Survey on Waste Management System for Smart City

S.P.Khaladkar[1], Prof. R.S.Suryawanshi[2], Prof. S.B.Chaudhari[3]

Abstract- *Now a days, in an urban cities there is a rapid growth in the urbanization, hence waste management in the urban city is a very big challenge in this city. Hence there is a major requirement that able to be maintained the urban development plans at an economic growth level. As the concept of the smart city, is very much popular trend in recent days, and this smart city cant be complete without the smart waste management system. Hence the prior information of the filled bins which alerts the municipality authority, so that this authority of the municipality can clean this dust bins on regularly basis, this maintain the environment clan and smart as well. To avoid this situation, we propose a solution for this problem "Smart Garbage Bin", in this paper it will alarm and inform to the municipality authorized person about the filling of the dust bin.*

Keywords-Internet of Things(IoT), IR Sensor, Location Based Services(LBS), ReDBin, RFID, Sensing, Smart Waste, Wireless Sensor Network(WSN), Zigbee.

I. INTRODUCTION

The Smart City represents in recent years becomes a very hot topic in terms of improving living conditions. Considering mainly the situation in European Union, the EU national governments and also private companies are investing every year significant amount of their budgets to research, development and implementation of the concept of Smart City[1].

Hence smart city has different ways to show that how to define it. In the current research the terms need to be considered in system such as how to improve the different levels of the city, the levels are nothing but different stakeholders(e.g waste management, low carbon solution, energy efficiency, mobility, policy regulation, open data), hence we need to analysis the some above issues in the concept of smart city[3].

II. REVIEW OF LITERATURE

The implementation of smart garbage bin is the idea which is existed for many years. This is not an original idea of smart bins. When IoT technology is being implemented at that time our original plan is carried out regarding the designing of smart garbage bin with IR Sensor, Weight Sensor and Wi-fi module for the data transmission.

In 2015, Roozbeh Jalali, Khalil El-Khatib, Carolyn McGregor, Smart City Architecture for Community Level Services Through the Internet of Things , proposed and implemented an architecture for smart cities, where community service providers and city management, and citizens have access to real time data which has been gathered using various sensory mechanisms in order to analyze and make decisions for future planning[15].

In 2015, Dario Bonino, Maria Teresa Delgado Alizo, Alexandre Alapetitey, ALMANAC Internet of Things for Smart Cities , implemented ALMANAC which is among the few currently available approaches to smart cities where federation between different companies and administrations, handling four features data, security and trust. Project activities in the last year lead to a first working prototype of the platform which, given the first experimentation outcomes, has the potential to address several challenges of the Internet of Things in the smart city domain[14].

In 2015, Theodoros Anagnostopoulos, Arkady Zaslavsky, Alexey Medvedev, Sergei Khoruzhnicov, Topk Query based Dynamic Scheduling for IoT-enabled Smart City Waste Collection , The Internet of Things (IoT) enables dynamic solutions aimed at make optimal to the garbage truck fleet size, collection routes and prioritized waste pick-up. They also introduced an IoT-enabled system architecture to achieve efficient dynamic waste collection. They proposed a top-k query based dynamic scheduling model to face the demanding nature of scheduling timing Finally, an Android app along with a user-friendly interfacee GUI is presented in order to implement a waste collection scenario on synthetic and real experimental data[13].

In 2015, Louis Coetzee, Andrew Smith, TRESCIMO: European Union and South African Smart City Contextual Dimensions , captures differences and similarities between South Africa and Europe, specifically to understand how and what needs to be introduced, and what challenges need to be resolved to effectively create a South African Smart City and if possible how these solutions can also be City incorporated into European initiatives. To obtain more detailed insight into a future South African Smart City and a European equivalent, dimensions related to application domains and governance are analyzed[5].

In 2016, Abrar Alkhamisi, Mohamed Saleem Haja, Seyed M. Buhari , A Cross-Layer Framework for Sensor Data Aggregation for IoT Applications in Smart Cities , we analyze a distributed cross-layer commit protocol (CLCP) support for query based search for IoT application and for itsdata aggregations . Increased the throughput and reduced the overhead[3].

III. SYSTEM ARCHITECTURE / SYSTEM OVERVIEW

We propose a smart garbage bin using cloud IOT based raspberry pi to identify when the garbage bin is fill by using Ultrasonic sensor we can get the volume occupied and left in the smart garbage bin.

If the volume is full then the program triggers an alert message through raspberry pi and sends an alert and location of the bin to collect the garbages. The garbage collector collects the waste and empties the bin. Though we can manage the waste through this advanced IOT based Smart Garbage Bin. This system maintains a dry waste a wet waste separately for that we are using a moisture sensor if that sensor detected then the cap will open for a weighted waste otherwise cap will open for dry waste. for saving a power for sensor we are using one PIR Sensor, this sensor will controls power of the sensors(ultrasonic and moister and buzzer). If PIR detect then we will connect supply of above mention sensors through relay which will ON and if PIR not detect then remaining sensors are in off condition thereby we can reduce the power consumption of the circuit.
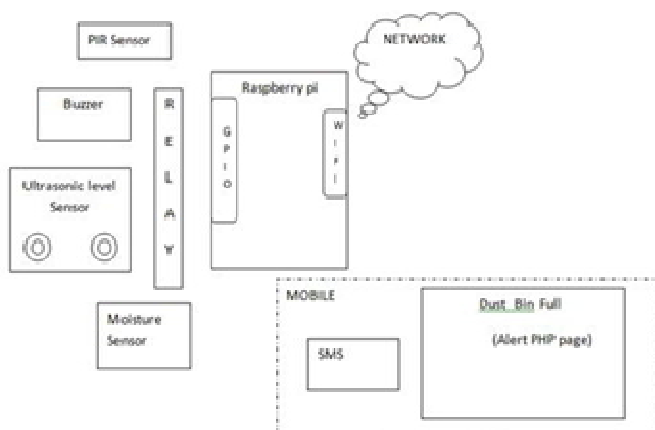

Fig. 1. Block Diagram of Proposed System

A. Advantages of this Proposed System are as follows:-

Reduces time and prevents over flow from the bin, also reduces air and land pollution through this alert. Reduces work pressure for the garbage handler.

Reduce complaints from the users and managing of the waste is solved by this smart garbage Bin.Can easily identify the bin if lost or damaged.

B. Objective of Proposed System

To constantly monitor and manage wet or dry garbage using waste management system.

Provide technique to detect a person near to dust bin using sensors.

Give notification to Municipality regarding the status of the dust bins.

To avoid the overflow of waste on the land, this system is used.

IV. CONCLUSION

The proposed work for the implementation of smart garbage management system using micro-controller, IR sensor, and Wi-Fi Module. This system guaranties that the cleaning of garbage bin as when the garbage reaches its maximum level. This system inform the status of each and every garbage bin with the real time information, which concern to the authorized person to send notification about the collecting garbage using the garbage vehicle only when garbage bins gets filled. To track waste identity (such as human, missing bin, weight of dust) with accurately and quickly without any human intervention.

The scope of the future system is that we can implement the system in real-time clock with the specific time stamp to show that to the authorized person at what period of time the dust bin is full and at what period of time the waste is collected from the smart garbage bin.

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