

Implementation of Smart Garbage Collection in Smart Cities



M.Gopi Krishna, Inamdar Akhil

Abstract: Garbage management is a big challenging with increasing population whether in a developing or developed countries. The main problem in Garbage management is that the waste bin at public places gets overflowed well in advance before the cleaning process take place. Because of this provoke several diseases amongst the surrounding people.

To avoid this and enhance cleaning process, my project "implementation of smart garbage system in smart cities" will help. My project use to detect level of garbage in bin like (0, 25, 75 and 100). In Each level of garbage in bin status will update on mobile application and led will indicate in front of bin, and we can track bin location depending on the garbage level in mobile application. Bin also has a camera for live streaming it will useful for identifying suspected persons and those who are not following cleaning rules.

And Gas sensor for detecting poisons gases in bin.

Index Terms: Raspberry pi3, GSM,GPS, MQ-32, Ultrasonic, PIR Sensor, IC

I. INTRODUCTION

India is the second most populous nation on the planet, which makes up 17.86% of the total population. It is expected that by 2022 it will be the most expensive nation in the world.

Approximately 32.8% of the population is urban, and the urban population increases to 3 - 3.5% per year, and the average per capita increases 1.3% per year. The current age group is expected to increase from 62 million tons per year to around 165 million tons in 2030.

In this situation, squander the executives includes various waste containers that displays huge filling varieties and assorted necessities for exhausting, from sporadic to visit. Then again, other waste structures (i.e agrarian, biomedical, synthetic, electronic, mineral, natural and radioactive) are described by explicit accumulation focuses, uniform and unsurprising generation, and equivalent, typically long, filling periods. The location of the fill-level for urban strong waste receptacles presents numerous challenges because of the different abnormalities of the waste-container filling process, for example, the unpredictable shape and the assortment of the included materials.

Revised Manuscript Received on December 30, 2019.

* Correspondence Author

Mr. M.Gopi Krishna*, Department of Electronics and Communications Engineering, Vardhaman College of Engineering,, Hyderabad, India. E-mail: mgopikrishna@vardhaman.org

Inamdar Akhil, Department of Electronics and Communications Engineering, Vardhaman College of Engineering, Hyderabad, India. E-mail: akhil.akpb@gmail.com

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](https://creativecommons.org/licenses/by-nc-nd/4.0/) article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

More difficulties exit for the practical and vitality proficient information accumulation from countless containers, as the unforgiving natural conditions can fundamentally influence the sensor estimation precision and dependability, while then again these conditions comprise parameters that one

II. LITERATURE SURVEY

The author "Prof. B.S.Malapur" They for the most part center on gathering. The present administration action of the framework and the portrayal of the waste was the fundamental target to be examined and decided. This was exhibited during the inconvenience gathering, which features the civil strong waste administration framework. And furthermore leaves with proposals, the present administration framework to improve that will be valuable for the experts to work as well. Keen canister isn't utilized at this time. In the archive, Author presents advancements, for example, Global position System, Radio Frequency recognition, universal small package Radio repair, Geographic in order scheme, and mesh Camera are included gadgets. The RFID peruser in the truck peruses both client and ship data. Viable gathering of waste is accomplished. Truck the board is likewise done however not enhanced. The writer of this article presents two directing models: dynamic and semi-static. Also, the amassing of waste in the city is finished by encouraging the IoT, a course model is progressively structured and, in case of a disaster, strong. Research identified with waste accumulation centers around the dynamic structure of directing and arranging. Albeit less and less research focuses to squander accumulation for help to more brilliant urban communities.

III. PROPOSED SYSTEM

The main purpose of implementation of smart garbage collection in smart cities is to manage all the waste in city and monitor all the process he Fig. 1 explains proposed system block diagram.

Smart garbage collection consisting of bunch of sensors and smart communication system, below describe in detail.

Proposed smart garbage collector system consisting of various sensors, a GSM Module for data transmission, GPS Module and camera Module for share location and live streaming, and a mobile application for interfacing and communication with the authorities who are take care of waste management department.



