**IoT based Smart Garbage System**

Alternative Title: Smart Waste Management Using Geo Tracking Of Waste For Sustainable Habitat

**Aim:**

The main aim of this project is to implement the best Garbage Management using IOT sensors and mobile technology.

**Synopsis:**

 The smart bin containers are equipped with ultrasonic, gas and fire sensors. The level sensor inside the smart dustbin provides the collection team with real-time information about fill level through the app, and helps to decide when and where to prioritize the collection. The flame sensor can alert the supervision team if incandescent waste is deposited through which the trash is set on fire. The gas sensor detects harmful gases like methane that are present in a dustbin. The garbage bin has GPS tracker that identifies the location of the bin. When the bin is about to overflow the notification of the location of the bin will be processed in the application. The nearest garbage collecting vehicle will receive notification about the situation. It will allow more flexibility in managing garbage locations. In some cases, the trash may be overflowing in the area where there are no bins or no proper maintenance of trash. In such a situation, citizen takes a picture and report through the app. The trash collector will be notified through the location embedded in the picture. This project helps to optimize waste collection and allows trash collector to deal and take necessary action immediately. The app allows to lodge complaint if no action taken, which will be monitored by the municipal corporation.

Existing System:

 Proper waste management is becoming a serious problem in developing countries resulting in deterioration of the environment and poor public health. Several factors contribute to this improper management of waste collection and processing in India like dependence on the services of small labors or waste pickers for the collection of waste and extraction of any potential value from the waste. Mixed biodegradable and inert waste are often dumped together with e-waste without any segregation. These workers do not utilize any efficient method for processing and disposal of the waste and often practice open burning of the garbage. Also, municipal corporations have budgets that are insufficient to cover the costs associated with developing the proper waste collection, storage, treatment and disposal. Local bodies spend around Rs. 500–1000 per ton on solid waste management (SWM) with 70% of this amount spent on collection and 20% spent on transport.

Problem Definition:

* Improper management of waste collection causes the environment unclean and hazardous.
* Burning of chemical wastes or electronic wastes causes serious health issues in respiratory system.
* Improper disposal of wastes accommodates huge area.

Proposed System:

 In this project, we propose a system (hardware, software and communications) intended to improve waste management and prevent hazardous wastes from exploiting the soil and environment and enable citizens to participate. This system follows an IoT based approach using smart bins that integrate several sensors such as ultrasonic, gas and fire sensors to supervise the state of the trash. Data is stored and processed through a mobile application which provides information about where trash can be found and collected. Notification alerts including the location will be sent to the nearest garbage collector truck if the waste exceeds threshold level through mobile application. Citizens can make use of this application to capture and upload pictures of unusual waste dumps apart from the garbage bins. The location of the waste dump will be embedded in the picture that the user takes and sent to the nearest garbage collector trucks to take necessary action.

**Objective**:

1. The project aims to improve the efficiency of waste management by geo tracking of smart dustbins.
2. To maintain a sustainable environment with inclusion of citizen participation.
3. To decrease human interaction with hazardous waste by using automated sensors instead of manual inspections.
4. To expedite the garbage collection process using geo tracking and reduce the number of trips required by garbage collection vehicle and thus reduce the expenditure associated.

**Architecture:**

Garbage Bin

Sensors

Citizen

Mobile App

Arduino Uno

Node MCU

Software Requirements

* Java jdk 8
* Android studio
* Arduino IDE

Hardware Requirements

* Arduino Uno
* Node MCU
* Gas sensor
* Flame Sensor
* Proximity Sensor
* Android Mobile \* 3