International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-5 Issue-11, April 2016

Intelligent Waste Collection System

Aniket Nikam, Nilam Thakur, Sachin Patil

Abstract*— now a days, there are a number of techniques used for waste collection. In this system, there is lift container for the collection of garbage in residential area. To give a brief description of the project, the sensors are placed in the storage area, when the garbage reaches the level of sensor; the controller will give indication to the driver of garbage collection truck that the garbage bin is completely filled and needs urgent attention. Indication is done by sending SMS using GSM technology.

Keywords: Garbage level sensor, GSM technology, SMS.

I. INTRODUCTION

In our daily life, we see the pictures of garbage bins being overfull and all the garbage spills out resulting in pollution. This also increases number of diseases as large number of insects and mosquitoes breed on it. Big Challenge in the urban cities is Solid waste management, not only in India but for most of the countries in the world. The concurrent effects of a fast national growth rate of a large and dense residential area and a pressing demand for urban environmental protection create a challenging framework for waste management. The complexity of procedure is primary concerns of local municipal authorities due to problems related to the collection, transportation and processing of residential waste. The garbage collection is manual, which takes lots of efforts and is time consuming. This project gives us one of the most efficient ways to keep our environment clean and green.

The Automatic waste collection system is proposed in this project. The proposed system is based on a series of experiments in real time scenario. The implementation covered all processes of waste collection i.e. garbage loading and transport of waste from deposit spot to Collection station. In short, the Automatic waste collection system is a highly reliable and alternate to the conventional waste collection system.

II. BLOCK DIAGRAM

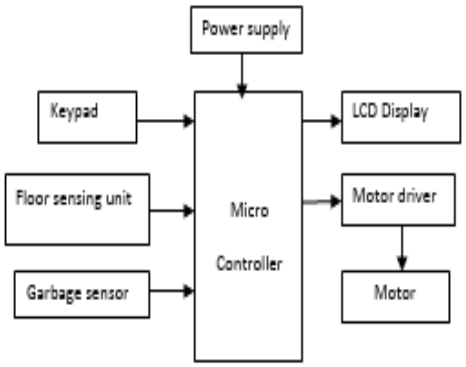

Fig.1.Garbage Consumer Unit

Fig.1 shows block diagram of consumer unit. Power supply will supply power to all the component which are mounted the
board. Keypad is used to call the lift container. Garbage sensing unit i.e. logic probes will differentiate dry and wet garbage floor sensing unit is used for detecting the position of lift on the floor. DC motor is used to drive the load. Microcontroller is the heart of this system the signals from the Sensor are given to the microcontroller, it processes all these signals. LCD will display the status of floor continuously.

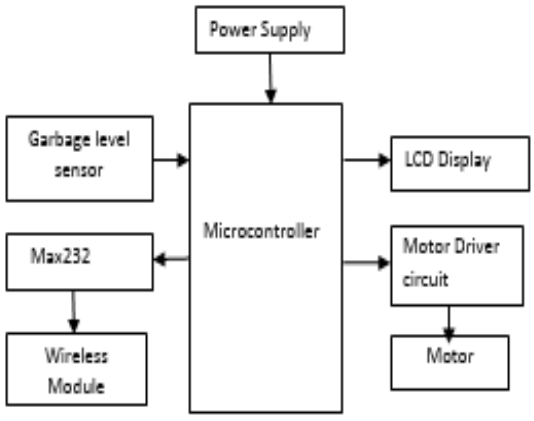

Fig. 2.Garbage Storage Unit

Fig.2 shows block diagram of garbage storage unit. Garbage level sensor i.e. ultrasonic sensor is used to detect the level of garbage in the container. The MAX232 is a dual driver/receivers and typically converts the RX, TX, CTS and RTS signal. Buzzer is used to give an alarm to the security guard if the garbage inside the container is full. GSM is used to send the SMS to collection office.

Manuscript published on 30 April 2016.
*Correspondence Author(s)
Aniket N. Nikam, B.E. Student, Department of Electronics Engineering, Nutan Maharashtra Institute of Engineering and Technology, Talegaon Dabhade, Pune, (Maharashtra). India.
Nilam N. Thakur, B.E. Student, Department of Electronics Engineering, Nutan Maharashtra Institute of Engineering and Technology, Talegaon Dabhade, Pune, (Maharashtra). India.
Sachin V. Patil, B.E. Student, Department of Electronics Engineering, Nutan Maharashtra Institute of Engineering and Technology, Talegaon Dabhade, Pune, (Maharashtra). India.

III. HARDWARE DESCRIPTION

MICROCONTROLLER:

The signals from the sensor are given to the Microcontroller. Microcontroller processes all these signals and gives data to LCD display.

LCD DISPLAY:

It is used for the displaying the information to user. The LCD requires 3 control lines (RS, R/W & EN) & 8 (or 4) data lines. The number on data lines depends on the mode of operation. If operated in 8-bit Mode then 8 data lines + 3 control lines and if operated in 4-bit Mode then 4 data lines + 3 control lines are required.

GARBAGE LEVEL SENSOR:

The sensor is used to detect garbage movement in container. The movement detector is a popular device for detecting motion in a free space.

