

“Digibin”-a smart way of sorting solid waste

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Abstract— Waste Management is the pervasive problem. Nowadays and rising continuously with rise in urbanization. Waste is always the mixture of different types of material. The main goal of this project is to design and develop a sorting system that is portable and also sorts the waste automatically. It’s an eco-friendly automatic system. With the Proliferation of Internet of Things (IOT) Devices as Such as Smart phones and Sensors, this Project describes the effective management of solid waste using embedded system. The solar panel and H-bridge are used by the motor to make the system portable. The moving system stops when a non-living obstacle arrives and takes a turn. Otherwise gets the inputs from the waste dumped by the person which is detected by the sensor. The sensor sends a signal to micro-controller where it decides the type of waste (biodegradable and non-biodegradable) and separates it automatically and moves forward. Here the IOT module is used to control and monitor the waste. The system consist of mobile app which receives a message when the dustbin is full (3kg) makes the system to alert and the information is sent to the authority who own the and it resend the meesge to the bin for automatic disposal to the dump site. It even includes database of wastage collection on the particular day.

I. TECHNOLOGY: PART OF IOT IN THE PROJECT

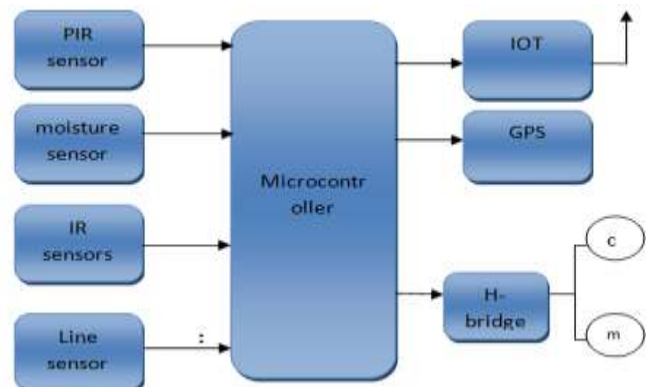
The information or the database of the dustbin on a particular day is made enabled to people to look in into the android application called “Mr.Bin” and it also can be viewed by the Waste management organization. The IOT is also applicable to send signals(messages) through web-base software application when the dustbin is full.

II. INNOVATION PART OF THE PROJECT

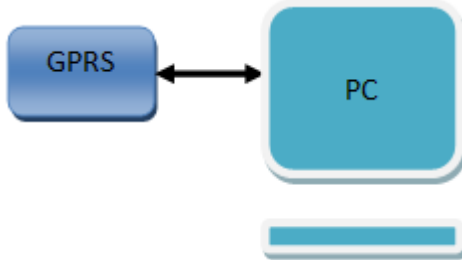
Our project can be implemented for historical monuments and pilgrimages that may also includes tourist places such as parks ,gardens ,beaches etc .But specifically lets go with the monument places and pilgrimages.So,the installation of process includes a tech bin, sensor(IR sensor, metal detector sensor, weight sensor, obstacle sensor), IOT module to instruct bin facility, a lid for management of waste segregation ,a motor and solar panel for the portability of the tech bin, GPS to keep the track of the bin. System is provided with the solar panels and H-Bridge which makes the system to be in motion, an IR sensor is interfaced in front of a bin which detects the obstacle arrived and this alerts the system to stop. The sorting part of the system starts if the waste material is placed on the lid, then the sensor transmits the signal and that signal is received by the microcontroller, depending on the signal received the lid of the system works. If the signal is transmitted by the metal detector then the lid tilts towards the bin that collect the non-biodegradable waste. If the signal is transmitted by the IR sensor then the lid tilt towards the biodegradable bin. In

case no signal is transmitted by the either sensor the waste may be plastic bottle, glass bottle or polythene bag, then the lid tilt towards the bin which collects the non-biodegradable waste. Another IR sensor is interfaced in front the bin which detects the obstacle if it is a person who is arrived to throw the waste it takes input and moves forward in chance that the obstacle may be a non-living thing, in that case the system will automatically take a turn. once the dustbin is filled 90% it sends the information (message) to a App the bin and resend the signal to the bin for automatic disposal hence forth the bin does not take any waste and directly go to dumpsite for waste disposal .The information or database of the dustbin on a particular day is also stored in android application and this monitored information can be also sent to a web-based software app which can also be viewed by municipal wastage community.

Dustbin unit:



Monitoring(pc)



COMPONENTS USED

Hardware requirements:

- Microcontroller
- PIR sensor
- Moisture sensor
- IR sensor
- GPS
- GSM modem
- Driver circuit
- DC motor
- PC

Software requirements:

- Embedded C
- Kiel vision 4
- Dot net

III. EXISTING SYSTEM

The existing system only consists of separation of solid waste (wet dry) in the bin which is static and can be used only for the household purpose. Garbage disposal is done manually in the existing system. There is no IOT monitoring is done for the bin.

Purposed system

Our paper talks about separation of three types of waste in the bin itself .it is a portable system can also be used in commercial areas, disposal of waste also automatically done by the bin itself through the monitoring of the IOT based android application .

Advantages

- **.Power generation using plastics:** The waste containing plastic is further used in the generation of power. The below figure shows power generation system using plastics.

- **.Making money from waste:** The waste which we separate can get us some amount of money but saves huge amount of money by providing us good health and health is wealth.
- **One of the steps for Swachh Bharat:** Swachh Bharat campaign was officially launched on 2 October 2014 at Rajghat, [New Delhi](#), where Prime Minister [Narendra Modi](#) himself cleaned the road.

Disadvantages

- **Mixed waste cannot be separated:**

Using our Smart dustbin mixed waste cannot be separated.

- **Cannot be used for large waste:**

Our smart dustbin cannot be use for large size waste.

IV. CONCLUSION

Waste Segregation using Robotic dustbin has been successfully implemented for the segregation of waste into metallic, dry and wet waste at root source. So that we can have a clean and smart tourist places. One of several environmental problems is bad waste management practices which can result in land and air pollution and can cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body. The method presented provides a fruitful way to come out of this problem by making entire system automated

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