

Green Globe: A step towards green and clean world

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Abstract— In this paper, we would be working with technologies like image processing using OPENCV, image enhancement, image classification, auto notification sending using Python. Here, we will be working on a cleaner and well developed environment. We will distinguish Garbage, litters from the surrounding environment and broken social asset like road and send all the info to the respective govt departments like PWD/municipal corporation. Garbage disposal is one of the biggest problem so the person disposing off garbages on the streets are doing a crime. We propose another structure for recognizing the illegal dumping of trash in surveillance cameras. And although a few activity/conduct recognition techniques have been explored, these investigations are not really applicable to genuine situations since they are mostly centered around very much refined datasets. Since the trash dump activities in reality take a variety of structures, making another technique to unveil the activities as opposed to taking advantage of past methodologies is a very good procedure. We distinguished the trash dumping activity by the adjustment of connection between an individual and the thing being held by him/her. To find the individual holding thing of unique structure, we utilized a “background subtraction algorithm” and “human joint detection.” The individual held object was then followed and a “relation model” between the joints and items is fabricated. At long last, the dumping activity was recognized through the module. Also, the proposed structure is carried out in a constant observing framework through a quick web-based online algorithm. we will also see how to alert an user on detection of a person in the camera view or a broken. We will use a deep learning model for person and broken road detection and remaining work of cropping the detected person and sending it in a mail will be taken care of by OpenCV and Python.

I. INTRODUCTION

- Green globe would help us in the road maintenance
- Basically the photos which CCTV captures of roads will be processed through computer vision and check if road is broken. If found directly sent to the PWD officer through mail.
- As we will use Machine learning algorithms in the cctv camera which is placed on roads.
 - Through which it will automatically capture the road photos for the time to time maintenance
 - We will also add a feature which would distinguish garbages from the environment and would help us catch people who throw garbage anywhere except inside the dustbin. Photos will sent to the respective department.
 - If garbage is thrown in the roads, that photos also been captured by the cctv camera and sent to PWD officer so the road will be cleaned time to time.

II. LITERATURE SURVEY

1. *Road Damage Dataset 2019*, Maeda, H., Kashiyama, T., Sekimoto, Y., Seto, T. and Omata, H. (2020)

Combining a progressive growing GAN along with Poisson blending artificially generates road damage images that can be used as new training data to improve the accuracy of road damage detection.

2. *Road Damage Detection and Classification Using Deep Neural Networks with Smartphone Images: Road damage detection and classification*, June 2018, [Hiroya Maeda, Yoshihide Sekimoto](#)

SSD using Inception V2 (GPU) 63.1

SSD using MobileNet (GPU) 30.6

SSD using MobileNet (smartphone)

3. **Litter-detection-tensorflow, Spring 2018, Dr. Shaun-inn Wuu** Team chose to use the API “TensorFlow” to develop the algorithm, “Jupyter Notebook” to give interface to the algo, and an “Amazon Web Services” in “Ubuntu server” to train the algo. Using TensorFlow’s already trained model and its associated “COCO” dataset, it was able to have a base for the object detection part of the project’s developmental activities.

III. METHODOLOGY

1. **To detect damaged Roads**, we are utilizing “Road Damaged Dataset” containing trained models and leveled pictures. Pictures are introduced as a similar type to “PASCAL VOC”:- trained Models are SSD Inception v2 and SSD Mobile Net

 - Road Damage Dataset (dataset structure is the same format as PASCAL VOC) of Adachi like :- JPEGImages - contains images, ImageSets - contains text files that show training or evaluation image list and Annotations - contains xml files of annotation

Required library

We recommend [Installing with virtualenv](#).

- tensorflow 1.4

The Definition of Road Damage

Table 1: Road damage types in our dataset and their definitions.

Damage Type	Detail	Class Name	
Crack	Linear Crack	Longitudinal	D00
		Wheel mark part	D01
	Lateral	Construction joint part	D10
		Equal interval	D11
		Construction joint part	D12
Alligator Crack	Partial pavement, overall pavement	D40	
Other Corruption	Rutting, bump, pothole, separation	D43	
	Cross walk blur	D44	
	White line blur	D44	

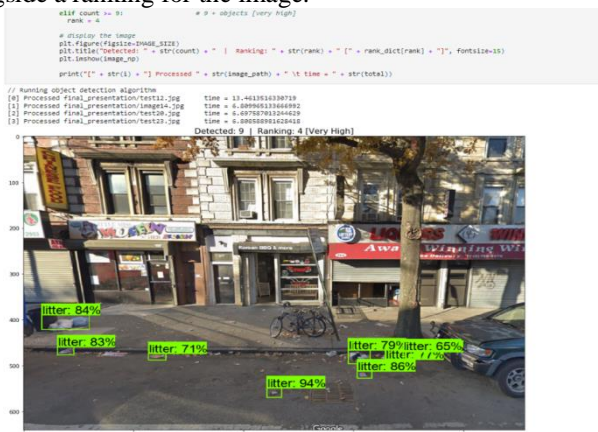
Source: Road Maintenance and Repair Guidebook 2013 JRA (2013) in Japan.

Note: In reality, rutting, bump, pothole, and separation are different types of road damage, but it was difficult to distinguish these four types using images. Therefore, they were classified as one class, viz., D40.

