Geo tracking of waste, Triggering alerts and mapping areas with high waste index

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ABSTRACT

In this module waste collectors will upload video and this video will start playing and we need to consider this video as its playing from webcam or drone. Video player continuously scan images to find pattern match between current location and user uploaded waste images. If pattern in video matched with user uploaded waste images then application will inform to waste collector via bounding boxes.

Keywords—Routing system, Smart waste bins, Waste management system, Zigbee standard

INTRODUCTION

OUTLINE OF THE PROJECT

Waste management is one of the primary problem that the world faces irrespective of the case of developing or developed countries. The main issue in the waste management is that the garbage bins at public places get overflowed well in advance before the commencement of the next cleaning process. Problem: The current system for waste management includes numerous stages with tremendous man-power. Every time labours have to visit the garbage bins in the city area to check whether they are filled or not. And if they are filled, garbage bins are collected and disposed at closest landfill. If garbage bins are not filled, then the man-power invested goes in vain. A city like Pune has population of 31.15 lakhs (2012) is projected to grow up to 44.30 lakhs by 2027. And as the population increases, the waste generated by them will proportionally increase. Currently, about 1,600 to 1,700 tonnes of waste is produced daily in Pune city. This is growing on daily basis which is leading to various problems such as waste lying unprocessed in the city, protests by surrounding civilians. Swachh Bharat Abhiyan is a camp aign by the Government of India to keep the streets, roads and infrastructure of the country's 4,041statutory cities and town sand its rural areas clean. The mission is bifurcated into sub-missions as Swachh Bharat Abhiyan (Garmin), under Ministry of Drinking Water and Sanitation, and Swachh Bharat Abhiyan (Urban), under Ministry of Housing and Urban Affairs. It includes ambassadors and activities such as a run, national real-time monitoring and updates from NGOs. Also, proposed system along with realtime fill level information collected through monitoring platform substantially reduces the overflow of the garbage by informing operators of such instances before they occur. From areas not covered by door to door collection, markets and other public places waste is collected from container bins and brought to the ramps. There are an estimated 350 locations where container bins are kept and an estimated 500 plus bins are placed in these locations.

. **LITERATURE SURVEY:**

Title: Garbage collection Management System
Year: 2016
Author: P.A. Lokhande

Methodology:

Now a days, Garbage collection management is very important issue for cleaning the environment. Due to increasing population there is increase in garbage. This garbage contamination into an environment that causes a large irreversible effect, Absence of order, detriment or distress to the ecosystem. Especially developing countries as well as most populated cities are very badly affected by the population. Proper arrangement, categorization or classification of garbage is necessary to make environment clean, but improper disposal garbage cause to various issues like health problems, hazards, pollution. Garbage removal as well as management of removable garbage are performed the main role to improve the health of the people. For garbage collection management performed by manually in traditional way as well as by using modern technologies. Garbage management is performed by using various technical parts like sensors, Zigbee, GSM/GPRS, RFID, GPS and GIS.

In daily life, see the garbage bins situation which are overflowed and spread out garbage[3]. Because of this overflowed garbage generated harm full and toxic gases, disorder and ugliness. Avoid these problems, there is collection and proper management of garbage. The condition of being uninformed of cleanliness is spoiling our environment[4].The main problem in garbage collection and management system is deficient information about the collecting time and area. When garbage from bins spilling out results in pollution. Pollution is contamination of hazardous chemicals into environment. This has great effect on health as well as hygiene of the people. The main aim of this paper is to mainly focus on cleaning environment and reduce this issue from the roots.

In modern technique, there is smartly managing the process of collecting garbage. In that uses technological things like Sensors, GSM/GPRS, GPS, Zigbee, GIS, and RFID etc. These techniques are used for the long distance communication. When garbage bin is full the by using these technologies information related to garbage bin sent to the cleaner for cleaning purpose. Garbage bin is collected by the cleaner at particular time.

