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A Review on Real Time Object Classification using Various Computer Vision Techniques

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Abstract*—Every object has certain patterns with respect to their geographical architecture. Analyzing these patterns for tracking objects at real time is effective to contribute in artificial intelligence towards automation. There are various conventional methods have been introduced till now that recognize objects on the basis of patterns, Convolutional Neural Network (CNN) is one of them. But CNN is limited with certain objects because of analogous patterns of different objects. System confuses or does not work effectively when multiple objects are intended to recognize at real time. The objective of this paper is to review earlier implemented systems that may having some flaws to recognizing or classifying objects on the basis of basic recognizing patterns. Google lens is also working on it for classifying objects at real time with high level of accuracy.*

Keywords:— *Object classification, object detection, pattern recognition, CNN, DNN, Python, Keras, Tensorflow.*

1. INTRODUCTION

An image identification algorithm (a.k.a an image classifier) takes an image (or a patch of an image) as input and incorporates the image. In other words, output is a class label (like “cat”, “dog”, “table”, etc.). How does an image recognition algorithm know the content of an image? Well, you have to train the algorithm to find the difference between different classes. If you want to find cats in images, you need to train an image recognition algorithm with thousands of images of thousands of cats and thousands of images in which the cats are not included. Needless to say, this algorithm can only understand the objects / sections which he has learned. In order to simplify things, we will focus on only two-tier (binary) classifier in this post. You might think that this is a very limited perception, but keep in mind that many popular object detectors (such as face detector and pedestrian detector) have a binary classifier under the hood. Like inside the face detector there is an image classifier that says that the patch of the image is face or background or not. Image classifier or object classifier is an approach through which one or more than one object is to be recognized and classify what features it belong and which object it is similar to [1].

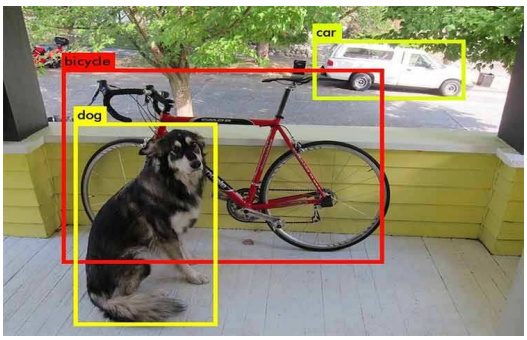

Figure 1: Object Classification [2]

Figure 1 represents the object classifications whether the objects are getting capture containing which objects.

2. RELATED WORKS

Davide Mulfari et al. [3] proposed a system whose main motive is to check how the proposed mobile system recognizes artifacts (in Messina city) is depicted in original image files (JPG format) taken from Google Image Search Engine Tanserflow based classification software runs on a minor Linux desktop machine, it calculates each visual data and after processing, gives us a data structure that has ten text descriptions.

Assuming the picture in other words, TensorFlow calculates the name of the main unit within a photo. The score between the string 0 and 100 is associated with the confidence level.

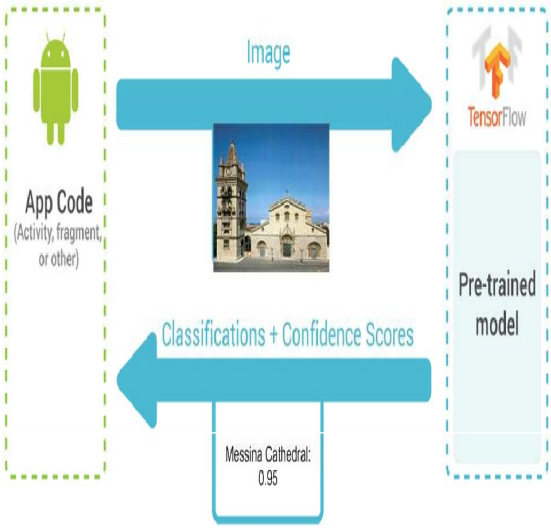

Figure 2: Overview of object recognition process with Google TensorFlow [3]

Figure 2 shows the object classification and classification scores that has been measured from pre trained model.

