

Improving Camera Surveillance Using Computer Vision

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Abstract— As you know that the growth of police operated surveillance cameras has basically get out-paced the ability of humans to monitor them effectively. In this regard the Computer vision is being considered as a one of the most optimal solution. Very recently, an ongoing research project in the same area of computer vision is being described here. It is within a municipal police department. This paper is basically used to get designed aiming to discuss these issues in detail with regards to their Design/methodology/approach Here I am going to discuss the computer vision technology and its potential effect in details using the relevant use cases for police agencies. Here I am going to focuses on the problem statement where the computer vision as a solution for two common surveillance camera tasks (live monitoring of multiple surveillance cameras and summarizing archived video files).

Keywords: Surveillance cameras, Computer Vision, monitoring, Human Prediction.

I. INTRODUCTION

In numerous types of applications whenever we are going to consider the security of individual vehicles as well as public transportation, the usual ability to track vehicles is very helpful. The computer vision and deep learning algorithms are very much useful in such cases [1]. There are many projects which deals with the concept of vehicle tracking in real-time based on continuous video stream from a CCTV camera to track the vehicles. The tracking system is tracking by detection paradigm. But in most of the cases we come across some questions like can specialized computer vision applications for law enforcement be developed at this time? Similarly, we can have other questions like how computer vision will be utilized within existing public safety camera monitoring rooms. And what are the system-wide impacts of a computer vision capability on local criminal justice systems? Still there is little knowledge of computer vision or its potential in the field.

II. UNDERSTANDING COMPUTER VISION

The computer vision is basically a process which involves with the comprehending digitization of a visual image. It is used to convert the visual images into a grid of pixels. Here each pixel is used to get assigned with a specific numerical value representing its color and contrast shade. Here the initial process is basically used to generates for an image (or in the case of a video, each frame) a two-dimensional grid of numbers which mathematically renders the original image as digits [3].

In the process of viewing, when the respective digital images/ photo is get opened, then the process is reversed by a photo processing program. Here the Photo program uses each dedicated pixel's value to instruct the viewing device. Here the devices may be a computer, smart phone, or digital camera etc. and let us knows how to color a

corresponding screen pixel. Here at each converting numbers back to colored pixels and reconstructing the images or picture in a specific form so that the humans can be able to see.

A. Computer vision for Surveillance

The computer vision is also being used on another aspect where a task is going to be assigned to a name to objects and actions. Here not only is it useful to be able to name objects in a picture but also an important goal which is used to determine the presence of a human and sometimes used to determine who they are. It is also used to determine their activity like what they are doing, a crucial public safety surveillance task etc.

Here we are going to use the classifier technique to determine the object scenario. The classifier is used for training process for a previously unknown object. It is used to get proceeds once the manual annotation is being done and during which the training data is get created by humans. Here the training data is used to assign the labels to a set of representative images of the object.

B. Computer vision as a criminal justice

Like the similar way as we have discussed above the computer vision is also being used in the field of criminal justice. Recently one research is going on in the field of such case where the Computer vision plays a vital role to define the significant fact. The computer vision has the potential to determine the significantly aid on basis of which these research efforts and increase the use of surveillance videos as a data source. Here a variety number of prior research efforts are already present which have employed surveillance video as data, but their usefulness has got lemmatized by the factor of time and heavy data processing. It has much usefulness but despite of this it is having a number of limit analysis to a single scenario. Due to processing workload; here each minute of video equalled by its transcription time. It is having a set of criminological theories and concepts which are basically used to define it among such cases few important facts are like routine activities, environmental crime, crime displacement, and hotspot analysis. They are being get benefited from the exploration of computer vision generated data.

