OBJECT DETECTION USING MACHINE LEARNING

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ABSTRACT: Generally, only a small number of instances of the object are present in the image, but there is a very large number of possible locations and scales at which they can occur and that need to somehow be explored. Each detection of the image is reported with some form of pose information. This is as simple as the location of the object, a location and scale, or the extent of the object defined in terms of a bounding box. In some other situations, the pose information is more detailed and contains the parameters of a linear or non-linear transformation. For example for face detection in a face detector may compute the locations of the eyes, nose and mouth, in addition to the bounding box of the face.

INTRODUCTION

The aim of object detection is to detect all instances of objects from a known class, such as people, cars or faces in an image. Object recognition is to describe a collection of related computer vision tasks that involve activities like identifying objects in digital photographs. Image classification involves activities such as predicting the class of one object in an image. Object localization is refers to identifying the location of one or more objects in an image and drawing an abounding box around their extent. Object detection does the work of combines these two tasks and localizes and classifies one or more objects in an image. When a user or practitioner refers to the term “object recognition”, they often mean “object detection”. It may be challenging for beginners to distinguish between different related computer vision tasks.

So, we can distinguish between these three computer vision tasks with this example: Image Classification: This is done by Predict the type or class of an object in an image. Input: An image which consists of a single object, such as a photograph.

Output: A class label (e.g. one or more integers that are mapped to class labels).

Object Localization: This is done through, Locate the presence of objects in an image and indicate their location with a bounding box. A few years ago, the creation of the

software and hardware image processing systems was mainly limited to the development of the user interface, which most of the programmers of each firm were engaged in. The situation has been significantly changed with the advent of the Windows operating system when the majority of the developers switched to solving the problems of image processing itself. However, this has not yet led to the cardinal progress in solving typical tasks of recognizing faces, car numbers, road signs, analyzing remote and medical images, etc. Each of these "eternal" problems is solved by trial and error bythe efforts of numerous groups of the engineers and scientists. As modern technical solutions are turn outto be excessively expensive, the task of automating the creation of the software tools for solving intellectual problems is formulated and intensively solved abroad. In the field of image processing, the required tool kit should be supporting the analysis and recognition of images of previously unknown content and ensure the effective development of applications by ordinary programmers. Just as the Windows toolkit supportsthe creation of interfaces for solving various applied problems.

Fig 1: Detecting Object

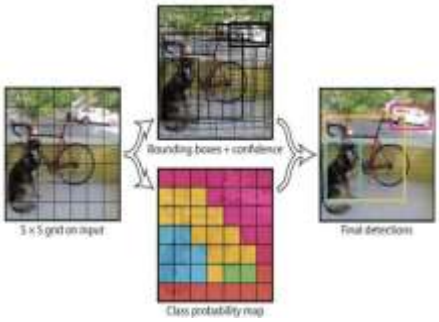
LITERATURE SURVEY

The Viola-Jones Algorithm, developed in 2001 by Paul Viola and Michael Jones, the Viola-Jones algorithm is an object-recognition framework that allows the detection of image features in real-time. Viola-Jones is quite powerful and its application has proven to be exceptionally notable in real-time face detection. The framework is still a leading player in object detection alongside many of its CNNs counter parts. The Viola-Jones Object Detection Framework combines the concepts of Haar-like Features, Integral Images, the AdaBoost Algorithm, and the Cascade Classifier to create a system for object detection that is fast and accurate.

Viola-Jones was designed for frontal faces, so it is able to detect frontal the best rather than faces looking sideways, upwards or downwards. Before detecting a object, the image is converted into grayscale, since it is easier to work with and there is lesser data to process. The Viola-Jones algorithm first detects the object on the grayscale image and then finds the location on the colored image.

EXISTING SYSTEM

In the existing system there are many implementations and proposals based on differential algorithms such as YOLO(You Look Only Once) with faster detection of object but with lower precision. YOLO is an open source object detection system recognizing objects on a single image or a video stream rapidly. It uses CNN to detect all objects in a frame simultaneously. Instead of using multiple passes on an image for each object present, YOLO divides the images to grids and applies a single CNN on it.



DISADVANTAGES:

- Low detection precision and locate objects with horizontal bounding box.
- Poor result for small and dense objects and easy to mislocate.

PROPOSEDSYSTEM

In the proposed system we use SSD(Single Shot multi box Detector).It uses single forward pass for recognition of objects from the whole image. The feature that sets it apart from YOLO is its approach to dealing with multiple bounding box of same instance of object. SSD uses priors(anchor box).Priors are pre calculated fixed size boxes, similar to original ground truth boxes with the approach of IoU with a score of more than 0.5. The convolutional model then regresses closer to ground truth bounding boxes providing more precision.

