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Solid Waste Management and Automated Data Processing System Using Multi-Sensors

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ABSTRACT: This paper aims to have a control over the dump from domestic usage. Here we use Processing bins not only for large waste processing/not only at public places, we plan to incorporate Processing BINS at domestic level in a minimal cost.

KEYWORDS: smart bins, Accelerometer sensor, dust sensor, temperature sensor, ultrasonic sensor.

I. INTRODUCTION

The New Era Of Web And Internet Of Things (Iot) Paradigm Is Being Enabled By The Proliferation Of Various Devices Like Rfids, Sensors, And Actuators. Smart Devices (Devices Having Significant Computational Capabilities, Transforming Them To 'Smart Things') Are Embedded In The Environment To Monitor And Collect Ambient Information. In A City, This Leads To Smart City Frameworks. Intelligent Services Could Be Offered On Top Of Such Information Related To Any Aspect Of Humans' Activities. A Typical Example Of Services Offered In The Framework Of Smart Cities Is Iot Enabled Waste Management. Waste Management Involves Not Only The Collection Of The Waste In The Field But Also The Transport And Disposal To The Appropriate Locations. In This paper, We Present A Comprehensive And Thorough Survey Of Waste Management Models. Specifically, We Focus On The Adoption Of Smart Devices As A Key Enabling Technology In Contemporary Waste Management. We Report On The Strengths And Weaknesses Of Various Models To Reveal Their Characteristics.

II. EARLIER DESIGN

EXISTING SYSTEM

In the existing system there is no indication whether the dustbin is over flown. It is more time consuming task and it is less effective. It leads to the wastage of time since the truck will go and clean whether the dustbin is full or empty. This system need high cost. This system will create a un-hygiene environment and make the city unclean. In this system the level of the dustbin will not be known and create the bad smell spreads and cause illness to human beings. It also make more traffic and noise.

HISTORY

This paper aims at developing an **IOT** based real-time product that could monitor and report the domestic waste which is implemented and used only in developed countries like **UK,SINGAPORE**. This paperis an application based on BLE technology and *sensor* based information system used for monitoring thedomestic solid waste. In India, the amount of waste generated in urban areas is about 188,500 TPD or 68.8 million TPY.The system designedhelps us to monitor the waste being dumped into the bins and also track the bins if they are lost. The GPS in built in the bins helps us to track

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the location of the bins which will be useful for the municipality truck to find out the bin and unload the wastes. As the GPS drains the power of the phone, we could use GPS tracking when the bins are lost.

ADVANTAGES OF THE PROPOSED SYSTEM

- The garbage will be collected on time-to-time basis.
- There would not be any bad smell around the bin.
- Real time notification to collect the garbage.
- The dumps are collected by intimating the truck drivers along their paths and so fuel consumption is achieved to some extent.

III. COMPONENTS USED

As we aim to minimize the domestic waste being overflowing in cities by collecting it now and then, the web interface is developed and the sensor data are recorded and the statistics are maintained in the database, and the overflow of bins could be monitored efficiently.

PURPOSE OF SENSORS

We ought to monitor the environment in which we locate our trash cans in order to understand the level of hazard it causes to the surrounding environment. We use a variety of sensors to accomplish our objectives.Here we use the following sensors,

- Temperature sensor
- Dust sensor
- Accelerometer sensor
- Ultrasonic sensor
- Humidity sensor

OBJECTIVES

- To optimize wastes in cities.
- To alert the authorities regarding the overflow of dump.
- To locate the trash bins exactly by the trucks
- To use low powered devices and low cost devices to broadcast the sensor information to the mobile devices.

DATA COLLECTION

The sensor information's are maintained as logs in our website that is created and maintained in individual columns and the data maintained are time events and so it'll be easy to refer in the future. It doesn't require any costly software installation at the maintenance side. The main focus here is to conserve the fuel being wasted by the trucks while collecting the trash from every places.

INNOVATIVE COMPONENTS

- The Processing bins doesn't require highly modified architecture. We aim to add some fittings to the existing bins.
- The communication means are so simple and we are not restricted to a particular range.
- The location of the individual bins could be tracked and are easily located by the trucks.
- The cost of these Processing bins are considerably lesser than the Processing bins that are implemented by the developed countries.
- The overflow of bin could be tracked and accordingly the trucks collect the dump from the bins along their way.

