To Identify and Recognize the Object for Traffic Analysis System using Deep Learning

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Abstract: ***The object identification has been most essential field in development of machine vision which should be more efficient and accurate. Machine Learning & Artificial Intelligence, both are on their peak in today's technology world. Playing with these can leads towards development. The field has actually replaced human efforts. With the approach of profound learning systems (i.e. deep learning techniques), the precision for object identification has expanded radically. This project aims to implement Object Identification for Traffic Analysis System in real time using Deep Learning Algorithms with high accuracy. The differentiation among objects such as humans, Traffic signs, etc. are identified. The dataset is so designed with specific objects which will be recognized by the camera and result will be shown within seconds. The project purely based on deep learning approaches which also includes YOLO object detection & Covolutionary Neural Network (CNN). The resulting system is fast and accurate, therefore can be implemented for smart automation across global stage.***

I. INTRODUCTION

Over recent years, Computer Vision along with advanced version of deep learning enhanced the role of human resources for overall development. Computer vision is the method to extract the details of a digital image which can be easily done through our eyes. Image processing with the help of Convolution Neural Networks provided a new name to digital world of enhancement. In addition, it supports the applications of computer vision such as Object detection, Face identification, Object tracking, Semantic segmentation. Object recognition is evolving from the single object detection to the multi-object detection. Object detection accompanied by Artificial Intelligence can be used in smart auto-vehicles. The proposed system can be implemented in the vehicles which used for object-detection. The system is so designed to identify road signs and pedestrian on the roads and the system algorithm will work on it with prepared dataset. It will identify the signs and passes the signals to appropriate vehicle machinery or to the driver for further respond to that particular incident. The Object Identification operation is based on CNN – algorithm and these popular datasets are upgrading to the highest accuracy.

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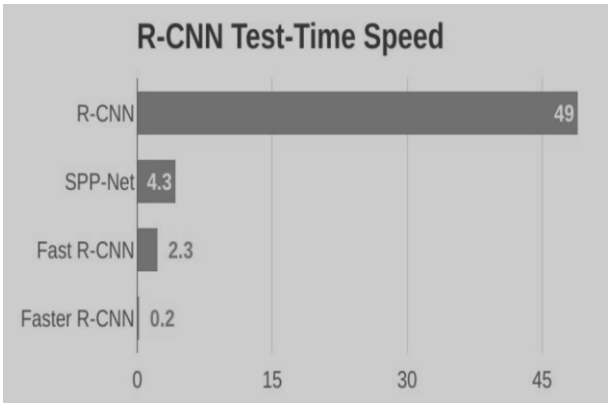
In this paper, we first describe some algorithms associated with deep learning to identify objects, then apply an algorithm to a new dataset to check its availability.

II. RELATED EFFORT

Deep learning permits models are made of multiple embedding layers for learning abstraction from many levels of abstraction. These modes improve speech recognition, visual object recognition, object oriented and many other domains such as modern state Drug discovery and genomics. In-depth training explores the complex structure of large data sets using a back-propagation algorithm to demonstrate how a machine must alter its internal parameters to represent each layer in the back-to-back representation. Go. The deep Convolunary Network improves the processing of images, video, speech and audio, while continuous networks shed light on the gains of data such as text and speech. For starters it may be challenging to differentiate between different computerized computer vision tasks. For example, the image classification is quite obvious, but the difference between the object's localization and the object's identity can be confusing, especially when all three functions can be changed in the same way as object recognition. Image classification affects assigning an image to a class label, while object localization involves drawing a bounding box around one or more objects in an image. Identifying objects is more challenging and combines both functions and assigns a class label to a bounding box around each object of interest in the image. Together, all these challenges are related to unit recognition.

III. PROPOSED STRUCTURE

Usually when fixed objects are identified for very low objects, normal neural networks are used due to the low complexity which leads to better performance in terms of processing speed. But this is also a major drawback in terms of accuracy. Therefore, a better neural network is used in this system i.e. Fast RCN uses a shield to detect field proposals. Selected search is a slow and time consuming process that affects the performance of the network. In this system we are dealing with traffic signals and pedestrians for recognition. Then fast RCNN is used to classify the item. The image is supplied as an input to a convolutional network that provides a counter-intuitive feature map. Instead of a selective search algorithm on the feature map to identify area proposals, a different network is used to predict area proposals



First, pre-processing the process image is usually done to remove unwanted sounds and properties from the input images. Following the normal chat lounge, the image is

preprocessed to fetch the feature from the input images. The layers of CNN capture the input image, then process and curate the features with different layers. The feature of each CNN image layer are combined to create high quality features. This is achieved through the application of in-depth training , and it assists in the process of identifying efficient traffic objects. Features that have been cached from previous steps are joining CNN to create a pre- trained CNN model. Using the extracted features the support vector machine (SVM) is run to describe them in the corresponding classes. The proposed method uses a cross- linear SVM training model for training purposes and increases computation speed. Once the training process is complete the SVM classification is forwarded with a test dataset for the classification processes . Upon successful completion of the inspection process is added to solve the compression visualization problem. And the test is done on real time video. The proposed method first classifies the training datasets and then processes the classification into test datasets.

