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TRAFFIC MANAGEMENT USING VIDEO ANALYTICS

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Abstract - *The rapid recent advancements within the computation ability of everyday computers have made it possible to widely apply deep learning methods to the analysis of surveillance videos. Traffic flow prediction, anomaly detection, vehicle re-identification, and vehicle tracking are basic components in traffic analysis. From a given CCTV Hd video input the system track details of the vehicle the methodology of our tracker is detect-then-track. For detecting the license plate we use opencv and keras deep learning object. The performance of the tracker is thus highly hooked in to the accuracy of the detection. For each frame, we extract salient features from the detected vehicles then identify them within the next frame.*

***Key Words*: YOLO, OpenCV, keras, Deep Learning.**

1.INTRODUCTION

The rapid recent advancements within the computation ability of everyday computers have made it possible to widely apply deep learning methods to the analysis of surveillance videos. Traffic flow prediction, anomaly detection, vehicle re-identification, and vehicle tracking are basic components in traffic analysis. From a given CCTV Hd video input the system track details of the vehicle the methodology of our tracker is detect-then-track. The performance of the tracker is thus highly hooked in to the accuracy of the detection. For each frame, we extract salient features from the detected vehicles then identify them within the next frame.

Deep Learning a branch of Machine Learning supported a collection of algorithms that plan to model high level abstraction in data by employing a deep graph with multiple processing layers, composed of multiple linear and non linear transformation. Widely used algorithm of deep learning in Image context are Convolutional Neural Networks , Since it explicitly implies that input is an image . The problem arises when the accuracy is obtained only when there are large number of training dataset. Since medical images are highly confidential and they are not available to public, obtaining data set has found to be difficult. Hence crowdsourcing platforms will helps the crowd to join with the pathologist and developers for converting problems to new prototype that can be implemented. [4]

2.CONCEPT

The massive integration of data technologies, under different aspects of the fashionable world, has led to the treatment of vehicles as conceptual resources in information systems. Since an autonomous data system has no meaning with none data, there's a requirement to reform vehicle information between reality and therefore the data system .This can be achieved by human agents or by special intelligent equipment which will allow identification of vehicles by their registration plates in real environments. Among intelligent equipment, mention is formed of the system of detection and recognition of the amount plates of vehicles. The system of auto number plate detection and recognition is employed to detect the plates then make the popularity of the plate that's to extract the text from a picture and every one that because of the calculation modules that use location algorithms, segmentation plate and character recognition.

In earlier systems the traffic prediction i.e. the number of vehicles passing through a particular area is known by using BPO systems which is done manually.

Our system mainly includes 3 steps:

2.1. Detection of license Plate of Vehicles

To detect the licence we are using OpenCV for the object recognition and using the Keras. YOLO(You Only Look One) deep learning object detection architecture based on convolution neural networks is the ancient method for the object detection techniques used in the cctv cameras.

2.1.1. YOLO

YOLO stands for You Only Look One is an architecture introduced by Joseph Redmon, Ali Farhadi, Ross Girshick and Santosh Divvala. Humans can catch a particular image very fastly and instantly. Their vision is accurate, and able to do multiple things with conscious thought. Accurate algorithms are used by the computers to detect an object. [1]

Recently, to detect an object, the system take a classifier for that object and evaluate it at various locations ans scales in a test image.

YOLO is refreshingly simple. A single convolutional network simultaneously predicts multiple bounding boxes and class probabilities for those boxes. YOLO trains on full images and directly optimizes detection performance. This unified model has several benefits over traditional methods of object detection. YOLO is extremely fast. Since we frame detection as a regression problem we don't need a complex pipeline. We simply run our neural network on a replacement image at test time to predict detections. Our base network runs at 45 frames per second with no execution on a Titan X GPU and a quick version runs at quite 150 fps. This means we will process streaming video in real-time with but 25 milliseconds of latency. Furthermore, YOLO achieves quite twice the mean average precision of other real-time systems.

YOLO reasons globally about the image when making predictions. Unlike window and region proposal-based techniques, YOLO sees the whole image during training and test time so it implicitly encodes contextual information about classes also as their appearance. Fast R-CNN, a top detection method, mistakes background patches in a picture for objects because it can't see the larger context. YOLO makes but half the amount of background errors compared to Fast R-CNN.

Yolo may be a single network trained end to finish to perform a regression task predicting both object bounding box and object class. This network is extremely fast, it processes images in real-time at 45 frames per second. A smaller version of the network, Fast YOLO, processes an astounding 155 frames per second.

Our unified architecture is extremely fast. Our base YOLO model processes images in real-time at 45 frames per second. A smaller version of the network, Fast YOLO, processes an astounding 155 frames per second while still achieving double the mAP of other real-time detectors. Compared to state-of-the-art detection systems, YOLO makes more localization errors but is less likely to predict false positives on background. Finally, YOLO learns very general representations of objects. It outperforms other detection methods, including DPM and R-CNN, when generalizing from natural images to other domains like artwork.

2.1.2 YOLOv3

YOLOV3 is a good detector. It's fast, it's accurate. It's not as great on the COCO average AP between .5 and .95 IOU metric. But it's very good on the old detection metric of .5 IOU[3].

2.2 Segmentation of licence plate

Now we have to segment our plate number. The input is that the image of the plate, we'll need to be ready to extract the unicharacter images. The results of this step, getting used as input to the popularity phase, is of great importance. In a system of automatic reading of number plates.

Segmentation is one among the foremost important processes for the automated identification of license plates, because the other step is predicated thereom. If the segmentation fails, recognition phase won't be correct. To ensure proper segmentation, preliminary processing will need to be performed.

