SMART WASTE COLLECTION SURVELLANCE AS WELL AS ALERT SYSTEM VIA IOT

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ABSTRACT:

The uncollected waste material when the waste bin is full is a common problem nowadays. Thus, an efficient waste management for the waste material is essential in ensuring a clean and green surrounding environment. This paper presents an Internet of Things (IoT) based Smart Waste Collection Monitoring and Alert System to monitor the waste material at the selected site of garbage collection area. The system is implemented using an ultrasonic sensor which is connected to Arduino UNO as to monitor waste bin garbage level. In this system, waste bin depth level will be sent via Arduino Ethernet Shield with an Internet connection to the Ubidots IoT Cloud. The Ubidots store the collected waste bin level data into IoT database and display the waste bin depth level on online dashboard for real-time visualization. The Ubidots Event manager invokes a notification alert to garbage collector mobile phone via a SMS when the waste bin is nearly filled for immediate waste collection. Therefore, the waste collection became more effective and systematic.

Keywords: IOT data, Ultrasonic sensor, IR sensor, distance, wifi network.

1. INTRODUCTION

At present, most of the cities around the world require challenging solutions for solid waste management, as there is rapid growth in residential areas and the economy. Municipal authorities have inadequate resources for waste management institutions to effectively collect the waste generated. It becomes an excessive wastage of resources when bins are collected that are filled up partially. The IoT based garbage monitoring system is a very innovative system which will help to keep the environment and cities clean. This system monitors the garbage bins throughout the city and informs about the level of garbage collected in the garbage bins to a person in the administrative department. For number of times we have seen that the dustbins are being overflown with the waste materials and the concern person don't have any information about it within the time, due to which unsanitary conditions are formed in the surroundings environment and living area. Bad smell is out due to waste in dustbin at the same time. Also, the bad look of the city which leads to air and environmental pollution and to some harmful infections and diseases around the locality which is spreadable easily. There are number of unwanted manual checks of garbage bin's level by municipal corporations which is less effective and time consuming. Trucks are sent to empty the dustbins whether they are full or not. And the trucks need fuel which is costly. Several sensing methods have been integrated and have combined their verdicts that offer the detection of bin condition and its parameter measurement. Though results and developed algorithms are

efficient for automatic bin status monitoring work lacks remote monitoring of bin. So, in this paper we have proposed system which can be deployed in general purpose dust bins placed at public places and which allows us to monitor its status remotely over web browser for efficient waste management. Due to drastic increase in economic and population growth in the nation there is huge development in the generation of the solid waste. Solid waste management is a main problem of surroundings in the whole globe. SWM is a huge problem not only in urban cities of India but in most of the nations in the globe. There is a requirement to evolve an effective system which will resolve this issue or decrease it to some level. It will support them to maintain their surroundings green and clean in an effective way. Today each government across the world is scheduling to construct smart cities or attempt to change the cities into smart cities. A smart city is a city which is constructed on smart integration of activities and endowments of independent, aware and self-decisive citizens.