RELAY:

It is used to drive AC/DC Load & also used for auto switching purpose. It also acts as a switch which is used to control the 230 volt AC supply.

GSM MODULE:

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. It is used to send garbage status information to PCMC office.

MOTOR DRIVER CIRCUIT:

It is used to drive DC Motor. The L293D DC Motor driver circuit is used to drive two 12V DC Motors.

MAX 232:

The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The MAX232 (A) has two receivers (converts from RS-232 to TTL Voltage levels) and two drivers (converts from TTL logic to RS-232 voltage levels). This means only two of the RS-232 signals can be converted in each direction.

BUZZER:

Buzzer is used to give an alarm to the Security guard if the garbage inside the container full.

ULTRASONIC SENSOR:

An ultrasonic sensor can determine the distance to an object by measuring the difference in time between the sound wave being transmitted and the echo being received and also capture the material property and structure of the object by measuring the strength of the reflection.

IV. PROPOSED WORK

The input to the sensor module would come from the waste bin which are placed at different localities in the area .The sensor is placed in the garbage bin at a max level , if that level is crossed by the garbage in the bin, then sensor will sense that and will communicate to Microcontroller. When the garbage bin becomes full, the ultrasonic sensor attached to its lid will detect the level and send a command to controller. The level of garbage bin is displays on Liquid Crystal Display. The Message would be that the garbage bin in particular area is filled completely, “please collect it”. At the same time a same message will be sent to a metropolitan office that particular garbage bin is completely full through Short Message Service. After receiving the message the waste disposal vehicle reaches to the desired location. [1]

V. IMPLEMENTATION

In this system there is lift container for the collection of the waste. It has two separate container i.e. dry and wet container. The waste is conveying towards main storage area. It has garbage level indicator that will show the level of garbage continuously on the LCD. It also has fire sensor and smoke sensor for safety purpose. The ultra-sonic sensors are placed at the storage area. If garbage level exceeds the maximum level, then buzzer will be turn ON and it gives indication to the driver of garbage collection truck that the garbage is filled. GSM technology is used for sending SMS to metropolitan collection unit. [2]

Fig. 3.Implementation of Waste Collection System [2]

VI. ADVANTAGES

1. The system is safe even for the user because, of the use of robotics and no manual work.
2. Eliminates the continuous monitoring , it facilitates 24 hours in a day, 365 days in year communication between system and user
3. By further modification security system can be added.
4. Easy to install and simple in operation.

VII. APPLICATIONS

1.It can be used in hospitals, ICU or general wards.
2.It can also be employed in the houses, hotels and industrial areas.

VIII. FUTURE SCOPE

In this system we can add hazardous material detector so that harmful material can be eliminate from the garbage and material differentiator can be added.

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)

By further modification, security system can be added so that entire control becomes password protected. Solar system can be used, so that large amount of energy will save

IX. CONCLUSION

This project solid waste monitoring and management system has been successfully implemented with the integration of communication technologies such as GSM and for truck monitoring system. The proposed system would be able to monitor the solid waste collection process and management the overall collection process. This technique would provide solid waste collection in time and also overcome all the disadvantages which are as use of minimum route, clean and green environment and available vehicle. The technologies which are used in the proposed system are good enough to ensure the practical and perfect for solid waste collection process monitoring and management for green environment.

REFERENCES

1. Gaikwad Prajakta , Jadhav Kalyani, Machale Snehal,"Smart Garbage Collection System In Residential Area",IJRET ,2015
2. Kanchan Mahajan , Prof. J.S. Chitode," Wate Bin Monitorin System Using Integreated Technologies",IITRSET,2014.
3. Islam, M.S. Arebey, M. ; Hannan, M.A. ; Basri, H,"Overview for solid waste bin monitoring and collection system" Innovation Management and Technology Research (ICIMTR), 2012 International Conference , Malacca, 258 – 262
4. Raghumani Singh, C. Dey, M. Solid waste management of Thoubal Municipality, Manipur- a case study Green Technology and Environmental Conservation (GTEC 2011), 2011 International Conference Chennai 21 – 24.
5. Latifah, A., Mohd, A. A.,& NurIlyana, M. (2009).solid waste management in Malaysia: Practices and challenges. Waste Management, 29,2902-2906.
6. Vicentini, F. Giusti, A., Rovetta, A., Fan, X., He, Q., Zhu, M., & Liu, B. (2008). Sensorized waste collection container for content estimation and collection optimization. Waste Management.29, 1467-1472

Authors Profile

Aniket N. Nikam is currently pursuing B.E. in Electronics Engineering from nutan Maharashtra institute of engineering and technology, Talegaon, pune.

Nilam N. Thakur is currently pursuing B.E. in Electronics Engineering from nutan Maharashtra institute of engineering and technology, Talegaon , pune.

Sachin V. Patil is currently pursuing B.E. in Electronics Engineering from nutan Maharashtra institute of engineering and technology, Talegaon , pune.

Published By:
Blue Eyes Intelligence Engineering
and Sciences Publication (BEIESP)