

# A Review on the Performance of Object Detection Algorithm

**Rubaljot kaur, Chetan Marwaha**

M.Tech Scholar Department of Computer Engineering and Technology, Guru Nanak Dev University, Amritsar  
rubal0004@gmail.com

Senior programmer, Department of Computer engineering and technology, Guru Nanak Dev University Amritsar  
cmarwaha@rediffmail.com

## ABSTRACT

This paper represents multiple Object recognitions technology in the field of computer vision for finding and identifying multiple objects in a image or video sequence. It is basically highlight only those objects which are needed. Algorithmic descriptions of recognition task are implemented on machines which is an complex job. Thus multiple object recognition techniques need to be developed which are less intricate and well-organized. The multiple object detection is a very important application of image processing. The literature survey has shown that the most of existing methods have ignored the poor quality images like image with noise or poor intensity. Noise means those signals which are not required. Also the most of the existing work for multiple object detection has neglected the use of hybrid technique. The overall goal of this research work is to propose an efficient and simple multiple object detection using the fuzzy and transition region based image segmentation.

## Keywords

Image segmentation, object detection techniques, fuzzy logic.

## 1. INTRODUCTION

Image segmentation can be the whole process of partitioning/subdividing digital photograph directly into a number of considerable places or teams of pixels places along with esteem to a particular request. Segmented image undergoes further processing such as feature extraction, texture analysis and content based image rescue. The idea is a pre-processing technique for getting rid of a thing (foreground) via backdrop dependant on several properties for example greys levels, color, consistency, etc. Object recognitions technologies in the area of computer vision to find as well as figuring out physical objects inside of a photograph or online video media sequence. [13] It is basically highlight only those objects which are needed. Algorithmic product descriptions associated with acknowledgement undertaking are generally applied with machines which usually can be an difficult job. Therefore item acknowledgement procedures should be designed which might be a smaller amount delicate in addition to well-organized [17].

### 1.2 OBJECT DETECTION TECHNIQUES

#### 1.2.1 Thresholding based approach

Thresholding is a vital approach around impression segmentation applications. A essence involving thresholding is usually to select a exceptional gray-level tolerance importance with regard to selecting out items of interest within the impression coming from the background structured on his or her gray-level distribution. Even though mankind can readily differentiate an item coming from sophisticated background impression thresholding can be a difficult task to separate all of them. Impression

segmentation by simply thresholding is a simple however highly effective means for segmenting images acquiring light items for darkish background. Thresholding method is based on impression space or room parts i.e. in traits connected with impression. Thresholding operation transfer the multilevel impression in a binary impression i.e., the item choose a correct building up a tolerance  $T_0$ , to split impression pixels in a number of parts along with separate things from background.[7] Easy and simple property or home which pixels throughout a location may share can be intensity. So, an all natural strategy to portion such parts is thru thresholding, this splitting up of light along with dimly lit regions. Thresholding brings about binary images from grey-level people through transforming just about all pixels below several building up a tolerance to help absolutely nothing and all of pixels that building up a tolerance to help one. (What for you to do with pixels for the building up a tolerance makes no difference, while you are consistent). If  $g(x, y)$  is a thresholded version of  $f(x, y)$  at some global threshold  $T$ .

$$g(x, y) = \begin{cases} 1 & \text{if } f(x, y) > T \\ 0 & \text{if } f(x, y) < T \end{cases}$$

#### 1.2.2 Boundary based approach

Boundary based or edge detection basically finds the edges or boundary of images and separates the object from the image. An Edge within an image is definitely a large community switch in the image intensity, normally of a typical discontinuity in either the whole picture intensity or also the initial derivative of your image intensity. The 3 process in Side diagnosis process is definitely a) Filter b) Enlargement as well as c) Detection.

**a) Filtering:** Photographs are generally damaged merely by disturbance just like behavioral instinct disturbance (salt and also boost noise) in addition to Gaussian noise.

**b) Enhancement:** It focuses on pixels wherever there's sizeable difference in regional strength principles and it is often done by computing the gradient magnitude.

**c) Detection:** Lots of issues in a photo use a nonzero value for the gradient, without these issues tend to be tips for the application. Thresholding is definitely used in your detectors with border issues [18].

**1.2.3 Region based approach:** It is a simple district dependent graphic segmentation method. Region dependent method decides the particular areas directly. It is also classified as a pixel based image segmentation method. This method examines neighboring pixels should be added to region. It is basically makes the groups of neighboring pixels having same value and spitting groups of those pixels having different values. Region glowing method determines the regions directly. Region glowing is the simplest region based method which groups the number pixels and finds the larger region. The pixel aggregation starts with the set of seeds in the way that the corresponding regions grows by adding each and every seeds point out people nearby pixels which often obtaining related values.