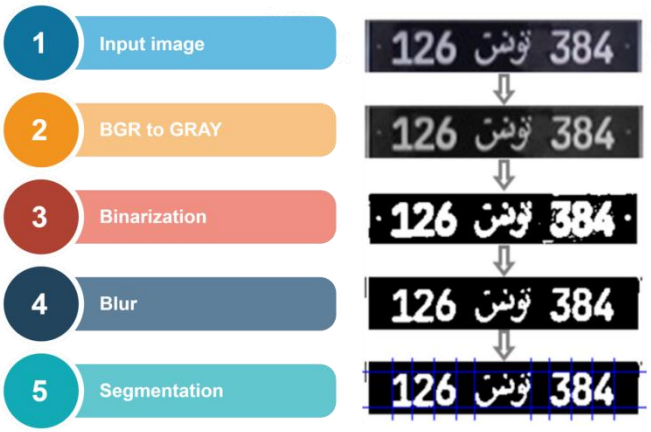

Fig 1 This is the figure which is adopt from an article published by Achraf Khari[1]

The histogram of pixel projection consists of each character recognition. The horizontal projection is to find the top and the bottom positions of the character.

The value of a gaggle of histograms is that the sum of the white pixels along a specific line within the horizontal direction. When all the values along all the lines in the horizontal direction are calculated, the horizontal projection histogram is obtained. The average value of the histogram is then used as a threshold to work out the upper and lower limits. The central area whose segment of the histogram is bigger than the edge is recorded because the area delimited by the upper and lower limits. Then within the same way we calculate the vertical projection histogram but by changing the rows by the columns of the image to possess the 2 limits of every character (left and right).

2.3 Licence plate recognition

This is the last step in the licence plate detection system. And considered to be the most important step. Automatic number-plate recognition can be used to store the images captured by the cameras as well as the text from the license plate, with some configurable to store a photograph of the driver. Systems commonly use infrared lighting to allow the camera to take the picture at any time of day or night.

Vehicle Number Plate Detection aims at detection of the registration code present on a vehicle then extracting the contents of that registration number plate. A vehicle's car place is usually referred to as 'a number plate'. it's a metal plate that's attached to a vehicle and has the official license number of a vehicle embossed thereon . Number plates are

placed at the front and back of the vehicle and help anyone to spot a vehicle.[2]

Then, we made some researches supported scientific articles that compare the multilayer perceptron (MLP) and also the classifier K nearest neighbors (KNN). And as a result we've found that: performance is increased if the amount of hidden layer neurons is additionally increased when using the MLP classifier and if the nearest neighbor number is additionally increased when using the KNN. the ability to regulate the performance of the k-NN classifier is extremely limited here. But an adjustable number of hidden layers and adjustable MLP connection weights provides a greater opportunity to refine the choice regions. So as a result, we'll choose the multilayer perceptron for this phase.

3.METHODOLOGY

Here for the automatic license plate detection rather than YOLO we are using the methods which is the combination of Opencv and keras.

3.1 OpenCV

OpenCV is an acronym of Open Source Computer Vision Library is a library of programming mainly aimed at real-time computer vision. It was firstly developed by Intel, supported by Willow Garage. The first alpha version was rleased at the IEEE conference on computer vision and Pattern Recognition in 2000. OpenCV mainly focuses on image processing, video capturing, egomotion estimation and so on.

History of OpenCV

- Officially launched in 1999 by Intel Research as a part of real- time ray tracing and 3D display walls project.
- Its first 1.0 version was released at 2006.
- Version 1.1 was pre released in October 2008.
- OpenCV2 in 2009 includes changes in C++ interface.
- In August 2012, it was taken over a non-profit foundation OoenCV.org[5]

3.2 Keras

Keras is an open source deep learning framework used in python. Which is developed by AI researcher, Francois Chollet. Deep learning is a popular in data cience fields like robotics, AI, audio and vedio recognitions and so on. Keras is most powerful and esay library which is used in python to built on top of some deep learning libraries like Tensorflow, Theano….

Keras mainly uses easy methods and structures to create deep learning models based on TensorFlow or Theano. It is an optimal choice for deep learning applications.

Features of Keras

- It is very simple API
- Scalability of its computation is very high
- Provides very User friendly frame which can run both on CPU and GPU
- It is highly powerful and dynamic framework
- Very easy to test
- Supports both convolution and recurrent networks
- It can be installed on windows, linux or mac OS

4.CONCLUSION

Traffic detection and prediction are considered to be a huge issue. And a variety of techniques are used for so. The most important issues in the ancient traffic management system is accuracy. And on the invention of the automatic system the problem came to a limited solution. And in our system it is based on detect- and-track method. First we detect the vehicle and then only track it. Ancient methods uses YOLO architecture to clearly identify the objects on the road. And in our system it accurately distinguishes between the pedestrians and the vehicle. Through this we can take the accurate report that how many vehicles that have been passing thorough a particular area at a particular time. And here using new python API are used for the object detection that is OpenCV and Keras. In this paper I only just introduced about the OpenCV and Keras.

REFERENCES

[1] Achraf khari, “Automatic License Plate Detection & Recognition using deep Learning, Aug 1, 2019

[2] Mehul Gupta, “Vechile Number Plate Detection and OCR(TCS HUMAIN 209), oct 9 2019

[3] YOLOv3: An Incremental Improvement by Joseph Redmon and Ali Farhadi, University of Washington, 2018

[4] Y. Xie, F. Xing, X. Kong, H. Su, and L. Yang, “Beyond classification: Structured regression for robust cell detection using convolutional neural network,” in Medical Image Computing and Comput.-Assisted Intervention—MICCAI 2015, 2015, pp. 358–365.

[5] OpencV tutorials

BIOGRAPHIES

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