# A Review on Concept of Object Detection Techniques

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**Abstract -** *Computer vision supply devices with capability to see the world around them visually, just like how humans utilizes their eyes. From several images can automatic extraction, analysis and understand of useful information. Object detection is a formula to see the computer that is gaining momentum in both technological communities and consumers. Object detection means classify and detect all objects in an image. Localization implies where the object is in an image and around it forms a square. Classification implies classify an image object from a set of predefined categories into a category. There are many of object detection techniques such as Background Subtraction, Template Matching, Shape Based and others. This paper present the concept of object detection , the researches interested in the field of object detection, difference between detection, localization and classification of objects, its importance and applications, General object detection framework ,the techniques used for object detection.*

**Keywords —** *object detection, computer vision, classification, localization.*

## I. INTRODUCTION

One of the computer vision techniques is object detection that is used for detecting the objects in images or videos. When peoples look in the images or videos can identify and locate objects with moments. The aim of object detection techniques is to detect objects using a computer. When you give an image or video, the object detection model can detect any known set of objects that may exist and present data about their locations within the image or video [1].

Object detection applied in a wide variety of industries, where use cases range from security of personal to productivity in the workplace. Face detection is one of its forms, which can be used as a security measure to allow only some people to enter a highly secret area in a government building. It can be used to calculate the number of people in a business meeting to automatically regulate other technical tools that will assistance organize the time for that certain meeting. In visual search engine helps consumers to find the specific item they are looking for [1].

In current years, the detection of objects in remote sensing images or videos has involved significant attention because the quick development for technology of remote sensing. Though much effort has been made to detection objects, it remnants a challenge because the variety of objects and the complexity of the backgrounds. Common objects of remote sensing are ships, aircraft, vehicles, buildings and etc. [2, 3].

Shifeng Zhang and et suggested a new one-shot based detector, which involves two interconnected modules. The proposed modules achieved high detection accuracy and efficiency [4].

Xudong Sun and et presented a new scheme of face detection by using deep learning and achieved advanced detection performance on the popular FDDB face detection evaluation [5].

Han Hu and et proposed a module of object relation. The module depends on interaction between features and geometry for set of objects [6].

Yong Liu and et proposed an algorithm of object detection that not only contains visual appearance of object, but also used two types of context containing information of scene contextual and object relationships in a single image [7].

## II. DIFFERENCE BETWEEN DETECTION, LOCALIZATION AND CLASSIFICATION OF OBJECTS

Localization, classification and detection of objects are the essential tasks in Computer Vision, which are applied in several realistic applications such as Robotics and autonomous cars. Classification/Recognition means an image with an object, knowing what that object is. In other words, classify object in an image into a category from a set of pre-defined categories. Localization means where the object is in an image and draws a square around it. Object detection means classify and detect all objects in an image (i.e. Assign a category to each object and draw a square around it) [1]. Figure 1 shows the concept of classification, localization and detection of objects.
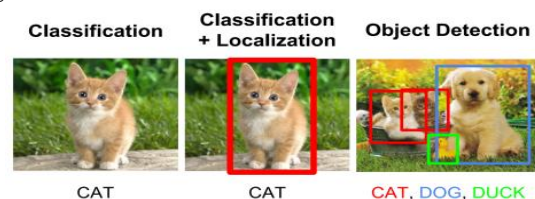


Figure 1: Classification, localization and detection of objects.

## III. FRAMEWORK OF GENERAL OBJECT DETECTION

There are typically three stages in object detection [8].

1. First, to detect areas of concern, a model or algorithm is used. These interesting areas are a big collection of boundary boxes spanning the entire picture.
2. In the second step, visual characteristics are obtained for each bounding box, assessed and determined if and which objects are present in the visual characteristics proposals.
3. In the final phase of post-processing, overlapping boxes are merged into one bounding box.

## IV. TECHNIQUES OF OBJECT DETECTION

We study the fundamental technique for object detection and monitoring during our literature review, all of which are described below:

### 1. Background Subtraction

A commonly used technique that is easy to enforce by simply subtracting the present frame from the prior frame and acquiring the difference threshold value between the pixel value provided and the pixel value acquired. If the threshold value exceeds the given pixel, it will be considered to be the foreground. This technique is not as suitable as it is extremely incorrect. Typically, the algorithm's fundamental steps are as follows [9].

a. Background modelling constructs a background reference picture.
b. The selection threshold determines the suitable threshold values used to achieve the required detection rate in the subtraction procedure.
c. Subtraction operation or pixel classification classifies a pixel type, i.e. a pixel is a background part or a moving object.

### 2. Template Matching

The distinction is provided as the matching measure feature between the RGB level histograms corresponding to the target object and the template object. The histograms of the target and template images are calculated from a plot of each independent channel of the triplet RGB level values versus the pixel number for each tonal value [10].

### 3. Real Time Subtraction and Technique of Shadow Detection

This technique is released by Mr. Deepjoy Das and Dr. Sarat Saharia, describing two types of distortion, namely distortion of brightness and distortion of chromaticity depending on pixel RGB values in the picture. This technique is precise to a certain extent as it also detects the object's shadow part [11].

### 4. Shape Based

Shape-based technique is used in real-world images to identify objects. Compared to local characteristics such as SIFT, the shape characteristics are more striking as most categories of objects are better defined by their shape than texture, such as cows, cups, and horses and for wiry objects such as bicycles, chairs or ladders, local characteristics contain big amounts of background noise. Thus, shape characteristics are often used to replace local characteristics [12].

## V. APPLICATIONS OF OBJECTS DETECTION

Object detection techniques have a broad range of apps in a variety of fields including robotics, medical picture analysis, monitoring and interaction with human computers. Current techniques operate fairly well in restricted domains but are quite susceptible to clutter and occlusion. The PASCAL VOC object detection challenge is a common benchmark for object detection. The challenge's objective is to identify items in pictures from prevalent categories like individuals, vehicles, horses, and tables. Over the past few years, the challenge has drawn considerable attention in the computer vision community, and the output of the finest technologies has steadily increased on an annual basis by a substantial quantity. Detection of face is a typical implementation of algorithms for object detection. In practical circumstances, there has been considerable success in deploying face detection techniques. Current digital cameras, for instance, use face detection to decide where to concentrate and even detect smiles to decide when to photograph [13].

## VI. CONCLUSIONS

This paper provides an extensive survey of common techniques of object detection and discusses each method's primary idea. This article describes and focuses the concept of object, difference between detection, localization and classification of objects detection, framework of general object detection and applications of objects detection. Due to the rapid growth of remote sensing technology, the detection of objects in remote sensing pictures or videos has engaged considerable attention in recent years. This study serves as the basis of the object detection schemes for the scientists involved.

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