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ASSESSING GARBAGE INFORMATION BY USING DEEP LEARNING ALGORITHMS

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Abstract

As we observe in our day to day life, the garbage that is thrown on the roads will be collected by the sweepers. This is mainly because of the random appearances of street garbage. In this application we implement the street cleanliness calculation and assessment of the garbage visually. This will be led to the development of clean city. The user has the provision to upload the image and assess the information.
Keywords: CNN,R-CNN**,** Deep Learning Algorithms

1.Introduction

A smart city is an urban area that uses state-of-the-art technologies such as the Internet of Things (IoT),Cloud computing [2] and other information technologies to manage and assess the resources and environment of a city in an efficient way [8]. The smart city concept integrates information and communication technology, and various physical devices connected to the network to optimize the efficiency of city operations and services [7].However, due to the rapid development of a smart city managers are facing huge challenges in how to develop and maintain urban infrastructure. Street cleanliness represents the spiritual outlook and humanistic atmosphere of a city. Keeping the streets clean is good for the development of modern cities. Currently, many major cities regard urban street cleanliness as one of the primary tasks of urban civilization. If the urban street cleanliness level does not pass the predefined standard, it will have a serious effect on citizen's satisfaction and also affect the overall reputation of the city. The European city cleaning network summit also points out that cleaning streets timely is an effective way to improve city cleanliness [6].

2.Previous Works:

As the country is developing day by day, responsibilities of each individual also increase especially when it comes to the maintenance of the country. This, problem mainly arises in urban places where population is more. In our daily life we find many garbage thrown on the road especially in the open plots or during any festival etc. It creates a problem to the persons of that residency. Based on the observations and the literature surveytaken, we found that

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many of the webpages are lacking with the assessing of information i.e. For e.g. if the user has reported the complaint, then no immediate action or reply is sent to the user to solve the problem.

3.Proposed system:

To overcome the disadvantages of existing system, proposed system came with the research on building a python-based webpage that helps the user to upload the image and post the complaint and will be receiving the reply. The main feature of this application is image detection which uses main concepts of neural networks i.e. CNN and Faster R-CNN which helps in identifying the image and counting the garbage along with many of the machine learning libraries and modules like OpenCV etc.

4.Main Technologies used in the Application:

1)Python:

Python is a programming language which supports object oriented, functional concepts and many features. The main reason python language used is due to the flexibility in the code and easy to use. Apart from that it supports and contains lot of machine libraries and deep learning concepts.

2)Django:

Django is a web-based python framework which supports lot of databases and ORM (object relational mapping). It provides a look and feel structure to the application through MVC.

5.Algortihms:

5.1.CNN:

Convolutional Neural Networks (CNN) is one of the main concepts of Neural networks that is used mainly for image detection. CNN is named after due to the hidden layers. The CNN mainly consists of 4 layers:

Convolution layer: apply filter o the image

ReLu layer: remove negative values

pooling: Decrease the computational complexity (Max pooling).

fully connected layers (combine the shrink filters into a single one)

5.2.R-CNN:

It stands for Regional Convolutional Neural network and in R-CNN we have

R-CNN

Fast R-CNN

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Faster R-CNN

R-CNN mainly comprises of a RPN (regional proposed Network) which is responsible for the square shapes to identify the image and R-CNN detector.

In this application we have used Faster R-CNN algorithm because it has more accuracy to detect and quantify the image.