Formulations:

**a) Completeness:** the segmentation must be complete i.e. every pixel must be in region.

**b) Connectedness:** the connections between the points of regions must have some meaning.

**c) Disjointness:** regions must be joint.

**d) Satisfiability:** pixels of the image must have at least one common property.

**e) Segment ability:** Different regions must have different properties.

**1.2.4 Hybrid based approach:** Hybrid image segmentation methods focus on combining two or more approaches to get improved segmentation. In this method any other two approaches are combined such as in transition region based thresholding approach region based and thresholding based approaches are used. So this approach can give better result.

**1.3 Local variance:** it is the standard deviation. It can be used to find the boundary or edges of the object. The part of the image has high local variance generally contains edges. So with the help of local variance, edges of the object can be find.

**1.4 Morphological operations:** First the image is divided in segments. There can some imperfections in the segmented image. To remove those imperfections morphological operations can be used. These operations also provide information on the form and structure of the image. These techniques basically deal with the shape or feature of the image.

**1.5 Fuzzy logic:** Fuzzy common sense is a technique to help computing based on "levels of simple fact" rather than typical "legitimate or perhaps fake" (1 or perhaps 0). Fuzzy common sense consists of 0 plus 1 since intense cases associated with simple fact (or "the state of matters" or perhaps "fact") yet also may include various expresses associated with simple fact concerning in order that, such as, the result of a comparing involving couple of things could

be certainly not "taller" or perhaps "modest" yet ".38 associated with tallness."

**Transition Region:** Transition region is geometrically located between object and background . It composed of pixels having intermediate gray levels between object and background. The local variance is important compared to local complexity for finding transition region. The area having higher variance generally contains edges, whereas the homogeneous regions have less variance.

## 2. RELATED WORK

Jia You et al. 2016[1] proposed Distance metric is an essential step of salient object detection in which the pair wise distances are used to distinguish salient image elements from background elements. Instead of using the point-to-point distance metrics which possibly implicitly take into account the context information around data points The proposed approach is evaluated on three large publicly available datasets with pixel accurate explanation. Extensive experiments clearly demonstrate the superiority of the proposed approach over the state-of-the-art approaches. Carlos Cuevas et al. 2016[2] proposed a public, complete, compact, and well structured database, which allows to test moving object detection strategies. The database is composed of many real indoor and outdoor sequences ordered in different categories, each of one covering a particular challenge. In contrast to other databases, the proposed one is fully annotated at both pixel and object levels. Kangham Oh et al. 2016[3] proposed, a novel method for the detection of multiple salient regions that is based on the integration of estimated foreground clues is proposed. Although this subject has been very well studied for the detection of salient objects, many technical challenges still exist regarding the multiple-object-detection task; in particular, unlike a single-object-detection problem, a high inter-object dissimilarity causes new difficulties. By analyzing the limitations of the existing models, the following two main frameworks that are based on a multi-level foreground segmentation strategy are proposed: non-parametric cluster-based saliency (NS) and parametric cluster-based saliency (PS). Nithin Raj et al. 2016[4] presented a new story algorithm formula according to bandlet remodel for concept diagnosis within Fabricated Aperture Mouth (SAR) images. Below initially a new bandlet based despeckling scheme is employed for the suggestions SAR graphic then a continuing phony alert amount (CFAR) detector is usually employed for concept detection. Your proposed Bandlet remodel based scheme outshines the conventional despeckling plus concept diagnosis strategies within wavelet domain name, with regard to math plus image quality. Haoya Ren et al.[5] This paper presents some sort of work of fiction binary descriptor Enhanced Local Binary (BLB) for subject detection. A planned descriptor encodes changing community neighbour parts in various machines in addition to locations. Every area pair of the particular planned descriptors decided on by the RealAdaBoost formula with a penalty period for the architectural diversity. Because of this, assured features that are great in describing certain qualities will be chosen. Furthermore, the particular encoding system is definitely utilized for the particular gradient site as well as the intensity site, which can be supporting to be able to

conventional binary descriptors. Yingying Liu et al. 2016[6] supervised object prognosis strategies learn object versions coming from referred to as education data. That is tiresome to develop specially when the training details set will be large. Discovery strategies for example headlight prognosis might detect possibilities constructive blobs that may include the object without the need of referred to as education details .However; such blobs aren't always accurate. Many people might include sounds such as part of an object, multiple objects and also other types of objects. M.Chandrakala et al.2016 [7] image segmentation is a significant technology for image processing. Many segmentation methods brought forward to deal with image segmentation, among these thresholding is more appropriate. This paper describes thresholding technique based on block processing, which removes non uniform illumination background. In this paper we compared proposed algorithm with the existing algorithms.Priyadarsan Parida et al. [8] have proved transition region based image segmentation. However, transition region based image segmentation has two shortcomings. Firstly these methods are generally put on typically pertaining to impression segmentation comprising an individual object. Subsequent, the ways work only when the pictures comprise easy background and foreground. The overall performance deteriorates as soon as background and forefront are generally distinctive or even of numerous intensities. Ultimately, a objects are generally purchased the whole picture readily available thing parts.Sahil Sharma et al. 2015[9] this paper presents a method to segments the retinal blood vessels using fuzzy logic. The proposed method is based on getting high pass filtered image at first and then applying different set of fuzzy rules on high pass filtered image to segment the retinal blood vessels. Different fuzzy rules were designed on the bases of some threshold values. Threshold values are intensity value of pixel and number of pixels in different cases. The proposed method is tested on publically available retinal images from DRIVE data set. The proposed segmentation results are compared with the manual results pixel by pixel and provide up to 95% accuracy. The proposed method is compared with previous methods. The proposed method segments the blood vessels in less interval of time than previous methods.Anu Bala et