Advantages:

Garbage is collected in time with the help of sensors, so that it can reduce polluting toxic gases into air.

Disadvantages:

Monitoring system is not properly work for cleaning purpose, then causes the spreading of garbage and generates the toxic gases as well as disorder.

Title: Smart Garbage Monitoring System for Waste Management

Year: 2017
Author: Norfadzlia Mohd Yusof
Methodology:

Piles of rubbish are one of the major problems faced by most people in Malaysia, especially those who live in flats, as the number of bins is limited and shared among all residents. It may cause pollutions, which may lead to sanitary issues and diseases. This project presents the development of a smart garbage monitoring system in order to measure waste level in the garbage bin in real-time and to alert the municipality, in particular cases, via SMS. The proposed system is consisted by the ultrasonic sensor to measure the waste level, the GSM module to send the SMS, and an Arduino

Uno which controls the system operation. It supposes to generate and send the warning messages to the municipality via SMS when the waste bin is full or almost full, so the garbage can be collected immediately. Furthermore, it is expected to contribute to improving the efficiency of the solid waste disposal management.

Advantages

Smart garbage monitors system in order to measure waste level in the garbage bin in real-time and to alert the municipality, in particular cases, via SMS

Disadvantages

If system fails SMS cannot be send to municipality.

Title: Garbage level monitoring system

Year: 2018
Author: Omkar Pathak
Methodology:

The current system for waste management includes numerous stages with tremendous man-power. Every time labourers have to visit the garbage bins in the city area to check whether they are filled or not. And if they are filled, garbage bins are collected and disposed at closest landfill. If garbage bins are not filled, then the man-power invested goes in vain. As the population increases, the waste generated will in turn increase. This leads to filling of garbage bins more frequently and garbage remains unattended for a longer period due to lack of management. We can automate the whole process by monitoring levels of these garbage bins and send the notification once the garbage bin is about to fill. This will drastically reduce the wastage of man-power and would enable us to collect garbage only from those places that are about to overflow. Also, proposed system along with real-time fill level information collected through monitoring platform substantially reduces the overflow of the garbage by informing operators of such instances before they occur.

The basic idea of the project is to monitor the level of garbage bins in the vicinity in real-time. Once the whole system is installed and power supply is given to the main processing unit i.e. Raspberry pi, it runs the program and activates Ultrasonic sensor. Sensor detects the garbage level in the bins and the result is provided to the server. This provides administrator a visual report of waste level in all the garbage bins on the server dashboard and he can monitor all garbage bin levels from a single location. Also, necessary actions can be taken on those bins whose garbage levels are above the threshold value. This helps in automating the process and reducing the wastage of man-power.

Advantages:

In this, the monitoring level of garbage bins in the vicinity in real-time. And Monitoring can be done from single location.

Disadvantages:

If Raspberry Pi is damaged then we cannot monitor the level of garbage.

Title: GPS based garbage tracking system

Year: 2019
Author: Rohan David, Roopa K Ghatke
Methodology:

In this paper, an innovative way to solve the issue of Garbage collection is proposed by designing an efficient system as standout point when compared to the previously proposed garbage collection systems. In present smart garbage collection system, smart dustbin(s) filling with waste would be located and an alert would be sent to the

parent server connected by Wi-Fi to communicate with the system server. The system would automatically generate an efficient route to the available garbage trucks enabled with smart GPS monitoring system, which in turn would be integrated with an algorithm for maximum collection of waste and fuel efficiency. In the present work the system is designed in such a way that the customers would also be able to book for a personal garbage disposal. The customers or the agencies can communicate with this system directly via an application designed specifically for booking and tracking purposes.

Advantages:

GPS tracking is done, so that garbage collection can be done easily.