Nitin R. Gavai et al. [4] proposed a system which is based MobileNets model on TensorFlow platform to retrain the flower category datasets, which can greatly minimize the time and space for flower classification compromising the accuracy slightly.

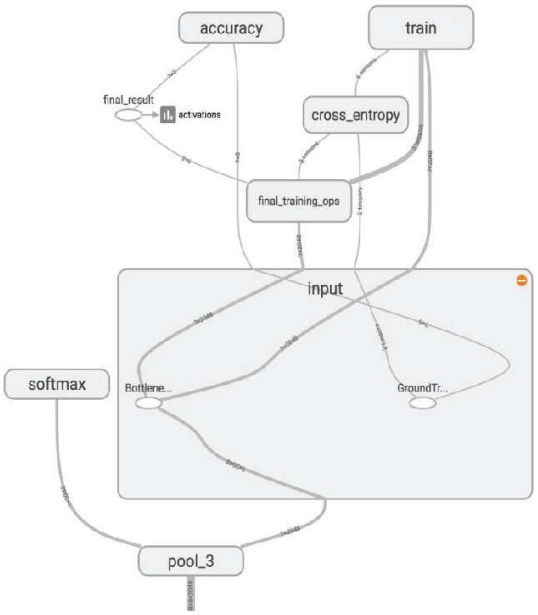

Figure 3: MobileNet Model [4]

MobileNet uses deep sense and makes sense each feedback channel applies a different filter. MobileNet. The model is built on intense intelligent intricacies which is complex as a factor converts a standard compound into a deep intelligent complexion and a 1x1 complexity is called dubious complexity. After that the point war complexity applies to 1x1 complexity add output to depth intelligent complexity. In a standard both complexity are filtered and add input to make a different output set in one step.

Diego Renan Bruno et al. [5] proposed a system which is based on traffic signal sign recognition at real time for driver assistance. System is able to classify different traffic signs (e.g. maximum speed allowed, stop, slow down, turn ahead, pedestrian). The training used in this work was implemented in the upper layer over CNN, which is based on the Inception Network. System uses an algorithm to detect traffic plates using slide window technique by giving an input image. The algorithm slides a template on it, thus generates many clippings. These snippets are then sent to Deep Learning classification system. This algorithm is quite simple, it was used to validate the classification system using only the other Images that are not in the original image dataset (knowledge) cropped

images base). This was to test this algorithm that has been also used a database of images provided by the institute made available by Neuroinformative.

Figure 4: Traffic Sign Recognition [5]

Rasika Phadnis et al [6] proposed a system which is based on Tensorflow for recognizing objects and classify them. System tries to eliminate set alarms or reminders. It's the goal of making atmosphere of the future where all the actions of a person is kept in mind and it helps to maximize its efficiency. It will not only bring the way things are done but orders for discrepancies a better investigation will be done.

System scope can be extended to train a user to identify the symptoms. When it commands the system to turn it off the user does not want to be tracked and it could be argued the system attacks user privacy to some degree, so voice commands can control the system at real time for precise assistance.

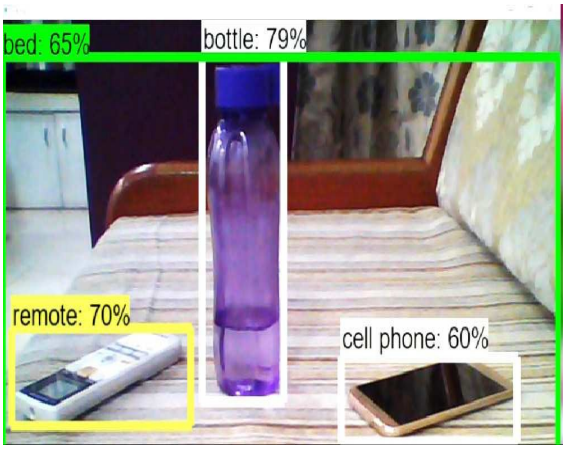

Figure 5: Object Classification and Recognition[6]