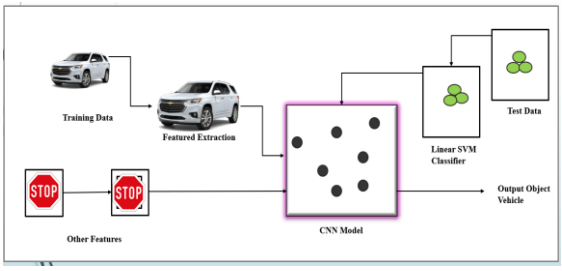


Figure 1: Workflow Of Embedded System

In this approach, the proposed method achieves its intended objectives and solves the problem of visualization by using the deep learning algorithm to detect and object to the traffic object. The work flow of the proposed system is shown in Figure 1.

A.2. Proposed CNN model for Traffic Objects Detection:

A.2.1. Training Statistics

During this we train the data using datasets which are importing into proposed working system. Images like traffic signals, pedestrian provided as an input to the training sets. Using these inputs, the model is summated into CNN model.

A.2.2. Image Pre-Processing

During this step the color images are converted into gray scale pictures. Sounds and distortions are removed from the image and the pixel intensity is expanded. Runs 3x3 mask pixels. Each time the image is requested from the image data store, a function is requested to complete the prerequisite process.

A.2.3. Feature Extrication:

Each layer of CNN produces a reaction or activation of the input image. However, only a few layers of CNN are suitable as border and block. CNN's opening layers capture image features such as edges and blotches. The network filter for the first convolution layer completes this process. During this stage, it filters out blobs and edges to capture the properties. Next the network goes through other layers and is scaled and resized for visualization operation. In this way, even the features from the previous layers are captured by deep network layers, and the deeper layers combine the extraneous feature of the back layers and produce high level image features. In this way, the higher-level features serve as a better solution for the object recognition process as it combines the key feature to create a better image representation. Extracting properties can be easily done by active processes from deep layers. Because there are so many deep network layers, the consistent solution is to choose the layers before the classification layer form. The activation function is built with GPU support, and higher GPU configuration provides better results. In this way, customizing features using CNN is the most suitable solution for image recognition process.

$$\sigma\left(c+\sum_{j=0}^{n}\sum_{k=0}^{n} w_{j,k}\, d_{m+1,a+k}\right)$$

Objects can be easily identified and categorized by the use of embedded features. The process of finding objects involves caching images from real-world plots and assigning the classification layer as input. The proposed algorithm uses optical flows for object detection purposes. It uses video pixels from one frame to the next for the object recognition process. Next, the moving pixels are different from the image area analyzer and remove the hassle from the video frame. In this way, the proposed algorithm uses the features to be compressed. Feature curation reduces unwanted attributes that optimize the data given to the classification and reduce the computational overhead.

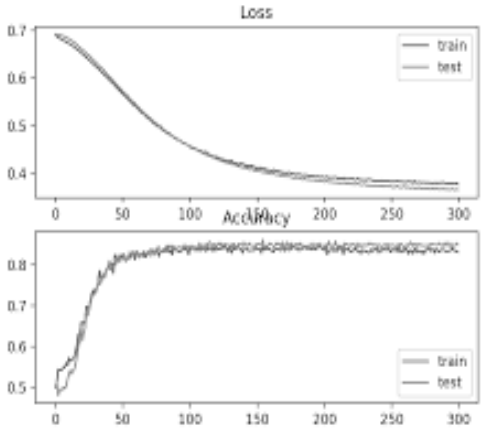
IV. OUTCOMES AND DISCUSSIONS

When a system dataset is supplied to a system, it will apply different image processing techniques to it. Accuracy has improved a lot. In the sample set more than 90% and more than 75% have been obtained with a sample set of 10 classes for 20 classes. Therefore, we can conclude that increasing the sample set size reduces the accuracy. We can cope with this by training the system on a large dataset.

Comparative Study with Traditional Work

The accuracy of Square Box Coder is comparatively high in relative to previous ideas. A new concept of web cam has been added to show live accuracy in the real environment . Data sets prescribed are well huge in number to provide maximum number of

percentages to an image. Evaluation time has been measured to 0.98 sec in Graphic user environment.
The comparative study can be shown in this graph:-



The different modules used basically RcNN Inception, Multiple Grid Test, Square box Coder, Tensor flow. The quality of the image in pixel is to be checked for performing the accurate detection of images. It basically deals with 70 to 95 % of the accuracy in recognizing image. Further, advancement in accuracy is still under works.

V. CONCLUSION

- ✓ The proposed system tends to perform well with good accuracy. The use of appropriate Deep learning algorithm i.e. CNN tends to give such accurate results.
- ✓ The Proposed System can be implemented in Auto-vehicles in future for smart automation. As driver-less cars are coming up in today's trends and the system can be implemented for smart driver-less automation. The implemented system can be connected with auto-braking system, can be utilize in emergency after any objection detection.

VI. FUTURE WORK OR ENHANCEMENT OF PROJECT

Automatic machines including car has given a boom exposure to IOT field of technology. Adding automatic traffic analysis system to the car can be a great milestone to be achieved. Hence, analyzing (traffic signals, animals, persons) in front of car which can provide sensor break instructions to the car is the future target of the project.

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