Detection Of Objects For Autonomous Cars Using Lane Detection Method

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Abstract: This paper presents two algorithms, one to detect, track objects and the other for lane line detection. This detection and tracking of objects are done by using a Tensor flow object detection API. And a simple computer vision technique is obtained for Lane line detection. The objects Location which are identified that is forwarded to the algorithm of object detection and tracking. The object detection tracking system algorithm is used for obtain by using CVV. The proposed approach can able to detect objects in different illumination and occlusion. It accuracy of achieved is 90.88% on self-generated image sequences.

1. INTRODUCTION

Autonomous / self-driving cars have drawn a great deal of interest as a research topic for both academia and industry in recent years. To be a truly autonomous vehicle, the world through which it drives must make sense. The autonomous car must be able to locate itself in an area and to identify objects (moving and stationary) and keep track of them. Using exteroceptive sensors such as LiDAR, cameras, inertial sensors, and GPS, the car collects environmental data. These sensor information can be used together and fused to locate the car and track objects in its environment, enabling it to travel from one point to another successfully.
Three aspects which are depended on the process of path planning and autonomous vehicle guidance: the location, mapping, and object tracking. Localization is the process of the autonomous vehicle's position in the environment. Mapping includes being able to make ecological sense. Tracking moving objects requires finding the moving objects during navigation and tracking them. Neural networks are actually doing things that no other algorithm in machine learning can achieve. Neural networks have gained popularity in recent years with massive data sets and computers capable of analyzing and optimizing against these huge datasets. We are amazing to learn from the datasets and to create data models. Our project uses TensorFlow to model our neural network, a platform provided for deep learning. This API(application program interface) is used in real-time video streams to recognize the multiple objects. SSD Mobile Net, To improve the accuracy and scope of objects that can be detected, a predefined model provided by TensorFlow is used as the basis and finely tuned. For any specific object that the user needs to keep track of that object, this model can be trained. Once the frame is well equipped to detect objects, tracking the object will be trained as long as it is within the camera range.

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2. LITERATURE SURVEY

Different researchers have presented different approaches starting with the subtraction of background to CNN. In this chapter, some of the human tracking methods are discussed. Human tracking consists of three basic steps for pedestrian safety: for specific purposes human identification from frame sequence, tracking and monitoring of tracking. There are three basic aspects of pedestrian tracking similar to object tracking:

1) video frame pedestrian detection,
2) video tracking, and
3) specific purpose tracking.

In this literature review, previous research algorithms of object feature identification, context subtraction, segmentation and classification are discussed. To make tracking perfect, it is most important to have features that described the object, hence the object detection plays a vital role. This can be done using deterministic or probilistic models of motion and the system based on appearance. CNN is noisy with the data variation. The CNN - based object tacking algorithm was introduced by Fan et al. by using shift variant architecture. During the online process, the features were learned in this algorithm. The spatial and temporal characteristics were interpreted using pairs of images rather than a single image. Hong et al presented the approach in which the output of the last layer of the pre-trained CNN module cascads with the online SVM to learn discriminative-looking models. The method Tracking which the work be done by using the target-specific saliency map of the Bayesian network. Wang et al suggested the pre-trained model of convolutionary neural networks for online tracking. The CNN is used to change the position of the object in the scene after parameter tuning, and the likelihood map is created instead to establish marks.

3. METHODOLOGY

3.1 Object Detection and Tracking

The proposed CNN-based algorithm for moving object detection consists of two phases: object recognition and tracking. The comprehensive block diagram of the system which proposed is shown in Fig. 1.

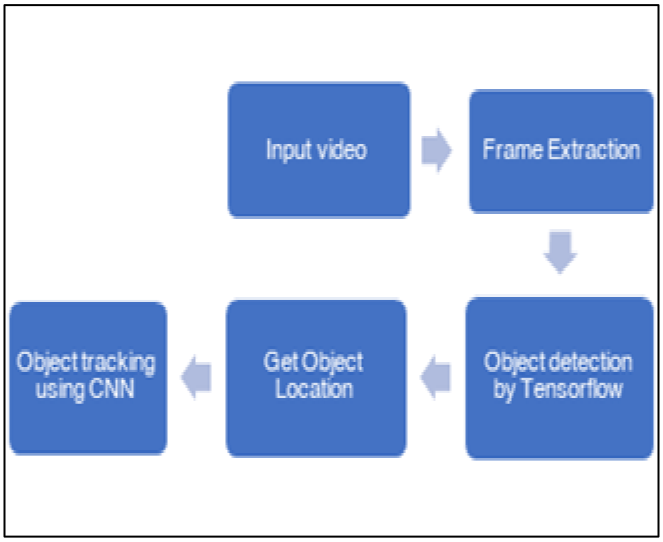

Fig. 1. *Proposed Block Diagram of a system.*

The video that is processed as an entry into the device. The removed sections are frames for potential production of enhancement. The two primary algorithms for object detection and object tracking are processes by means of deep learning methods. The identification of artifacts in the following stream is explained in detail. Different aspects such as light variability, lighting, occlusion, and device are having trouble detecting multiple objects influencing object detection using computer vision algorithm. Consequently, in this report, tensor flow-based detection of entities algorithm was used. The Tensor Flow-centered object or entity detection API is a platform that is open to all. The detection intent is based primarily on the upper layer of Tensor Flow, making it user-friendly to create, train, and classify models . The tensor-based object detection method is shown in Fig. Next, the appropriate libraries are imported and then the pre-trained object detection prototype is imported. Combining with category box and tensor helps in weight initialization. After initializing all the parameters of the tensor flow model, the picture in which the object to be described is read. Apply the loaded tensor flow model to the image, the TensorFlow-based model checks the image and returns the image location of the object(x, y, w, h).

