Smart Garbage Monitorng System Using Iot

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ABSTRACT— Many times as we have seen that the garbage bins or dustbins placed at public places are overloaded, which creates unhygienic conditions for people as well as ugliness to that place leaving bad smell in the cities. To avoid all such situations, we are going to implement a project called IoT Based Smart Garbage and Waste Collection bins. These dustbins are interfaced with micro controller-based system having Ultrasonic wireless systems along with central system showing level and current status of garbage, on web browser with html page by Wi-Fi. Hence the status will be updated on to the web page. Major part of our project depends upon the working of the Wi-Fi module; essential for its implementation. The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision.

Keywords— Garbage monitoring, Internet of things, Arduino, Ultrasonic sensors, Power supply, Collecting data, Store data, Webpage, Wi-Fi module

I. INTRODUCTION

Internet and its applications have become an integral part of human lifestyle today, it's an essential tool in every aspect. Due to the incredible demand and requirement, researchers went beyond by connecting computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IoT). Communication over the internet has grown from user - user interaction to device – device interactions these days. The IoT concepts were proposed years back but still it's in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IoT, yet not many articles have been published in this field of study. This paper aims in structuring a state-of-the-art review on IoT. The technology, history and applications have been discussed briefly along with various statistics.

Since, most of the process is done through the internet, there must be an active high speed internet connection. The technology can be simply explained as a connection between humans-computers-things. All the equipment's we use in our day-to-day life can be controlled and monitored using the IoT, majority of process is done with the help of sensors. Sensors are deployed everywhere and these sensors convert raw physical data into digital signals and transmits it to the control center. By this way we can monitor the environment changes remotely from any part of the world via internet. This systems architecture would be based on context of operations and processes in real-time scenarios.

Smart collection bin works in the similar manner with all the combination of sensors namely weight sensor and IR sensor that indicates its weight and different levels respectively. The IR sensors will show us the various levels of garbage in the dustbins and also the weight sensor gets activated to send its output ahead when its threshold level is crossed. These details are further given of the microcontroller (ARM LPC2148) and the controller gives the details to the transmitter module (Wi- Fi module). At the receiver section a mobile handset is needed to be connected to the Wi-Fi router so the details of the garbage bin are displayed onto the HTML page in web browser of our mobile handset.

The noted advantages of using Garbage monitoring system are as follows:
i.   It saves time and money by using smart waste collection bins and systems equipped with fill level sensors. As smart transport vehicles go only to the filled containers or bins. It reduces infrastructure, operating and maintenance costs by up to 30%.
ii. It decreases traffic flow and consecutively noise due to less air pollution as result of less waste collection vehicles on the roads. This has become possible due to two-way communication between smart dustbins and service operators.

iii. It keeps our surroundings clean and green and free from bad odor of wastes, emphasizes on healthy environment and keep cities more beautiful.

iv. Applying smart waste management process to the city optimizes management, resources and costs which makes it a "smart city".

v. It helps administration to generate extra revenue by advertisements on smart devices.

II. RELATED WORK

Literature survey is the most important step in software development process currently. Before developing the tool, it is very necessary and important to determine the time factor, economy and company strength. Once these things are satisfied and requirements are met, then the next step is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support and accessories. This support can be obtained from senior programmers, from books or from websites as references. Before building the system all the above points are taken into consideration to the account for developing the proposed system. Hence, it is very important to have a proper literature survey done before going ahead with any of the project work. Below lists some of the surveys that have been performed in order to obtain the results.

Fig 1: Process of Literature Review.

One of the major concerns in the present era, is the collection and monitoring of garbage waste. As we have seen number of times the dustbins are getting over flown which leads to hazardous diseases and the concern person don't receive the information within the given time and due to which unsanitary condition formed in the surroundings, which leads to various hazardous and harmful diseases and also results in bad pungent smell in the surroundings.

Disadvantages of the existing system are, its very time consuming and less effective, the trucks go and empty containers whether or not the bins are filled, fuel waste, high costs, unhygienic Environment and look of the city, bad odor spreads around the surroundings and may cause illness to human beings and animals.