2. RELATED STUDY

The solid waste collection in a smart city is an essential part for surroundings and its effect on society must be regarded seriously. By offering a whole internet of things based system the process of collecting, tracking and handling the solid waste can be monitored and automated easily and effectively(Chaudhari and Bhole, 2018; Ramesh et al, 2018; Sharma and Singh, 2018). Pokalekar et al (2018) has stated that internet of things can be described as a physical object networking with the use of embedded software and electronic sensors that permits the devices to receive and send information from each other. The internet of things carries out collection of data, sensing, storing data and processing by linking physical devices to internet. Surapaneni et al (2018) has stated that the municipal corporations are wholly liable for proper management of waste in their respective cities in the context of India. But most of the authorities are not satisfying their duty to offer effective ways of handling the waste generation at source, transporting, collecting and waste disposal. Because of this ineffective waste collection, the collected waste is always integrated with excreta of animals and humans in the drains and liable for roads flooding during rains, breeding of insects and lastly resulting in spreading various diseases. Dilip et al (2018) internet of things SWM system is a creative way which will support to maintain the cities clean. This system supervises the bins of garbage and informs about the garbage collected in dustbin through a web page. For this the system utilizes ultrasonic sensors placed on the top of dustbin to sense the level of garbage and comparing it with depth of garbage bins continuously (Nithish et al, 2019). This system makes use of LCD screen, ARM microcontroller, RF transmitter and GSM module for sending the information. The LCD display is utilized to show the garbage collected level in dustbins in percentage form. Sherly et al (2018) has stated that the solid waste management system is produced every day and by 2025 it would increase rapidly and hence effective method and decisions must be taken in order to handle the waste. Kumar et al (2016) have led a method of handling waste in a well-mannered way. The internet of things based alert system is used to produce the alarm signal to municipal officers. Arduino UNO is interlinked with ultrasonic sensor to evaluate the garbage level of dustbin (Anwar et al, 2018). RFID is used to identity and verify dustbin. Android application is connected with web server for interaction from municipal officer to nearby truck vehicle to collect the garbage (Pawar et al, 2018). Several solutions have been used for waste management to make it efficient and smarter. Every waste bin is attached with ultrasonic sensor which predicts the level of waste of dustbin (Sharma et al, 2018). According to Ali et al (2018) the ultrasonic measures

estimate the waste level by sending a sound wave at a particular frequency and listens the sound wave that is bounced (Rao et al, 2018). Moisture sensor predicts the waste content that is disposed into dustbin and segregates the waste stored relying on waste moisture content (Jadhao et al, 2018).

EXISTING SYSTEM:

In the existing system, typically the populace in the city locations is boosting day after day. These bring about the extra requirements of the resident in the metropolitan location. As the populace is enhancing the quantity of the waste generated is likewise high. The environments obtain filthy delicately. This causes extreme strike on atmosphere if it is not recycled and also there by impacts person's wellness.

3. AN OVERVIEW OF PROPOSED SYSTEM

This study's emphasis gets on even more energy-efficient IoT as an enabler of numerous applications consisting of waste administration. Particularly, it intends to provide a big collection of designs handling the effective waste administration. Unique interest is paid on the waste collection. It provides initiatives for the smart transport within the context of IoT and also Smart Cities for waste collection. They suggest an inductive taxonomy to do relative analysis of the checked versions. It concentrate just on initiatives that include ICT designs for waste collection They report on the stamina's as well as weak points of numerous versions to disclose their features. This study establishes the basis for supplying brand-new versions in the domain name as it exposes the demands for specifying unique structure benefits waste administration.
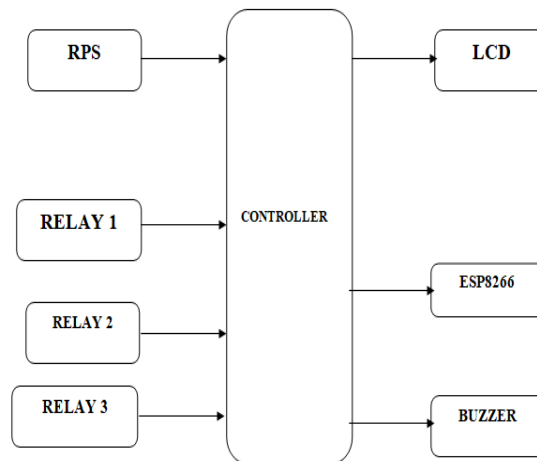

Fig.3.1. Proposed system.

RELAY:

Basics of IR transmitter and receiver transmitter and receiver are commonly used in engineering projects for remote control of objects. In particularly, in Robotic system uses transmitter and receiver. Here i would like to describe the basics if IR transmitter and receiver

Basics of IR transmitter:

An electroluminescent IR LED is a product which requires care in use. IR LED's are fabricated from narrow band hetero structures with energy gap from 0.25 to 0.4 eV. Infra red transmitter emits IR rays in planar wave front manner. Even though infra red rays spread in all directions, it propagates along straight line in forward direction. IR rays have the characteristics of producing secondary wavelets when it collides with any obstacles in its path. This property of IR is used here.

Fig.3.2. IR Sensor.