The smart bin consisting of level sensor for finding level of garbage, PIR sensor for person detection that are approaching to bin, Gas sensor for detection of different gases which are produced by wet garbage.

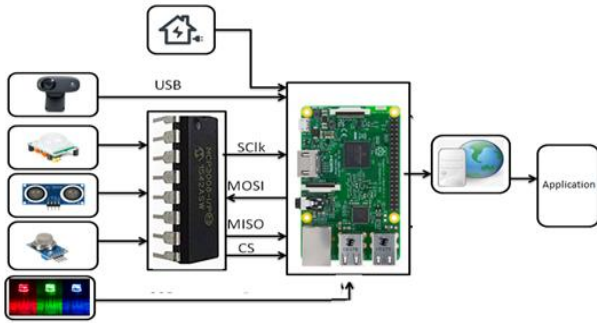


Fig. 1. Block Diagram of Smart bin

IV. IMPLEMENTATION

A. Algorithm and flowchart

- Step 1 : Give Power Supply to the Raspberry PI Board
- Step 2 : Initialization of GPIO Ports for Raspberry PI, Sensors and Hardware
- Step 3 : Read the PIR, Ultrasonic sensor.
- Step 4 : Display the measured values
- Step 5 : If any person approaches to bin PIR will detect and open bin.
- Step 6 : if garbage exceeds the level then status of bin and location will share to authority
- Step 7 : if Gas sensor detect any poisons gases then message alert will send to authority
- Step 8 : 'Raspberry PI' reads sensed data show the status of a bin on android app.
- Step 9 : This Process repeats until system stop by the user

B. Flowchart of the Project

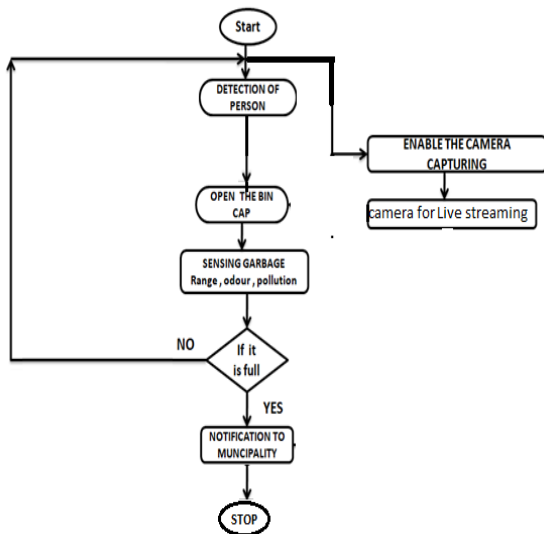


Fig. 2. Flow Chart

Software requirements:

- Raspbian operating system
- Languages – python, Arduino crypt

V. EXPERIMENTAL RESULTS

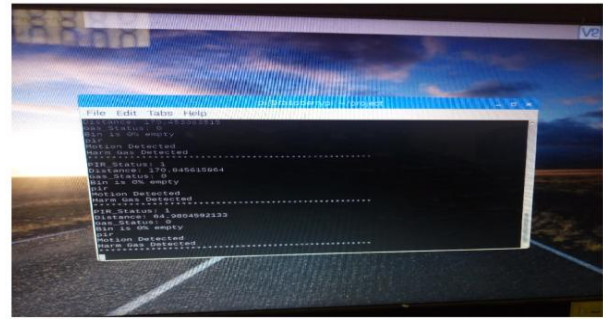


Fig. 3. When main code running pi terminal

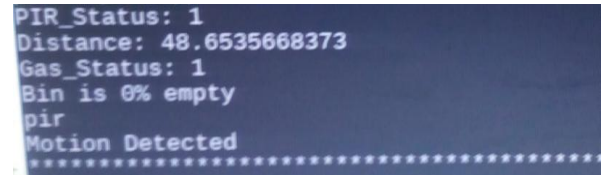


Fig. 4. When person detect PIR status



Fig. 5. Bin open when PIR is detected

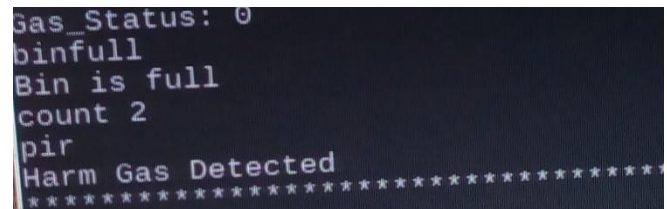


Fig. 6. Gas sensor status when poisons gas detected



Fig.7. Android application

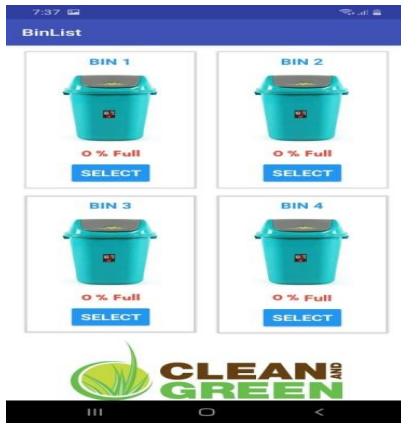


Fig.8. showing No of Bins in Application

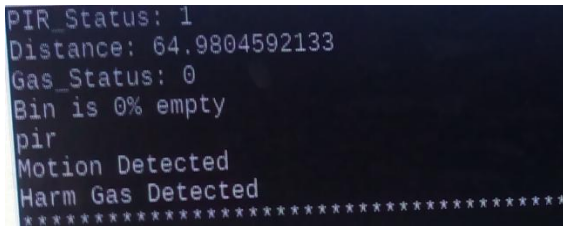


Fig. 9. Ultrasonic sensor displaying

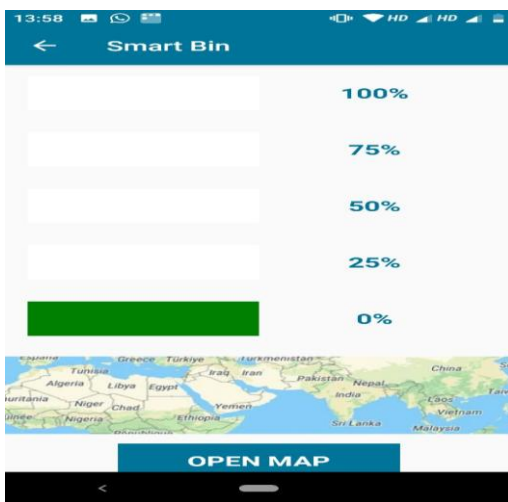


Fig. 10. Garbage level as 0 in Application



Fig. 11. Garbage status 25 in application

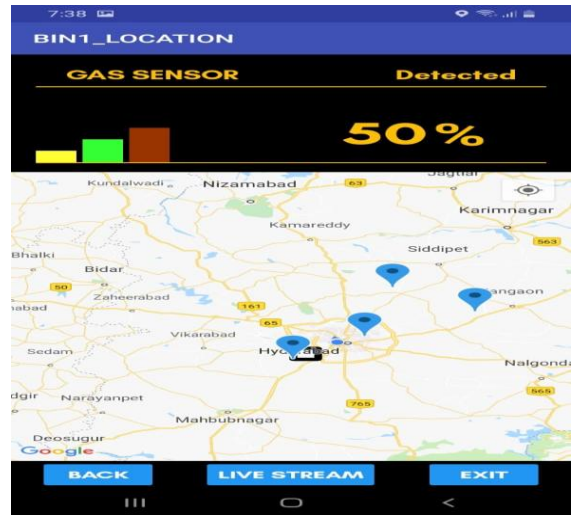


Fig. 12. Garbage level when 50 in application

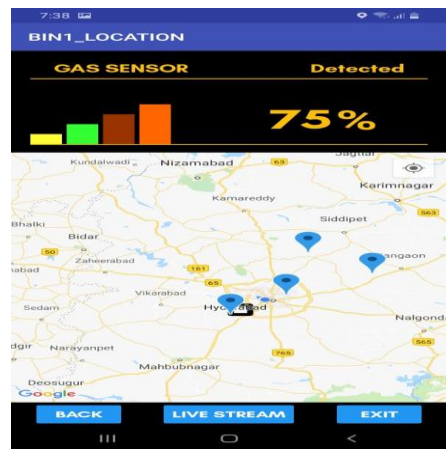


Fig. 13. Garbage level 75 in application

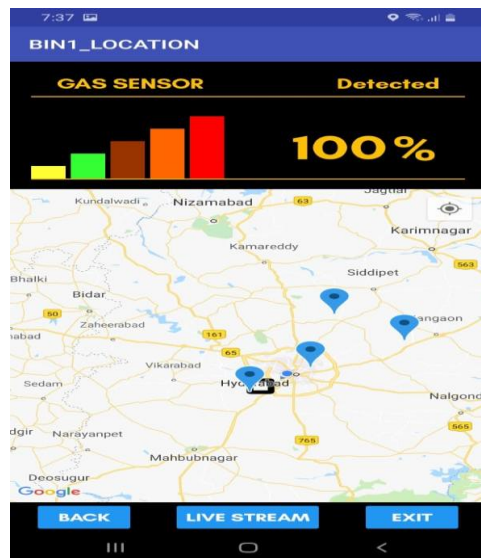


Fig. 14. Garbage level 100 in application

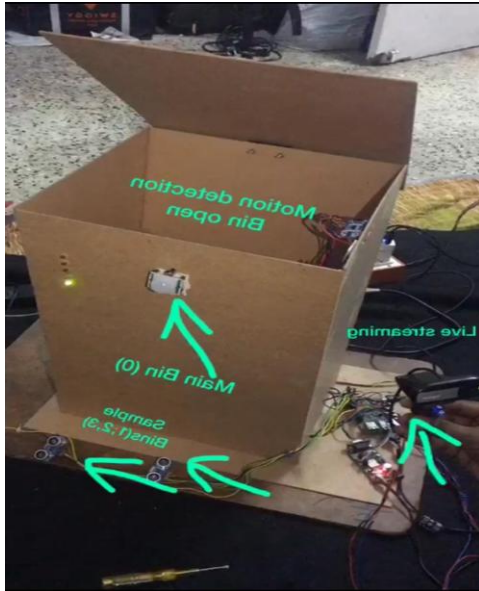


Fig. 15. LED indication when 0th level

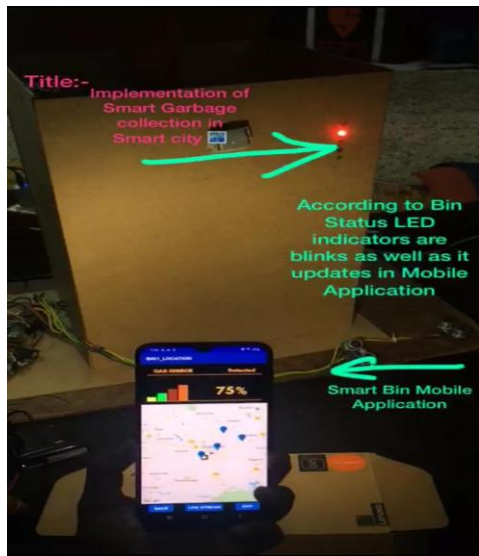


Fig. 16. LED indication when 100th level

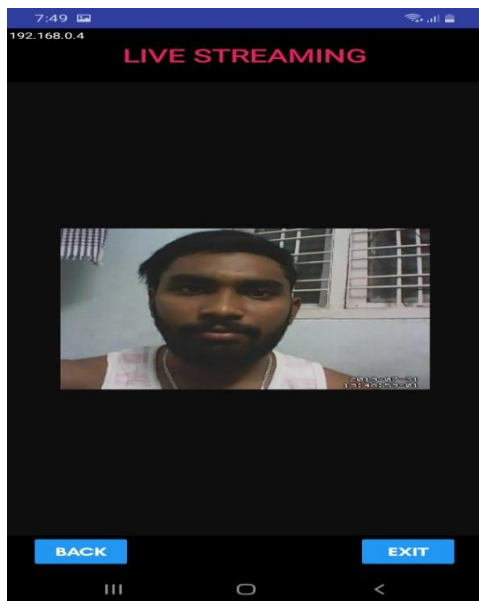


Fig 17: Bin camera when live streaming

VI. CONCLUSION

In our paper we suggested a helpful a way to deal with oversee squander with expanded effectiveness, in order to limit the expenses related with the waste the board framework and to facilitate the procedure for both the legislature and the administration. Smelling of the waste due to overfilling of the dust bins also solved.