6.Results

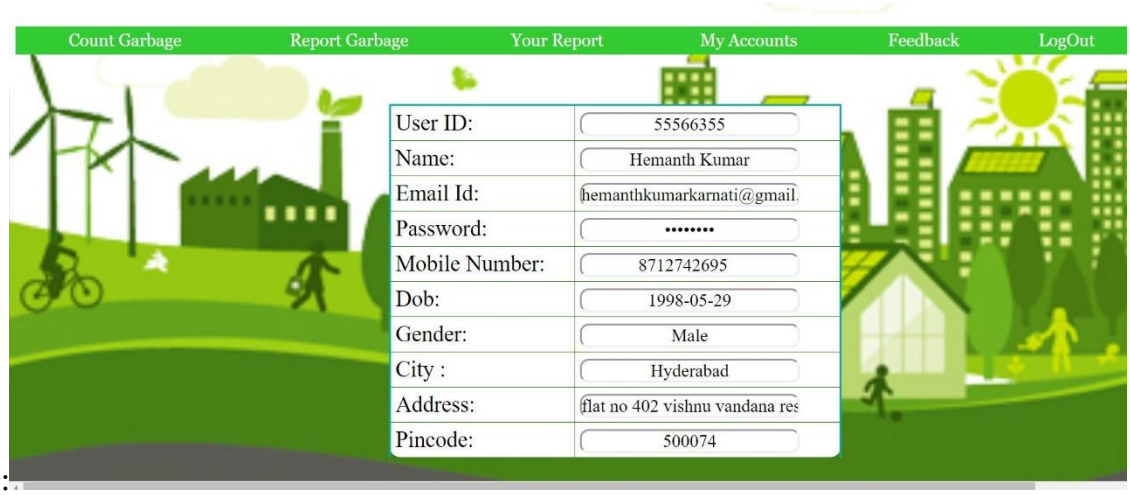

Fig 1: The details entered by the user

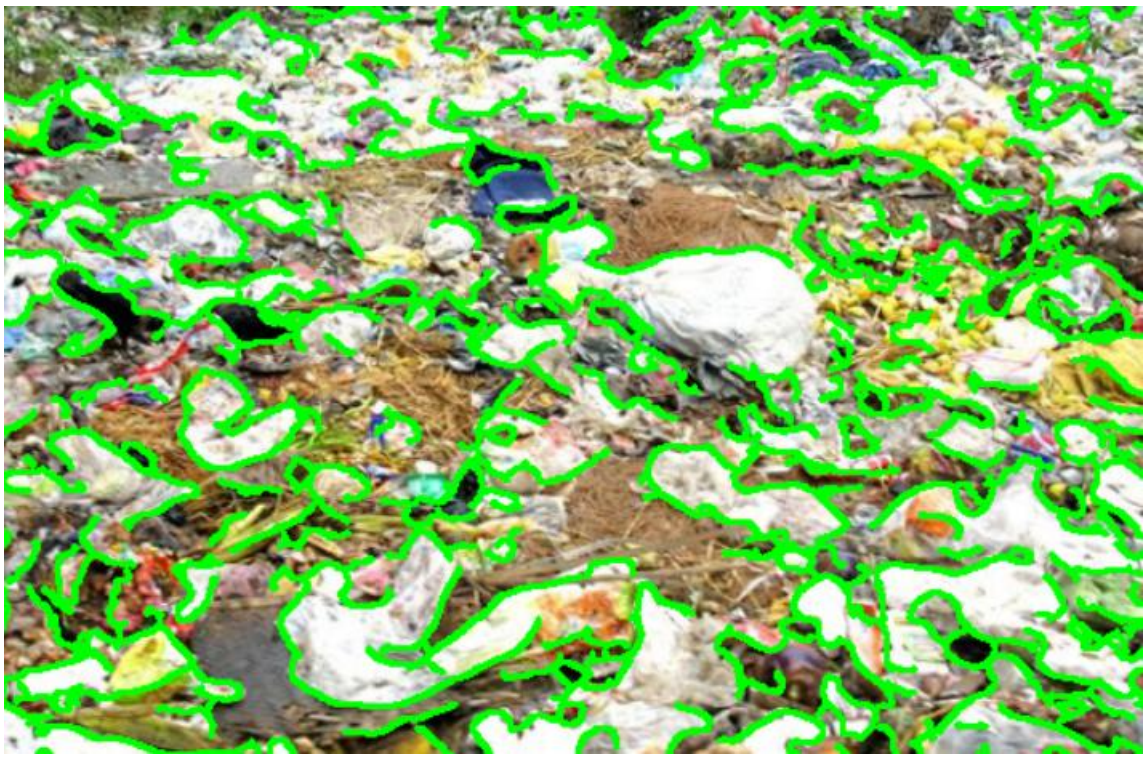

