MSD-Smart Dustbin

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Abstract

In the recent decades, Urbanization has increased tremendously. At the same phase there is an increase in waste production. Waste management has been a crucial issue to be considered. This paper is a way to achieve this good cause. In this paper, smart bin is built on a microcontroller based platform Arduino Uno board and Ultrasonic sensor. Ultrasonic sensor is placed at the front face of the dustbin which will measure the distance of the person from dustbin. The threshold distance is set as 50cm. One ultrasonic will be placed facing inside of the bin whose threshold is set as 24 cm. Arduino will be programmed in such a way that when the dustbin is being filled, the remaining distance from the threshold distance will be displayed. Once the garbage reaches the threshold level ultrasonic sensor will trigger the LED light which will continuously alert by blinking until the garbage in the dustbin is squashed. Once the dustbin is squashed, people can reuse the dustbin. At regular intervals dustbin will be squashed. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. Foul smell from these rotten wastes that remain untreated for a long time, due to negligence of authorities and carelessness of public may lead to long term problems.Breeding of insects and mosquitoes can create nuisance around promoting unclean environment. This may even cause dreadful diseases.

I. INTRODUCTION

Smart dustbin is a smart solution for waste management [1]. It has some significant advantages over the normal dustbin. Firstly it opens automatically when a person is in front of it. It also has garbage detection facility to allow the cleaning of dustbin in time. This dustbin doesn't open when the level is full ,thus preventing the overflow of dustbin. The MSD sends the notification to the concerned people like housekeepers to clean it when it becomes full. It has been designed by using a normal dustbin and is very cost effective. This smart dustbin has the potential to overcome the disadvantages of a normal dustbin and thus result in effective management of waste in a particular area or a city. Unlike the conventional dustbin where problem of hygiene and dirt is main concern our dustbin MSD has cons over it like it can it keep it lid shut whenever it is not in use and it also gives message when the bin is full and it does not any further use of it..

II. MOTIVATION

The main motivation for this solution is to save the work and hassle which is required for cleaning the Dustbin and most importantly the Swacch Bharat Abhiyan which has motto of making India clean. So, this Dustbin is designed to facilitate the crowd at public places to put the garbage in it and thus saving time and energy of the people as crowd moves fast. The Garbage level indication will enable the manager at public places to clean the dustbins as early as possible so that they will be again reusable.

The contemporary dustbins which use technology are more expensive whereas MSD uses the components which are more economically feasible and viable which make it indeed a special feature in itself.

III. LITERATURE SURVEY OF EXISTING SYSTEM

1.By Neha Singh , Pooja Siriya , Pooja Pandey , Priya Sevlani

In this work, the methodology they used is that when the person throw the garbage in the dustbin and it subsequently fills, a message via GSM is sent to the authority when the dustbin is thirty percent filled. Consequently, when the dustbin is filled completely a second message to the authorized person is sent giving a warning message to them so that the necessary actions should be taken. It not only gives the information of the extent to which the dustbin is filled but also sends the information regarding the weight of the garbage. . Also it maintains the data log of all the dustbins placed at various areas in the cities , maintaining the weight and level up to which the bin is filled.

Credits :- Indiamart

2.By Ruhin Mary Saji , Drishya Gopakumar, Harish Kumar , K N Mohammed Sayed, Lakshmi

Smart Garbage Management in Smart Cities are IoT based[2].The level of garbage in the dustbins is detected with the help of ultrasonic sensors system, and communicated to the authorized control room through GSM system and communicated to the authorized control room through GSM system. Arduino microcontroller is used to interface the sensor system with GSM system. A GUI is also developed to monitor the desired information related to the garbage for different selected locations. This will help to manage the garbage collection efficiently. Level detector consists of IR sensors which is used to detect the level of the garbage in the dustbin. The output of level detector is given to microcontroller.

Credits :- TheAsianAge

3.Bikramjit Singh, Manpreet Kaur IJCSIT 2016 This system to garbage collection providing greater accessibility ,planning proper for disposing process.

IV. SYSTEM ARCHITECTURE

Smart Components: Arduino Uno, servo motor, GSM (Global System for mobile) module, Jumper wires etc. Sensors: Ultrasonic sensor.