2. **To detect Garbages around the corners, roadside** we utilized the API “TensorFlow” to develop the algorithm, “Jupyter Notebook” to give interface to the algo, and an “Amazon Web Services” in “Ubuntu server” to train the algo.

The objective was to carry out the trash recognition part of the algo and to execute the recognition, nonetheless, the group will initially have to train the marked dataset as per its requirements. The group previously divide the “dataset” into 2 sets; 81 % of pictures are utilized for training and left are utilized for testing. Like Fix-it, we train the algo to specific measure of "steps", creating a needed “checkpoint” file which is then use to test the accuracy of algo’s trash recognition. This “checkpoint” file showed to the group when to pause the training and then test algo to confirm its learning progress. We utilized RCNN model to recognize litter from pictures pulled off of google streets.

When the training is done, team tried the algo with different kinds of pictures. Those pictures that didn't have trash in that “dataset” are likewise utilized here. The group expected to ensure algo wouldn't confine different items pictures regardless of whether there was no litter in the image. Last result has the algo only box parts of trash with more than a half certainty (50%), alongside a ranking for the image.



3. Object Detection Notifier

Detect objects, capture it and send them to mail with the image attachment : Here we will be using Vignesh karthik Kumar’s git repo, as it already prep by him. We ll need to use “SSD Mobilenet v2” trained with “COCO” dataset using API of Tensorflow.

Requirement:

Imutils == 0.5.4

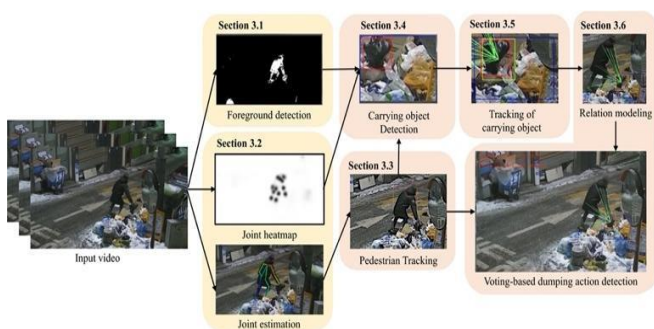
opencv-python == 4.5.3.56

Numpy == 1.21.2
 pkg_resources == 0.0.0
 pip==21.2.4
 Scipy == 1.7.1
 Setuptools == 57.4.0
 Wheel == 0.37.0

In Process:

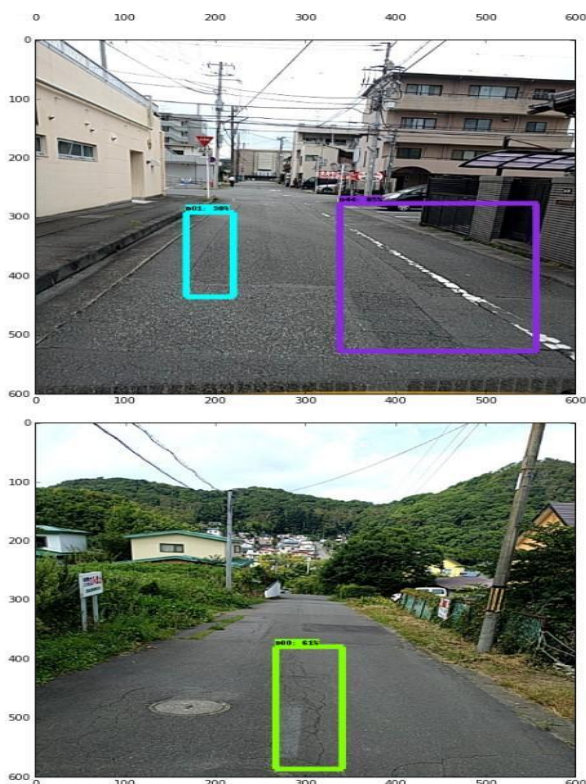
4. Vision-based Trash dumping activity and movement detection:

In this paper, they propose another structure for recognizing the illegal throwing of trash in genuine surveillance cameras. However a few activity/conduct recognition techniques have been explored, these investigations are not really **applicable** to genuine situations since they are mostly centered around very much refined datasets. Since the trash dump activities in reality take a variety of structures, making another technique to unveil the activities as opposed to taking advantage of past methodologies is a good procedure. We distinguished the throwing activities by the adjustment of connection betn an individual and the thing being held by him/her. Finding individual holding matter/thing of unique structure, we utilized a “background-subtraction-algo” and “human-joint-detection.” Individually held thing was followed and the “Relation-model” between the “joint” and items were fabricated. At long last, the dumping activity was recognized through the module. Also, the proposed structure is carried out in a constant observing framework through a quick web-based online algorithm.



IV. EXPERIMENTAL RESULT

1. Damaged Road Output



After Training when real life photos are provided, they boxed the broken parts of the road with the damage ranking (i.e scale of damage). Refer to “**The Definition of Road Damage**” to know how we classified different scales of road damages.

2. Litter detection Output



Here the Algorithm successfully identifies the litters thrown in the road with 50% certainty.

V. CONCLUSION

Safe and Clean Roads and environment would ensure a healthy environment for our future generation, more strong India can compete with the world to become the most respected , powerful and well maintained country. Stricter the clean India rules with advance technology ensuring its strictness will help the society. So in conclusion I will like to thank Our University, Our Project Guide Mr. Kiran Kumar A for giving us the platform to fulfill our dharma of “Raj-Seva” and let us help our country.

VI. REFERENCES

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