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SMARTBIN - AN EFFECTIVE WAY OF GARBAGE MANAGEMENT

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Abstract-Volume of municipal waste is increasing day by day due to overconsumption of non-recyclable resources and urbanization. Cost effective and environment friendly solution for real time collection and status monitoring is major issue to municipal authority. This paper proposes a model for intelligent sensing, CCTV monitoring and providing Wi-Fi hotspot, which would contribute to optimize solid waste collection.

Keywords:-Smart city, Smart Bin, Urbanization, Waste Management, Real Time Analytics.

I. INTRODUCTION

The “Swachh Bharat Abhiyan” was created to reduce the issues of waste management, cleanliness all over India. This mission is expected to be completed by 2019.

Today the Indian authority handling around 3 billion tons of waste each year among which, around 150 million tons of waste are hazardous to human beings and animals [1]. So treating and disposing this waste properly with harmless will least harm the environment.

The smart city [2] concept is still new in India, although it has received a lot of attention in few years when our present prime minister gave the idea of building 100 smart cities throughout India.

Now, with the upcoming large number of smart cities, large numbers of responsibilities are also required to be fulfilled. The prime need of a smart lifestyle begins with cleanliness and cleanliness begins with dustbin. A society will get its waste dispatched properly only if the dustbins are placed well and collected well. The main problem in the current waste management system is that, most of the Indian cities are having unhealthy dustbins. In this paper we have tried to upgrade the trivial but vital component of the urban waste management system, i.e. dustbin. Now with the rise of technology it is high time that we should use technology for waste management systems [2].

As we have seen that technology with analytics has made the world a better place to live by its application in the field of genetics, insurance, marketing, engineering, banking etc in past many years. So, in this paper we have integrated analytics and electronics in order to create optimal changes in the conventional methodology of waste collection with the large amount of data that is being produced by the smart bin networks. The movement of waste across the whole city can be tracked and thus can be monitored by a single system efficiently and concretely. [2] The main aim of the project is to develop highly scalable embedded system for the existing waste-bins, so that the level of the garbage inside of the bins can be sensed and notified to the concerned authority for collection.

II. EXISTING SYSTEM

Now a day's number of times the dustbin in many areas are getting overflow and due to which unsanitary condition and bad smell spread out due to garbage as well as various diseases are spread around nearby localities as well as it also produces air pollution.

III. PROPOSED WORK

RASPBERRY PI is connected to 5V 2A supply. It is also interfaced with ultrasonic sensor, CCTV camera, Wi-Fi module and the GPS module.

Ultrasonic level sensor is deployed in the smartbin used to sense the level of the garbage inside the smart bin and this sensor transmits the signal to the Raspberry pi 3 where it checks the status of smart bin whether the threshold has been crossed. It shows the real time level status of the garbage inside the smart bin and shows on the web browser of the host. Here host can be smartphone or pc as well as the nightvision CCTV is also connected to raspberry pi, so we can live stream the video footage on the web browser. GSM module is interfaced to the Raspberry pi 3.

It can be used to locate the smartbin by the host. So by tracking the smartbins which are placed in different areas, the status of the garbage is known by the municipal corporation, so that they can get effectively get the status and dump truck can take the shortest possible route to pick up the garbage from the smartbins. Additionally, high gain Wi-Fi module is connected to the raspberry pi 3. Wi-Fi module specially used for providing internet using Wi-Fi hotspot to the nearby area.

A. BLOCK DIAGRAM

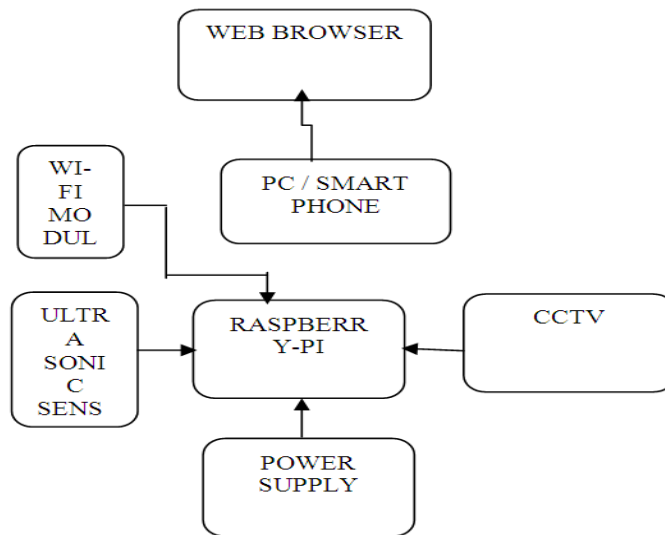


Fig 1: Block diagram of proposed system.

