

Review on Cloud Connected Dust Bins With Predictive Analytics Using Machine Learning

Diksha H. Chiwande¹, Prof. Ashish Manusmare²

¹(Department of Electronics and communication, Ballarpur Institute of Technology Ballarpur, India)

²(Department of Electronic and communications, Ballarpur Institute of Technology Ballarpur, India)

Corresponding Author: Diksha H. Chiwande

Abstract: This work is about to create a smart dust bin, which can be use by officials to collect waste refuse. They collect the garbage to collect garbage where the garbage is collected from only slurry filled areas. The concept of 'machine-learning' is used to collect information about the waste generation practices in that area and therefore can be quantified in the future for the waste generated. In addition, there has also been continuous analysis of data which will be pushed into the form of clouds. Once the waste level in the dustbin will be passed, the email alerts and the text message will be sent to the concerned authorities after crossing the threshold fixed by the Authority. This will mainly save the time and money of the Authority. This will also reduce air pollution in the area and prevent spread of diseases caused by improper waste.

Keywords: Arduino, Raspberry Pi, Machine Learning.

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I. Introduction

According to the United Nations report by 2025, the population will increase by 20% and the population will reach 8 billion. Due to such increase in population, the demand and consumption of goods will increase, which will increase the waste production at the same rate. Considering the current methods of managing waste in the city, there will be no right to the technology required for such large scale waste management system.

Dustbins are kept at various places in the city. It is their duty to check and clear the waste in the dustbin at regular intervals. But often they are late or go empty-handed because there is no garbage in the garbage dump. If there is a delay, there may be some possibility of reducing the garbage. This can cause bacteria and viruses to grow. Combined waste will then create air pollution and COPD, asthma etc. Similar causes of respiratory problems It is estimated that 90% of people suffering from Chronic Obstructive Pulmonary Disease cause harassment and pre-disposition by 235 million people. That is why the question arises that how can we report to the corporation that without the human intervention, it is time to get out of the garbage dump. It should be kept in mind that 75-80% of solid waste management budget is spent on collection and transfer of garbage. It is a waste, time consuming, and costly approach to check every garbage in large cities.

This approach does not get suits in today's modern technology where everything is automated and more systematic and efficient. So, what can be done to avoid waste-unwanted garbage truck trips?

The answer to the above question is yes, a technical solution can be included to make the waste collection system more efficient in the future. Previously see some recent methods to solve the problem first. Some neighbors from Delhi, Goa have decided to use WhatsApp to provide information about the condition of the trash. Also, the Patna authorities have launched an app called Patna to file a complaint of cleanliness in their area. All these efforts made by the people are appreciated but the broad look of the problem seems to be low. Our country is growing in terms of population and economy and our city is expanding. It is estimated that by 2050, the number of population will reach 70% of the population. Therefore, we resolve the above problem which can be applied extensively due to simplicity from the design and innovation perspective on a large scale.

The proposed system monitors the real time waste generation pattern using basic ultrasonic and IR sensors and node MCU. It also alerts the authorities in case the dustbin is full by sending a mail and SMS using Raspberry Pi and it also predicts the amount of waste generated in future using Machine Learning approach by taking data on cloud using Arduino and Wi-Fi.

II. Literature Review

A machine learning based Smart Bin has been proposed to reduce waste in this paper to reduce air pollution. In this system machine learning based smart bins will exchange information with each other using cloud via Ethernet shield. It is used to connect to the Azure platform. It is a cloud computing platform which enables the user to communicate to IOT device. This system shows the real time prediction of the future waste generation [1].

This paper presents a new method of smart waste city management which makes the environment of the city cleans with a low cost. In this system the sensor mode detects and measures and transmits waste volume data through internet. Server collect data including trash bins geo-location and then the serial number is processed by using parameters like regression, classification and graph theory. In this paper they first clustered the working area by using the open source data-base of Philadelphia. They introduced an algorithm that automatically makes the working clusters and calculates the optimal garbage truck routes. They use the logistic regression to predict and update the weight of each trash bin. The system helped to minimize the pollution and fuel consumption more efficiently [2].

This paper investigated the smart waste bin is connected to Internet of thing to obtain the real time waste monitoring capability. In this, the present work proposes an off-the-shelf IOT bases waste monitoring solution. They combined with back-end data analytic for the efficient waste of bins with Raspberry Pi and ultrasonic sensors, place over the waste bin in the specified area of the municipality for waste capability monitoring. The real time bin status and machine learning analytics are used to identify and predict the future waste collection scheduling. In the system has a ten-day trial and validation period is available. We are observed the proposed design increases fuel efficiency by up to 46% and a reduction in collection time by up to 18% [3].