IV.PROPOSED SYSTEM

We saw the various sensors used and the web interface developed. Let us now see how we are going to integrate these things in this paper.

ATTACHING SENSORS

The sensors are attached to every bin in and around the particular region(say our city). The sensors are configured and are placed in the trash cans without greater alteration in the existing bin design, by this way we can reduce the expensive smart bin model for our domestic purpose.

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The purpose of those different sensors are:

a) ***Accelorometer sensor:***
It is used to check the opening and closing of lid. This enables us to find out whether the bin overflows or not.

b) **Ultrasonic sensor:**
This sensor is used in our bin to detect the trash bins that are found along the way in the path of our truck.

c) **Temperature sensor:**
This sensor is used to know the temperature of the dump in the trash bin, if the temperature is more it is not good for the surrounding.

d) **Humidity sensor:**
This sensor is used to monitor the moisture content in the air near the bins, if the humidity is more the bacteria formation is high in rate.

e) **Dust sensor:**
This sensor is used to monitor the dust in the surrounding. It reads the level of dust in the air that passes through itself.

In present day the dustbin is over flown, the proposed system will help to avoid the overflow of dustbin. It will give the real time information about the level of the dustbin. The proposed method for the management of wastes is efficient and time saving process. This automation of waste also reduces the human effort and consequently the cost of the whole process. This system can be implemented at any place with ease and within reasonable amount of time. The implementation costs for the automation is also affordable. The overall method for the detection and management of waste becomes efficient and intelligent. This proposed system would not only function for collecting and updating data automatically and timely, but also it could analyze and use data intelligently. The use of Internet in this automation makes this system efficient and reliable with long distance coverage.

ILLUSTRATION

Let us see the model of the garbage monitoring system and the modules used in the configuration of the system efficiently. The wifi module is used in here to read the sensor information from the source(that is from the bins).

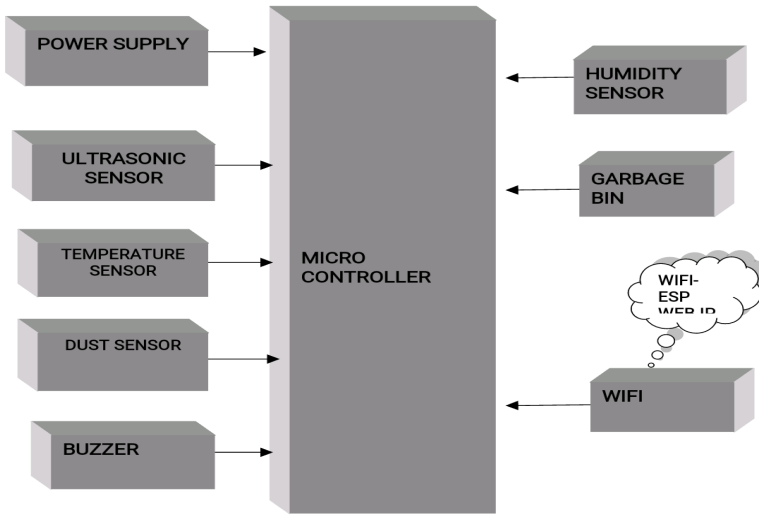

Fig.1.Block diagram of the proposed system

We saw the the physical components that should be attached to the bin for the working of the bin as a 'SMART BIN' (in figure1). Now, let us see the things that are necessary for building the web interface to monitor the dump status and to maintain the logs at the higher end in the figure2.

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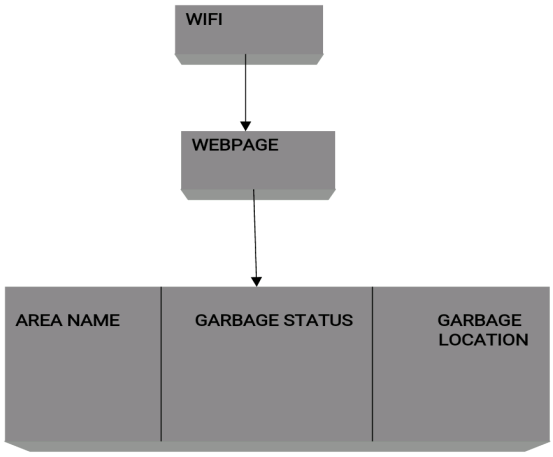

Fig.2 Block diagram for the web interface

The website has been created and let us see the logs maintained at the municipal level(fig 3).