Disadvantages:

In this, sensors are used, which is not cost effective. People cannot afford it.
Title: first_page
settings
Order Article Reprints

Title: A Smart Waste Management Solution Geared towards Citizens

Year: 2020
Author: Kellow Pardini

METHODOLOGY
3.1 Existing System

The ultrasonic sensor measures the amount of waste in the dustbin and the servo motor is used for opening its lid when a user scans the QR code present on it. An accelerometer MPU3250 is used for monitoring the orientation of the dustbin and an SMS alert is generated if there is any tilt in its position. This ensures that the vertical orientation of the dustbin is maintained and no spillage occurs. A Bluetooth module is used for sending the authentication prompt of QR code from the mobile application to the microcontroller in the dustbin. A XBee module is used for transmitting the amount of waste present in the dustbin to the central station. This data transmission is done through a mesh network of such XBee modules from different dustbins.

Disadvantages:
- Hardware devices are used which makes it difficult to access the location of dustbins
- The complex structure makes it difficult to use
- Not much efficient due to device failure problems
- No real time data is used

Cannot connect to mobile devices and no GPS tracking

4.2 Proposed System:

In this we propose the ML model to a website which will help us to do object detection on the images captured by camera. All of the processing will be done on the website's server to provide a quick and accurate response. The website also allows the user to add images and location of waste lying in a locality and we can also give description about the waste which is

need to be cleaned and allows the garbage collector to see the garbage lying in an area. Description helps to notify the garbage collector about the waste present in an area to be cleaned up by the admin. All the operations performed by admin and garbage collector are saved in the database.

- Python
- Django
- Mysql
- Technologies and Languages used to Develop
- Python

ADVANTAGES

- No requirement of hardware
- Actual status of Bins collected across the city
- Better utilization of the resources
- Cleaner and better city
- The software application makes it easy to access
- It is cost effective

3.3 SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Operating System supported by
- Windows 7
- Windows XP
- Windows 8
- Processor – Pentium IV or higher
- Ram – 256MB
- Space on Hard disk – Minimum 512MB

SOFTWARE REQUIREMENTS

- For developing the application

SYSTEM ARCHITECTURE:
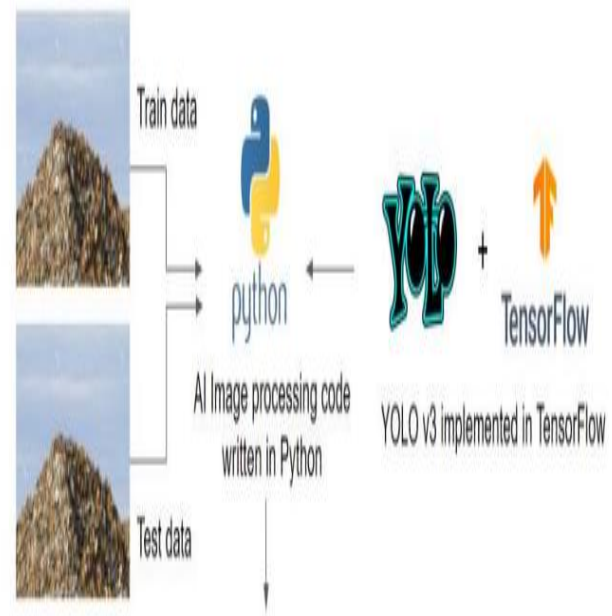
ALGORITHMS

CONVOLUTIONAL NEURAL NETWORL(CNN)

Convolutional neural network (CNN) is a class of artificial neural network (ANN), most commonly applied to analyze visual imagery. CNNs are also known as Shift Invariant or Space Invariant Artificial Neural Networks (SIANN), based on the

shared-weight architecture of the convolution kernels or filters that slide along input features and provide translation-equivariant responses known as feature maps. Counter-intuitively, most convolutional neural networks are not invariant to translation, due to the down sampling operation they apply to the input. They have applications in image and video recognition, recommender systems, image classification, image segmentation, medical image analysis, natural language processing, brain–computer interfaces, and financial time series.