A state-of-the-Art review on Internet of Things. Gives the idea of IoT subject as well as the related information. Training should be provided to people [1]. Internet of Things: Challenges and state-of-the-art solutions in the internet scale sensor management and mobile analytics. Gives details about mobile analysis and sensor information management that helps in data segregation of various dustbins. Low data speed and shorter range [2]. Top-k Query based dynamic scheduling for IoT- enabled small city waste collection. Gives us the conceptual understanding of dynamic scheduling required for cleaning the dustbins and top-k leads us to priority-based cleaning. High initial cost [3].

Smart garbage System Management, provides additional designs and working, high initial cost [5]. IoT based Smart Garbage system for efficient food waste management, overview of smart garbage monitoring system. Requires more waste bins [6]. Smart Bin, Applications and uses of smart garbage monitoring system in maintaining a friendly environment. Training has to be provided. Reduces man power.[11]

III. METHODOLOGY

An ultrasonic sensor is placed on the interior side on the trash bin, the one side of the sensor facing the solid trash. As the amount or level of trash increases, distance between the sensor and the trash in the bin decreases. This current level of data will be sent to our microcontroller, then processes the data sent by the sensor and sends it to the HTML page connected to the web browser. At the receiver end any device will be connected

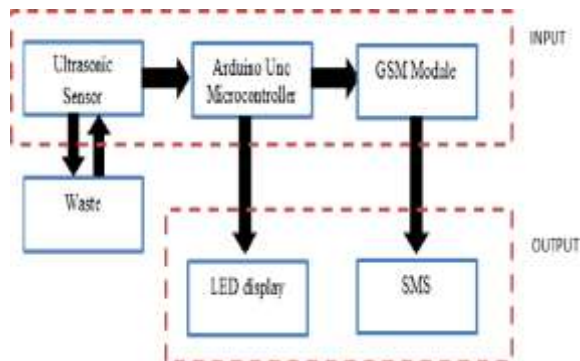which displays the amount of thrash or the current level of the trash in the bin.

Fig 2: Representation of garbage monitoring.

IV. RESULT AND DISCUSSION

Ultrasonic transducers/sensors are transducers that convert ultrasound waves to electrical signals or vice versa.

The sensors is placed on the top of the bin facing the trash in the bin they measure the level of trash based on the distance between the trash in the bin and the sensor placed at the top.

If the trash thrown in the bin is very less or little there will be huge distance between the sensor and the trash as the amount of trash is less and is measured in cm (centimeter), here in the below example the garbage level is 24cm. The value is displayed on the Arduino serial monitor window and then the data is transmitted to the web page via Wi-Fi module.

Fig 3: Example 1 The Arduino serial monitor showing the garbage level is at 24cm.

If the trash thrown in the bin is half or little less than half, then the distance between the sensor and the trash will be reduced and is measured in cm (centimeter), here in the below example the garbage level is 12cm. The value is displayed on the Arduino serial monitor window and then the data is transmitted to the web page via Wi-Fi module.

Fig 4: Example 2 The Arduino serial monitor showing the garbage level is at 12cm.

If the trash thrown in the bin more than half or almost full, then the distance between the sensor and the trash will be reduced toa great extent as the bin is almost filled and is measured in cm (centimeter), here in the below example the garbage level is 10cm. The value is displayed on the Arduino serial monitor window and then the data is transmitted to the web page via Wi- Fi module.

Location:Dadar

Mobile Number:9632587410

Garbage Data:Garbage Data

Fig 3: Example 3 The Arduino serial monitor showingthe garbage level is at 10cm.

V. CONCLUSIONS

Smart Garbage Management is very much important towards having the city clean and hygienic. Traditional Garbage management employing human is not very effective and requires more man power with no proper supervision. Research has been done in employing the IOT based technology in monitoring the status of the garbage bin towards collecting the trash once the threshold level is reached. So IOT based Smart Garbage Management System has been developed as a prototype where ultrasonic sensors are fitted in the garbage binfor monitoring the depth of bin and accordingly once the threshold level is reached alarm is buzzed. This information is updated in HTML page viewed through the web browser. This web page also sends all information and updates to vehicles collecting the garbage, it also shows the present status to the user monitoring it. The web page gives a view of the garbage bin and it also highlights the color in order to show the level of garbage collected in the bins. The system puts on the buzzer when the level of garbage in the bin crosses the limit set in the system. Hence, this system helps the city to be clean by informing about the present garbage levels of the bins by providing the graphical image of the bins via the web page.

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