SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

Waste management is an important issue that needs to have a concern in every country including Indonesia. As reported by the Report of Study from Ministry of Environment and Forest,that only 38, 653 million tons of waste handled in 360 cities, and garbage increased 7% from 2015-2016 . Waste management in Indonesia at this time, is still limited and manually,the officer will clean up at a specified time according to the schedule, this is very ineffective because the trash can has been fully before the garbage collection schedule, the delay of garbage collection will cause the garbage on the trash can overflow and smell. Waste volume produced by inefficient waste management would cause insects, bacteria and viruses multiply rapidly that can infect humans . Traditional waste management through a garbage burning system would cause air pollution produced, which can be health problems to the surrounding With a large amount of waste, Indonesia certainly needs a system to assist the waste management process properly and efficiently.

**THE FIRST REASEARCH PAPER**

The idea of smart garbage bins and systems have been in discussion for quite a long time. The technologies used at disposal to develop this smart system have also evolved, Internet of Things (IoT). Each idea seems to be similar but is slightly different at its core and our proposed work is no exception from the same. After the IoT field, finding its hold in our lives, this is our original plan for designing a smart garbage collection system which has provision for citizen participation and analysis of data for better decision making. At hardware level, the smart system is a garbage bin with ultrasonic sensor, a micro-controller and Wi-Fi module for transmission of data. The worldwide implementation of Internet of Things is possible with a Cloud centric vision. This work exploits the future possibilities, key technologies and application that are likely to drive IoT research. But a strong foundation to our work is provided, where the basics and applications of Arduino board is explained . It is quite interesting as it implements a GAYT (Get As You Throw) system concept as a way to encourage recycling among citizens. As we would discuss further, the citizen participation part of our system is quite influenced by their work. In this we are changing the base with node MCU break board

**THE SECOND REASEARCH PAPER**

RFID technology is used for collection of data regarding garbage container. RFID tag detected within the frequency range and when any tag comes to the range of RFID reader, it automatically reads data from RFID reader, then filters collected data and arranges it into specific formatted SMS. After that, the data is sent to central server sends the information to the web server as well as authorized person’s mobile phone. But in this we are changing the total system that the information as been collected by the IOT will be delivered to the service that as been run under the waste disposal system of the government that will not affect any surrounding and citizens.

**THE THIRD REASEARCH PAPER**

This Paper proposed a method as follows. The level of garbage in the bin is detected by using the ultrasonic sensor and communicates to control room using GSM system. Four IR sensors are used to detect the level of the garbage bin. When the bin is full the output of the fourth IR is active low and this output is given to microcontroller to send a message to control room through GSM In this paper ZigBee, GSM and ARM7 controller is used to monitor the garbage bin level. When garbage bin is full, this message of garbage level is sentto ARM7 controller. Then ARM7 will send the SMS through GSM to authority as to which bin is overflowing and requires cleaning up. From this we are adding the LCD display system for showing the level of the bin has been stored in the garbage system.

**THE FOURTH REASEARCH PAPER**

The fourth research paper is similar system is interfaced with Arduino UNO board to send the alert text message about filled up-level of garbage through GSM technology. This system also indicates filled up-levels through color Light Emitting Diodes (LED)

In this section of second research paper the, a central system is used for Garbage Monitoring about filled up-levels of containers using General Packet Radio Service(GPRS) technology. It also provides compression mechanism to handle overflowing garbage . In the last paper, garbage level is supervised through an Android app and a location of nearest container is traced with Global Positioning System (GPS) and the authorized person gets to the place easily on time.

Most of the research related with Garbage Monitoring has been conducted in last couple of years.

Garbage compression and location tracking garbage the only additional functions implemented along with Garbage Monitoring .variety of microcontrollers / boards such as ARM7, PIC and Arduino board, are used in implementations of Garbage Monitoring systems.

Mostly Wi-Fi or GSM technologies are used as a one way communication medium. widely ultrasonic level sensor is used to detect level of garbage in the containers.

Last but not least , Internet of Things has provided a promising opportunity to build powerful industrial applications which have been deployed in recent years. Using IoT a smart and organized system is designed for measuring garbage level in the bin and dc motors powered platforms are used to segregate dry and wet waste.in order to reduce the time consumption an alert message is sent to the employees and cloud when the dustbin is full .