CNNs are regularized versions of multilayer perceptrons. Multilayer perceptrons usually mean fully connected networks, that is, each neuron in one layer is connected to all neurons in the next layer. The "full connectivity" of these networks make them prone to overfitting data. Typical ways of regularization, or preventing overfitting, include: penalizing parameters during training (such as weight decay) or trimming connectivity (skipped connections, dropout, etc.) CNNs take a different approach towards regularization: they take advantage of the hierarchical pattern in data and assemble patterns of increasing complexity using smaller and simpler patterns embossed in their filters. Therefore, on a scale of connectivity and complexity, CNNs are on the lower extreme.

Convolutional networks were inspired by biological processes in that the connectivity pattern between neurons resembles the organization of the animal visual cortex. Individual cortical neurons respond to stimuli only in a restricted region of the visual field known as the receptive field. The receptive fields of different neurons partially overlap such that they cover the entire visual field.

CNNs use relatively little pre-processing compared to other image classification algorithms. This means that the network learns to optimize the filters (or kernels) through automated learning, whereas in traditional algorithms these filters are hand-engineered. This independence from prior knowledge and human intervention in feature extraction is a major advantage.
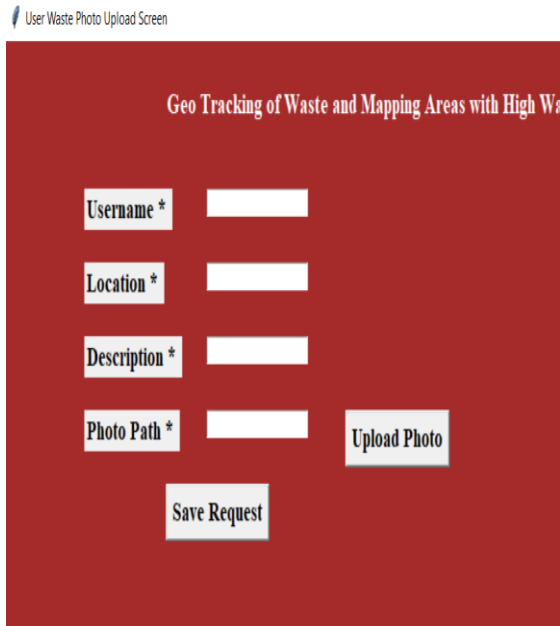
MODULES

User Module:

In this module user can upload waste images and add location details. Here student asking to display location in map but the problem is to display location in map we need to have latitude and longitude values then only we can display exact location in map and we don't have any sensor or devices to track latitude and longitude. So we can't use maps.

Waste Collector Module:

In this module waste collectors will upload video and this video will start playing and we need to consider this video as its playing from webcam or drone. Video player continuously scan images to find pattern match between current location and user uploaded waste images. If pattern in video matched with user uploaded waste images then application will inform to waste collector via bounding boxes.
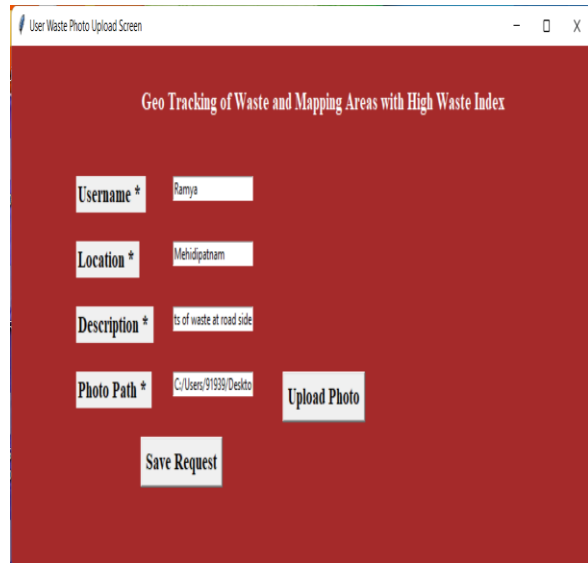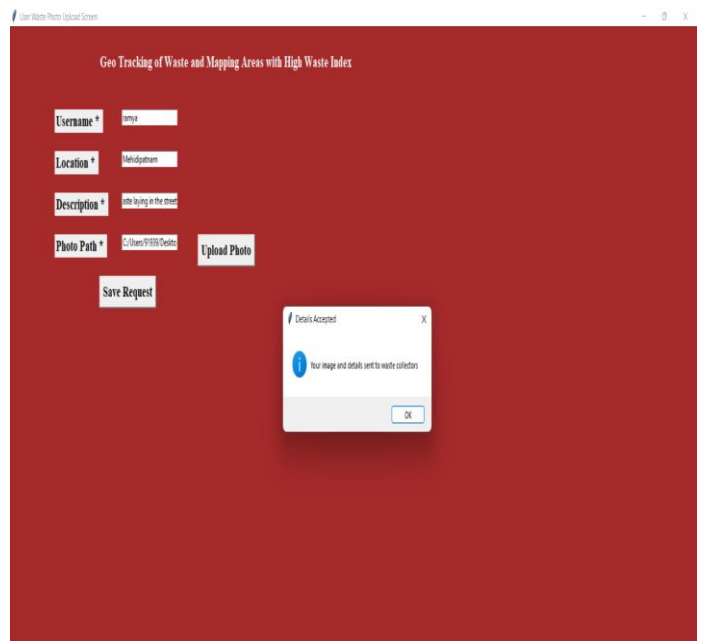
OUTPUT SCREENS

First run user module by clicking on 'Run_User_Module.bat' file to get above screen
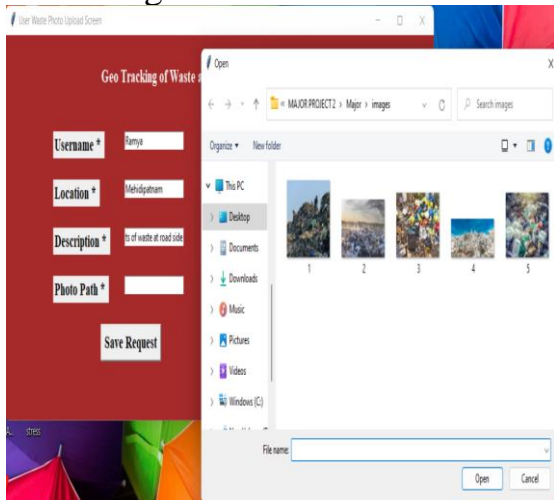
Using above screen user will enter location details with waste upload image
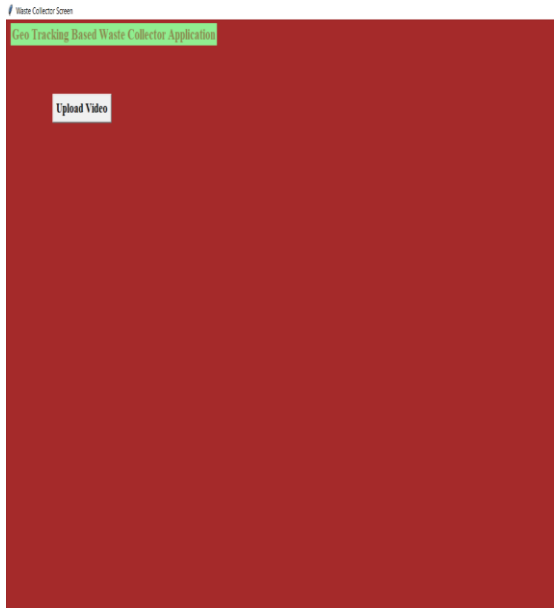

