HUMAN AND OBJECT RECOGNITION USING VIDEO SURVEILLANCE

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ABSTRACT - Human and Object recognition is a computer vision process for detecting objects in images or videos. When humans look at a camera or watch a reel, we can easily identify the people, objects, scenes, and visual details. To develop a system that is used to recognize different objects in each frame of the video in a video surveillance system and to give an alert when some animals enter the residential surroundings. Image processing is used to extract the images from video. Deep learning is used to train the system to identify different objects and to detect the objects. Big data applications are consuming most of the space in the industry and research areas.

Key Words: OpenCV, NumPy, Mobile net-SSD

1.INTRODUCTION

Deep Learning is a part of machine learning. This process is not a new one it has been there for a couple of years. Deep Learning provides the latest techniques in terms of Computer Vision, Object detection,3D image rendering. The process of image recognition is easy but differentiation between person and object is a tougher task to execute and to provide a satisfactory output.

2. RELATED WORK

Ms. Bulbul Bamne, Ms. Neha Shrivatava, MR. Lokesh Parashar, MR.Upendra Singh [1]. This paper proposes a transfer learning-based deep learning method. The different convolutional neural networks (CNN) are studied in this work. It detects only the images. The fields like Artificial Intelligence, Speech recognition, face recognition.

Ali Borji , Ming- Ming Cheng ,Huaizu Jiang and JiaLi. [2].This review paper focuses on the object detection algorithms based on deep convolutional neural networks, while the traditional object detection algorithms will be simply introduced as well.

Youzi xiao Zhiqiang Tian, Jiachen Yu, Yinshu Zhang Shuai Liu Shaoyi Du Xuguang Lan. [3]. With the rapid development of deep learning techniques, deep convolutional neural networks (DCNNs) have become more important for object detection. Compared with traditional handcrafted feature-based methods, the deep learning-based object detection methods can learn both low-level and high-level image features. The image features learned through deep learning techniques are more representative than the handcrafted features.

Sandeep Kumar, Aman Balyan, Manvi Chawla [4]. At the prediction time, this model generates scores for the presence of the object in a particular category. It makes predictions with a Single network evaluation. Here object detection is a regression problem to spatially separated bounding boxes and associated class probabilities. The algorithm is based on matching, learning, or pattern recognition algorithms using appearance-based or feature based techniques.

Yen-Han Wang, Tzu-Wei Wang, Jia-Yush Yen and Fu-Cheng Wang [5]. The algorithm is based on skeleton-tracking by tracking depth images this process overlaps the detection to avoid misidentification during the human detection or tracking process.

3.PROPOSED SYSTEM

The proposed system tells us the basic differentiation and classification between both humans and objects. It recognizes both persons and objects for the required situation and provides very good results. But in the currently existing system both human and object recognition is not possible at the same time it requires separate code for both human and object detection.

A. Applied Science

The process of human detection and object detection can be achieved by Computer Vision. A library called OpenCV is used for processing the images to detect even we can detect hand movements and handwriting of a person. OpenCV process the array structure for analysis.

Time module in python is used in this process it provides many ways to represent the time in code like objects and strings.
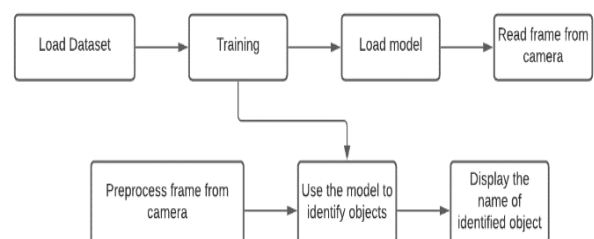

Figure 1. Flow diagram

B. Working Model

The primary features of this model are:-

- Capturing image frames from the camera.

- Preprocessing the captured images or detection.

- The detected objects are then identified through the trained model for object labeling. Detecting the human faces across the objects.

With the help of libraries of Computer Vision and python like OpenCV, imuilts we can achieve the above mentioned detection. We must give the camera access to the terminal to undergo this detection process using the python libraries.

C. Loading Dataset and Training

To detects the objects with the specified name we need a set of images of that object and we should keep them together in a single folder if we want more objects for detection then we simply create a database or dataset of all the images we require for detection. Then we train our model using the dataset we have created using MobileNet SSD.
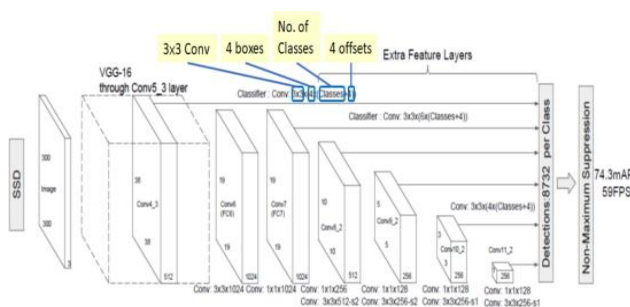

Figure 2. Training image with SSD model

D. Load Model and Read Frame

After training our SSD model with the data set now we load our MobileNet SSD model for object detection. For detecting the objects we must capture the frames from the camera. By using the OpenCV library we can detect the frames of the object from the camera. These frames are used for detection.

Figure 3. Reading frames from images

E. PreProcessing the frames and Identifying the Objects

The captured images are now preprocessed using python imutils. This library is used to perform functions like basic image processing and resizing the captured frames. Now, the Mobile Net SSD model is applied to the preprocessed frames for identifying the displayed objects.
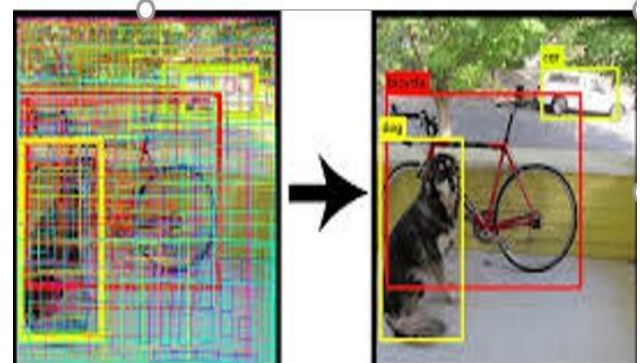

Figure 4. Preprocessing the captured frame and identifying the images

4. CONCLUSION

This project involves both human and object detection that is being displayed in-front of the camera feed by capturing image frames. The images are preprocessed using python libraries for resizing and removal of noise. The MobileNet SSD model with a pre-trained dataset with object images is applied to the frames detected and the objects are identified. At last names of the detected objects are displayed on the detected object frame.

5. FUTURE ENHANCEMENTS

Human and Object recognition has a lot of scope in future work. It can be used in facial recognition and character evaluation. Human and Object detection can be applied in a surveillance system for security purposes in the banking and military sectors. We can increase the accuracy of the model by loading more samples of the images. We can extend this in terms of facial recognition by accessing the database of Aadhar centers with government permission. Using that database or data sets we can train our model to detect the humans with their names with the help of these trained models we can increase the video surveillance in high crime-rated areas. Then we can detect the face of the criminals by that we can control the crime rate. We can also get the database of machinery like guns and we can train our model accordingly. We can use this in the conditions of heists to detect the weapons carried by the criminals so, that we can prepare a strategy to hit them back with the force. We can use both 2-dimensional and 3-dimensional object images to train our model for more accuracy.

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