Overall Working of System:
Arduino is the main part of our system. The other major components of system are ultrasonic sensor, servomotor and GSM module (Global system for mobile). Two ultrasonic sensors are used one for level indicator and second for object detection. Servo motor is been used for opening and closing the lid. GSM module is use for alerting the concern person after the bin is full. A message will send to the respective person using GSM module to clean the bin. Nine volt power supply is the secondary source of power while the primary source is Arduino connection to CPU. Ultrasonic sensors emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. The Vcc pin powers the sensor, typically with +5V. Trigger pin is an Input pin. This pin has to be kept high for us to initialize measurement by sending US wave. Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor. Ground pin is connected to the ground of the system in Arduino.

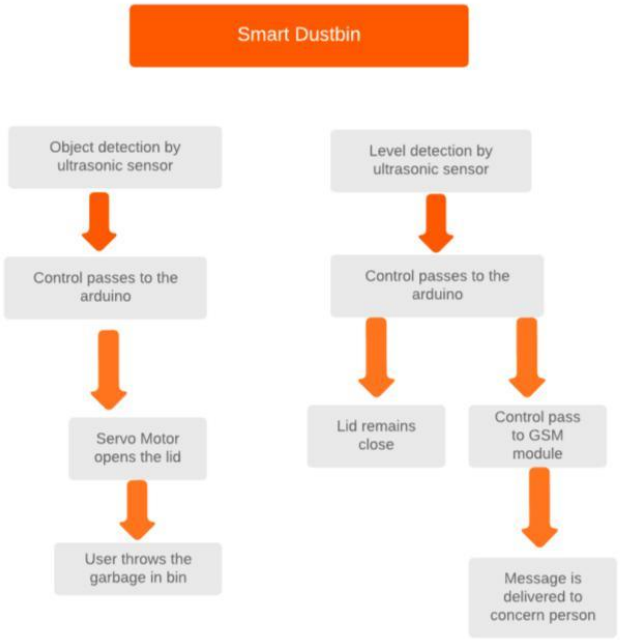

Fig 1: Flow Chart of internal structure.

Arduino is the main part of our system [3]. The other two major components of system are ultrasonic sensor and servo motor. Two ultrasonic sensors are used one for level indicator and second for object detection. Servo motor is been used for opening and closing the lid. Nine volt power supply is the secondary source of power while the primary source is Arduino connection to CPU. Ultrasonic sensors emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. The Vcc pin powers the sensor, typically with +5V. Trigger pin is an Input pin. This pin has to be kept high for us to initialize measurement by sending US wave. Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor. Ground pin is connected to the ground of the system in Arduino.

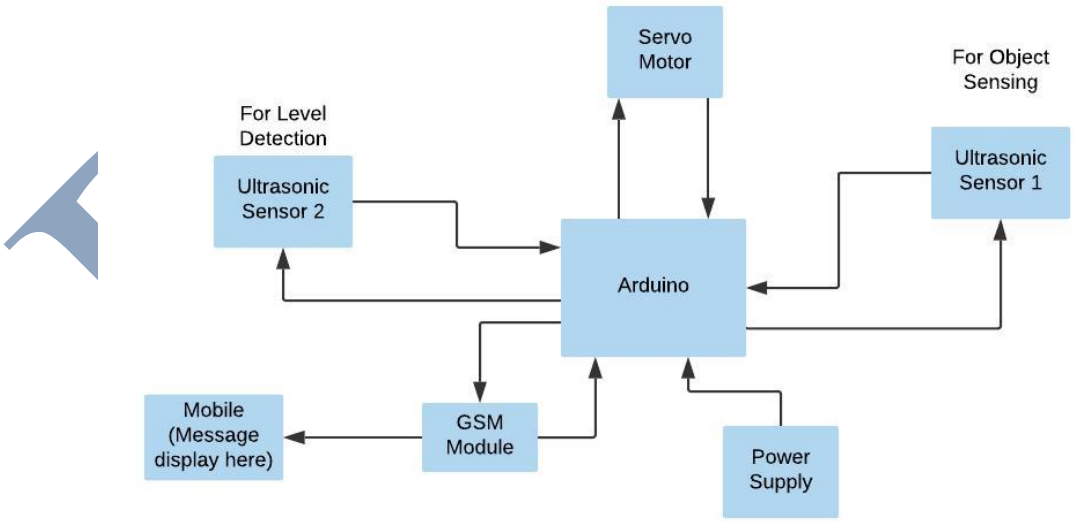

Fig 2: Block Diagram of Connections.