C. How computer vision algorithms work

Normally whenever we are going to discuss about the workability of computer vision and its application, we always need to know how it get work. On contrast to this we could say that the Computer vision algorithms are merely being evaluated based on some standard pre-curved, annotated datasets. They are the many advances, and they are having the ability to get partitioned for training and testing data set values. In most of the case for many computer vision related tasks, the prior algorithm accuracy has been considered as very high. If we are going to consider the most generalized case, then almost above 90

percent for easy action recognition datasets. But if we are going to consider the challenging datasets then its accuracy get drops to around 60 percent. It is a level that would get generated by the numerous false hits in applications. Here the main goal is to produce computer vision algorithms that are considered as a more sensitive enough to not miss significant events but also do not swamp.

D. Computer vision as a solution

When we are going to consider the various aspect of Computer vision then definitely a lot of facts are get coming to us. Some of the facts are becomes big challenges and to cope with these challenges, we are having an online dictionary learning approach. This approach is basically get used to detect the presence of abnormalities that are being get found and pursued which divides long videos into small non-overlapping meaningful clips. When these clips are going to be generalized then here the segments are got computed based on the appearance and motion information. Here it should be get noted that many of such segments are contain tracked vehicles and people, which are then compared with existing elements in a dictionary. Once after the comparison and thereby permitting the detection of abnormalities.

In the similar manner the computer vision also has a benefit that it has the ability to automatically summarize video files. It also has the feature that using this we can be able to screen out irrelevant information from the dataset. If we are going to consider the usefulness approach of computer vision, then it is to use to identify a small set of suspicious video clips in real time from multiple camera feeds or from a large video archive.

III. PROPOSED MODEL

In this project titled Improving “Camera Surveillance Using Computer Vision” we are trying to detect criminal scenes or object through the help of computer vision using android. We use android for the development of the ‘crime detector’ app using TensorFlow lite because it can be fitted easily on a small device like camera for onsite fast processing of the video scenes on real time and can send data to the concerned crime prevention authorities as soon as possible.

As we can see below in the screenshot of the developed app that it is able to detect the criminal object as soon as it come under its camera area. But on the same time, it will not detect another object as criminal object upon coming under its camera region. So, with the help of this technology, we can use the CCTV cameras across the streets to detect and prevent crime. As criminal would generally carry most of the time criminal object openly due to less time before committing a crime.

Similarly, we can monitor other things like unwanted garbage in a particular area due to miss care of municipal corporations and monitor easily across the cities. Here I am observed the output which is being shared below as figure-1, 2 and 3.



Fig. 1: Output of the system object 1



Fig. 2: Output of the system object 2

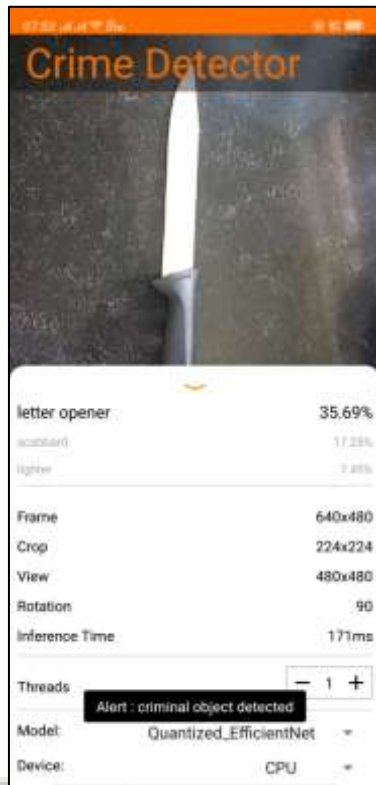


Fig. 3: Details of the image with object

IV. CONCLUSION

From the above it is being concluded that the computer vision is basically a process which involves with the comprehending digitization of a visual image. It is used to convert the visual images into a grid of pixels. Here each pixel is used to get assigned with a specific numerical value representing its color and contrast shade. In our proposed model also the same fact we could be able to get found. It means the Computer Vision can used to monitor other things like unwanted garbage in a particular area due to miss care of municipal corporations and monitor easily across the cities.

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