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An Approach to Restrict Animal Vehicle Collision in Wilderness Using Object Detection with Convolution Neural Networks

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ABSTRACT: Animal vehicle collision is beginning to increase in our country. Though it hasn't been noticed a lot it still remains to be unsolved issues. Keeping sign board on the roadside and maintaining analyzer based on the data to detect the animal crossing on the roads doesn't seem to be effective.

Most of the accidents are happening in night time where driver couldn't able to see animals crossing the road in the dark. In this paper, we are going to provide a way to detect the animals crossing on the road; railway tracks etc and intimate the drivers who are travelling on that way with the caution signals from a certain distance. This reduces the collision in a large scale. This can be also used in hilly regions.

Nowadays, animals entering in to village has been increasing drastically. So we can also detect and warn the people in those villages about the animals entering into their places.

KEYWORDS: Text detection, Inpainting, Morphological operations, Connected component labelling.

I. INTRODUCTION

Python with Artificial Intelligence is designed for practitioners in Artificial Intelligence in both academic and business environments. The aim is to predict whether the given image is dog or cat by using deep learning which is the subset of Artificial Intelligence. And we're going to build our project by Python, Tensorflow, Numpy, Matplotlib, Flask, HTML and Bootstrap. From speaking about library the main and important library that we're using in this project is called Tensorflow. Tensorflow is a library, open-source and free library based on python for creating machine learning models and deep neural networks. Tensorflow is developed by Google and then was released in 2015. Python is a perfect tool ideal for developers who want to script applications and websites. Artificial Intelligence makes it possible to create innovative solutions to common problems, such as fraud detection, personal assistants, spam filters, search engines, and recommendations systems. The demand for smart solutions to real-world problems necessitates the need to develop AI further in order to automate tasks that are tedious to program without AI. Python programming language is consider the best algorithm to help automate such tasks, better than R programming, Java, C++ in the field of Artificial Intelligence and it offers greater simplicity and consistency than other programming languages.

Further, the presence of an engaging python community makes it easy for developers to discuss projects and contribute ideas on how to enhance their code. Python is an ideal tool for beginning programmers. Python offers programmers the advantage of using fewer lines of code accomplish tasks than one needs when using older languages. In other words, you spend more time playing with it and less time dealing with code. Python is open-source, which means it's free and uses a community-based model for development. Python is designed to run on Windows and Linux environments. Also, it can easily be ported to multiple platforms. There are many open-source Python libraries such as Data manipulation, Data Visualization, Statistics, Mathematics.



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II. RELATED WORK

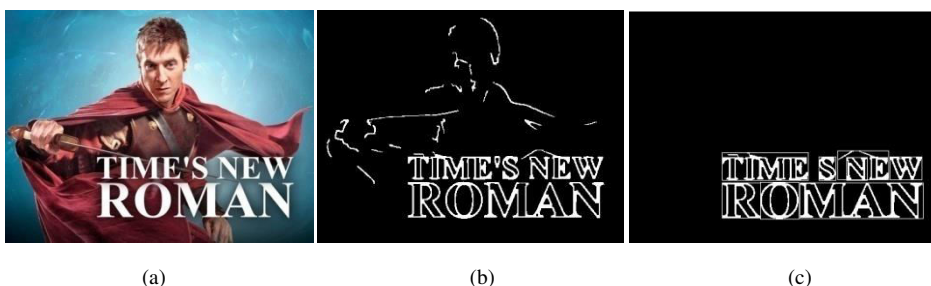
The concept of image inpainting was first introduced by Bertamioetal.[1].The method was inspired by the real inpainting process of artists. The image smoothness information interpolated by the image Laplacian is propagated along the isophotes directions, which are estimated by the gradient of image, rotate by 90 degrees. Exemplar Based method proposed by Criminisietal. [2] used a best exemplar patch to propagate target patch including missing pixels. This technique uses an approach which combine structure propagation with texture synthesis and hence produced very good results. In [3], the authors decompose the image into sum of two functions and then reconstruct each function separately with structure and texture filling-in algorithms. Morphological technique is used to extract text from the images presented in [4]. In [5], the inpainting technique is combined with the techniques of finding text in images and a simple algorithm that links them. The technique is insensitive to noise, skew and text orientation. The authors in [6] have applied the CCL (connected component labelling) to detect the text and fast marching algorithm is used for Inpainting. The work in this paper is divided in two stages: 1) Text- Detection 2) Inpainting. Text detection is done by applying morphological open-close and close-open filters and combines the images. Thereafter, gradient is applied to detect the edges followed by thresholding and morphological dilation, erosion operation. Then, connected component labelling is performed to label each object separately. Finally, the set of selection criteria is applied to filter out non text regions. After text detection, text inpainting is accomplished by using exemplar based Inpainting algorithm.