VII. FUTURE SCOPE

In future, the problem of separation of dry and wet garbage will be taken in to consideration. And travelling route for garbage collection can be optimize

REFERENCES

1. Samrat Sinha; Special Report IPCS 27 "Major Terrorist Attacks in India" 2006
2. Neel Mathews; Narendar Rao; Gowrisankar; Biswajit Pattnaik; G. Siva Prasad "Solar roof connected to the network: problems, lessons and solutions" First International Conference on Sustainable Green Buildings and Communities (SGBC), 2016. [3] Mr. Banzi, First steps with Arduino. " O'Reilly Media, Inc. ", 2009
3. P. D. Minns, C Programming for PC the MAC and the Arduino microcontroller System. House of the author, 2013
4. Grewal Kaushal, "Using RFID-Based Security and AccessControl System Arduino With GSM module "IJEET, Vol 2, Edition 2 April 2015 e-ISSN: 1694-2310 | p-ISSN: 1694-2426
5. A. Ohya; Y. Nagashima; 1994 IEEE International Conference on Robotics and Automation, "Searching an Unknown Environment and Building Maps with the help of ultrasonic detection of the normal direction of walls ".
6. Jeetender Singh Chauhan, Sunil Semwal, "International Journal of Research in Engineering and Applications (IJERA) ISSN: 2248-9622, Vol. 3 Edition 1, January - February 2013.
