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REAL TIME HUMAN DETECTION AND COUNTING

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ABSTRACT:There's an increasing interest in videotape features for people detecting and counting in commercial areas and security applications. Compared to classic sensor-based features, the video-tape ones provide more adaptable features and improved performance with lower costs. Human counting may be a crucial and challenging problem in visual surveillance. Automatic monitoring of the amount of individuals in public open spaces is vital for safety control and concrete planning. For this reason many approaches and methodology are proposed. These techniques aren't producing high performance and better accuracy for sophisticated scenes counting. People counting features has a huge selection of applications within the factors of common systems. These applications can range from efficient allotment of supply in smart buildings to handle critical situations.
In this paper, we are getting to build the Human Detection and Counting System through Webcam or by giving our own video or images.
KEYWORDS: Video analysis, video surveillance, Histogram Of Oriented Gradient, computer vision.

I. INTRODUCTION

Specifying the exact number of people in a place can be crucial for the success of workplace or rescue operations. Therefore, a lot of institutions are supposed to know the exact number of persons present in their workplace, at any point of time. Thus, they often buy and execute both counting of people and video surveillance systems. Each of those systems is usually focused on one function at a time, either counting or detecting the people within a given area. Even though they are operating within the same area and performing similar missions, they usually do not interrelate in any way and thus do not benefit from the information collected by the other system. Additionally, people-counting systems typically determine the amount of individuals passing through a barrier by counting the number of times a beam of sunshine , e.g. infra-red light, is interrupted. Even though it is very simple, such a system can be very well organised in frameworks where no two persons, or objects in factories, pass through the behold barrier at the same time. They fail, however, to accurately count the number of individuals passing through a barrier of a mall which is usually wide enough to permit several persons to enter directly . The prior systems do not differentiate between passing persons and objects like carts or trollies . For all these reasons we develop a flexible system that can precisely count the people in a single room or a group of shopping malls, or any other place, combining the existing beam-based counting systems and video surveillance systems. Therefore, we have six methods:
Detect() method, HumanDetector() method, DetectByCamera() method, DetectByPathVideo() method, DetectByPathImage() method, Argparse() method.
In this report we have demonstrated a real time human detection and counting method, using deep learning on computer vision.

II. LITERATURE SURVEY

2.1 Ma, Zheng, and Antoni B. Chan. "Crossing the line: Crowd counting by integer programming with local features."

Zeng, Chengbin, et al, 2010[1] have established a foundation by merging the multilevel HOG (Histograms of Oriented Gradients) with the multilevel LBP (Local Binary Pattern) because of the feature set, detection of the head to shoulders of people can be done. To improve the detection production, Principal Components Analysis (PCA) is used to decrease the dimension of the multilevel HOG-LBP feature set.

2.2 N.Dalal and B.Triggs, Histograms of oriented gradients for human detection.

Navneet Dalal and Bill Triggs [2] stated that the grids of Histograms of Oriented Gradient (HOG) descriptors remarkably conquer the existing feature sets for human detection. We describe each stage on the computational performance, concluding that fine-scale gradients, fine orientation binning, relatively coarse spatial binning, and top quality local contrast normalization in overlapping descriptor blocks are all important permanent results. This new approach gives very good separation on the first collected information of the pedestrians, so that we can introduce a better collection of information containing over a hundred marginalized human images with an outsized range of posture disparity and backgrounds.

2.3 A.B.Chan, Z.S.J.Liang, and N.Vasconcelos, Preserving privacy and crowd monitoring

In [5] Antoni B.Chan, Zhang-Sheng John Liang and Nuno Vasconcelos suggested a system for securing privacy for gauging the size of heterogeneous crowds. The crowds are usually made up of the pedestrians who travel in various directions, by not using the conventional models.

III. PROPOSED SYSTEM

The system that we have proposed counts the number of people in real time. It is vigorous to lighting and background changes. Rectangular frames are deployed to highlight the detected human beings. Input is given in the form of images, videos or fed into the system using web cameras.The number of humans detected will be displayed on the screen.

3.1. SYSTEM IMPLEMENTATION

Implementation of this project requires a few libraries, they are given below
OpenCV, Imutils, Numpy, Argparse.

3.1.1 Detect() method

Here we'll detect the person within the frame. And show it one after another that it's sort of a video.
A sequence of images are turned into a movie. This task is performed by the video taken. These images are called frames.

3.1..2 HumanDetector() method

Here we are supposed to give the path of the file or image stored as the input. The algorithm reads the path and provides the corresponding output. In case the mentioned file does not exist in the path mentioned then it opens the webcamera.

3.1.3 DetectByCamera() method

Here the commands passed are cv2.VideoCapture(0) and video.read(). IN the first command, passing 0 in the function implies that we want to record from a webcam. The second command means to read frame by frame. If it is ready to read the frame it checks True else False.

3.1.4 DetectByPathVideo() method

Here we'll give a path to the Video as input. Then we have to check if the video on the given path is foundt.. At the top if the frame isn't read we'll have to end the loop.

3.1.5 DetectByPathimage() method

We employ this method if an individual must be detected from a picture . The image is read and the number of people are displayed.

3.1.6 Argparse() method

The job of this function is that it parses and returns as a dictionary, the returned values are arguments skilled in terminal to our script. There will be Three arguments within the Parser: Image, Video, Camera.
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3.2. SYSTEM DESIGN

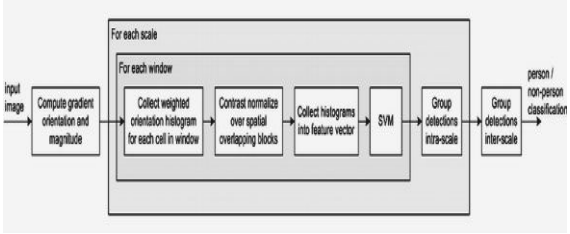
3.2.1. Histogram Of Oriented Gradient Descriptor

HOG is a feature descriptor utilized in computer vision and image processing. The goal of HOG is object detection. This is one among the foremost popular techniques for object detection. OpenCV has already been implemented in an effective way because of combining the HOG Descriptor algorithm with Support Vector Machine.