ESP8266:

Modules made with the ESP8266 by the third-party manufacturer Ai-Thinker and remains the most widely available. They are collectively referred to as "ESP-xx modules". To form a workable development system they require additional components, especially a serial TTL-to-USB adapter (sometimes called a USB-to-UART bridge) and an external 3.3 volt power supply. Novice ESP8266 developers are encouraged to consider larger ESP8266 Wi-Fi development boards like the NodeMCU which includes the USB-to-UART Bridge and a Micro-USB connector coupled with a 3.3 volt power regulator already built into the board. When project development is complete, those components are not needed and these cheaper ESP-xx modules are a lower power, smaller footprint option for production runs.
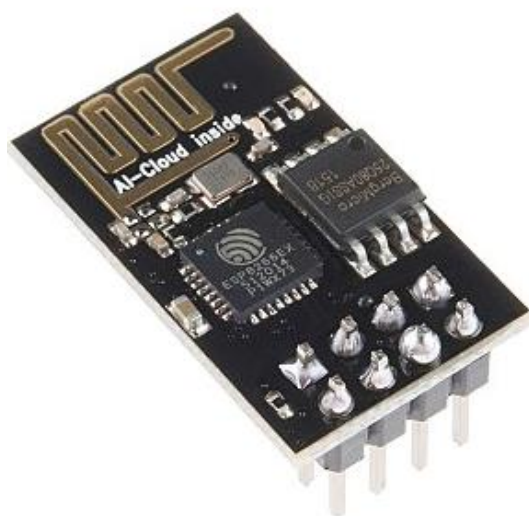

Fig.3.4. ESP8266 module.

OPERATION:

The brand-new age of Web as well as Internet of Things (IoT) standard is being allowed by the expansion of different gadgets like GPS, sensing units, as well as actuators. Mart tools (tools having considerable computational abilities, changing them to 'wise points') are installed in the setting to keep track of and also accumulate ambient details. In a city, this causes Smart City structures. Smart solutions might be provided in addition to such details pertaining to any kind of element of people' tasks. A case in point of solutions provided in the structure of Smart Cities is IoT-enabled waste monitoring. Waste monitoring entails not just the collection of the waste in the area yet likewise the transportation as well as disposal to the suitable areas. In this paper, we offer a

thorough as well as extensive study of ICT-enabled waste monitoring versions. Especially, we concentrate on the fostering of clever gadgets as an essential allowing innovation in modern waste administration. We report on the toughness and also weak points of different designs to disclose their qualities. This study establishes the basis for supplying brand-new versions in the domain name as it exposes the requirements for specifying unique structures for waste monitoring.
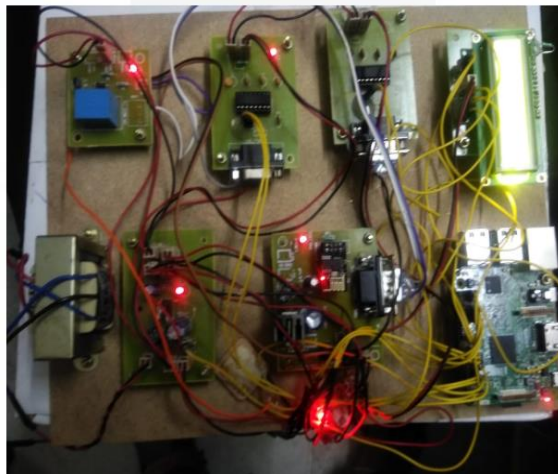

Fig.3.2. Hardware kit image.

4. CONCLUSION

In this project, we propose a new solution to enhance waste collection efficiently using the Arduino Uno with Arduino Ethernet Shield technology and ultrasonic sensor systems. In this proposed system, the garbage overflow of garbage can be avoided and managed efficiently. This will intimate or send SMS or email to the authorized person through Ubidots platform. The garbage managing system and the facility of collecting the garbage presently doesn't fit to the current requirement. Hence better facility of collecting garbage and transportation should be provided. Since, this system provides the information when the bin gets completely filled with garbage, it reduces the number of times the arrival of vehicle which collects the garbage. This method finally helps in keeping the environment clean. Thus, the waste collection is made more efficient.

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