In this article, with the increase of population of a country, proper management of cumulative of Municipal Solid waste becomes more acute for green environment. Many trucks collect MSW from a traditional perspective, and then transport and transfer this MSW to a pre-specified location, but all the above jobs are not properly maintained. It is very important to inspect the truck. This system uses the greatest strength of GSM technology and presents the development of an electronic monitoring system. The proposed e-monitoring system is an embedded system that consists of GSM and GPS technology interfaced with AVR microcontroller based computerized software. A web base GUI so that the system can be accessed from anywhere and information can be viewed by different people of the group. The service has a GUI for citizens and their complaints and comments. It has been tested in laboratory environments and field environments. The test results show that the real time SW can monitor the status of SW stored by the municipal authority system and prepare for their services [4].

In this paper, the proposed system bins installed with sensor unit and send information to sever through Wi-Fi module. In this system is divided into two parts: an administration section and a service section. The service section they are collect data and transferred to the administration. Another the administration section the web server shows the detail of sensor value, at real time. This system helped to collect the garbage in several times [5].

In this work, the smart waste was connected to the Internet to get the real status of the garbage compartment. Over the past few years, the destruction of waste has increased due to the huge population growth. To prevent transmission of the disease, proper waste management system is necessary. In this, smart dustbins are monitored and decisions are made according to the condition of the ovules. Garbage wells are kept in a city or campus and interfaces are made in a microcontroller based system with IR sensor and RF modules. The IR sensor detects the waste level in the trash bin and send the signal. The same signal is encoded and forwarded to the RF receiver via a micro controller RF transmitter. Receives the RF receiver signal and decodes it on the central system. Internet connection has been enabled from LAN via LAN cable. On the web cloud, it receives, analyzes, and processes in the cloud showing the garbage condition in the garbage bin on the GUI [6].

After the various study and literature survey, Air pollution monitoring and good air quality is the important aspects to be considered as a research topic. This literature highlights a mechanism integrating the Internet of Things (IOT) and some widely used machine learning algorithms to create a predictive model that can be used for forecasting of air pollution in the area. This predictive model has been trained with on-line learning methodology for developing viability to a completely unfamiliar data set. This paper carries out a Machine Learning based experimentation on recorded real sensor data to validate the approach. We have presented an approach combining the IOT and Machine Learning mechanisms to predict amount of waste. We discussed here a detailed study on ambient air pollution monitoring and prevent spreading of diseases caused by unpicked waste in cities using sensor nodes in a machine learning algorithm. This paper carries a detailed survey work on major contribution of several authors towards garbage monitoring and determines the air pollutants in several methods. This work is helpful to forecast and send the notification to the authority.

III. Proposed work

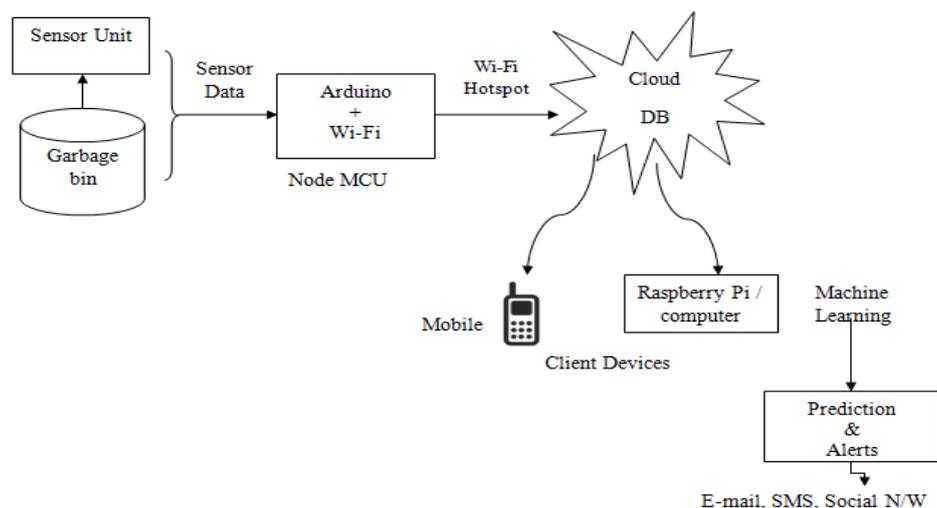


Fig. The block diagram for proposed system

Often we see in our city that there is a waste or dustbin overflow in public place. It creates unhygienic condition for people. Also, it creates ugliness to that place. At the same time bad smell is also spread. To avoid all such a situation we will implement a Cloud Connected Dust Bins with Predictive Analytics Using Machine Learning.

In this project we are going to place a sensor unit under the dustbin which senses the level of waste in it. Then the indication to the threshold value the data is sent to raspberry Pi which sends an alert notification to the client device. The arduino based node MCU used in the system. They can transfer the data to raspberry Pi. The Raspberry Pi receives this data and analysis the various types of machine learning algorithm. They are predicting the waste generation pattern in the given area.

IV. Conclusion

Waste management is an important issue in which everyone has to take immediate prompt action. Different sensing and communication technologies will be integrated in this proposed system which monitors real time bin information. This will increase the efficiency of solid waste collecting and waste disposal timely. So that can be done in a green and pleasant environment using machine learning. This project believes that garbage can be avoided on the road.

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