III. METHODOLOGY

Exemplar based Inpainting technique is used for inpainting of text regions, which takes structure synthesis and texture synthesis together. The inpainting is done in such a manner, that it fills the damaged region or holes in an image, with surrounding colour and texture. The algorithm is based on patch based filling procedure. First find target region using mask image and then find boundary of target region. For all the boundary points it defined patch and find the priority of these patches. It starts filling the target region from the highest priority patch by finding the best match patch. This procedure is repeated until entire target region is inpainted. The algorithm automatically generates mask image without user interaction that contains only text regions to be inpainted.

IV. EXPERIMENTAL RESULTS

Figures shows the results of text detection from an image and inpainting by using exemplar based Inpainting algorithm. Figs. 2, 3, 4 (a) shows the original image. (b) is the image obtained by applying first set of criteria. All objects whose area greater than 10000 and filled area greater than 8000 are eliminated and major axis lengths are in between 20 to 3000 are considered to be text. Still, some small non-text objects are detected.





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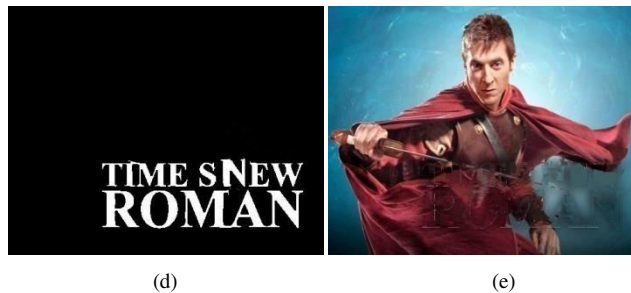


Fig. 2. Text Detection and Inpainting (a) Original image (b) Image after applying first set of criteria (c) Image after applying second set of criteria (d) Image mask (e) Inpainted image using patch size 4 x 4 and search window size 81 x 81

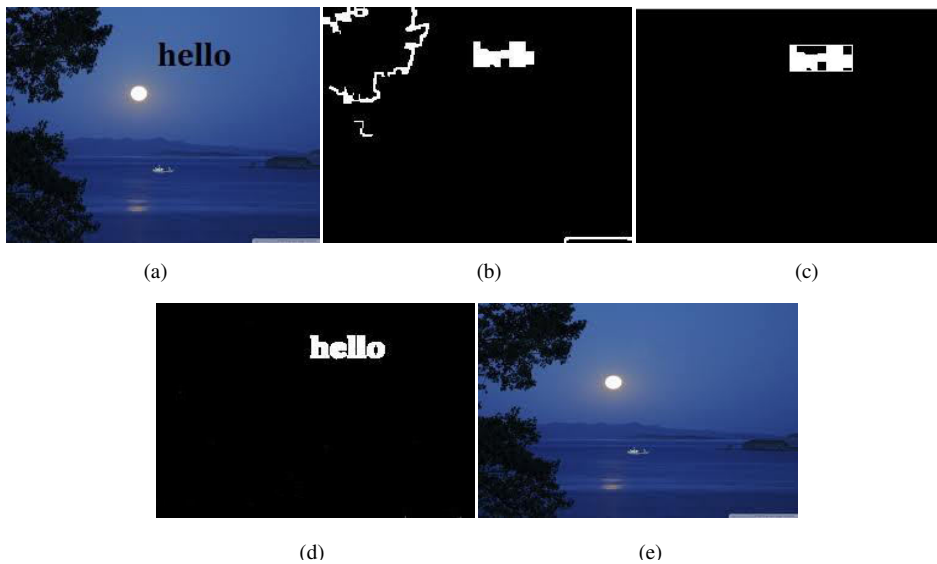


Fig. 3 Text Detection and Inpainting (a) Original image (b) Image after applying first set of criteria (c) Image after applying second set of criteria (d) Image mask (e) Inpainted image using patch size 5 x 5 and search window size 81 x 81



Fig. 4 Text Detection and Inpainting (a) Original image (b) image after applying first set of criteria (c) image after applying second set of criteria (d) Image mask (e) Inpainted image using patch size 5 x 5 and search window size 81 x 81



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To eliminate small objects, connected component labelling is applied to the resultant image.(c) represents text detection by applying second set of criteria which eliminates all the objects whose area is less than 300 and filled area is less than 500.

V. CONCLUSION

In Image classification we showed up how Artificial Intelligence predicts the given image with the help of artificial neural network and convolutional neural network. This is small step in Deep Learning which is the base for all modern day applications like Object Detection, Lane Detection, Traffic Sign Detection, Face Recognition and many more. This is the same procedure that followed in Google Lens which that the camera detect the live image and pre-process it and forward to the prediction.

Image recognition can really help you with digital marketing. By integrating the application's programming interface to your text-based analytics platforms, you will be able to offer visual insights to your customers without the expensive product creation that uses logo detection. Image recognition can also help you monitor ROI and protect your brand. You will be able to track how a sponsorship is doing with image and logo detection and this will help you determine how much revenue you will get in return. Therefore, integrating an image recognition application programming interface is an easy way of giving your customers the best service.

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