al. 2015[10] planned strategy accumulates the writing with XOR sample that gives the dwelling with the query photograph or even data bank image. Initially, a RGB (red, green, blue) color photograph can be transformed into HSV (hue, saturation in addition to value) color space. Secondly, a V color living space is split directly into the overlap sub-contract blocks involving dimensions  $2 \times 2$  in addition to textual content with are collected in accordance with the form with the textons. A operation with the planned technique considered by assessment with standard data bank, Corel-1K, Corel-5K in addition to Corel-10K in terms of accurate, recognition, ordinary retrieval accurate (ARP) in addition to ordinary retrieval rate (ARR). Payal Panchal et al. 2015[12] Object recognition is a process of detecting the object present in an image or a video sequence, with the help of some recognition technique or methods. Object recognition is one of the techniques of digital image processing where we can process any image by applying some of the operation. It actually depends on human perception that what sort of output he needs, based on that, one can apply a particular technique. Astha Gautam et al. 2015[13] Monitoring in addition to uncovering involving thing is definitely most popular presently and is also employ pertaining to motion recognition of assorted things on a presented movie or perhaps an image. The actual uses of thing recognition in addition to tracking is definitely harvesting, armed forces, vehicles, city, stability and for professional use. Some tips normally employ in it usually are track record subtraction, Framework variation, template complementing in addition to design based mostly methods. We can talk about problems pertaining to recognition in addition to tracking.

### 3. COMPARISON TABLE

Table 1: Comparison of Various Techniques

Serial No	Authors	Year	Technique	Features	Limitations
[1]	You Jia, et al	2016	Image binarization method based on wavelet domain gray stretch	Robustness to noise and better segmentation quality	Threshold determination to segment an image using otsu method cannot produce efficient results when gray levels between foreground and background do not change

					remarkably
[2]	Cuevas, et al	2016	FELICM (Fuzzy Edge and Local Information C-Mean) with the negative selection algorithm.	High accuracy results and handles the problem of over segmentation efficiently.	NA
[3]	Kanghan, et al	2016	An iterative thresholding based on 2D improved Otsu method using a novel threshold value recognition function	Well detection of objects and better anti-noise performance. Computationally much better method to segment an image that has diverse complexities, which can be utilized to segment any type of histogram	When shape of histogram is non bimodal and $\text{intensity}_{\text{background}} > \text{intensity}_{\text{foreground}}$ , the traditional otsu method cannot produce efficient result of segmentation
[4]	Nithin, R, et al	2016	Hybrid clustering technique (k means and fuzzy c means clustering)	Minimal execution time and much better accuracy	Lack of fast and efficient image segmentation for medical images.
[5]	Ze-Nian Li, et al	2016	Partial contrast stretching, subtractive clustering, k-means clustering and median filter.	A Efficient and much better segmentation results and improved performance.	NA
[6]	Yingying, et al	2016	Spatial FCM	Higher accuracy and low error rates.	NA
[7]	Parida,et al	2016	FELICM	Solves the problem of isolation of samples and random distribution of pixels inside the region and also produce the high edge accuracies.	Loss of essential details because of presence of noise in satellite images
[8]	Bala, et al	2016	Sp Improved median based otsu image thresholding algorithm	Obtains much accurate threshold	Original otsu method provide not so efficient segmentation results if the histogram is non bimodal
[9]	Weizhi,et al	2016	Improved thresholding based segmentation integrated with an inverse technique(TSTN)	Better accuracy and good quality segmentation	Both otsu and fuzzy c mean were unable to produce good quality segmentation of natural images owing to the complicated background and non uniform illumination of images

[10]	Panchal, et al.	2015	Automatic edge based image segmentation.	Simplicity, accuracy, non invasive, lower cost, less immune to human errors (being automatic technique), ease of implementation, reduced computational time	The manual technique used so far have higher cost and body is exposed to ionizing radiations
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#### 4. CONCLUSION

The essence photo segmentation will be to shorten this representation associated with an photo in one thing that is additional significant and much easier to understand. Edge degradation can be efficiently handled. It works well on overlapped or mixed data set. Much better and efficient as compared to other clustering based segmentation technique. In fuzzy c method effects of noise are nullified by making an effective use of spatial relation between pixels but it results in edge degradation. To overcome this problem, FELICM (Fuzzy Edge and Local Information C Mean) method is available that brings down the edge degradation by using weights of pixels within local neighbor window.

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