3.2.2 HOG approach for human detection

The grids of Histograms of Oriented Gradient (HOG) descriptors exceptionally give improved enforcement than the ones that are already present feature sets for the detection of people. Here we

measure the impact of every state of the calculation on evaluation, and by this, we conclude that pocket-size slopes, fine assimilation depositing, adequately coarse dimensional depositing, and local contrast Normalization in imbricating descriptor blocks are all very significant results that are permanent. The different and latest proposition gives an almost perfect detachment on the information or data of the pedestrians, due to this reason we inaugurate a tougher dataset containing more than 1000 marginalized human images with a massive range of posture disparities and backgrounds. An outline of this is as shown in fig. The method and logic are based on appraising well-normalized local histograms of image gradient initiation while they are present in a thick or heavy grid. The shape and appearance of an object can usually be deemed as alright by the dispersal of local intensity gradients or edge direction in spite of not having any prior knowledge of the gradient or position of the edges. This is the key purpose of it. In real-world scenarios, this is often executed by splitting the image window to smaller blocks of regions or cells, for one cell occupying a neighborhood 1-D histogram of gradient directions or edge orientations over the pixels of the cell. The overall histogram arrivals form the representation. flooring the detection window with a thick grid of HOG descriptors and using the combined feature vector during a typical SVM based window classifier gives us a person's detection chain (in Fig).

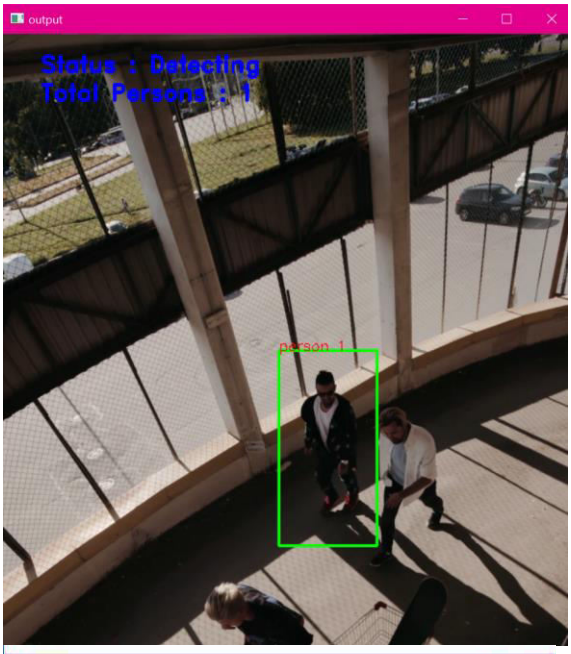


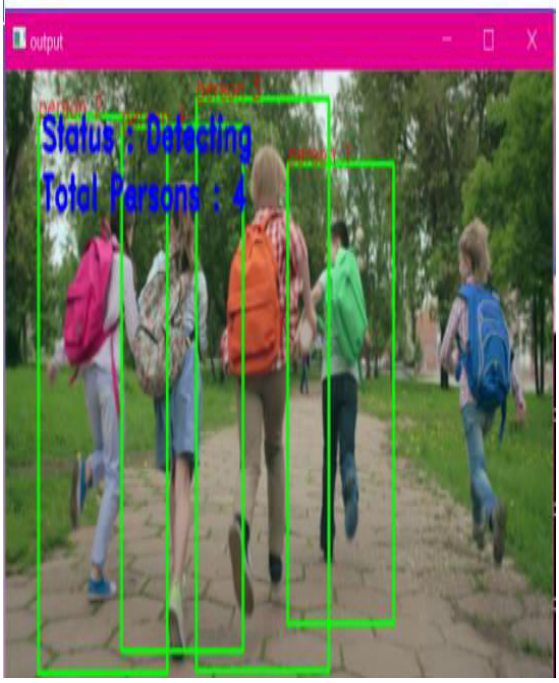
IV. TESTING

After the various algorithms detect humans, we need to test the algorithms productivity and efficiency, for which the algorithms are executed in various situations or scenarios. The algorithms are tested in the given below scenarios:

• In situations where the orientation of cameras vary.
•Varying density of the people
• Different lighting conditions
• Presence of occlusion

Our output for two different orientations are shown in the figures given below.





The data that we have employed for evaluating the algorithms include inputs given in the form of video from the camera. The count of people which the algorithm provides is discerned to the actual count that is done manually and this is used to determine the accuracy.

Given below are the screenshots of the experiment conducted on still images, i.e., Fig 3.

V. RESULTS

Detection Rate refers to the proportions of humans detected accurately to the total number of humans detected.
Recall refers to the proportions of the number of people accurately detected to the actual number of people.
Accuracy refers to the measure of how close the sum of all possible values is to the true value.
Response Time refers to the total time taken by each algorithm to execute..

Therefore considering the average of all the number of trials conducted, the results are as follows

Detection Rate	Recall	Accuracy
0.9405	0.7355	0.7415

VI. CONCLUSION

We propose a method to track and count people using HOG and OpenCV to generate an effective people counter .We developed the deep learning project where we give the input as video, image through camera, and the number of humans detected will be detected on the screen. It is way better than the conventional method that does not use video surveillance and can be implemented instead of them.

VII. REFERENCES

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