3.2 Lane Line Detection

Identifying lanes on road is a very common task performed by human drivers. This is important to keep the vehicle within the lane's constraints. For an autonomous vehicle to do, this is also a very important function. And with help of computer vision techniques, a very simple Identification of Lane pipeline is possible. Here images are extracted from the input video captured by camera sensors and frame it to images. Steps for Lane detection on each image are shown in Fig. 2.

Fig.2. *Block diagram of Lane detection process.*

Finally, all the output images are combined to form the Lane detected video. This video is used by the car to maintain its path along the lanes.

4. RESULTS

Here we used OPENCV model to capture video from the webcam of a laptop and detect objects. Open CV is an open-source computer vision and machine learning software library. OpenCV was designed to provide a shared platform for the application of computer vision and to promote the use of machine perception in commercial products. Results of proposed TensorFlow object detection are shown in Fig.3.1, 3.2.

Fig.3.1 *person and bottle are detected.*

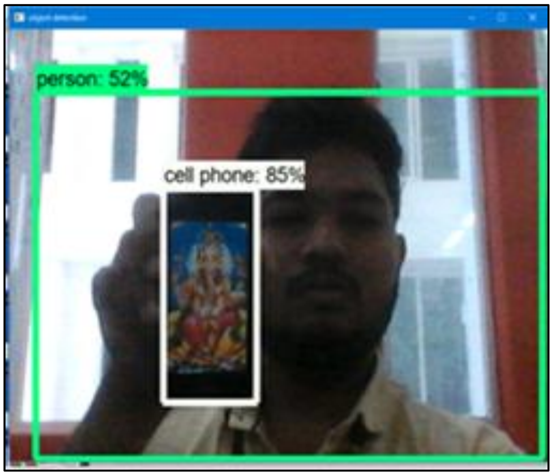

Fig.3.2 *person and cell phone are detected.*

Results of proposed computer vision based lane line detection are shown in Fig.3.3, 3.4, 3.5.

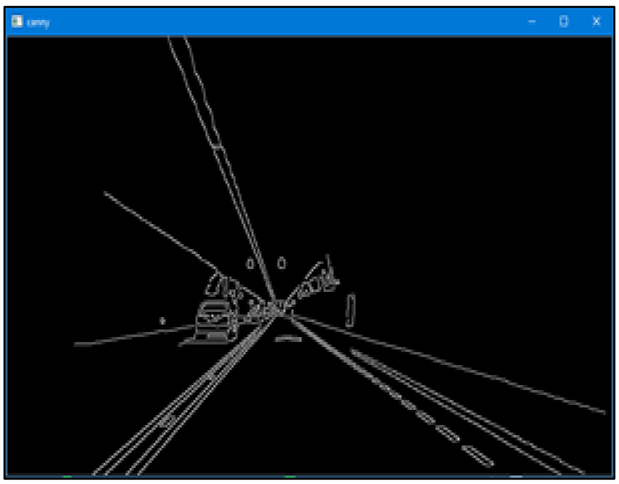

Fig.3.3 *canny edge detector output.*

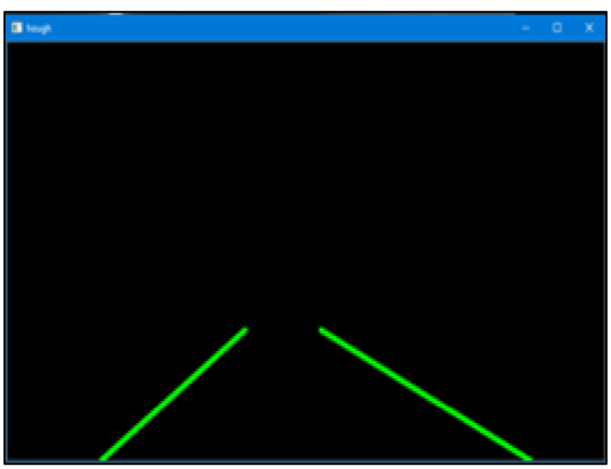

Fig.3.4 *Hough Transform output.*

Fig.3.5 *Final Lane line detected output.*

5. CONCLUSION

In this paper, the use of convolutional neural network presented a novel approach to object detection and tracking. Detection of moving objects is done with the TensorFlow object detection API and Lane line detection with computer vision techniques. The object module senses the target robustly. Using CNN algorithm, the detected object is monitored. Considering human monitoring as a special case of object detection.The architecture of the shift model has expanded the use of traditional CNNs and has naturally merged international features with local features. The methodology which was proposed achieves sensitivity of 91.24% specificity, and 90.88% accuracy**.**

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