V. EXPERIMENTAL SETUP

Circuit Diagram:

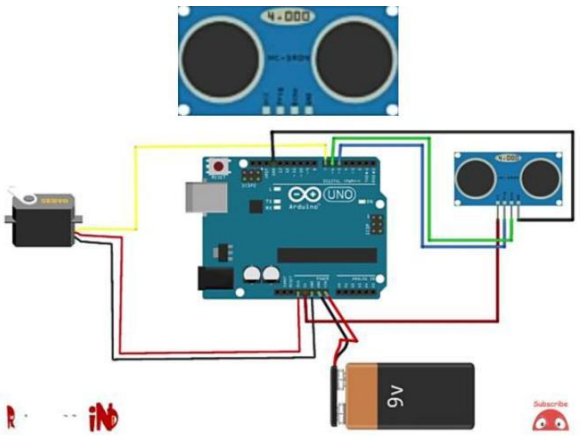

Fig 3: Circuit diagram of two ultrasonic sensor

The one ultrasonic sensor is placed on the front side of the MSD (smart dustbin) because any person or object which is come nearer to the bin, sensor sense it and lid will opens automatically. Another ultrasonic sensor which used for level detection is placed in the bin. If the level of garbage will increase and if it comes in the range of second ultrasonic sensor then buzzer will blow and message is delivered to the concern person. Arduino is placed on one side of the bin for convenience.

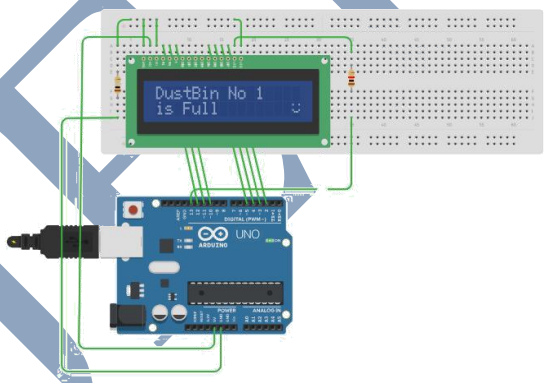

Fig 4: Circuit diagram for GSM module

VI. TESTING AND RESULTS

The system has been tested to ensure its proper functionality. The Smart Dustbin works when connected to Input source so the code can run accordingly. The Arduino Uno was used, which is compactible and also it provides effective way to perform tasks. The result generated i.e. Distance measured is sent to the serial monitor accordingly the lid opens or stays in the rest position.

Total Costing

Components	**Price**
Arduino Uno	239 Rs
Servo Motor	55 Rs
GSM Module	225 Rs
Jumper Wires	12 Rs
2 X Ultrasonic sensors	2 x 48 Rs
Total Cost	**627 Rs**

VII. CONCLUSION

We have developed a simple but useful project of smart dustbin using Arduino and ultrasonic sensor. Using this project, the lid of the dustbin stays closed, so that waste is not exposed (to avoid flies and mosquitos) and when you want dispose any waste, it will automatically open the lid. We also add a level detector in our dustbin which can detect the level of garbage and if it is full then buzzer will blow and will tell us to make it empty.

When an obstacle is stuck on the sensor, it may give a reading which may vary from the actual reading which may lead to abrasive action from microcontroller which is not necessary.

VIII. FUTURE SCOPE

There are some problems occurs when it tested in outdoor. So we can solve some issues in that. There is a great scope for the modifications of the Smart Dustbin in future.The system can be improved by adding new functionalities

Fig 4: Strong casing for sensors

The product can turn on or turn off light automatically according to ambient-light. Ambient temperature and humidity can't affect it. It is not only convenient but also practical; it can control the load working only at night. It is used for road light, garden light etc.

We can use such a product for our model

We can use strong casing for our Arduino. So that it will worked well in outdoor also.

In our project we are using batteries but in future events we can directly charged it through the circuit.

The proper timely maintenance mechanism of dustbin would not lead to any faulty action in system

ACKNOWLEDGMENT

REFERENCES

The template will number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first . . ."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the reference list. Use letters for table footnotes.

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For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

[1] G. Eason, B. Noble, and I. N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. (references)

[2] J. Clerk Maxwell, "A Treatise on Electricity and Magnetism", 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[3] I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[4] K. Elissa, "Title of paper if known," unpublished.

[5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].