller output the valve will open or close and thus level is maintained.

## 4. RESULTS AND CONCLUSION

This project work is that the implementation of smart garbage management system using IR sensor, microcontroller and GSM module. This system assures the cleansing of dustbins before the garbage level reaches its maximum. If the garbage isn't cleansed in specific time, then the record is shipped to the upper authority who will take appropriate action against the involved contractor. This system also helps to observe the pretend reports and thus will reduce the corruption within the overall management system. This reduces the entire range of visits of garbage pickup vehicle and thus

reduces the expenditure related to the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the smart garbage management system makes the garbage collection a lot of economical. Such systems are liable to plundering of parts within the system in several ways which must be worked on.

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