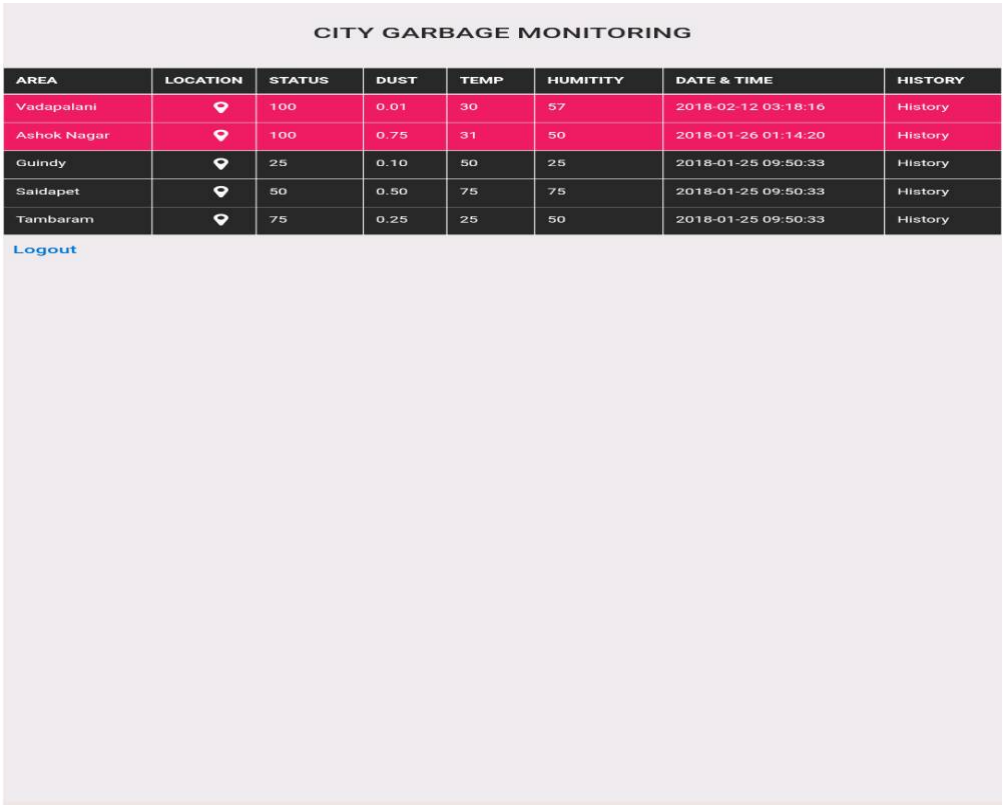

Fig 3. Status of garbage and sensor information

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MODULES

1. User Authentication
2. Checking progress
3. Verification

Let us see about these modules in detail in the following section:

1.User Authentication

- For the first time the user should sign up
- And then the user should login into the web page to monitor the dustbin status.
- The login contains the:

1) Username
2) Password

2.Checking progress

The Checking progress does the following:

A) Selecting the prototype:The user will login and then view the dustbin status.

B) Submit and see the Result:After sending the sensor data's to the cloud server, click login button and then view the current data readings.

C) View the database on the Web page:Then click the View old history button to view the old database entries on the web page.

3.Verification

The User can use this part to verify the whether the dustbin is FULL or EMPTY condition. This is the last module in this application.

IV. FUTURE ENHANCEMENTS

As part of the future work we will be looking at bin connectivity constraints that may affect their placement, for example, the output power of a communicating sensor would need to be set too high which may drain the battery faster. In this case, the bin may be placed somewhere where energy consumption is more efficient.

V.CONCLUSION

The major focus is on more energy-efficient usage of IoT technology as an enabler of various applications including waste management. Specifically, it aims to present a large set of models dealing with the efficient waste management. Special attention is paid on the waste collection. We present efforts for the intelligent transportation within the context of IoT and Smart Cities for waste collection. We propose an inductive taxonomy to perform comparative assessment of the surveyed models. We deliver the strengths and weaknesses of the surveyed models. Finally,our future work is focused on the definition of an effective IoT-enabled model for waste collection, which will touch on the incorporation of high capacity waste trucks as mobile depots. In addition, waste bins are placed to optimize comfort of residents.

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