Block diagram includes following blocks

1. RASPBERRY-PI
2. ULTRASONIC SENSOR
3. CCTV
4. PC/SMARTPHONE
5. WI-FI MODULE
6. WEB BROWSER
7. POWER SUPPLY

Ultrasonic sensor senses the level of garbage and gives corresponding signal to raspberry pi. Webcam captures video gives live streaming video signal to Raspberry pi. Raspberry pi processes both the inputs and gives output to the Host PC and Smartphone. Web browser shows status of bin and live streaming video.

IV. HARDWARE

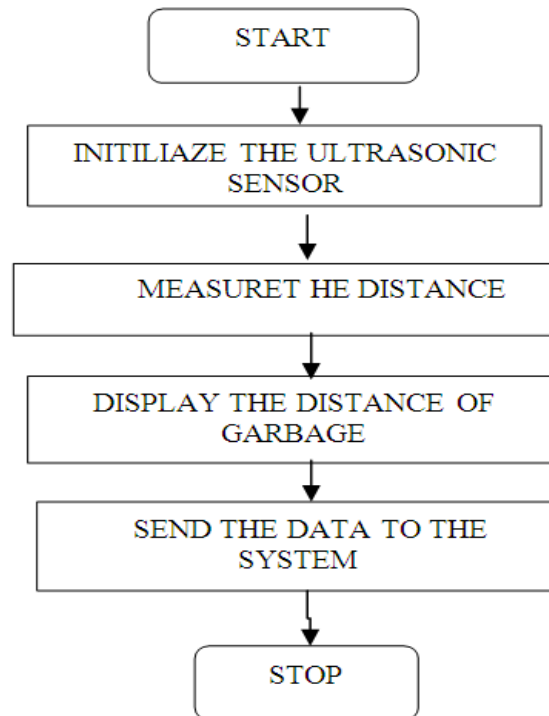
A Component

Component	Specification
Raspberry-pi	Raspberry-pi-3
Ultrasonic sensor	HC-SR04
CCTV	IT-306 WL
WI-FI Module	TL-WR150KIT

B. SELECTION CRITERIA OF SENSOR

Technology	Sensing Range	Application
Inductive Sensor	>3.5-42 mm	Any closer range detection of ferrous material.
Capacitive Sensor	>3-65 mm	Any closer range detection of non-ferrous material
Photoelectric Sensor	<1mm-50 mm	Long and short range detection.
Ultrasonic Sensor	<30mm-3 mm	Long and short range target detection with difficult surface properties.

V. SOFTWARE ANALYSIS



VI. Features

1. Quick and proper level detection of dust bins is done.
2. Improved the reliability for proper working of system.
3. Improved the routine collection of dustbin. Reliable wireless communication. Less rate of failure of system.
4. Accurate detection of sensor.
5. Surveillance by using camera.

VII. Advantages

1. Real time status of the level filled in the dustbin.
2. Deployment of dustbin as per the requirement.
3. Cost Reduction
4. Improves Environment quality.
5. Resource optimization.

VIII. CONCLUSION AND FUTURE

SCOPE:-

Smartbin is better solution to existing system. We can be used in Google map to locate the position of dustbin. Location Mapping: Garbage disposal facilities at proper places. SMARTBIN can be more user friendly by making it artificially intelligent using machine learning.

SMARTBIN can be converted to internet of thing, so that it can communicate with the user and other smart bin, its own ad-hoc network and the internet. Additional feature is that it will be connected to the wireless CCTV, so that it can be used by the user for other purpose like security, traffic management etc.

IX. References

- [1] "Swachh Bharat Abhiyan: PM Narendra Modi to wield broom to give India a new image". *The Times of India*. Retrieved 2 October 2014.
- [2] Narayan Sharma, "Smart Bin Implemented for Smart City", *International Journal of Scientific & Engineering Research*, Volume 6, Issue 9, September-2015
- [3] Sapcon Instruments. "Fly Ash Level Detection". Retrieved 2016-09-22.
- [4] Ultrasonic Testing" testexndt.co.uk. 2016-08-04. Retrieved 2016-08-04.
- [5] "Label Sensor Types and Technologies, Clear Label Sensor Choice" *Labelsensors.com*. Retrieved 2015-03-17.
- [6] "Ultrasonic Gun Cleaner"
- [7] A.Ohri and P.K. Singh. "Development of decision support system for municipal solid waste management in India: A review." *International Journal of Environmental Science*.
- [8] "Wide Area Augmentation System (WAAS) B.3, Abbreviations and Acronyms: "GPS: Global Positioning System (or Navstar Global Positioning System)"
- [9] Verman, Romesh. Distance Education In Technological Age, Anmol Publications Pvt. Ltd., 2005, pp.166
- [10] Vikrant Bhor, "Smart Garbage management System *International Journal of Engineering Research & Technology (IJERT)*, Vol. 4 Issue 03, March-2015 2000.