The SSD object detection composes of

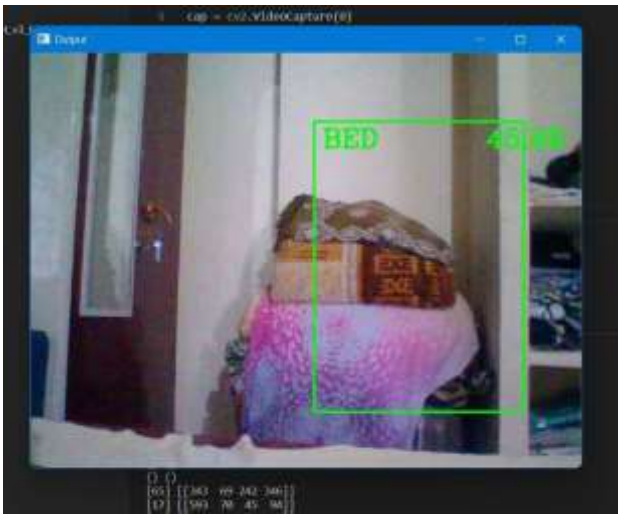
2 parts:

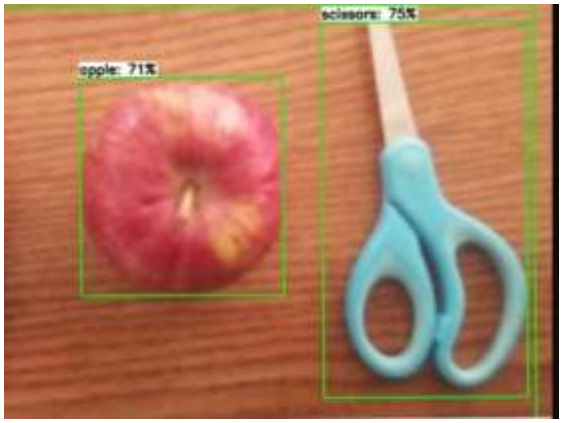
1. Extract feature maps, and
2. Apply convolution filters to detect objects.

ADAVANTAGES:

- ☐ High detection precision.
- ☐ Low misdetection rate.

SAMPLE RESULTS





CONCLUSION

The Object Detection system in Images is web based application which mainly aims to detect the multiple objects from various types of images. To achieve this goal shape and edge feature from image is extracted. It uses large image database for correct object detection and recognition. This system will provide easy user interface to retrieve the desired images. The system have additional feature such as Sketch based detection. In

Sketch detection user can draw the sketch by hand as an input. Finally the system results output images by searching those images that user want.

SCOPE OF OBJECT DETECTION AND RECOGNITION

The project has wide scope in multiple areas and can easily increase its utilization by adding more efficientalgorithms. Some of the areas are as follows-

Medical Diagnose:

Use of object detection and recognition in medical diagnose to detect the X-Ray report, brain tumors.

Shapes recognition:

Recognize the shape from whole region in images.

Cartography:

The cartography as the discipline dealing with the conception, production dissemination and study of maps.

Robotics:

In robotics use of object detection is movement of body parts and motion sensing.

REFERENCES

- He, K., Zhang, X., Ren, S., and Sun, J. Deep residual learning for image recognition. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (2016), pp. 770–778.
- Hoiem, D., Efros, A. A., and Hebert, M. Automatic photo popup. ACM transactions on graphics (TOG) 24, 3 (2005), 577–584.
- Hoiem, D., Efros, A. A., and Hebert, M. Geometric context from a single image. In Computer Vision, 2005. ICCV 2005. Tenth IEEE International Conference on (2005), vol. 1, IEEE, pp. 654–661.
- Hoiem, D., Efros, A. A., and Hebert, M. Putting objects in perspective. International Journal of Computer Vision 80, 1 (2008), 3–15.
- Hornik, K. Approximation capabilities of multilayer feedforward networks. Neuralnetworks 4, 2 (1991), 251–257.
- Huang, T. Computer vision: Evolution and promise. CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH-REPORTSCERN (1996), 21–26.
- Hubel, D. H., and Wiesel, T. N. Receptive fields and functional architecture of monkey striate cortex. The Journal of Physiology 195, 1 (1968), 215–243.
- Ioffe, S., and Szegedy, C. Batch

normalization: Accelerating deep network training by reducing internal covariate shift. CoRR abs/1502.03167 (2015).

- Jia, Y., Shelhamer, E., Donahue, J., Karayev, S., Long