In above screen I entered some details and uploading waste image, after upload image will get above screen
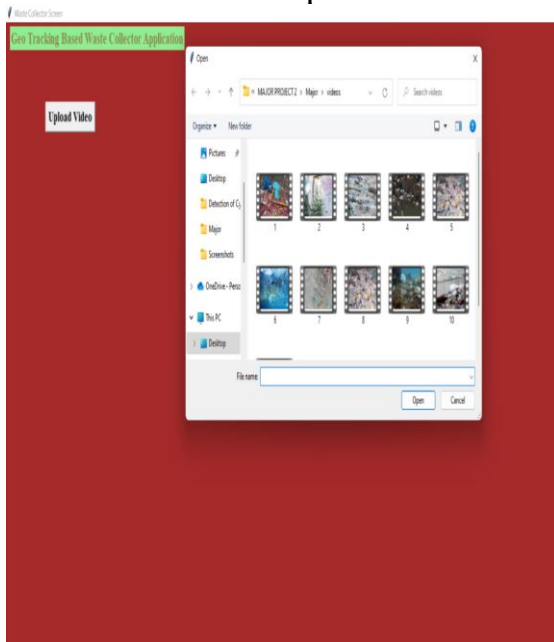

Now click on 'Save Request' button to send request to waste collectors

In above screen we can see user request details saved. Now close this application and run waste collector module by double click on 'Run_Waste_Collector.bat' file to get below screen

In above screen click on 'Upload Video' button and upload video

In above screen I am uploading one video and after uploading video will get below screen
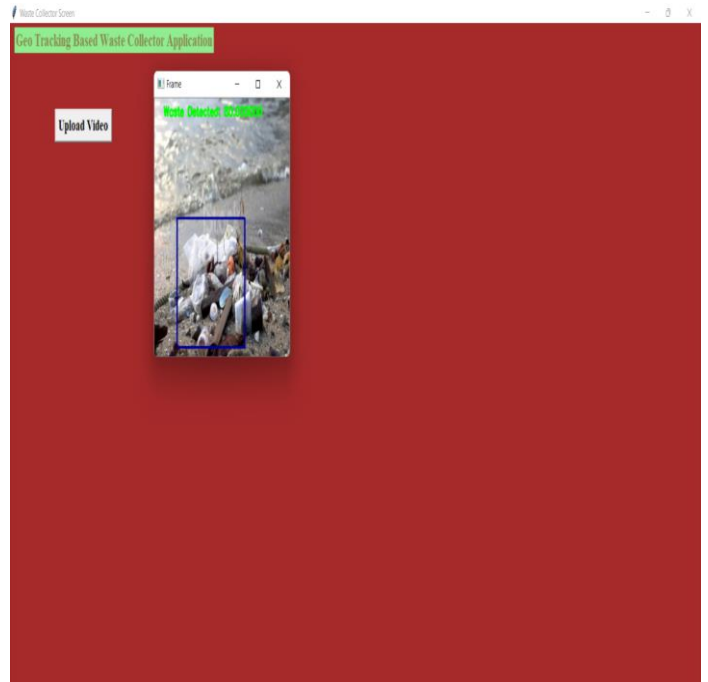
Here we can see that waste is detected in the boundary box

CONCLUSION:
This paper presents a geo tracking way of managing the waste, so that not only the whole process becomes efficient, but also, the

disposal of waste is done in a productive way. By using Geo Tracking, we believe that a lot of littered waste can be easily detected and tracked thereby helping garbage collectors to know where littered waste is present in an area all at one place on a map and take required actions on it, thereby saving time and eliminating confusions caused such as which area to be cleaned first. Also, by providing location and description, the garbage collectors can easily communicate with their administrators thereby reducing friction and chaos caused by communicating through various methods. We used CNN algorithm to detect waste. We got 80% accuracy.We are glad that our system will be useful for all small waste cleaning organizations and NGOs for cleaning waste efficiently and thereby contributing to a cleaner, greener and litter free environment.

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