Computing Waste Management Using Cloud Platform and Sensors

M. Govindaraj and Vedanth Ramachandran

Abstract--- A happy and hazard free development of our city promotes growth in the field of information and Communication Technology. The issue of waste and hazardous garbage in our city has caused acute problem of managing it. We see that we have number of garbage trucks roaming around in our city, collecting waste which has turned out to be inefficient as we see that part of them may have turned away from their given responsibilities and tasks, due to which we face difficulty in the procedure of conventional waste collection approach. The purpose of this paper is to introduce an efficient and technological waste management system that will enable us to handle the process dynamically and provide the best way in utilizing manpower efficiently. In our model approach, the weighted and volume waste which are thrown in the waste bins are collected by economical sensors and then sent to cloud server using a micro-controller and GPRS. This data is used to find the waste collected and report to the system about the area and location. This phenomenon could help the team to collect the lump sum waste by locating the nearest vehicles and scheduling a task to clear up the waste bins and by sharing the driver the shortest route possible .This paper proposes a model to keep our city free from garbage therefore ensuring good health for all.

Keywords--- Conventional Waste Collection Approach, Micro-controller, Economical Sensors, Cloud Platform, Internet of Things.

I. INTRODUCTION

Today in our society we see that waste and effective disposal has become a serious issue to compute Waste Management is the process which involves the activities such as collection, transportation and disposal of garbage. Waste can be in the form of solid, liquid, or gaseous state and each type have different methods of disposal and management. when the waste is not properly handled it has given birth to human and biological problems such as growth rate of harmful bacteria and insects, Rotting garbage is also known to produce harmful gases that mix with the air and can cause breathing problems in people, when waste encountered with water causes problems such as cholera Typhoid and many type of diarrheal diseases , when we inspect the vegetation around landfill sites carefully we can determine the damage that can be caused by garbage and waste if left untreated in the open causing damage to the soil, which would lead to the loss if fertility. Waste has also impacted a change in climatic condition of our city by which we see in sudden rise and decrease in temperature also affecting our surrounding ecosystem.

Waste management practices are not uniform among our city as a lack of manpower power management as they fail in providing adequate collection services, pollution free disposal caused due to ineffective monitoring and task allocation which has resulted in turning the area or sector into an uncontrolled dumpsite Waste collection and rubbish disposal play an extremely important role in the global cleanliness and sustainability drive, with people's

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health and the conservation of resources being the responsibility of every individual government and industries to take appropriate action in bring up a safe and healthy environment. Monitoring and active task allocation plays an important role in motivating productivity and achieving one's goals. Through this paper we put forth a system which will help in monitoring and managing waste and manpower using the application of cloud infrastructure and economical sensors by which waste can be efficiently managed such that we can determine on providing a clean, healthy and neat city.

In [4] the web based and mobile application systems which are developed for waste management intends to minimize the human resource, budget, time and also protects the environment for the healthy living of the people.

II. MANAGING WASTE WITH THE APPLICATION OF CLOUD AND SENSORS

Cloud computing today has proved of being a new paradigm in field of development cloud computing refers to the delivery of computing services such as servers, storage, databases, networking, software, analytics, intelligence and more through the medium of the Internet which implements faster innovation with flexible resources and motivating economies of scale.

In [3] the different technologies like Radio Frequency Identification (RFID), Global Positioning System (GPS), General Packet Radio Service (GPRS), Geographic Information System (GIS) and camera technology can be used to develop web based and mobile application for waste management.

A sensor is a sophisticated device that measures a physical quantity like speed, pressure, volume, moisture and converts them electric signals that can be stored as data which can be further evaluated to perform the required tasks.

Working of Sensors with Cloud

An Internet of Things system consists of sensors/devices which transmit data to the cloud through various mediums of connectivity. Once the data gets to the cloud, the software processes it and then based on the data it would decide to perform an action, such as sending an alert or automatically adjusting the sensors/devices which will help the user in taking necessary steps to achieve their set goals. In [5] the central idea of this system is it collects data from sensors and delivers it to the cloud server system, the data is processed in the cloud and the necessary action is initiated.

Application of Cloud Platform and Sensors Used in this Proposed Model

Software as a service (SaaS): This is a cloud computing model where a provider hosts applications such that it would make them available to user over the Internet. In our model we have used application of SaaS which would help the end user to download software application which has features such as GPRS, maps, and monitoring system.

Platform as service (PaaS): This is a cloud computing model in which a provider delivers hardware and software tools for application development to the users over the internet hosting on its own infrastructure.

Tilt Sensor: A tilt sensor is an instrument that is used for measuring the tilt in multiple axes of a reference plane. In our model this system is used to measure the level of tilt such that it could detect any sort of abnormal position (fall, theft)

Fill level Sensor: The Metro is the most versatile & advanced fill-level sensor on the market. Utilising various communications, the device provides accurate fill-level reporting for many container types in our model it is used to detect the capacity filled in dustbins.