Fig 2: image detection

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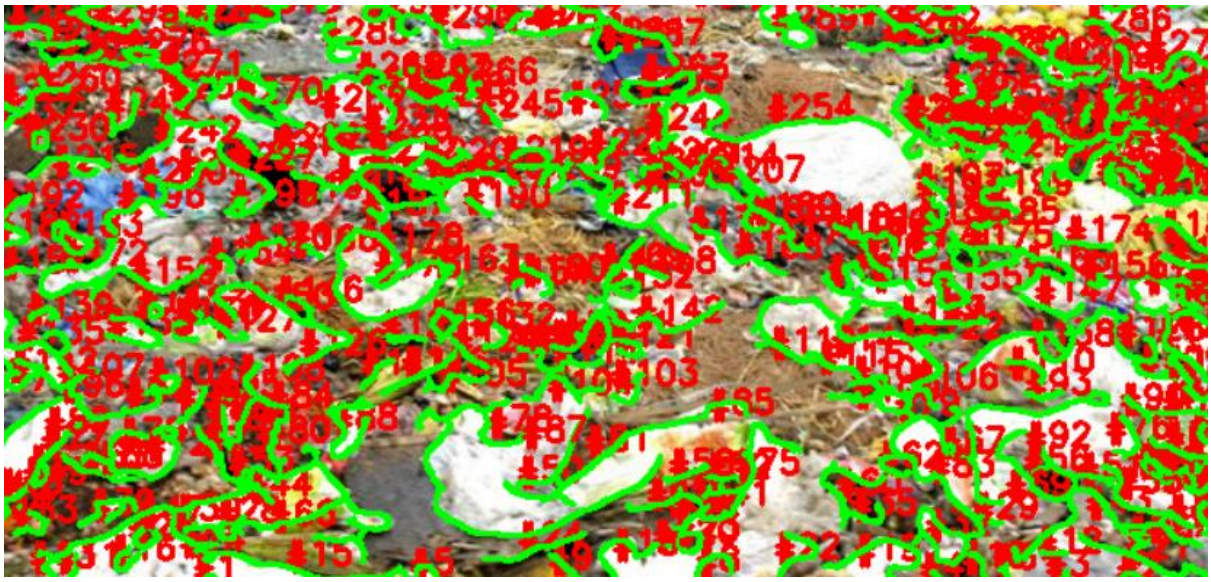