7. Vijaykumar Kawde, "Automatically integrated wheelchair system". International Journal of Advent Technology Research, vol.2, n ° 3, March E-ISSN 2014: 2321-9637. [9] Yahia Makableh, Georgia Southern University, "Effective Control of DC Servo systems using backpropagation neural networks "Spring 2011.
8. Jaeseok Yun, Sang-Shin Lee; "Detection of human movements and Identification with Infrared Pyroelectric Sensors "Year 2014 8057-8081; doi: 10.3390 / s 140508057; ISSN 1424-8220.

AUTHORS PROFILE



Mr. M. Gopi Krishna is born on 27th July. He received his B.Tech degree in Electronics and Communication Engineering from Vardhaman College of Engineering, affiliated to JNTUH in the year of 2005. He then received his M.E degree in Wireless and Mobile Communication Vardhaman College of Engineering, affiliated to JNTUH in the year of 2010. He entered to teaching field as a Lecturer in 2006 and latter promoted as Assistant professor. Presently he is working as Assistant Professor in Department of ECE, Vardhaman college of Engineering, Hyderabad (Telanaga, India).He has published 7 Research papers in National /International Journal/Conferences.



Inamdar Akhil is born on 23rd June. He received his B.Tech degree in Electronics and Communication Engineering from JBIT, Affiliated to JNTUH in the year of 2017. Presently he is pursuing his M.Tech in the stream of Embedded Systems from Vardhaman College of Engineering, Hyderabad.