Temperature sensor: A temperature sensor is a device that detects and measures hotness and coolness and converts it into an electrical signal. In our model this sensors are used to measure the level of temperature which will help the system in predicting the level of toxicity

Smell sensor: A smell sensor will detect is used to detect the smell form any dataset. In our module the smell sensor is used to detect the level foul smell caused by hazardous waste and spray anti- infectors.

Sensor protection: A sensor protection cap is used to protect sensor components from getting exposed to external damage or harm.

III. EXISTING MODELS

As Waste Management is a dynamic vast field there are many models designed for obtaining an optimal solution to the problems some of the existing models are:

Smart garbage disposer: It is a model designed using sensors to identify what type of waste it is depending on that it would help the user to dispose it into the correct garbage bin.

Smart Dustbin: It is the garbage bin created with sensors which can identify the volume level in the bin

Bio Bins: It is a type of bin which will help the users in decomposing wet wastes.

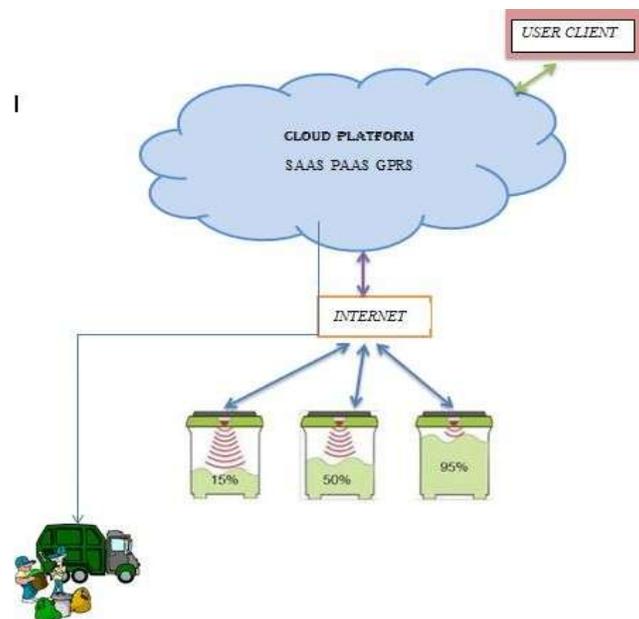## IV. PROPOSED MODEL

A. Working of the Large Model

Fig. 1: Image Showing the Working of Large Model

This model is equipped with sensors liked to the internet via the users phone .this model will regularly update the data to the users application. The user through the application can connect to the site of the client (ex BBMP office) and request for a service to collect the garbage. If the user wishes to launch a complaint or a feedback or contact authorities he will be able to do that from the mobile application portal.

Fig. 2: Image Showing Working of Domestic
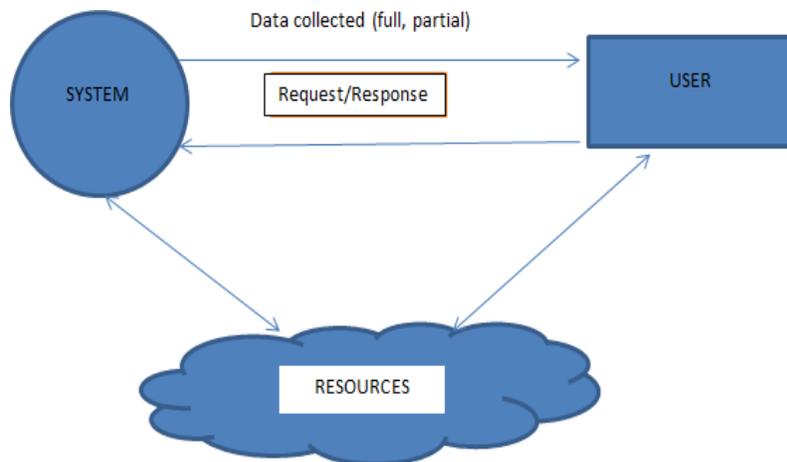
B. Basic Functionalities of the Models

Fig. 3: Image Showing Working Functionality

The model is equipped with sensors connected to the cloud via the internet provided by local service providers this. When the garbage is full it will send data via the cloud to the client system (ex. BBMP office) and share its location. The Manager in charge will deploy the worker and share the location over the cloud and direct him to clear the bin.

C. Working of the Domestic Model

Both models basically follow a sequence of instruction where once the system is full or partially full the data is given to the user through the cloud platform once appropriate actions are taken the user is given access to deploy

instruction for executing the event .

V. FUTURE ENHANCEMENT

Information and communication technology is has a wide scope in various fields .In This system we can further connect to Data store such that such that the user can access information from any part of the world even through different service providers.

Further implementations can be done such as composite waste segregation and remote sensing.

VI. CONCLUSION

Waste Management has always been a prominent point of concern in our society .The application of cloud platform and IoT has not boosted the field of information and communication technology but has also has provided the scope in expanding its features in various fields.

With the help of these technologies our model will help us in implementing and managing manpower and tasks such that we could help our society to be greener, healthier and clean.

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