Fig 3: quantify the image

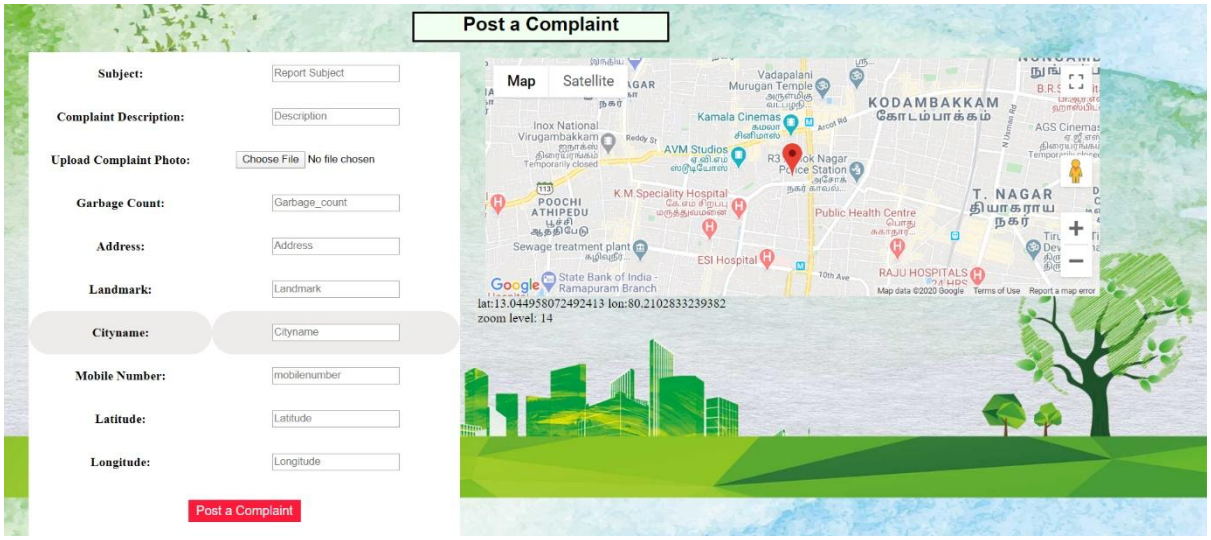

Fig 4: user provision to report complaint

UserName	Garbage Total Counts
Pragatheswaran	139
Pragatheswaran	293
Pragatheswaran	176
Pragatheswaran	139
Pragatheswaran	56

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Fig 5: the user who have uploaded the images and their garbage counts.

Complaint Photo	UsersName	Subject	Complaint Description	Garbage Count	Address	Landmark	Cityname	Mobile Number	Map	Status Update
	Pragatheswaran	Over Garbage	Clearance Of Garbage Dump	206	2 9 A Main Road SRM Hospital mysore	Opp Pallva Hospital	mysore	9790163802	View Map	Send Update

Fig 6: the admin sending the reply to the complained users.

Complaint Photo	UsersName	Subject	Complaint Description	Garbage Count	Address	Landmark	Cityname	Mobile Number	Report Status
	r.vignesh	garbage	problem of garbage	150	ramalayam street	sitafalmandi	secunderabad	8688405170	accept the problem

Fig 7: the users viewing the status sent by admin

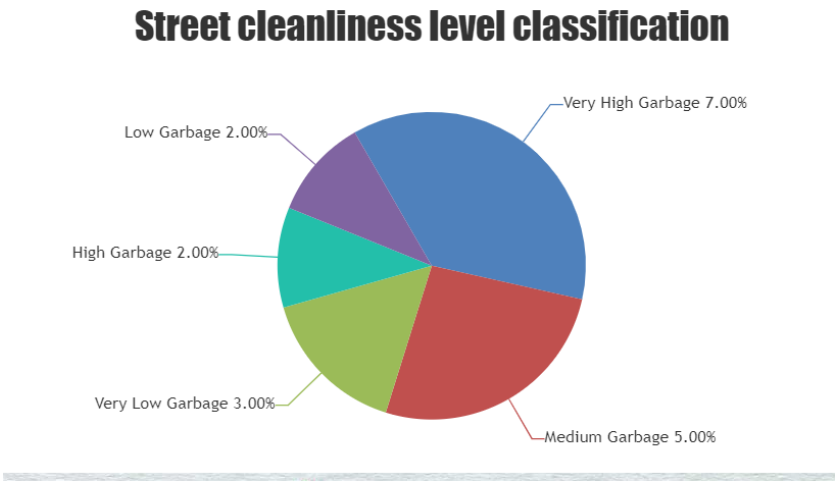

Fig 8: graphical analysis of the garbage

7.Conclusions

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The development of novel technologies has driven a numberof cities into the way to smart cities. Street cleanliness isone of the concerns for smart cities. Consequently, thispaper proposes a novel urban street cleanliness assessmentapproach using mobile edge computing and deep learning.A visual street cleanliness road diagram is presented, suchan automated system can help city administrators to knowthe cleaning state of the street easily. It has proved usefulSeveral directions for future work are possible. Thesedirections are described as follows:•We plan to develop a solution that can automaticallyimplement image filtering preprocessing at the mobile edge because manual filtering greatly affects thereal-time transmission and wastes time.Our model contains common street garbage data.However, the model does not play a great role inthe uncommon garbage data. Thus, the training data needs to be further expanded to improve the accuracy of the model.Our model is always used on sunny days, and the cleanliness on rainy days is also worth studying inthe future.

8.References

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