Shaukat Hayat et al. [7] proposed a system which is based on CNN for recognizing objects at real time. The object recognition is the classic technique that is used for identifying an object effectively in the image. Especially the area of computer vision is expected to detect objects with the help of local facilities recognize more complex tasks ways to find out the objects. In the last decade, there has been continuous increase in the number of researchers from various types of topics such as education, industry, security agencies and even the general public has also attracted attention to its detection object aspects of detection and related recognition covered problems. It has been further modified while adopting it deeply. Learning Model In this paper, we implemented deeper education multi- category object recognition and firm nerve detection Network (CNN). The decorated nerve network is made trained with generalized standard initialization and training set of sample images from 9 different object categories plus sample test images using diverse diversities widely. All results Python tactical flows are implemented in the framework. We check And compared CNN results with final feature vectors based on linear L2-SVM different types of BOW Classifier Based on this, adequate use validates our CNN effectiveness and strength of the model with a rate of 90.12% of accuracy.

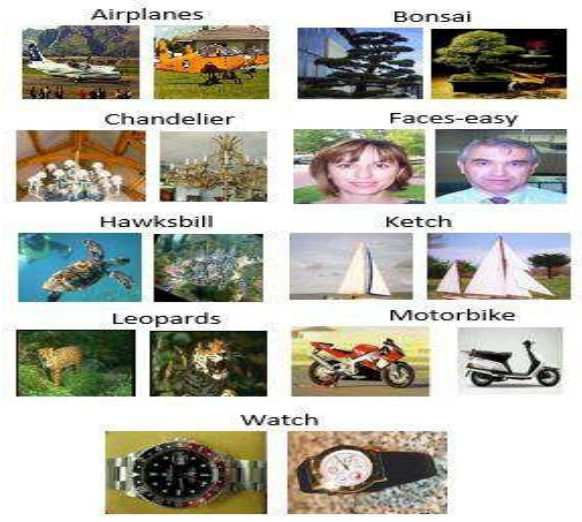

Figure 6: Object Classifications [7]

Nicolas Diaz Salazar et al. [8] proposed a system which is based on Convolutional Neural Network. In this work, transfer learning techniques are used to create a computational device that recognizes objects at real time. As per pre-trained neural network, inception-V3 is used in the form of a feature extractor in the images and one on the other the softmax classifier is trained, it contains classes which are being recognized. This GPU was used with Tensorflow platform originally the OpenKeyl Library for Python and Use in Windows 10 of video camera and other devices.

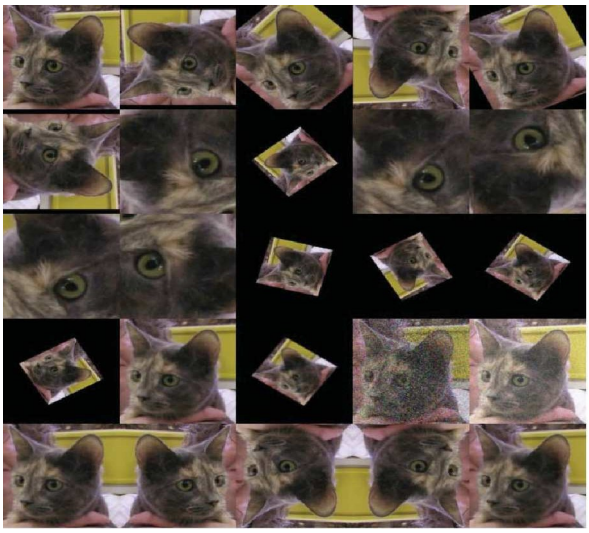

Figure 7: Data Augmentation [8]

3. CONCLUSION & FUTURE SCOPE

As per the survey takes place on various researches made in the field of real time object classification; most of the systems are based on CNN that intended to train a network in the reference of object patterns and features. System trails with the precision and processing time for decision making to classify objects at real time and action accordingly. Tensorflow is technique through which an object can be recognized at real time but classifying objects among various objects are difficult task. Multi- objects recognition in a single frame with high level of accuracy is bit challenge. A system is required to recognize objects at real time with high precision rate that met the technical configuration effectively.

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