

IMAGE SEGMENTATION- A REVIEW

Ripandeep kaur¹ and Manpreet kaur²

¹ Student, Department of Electronics and communication Engineering, Punjab Technical University,
Jalandhar

² Assistant Professor, Department of Electronics and communication Engineering, Punjab Technical University,

¹ Ripanchahal553@gmail.com and ² Cecm.ece.mpk@gmail.com

ABSTRACT: Image Processing is a procedure to translate an image into digital figure and carry out some operations to get a better image and take out useful information from it. There are many techniques of digital image processing like image enhancement, compression and reconstruction which are discussed in this paper. Image segmentation is an important method of image processing which is widely used in these days. Further image segmentation is divided into different categories in which edge segmentation is very common and

effective in the latest research area.

Keywords: Enhancement, reconstruction, compression, particle swarm optimization, image segmentation, region segmentation, edge segmentation and data clustering

Introduction

Image is a matrix, an array or elements of picture called elements in the square form which are arranged in the form of rows and columns. Analog images are those images which human looks like paintings, photographs etc. It is continuous and cannot be broken down into pieces. Digital images can be divided into number of pixels. Each pixel represented by numerical value. Image Processing is a process to translate an image into digital figure and carry out some operations to get a better image and take out useful information from it [1]. It is a learning of any algorithm that takes an image as input and precedes an image as output. Image processing is also referred to dealing of a 2D picture by a computer. It is a structure of signal dispensation in which image is

input related to video frame or photograph and is image and also important features related with that figure may be output. Image processing system indulgence images as two dimensional signals and set of signals processing methods are applied to them. It is newest technologies and its applications in a variety of aspect of a business. Image Processing forms center of research area within engineering and computer science disciplines too [2]. Image processing has three types of techniques. These techniques are:

1. Image enhancement
2. Image reconstruction
3. Image compression

Image Enhancement refers to accentuation, or sharpening, of image features like margins or compare to construct a graphic display which is more helpful for display & investigation. This procedure does not raise the inherent information content in data. It includes gray level & distinguish between operation, noise drop, edge crispening and sharpening, filtering, and

magnification, pseudo coloring, interpolation and so on. Image Restoration is associated with filtering the experiential image to diminish the effect of degradations. Efficiency of image restoration depends on the degree and accuracy of the acquaintance of degradation process as well as on filter design. It is totally differ from image enhancement in that the later is linked up with more mining or inflection of image features. Image Compression is that which is used to minimizing the numbers of bits necessary to symbolize an image [3]. Image segmentation is one of the processes of the image processing in which partitioning the images into different types of regions. A region is collection of pixels of similar properties. The properties of the images include its gray level, texture, motion etc. The image segmentation can be done with the help of different-different intelligent techniques like bee colony optimization, particle swarm optimization etc.

2.Literature Survey

In paper [4] Nasrul Humaimi et.al proposed the ultrasound liver image enhancement based on watershed segmentation method. The main center of this study is to develop the region of liver based on watershed algorithm of segmentation and visualization technique. In this study, an ultrasound image is malformed into a binary image using the threshold method. It means that the color of the output image appear only black and white. After the image is converted into binary image, the image is tailored using Watershed technique together with the visualization process. The result is really helpful in medical diagnostics. In paper Pham et.al [5] proved that the extraction of effective features of objects is an important area of research in the intelligent processing of image data. A well-known feature in images is the features of texture which can be used for image description, segmentation and classification. A novel texture extraction method using the principles of geostatistics and the concept of entropy in information theory. Experimental results on

medical image data have shown the better performance of the proposed approach over a number of popular texture extraction methods. In paper,Hongmei [6] et al. proposed a multilevel thresholding method segmenting images based on the maximum entropy and an improved PSO. First, the parameters and the evolutionary process of the basic PSO have been improved, and then the combinations of near optimal thresholds are searched out by combining the improved PSO with maximum entropy. In this paper Eberhart and Kennedy [7] introduced PSO which is based on social relationships established among simple individuals in a group. There is a leader in the flock which is followed by the others members. However, each member has a memory about its position in the group. In this way, the individual is able to take a decision based on its own knowledge of cognitive element and also based on the behavior of its neighbors of social element. The convergence of traditional PSO algorithm is so fast that it easily falls into the local optimal solution. In order to resolve this problem, the optimal threshold value was obtained in accordance with the local maximum entropy for the best position ever attained by a proper particle and the global maximum uniformity indicated the best position ever encountered by all particles. Initially, PSO algorithm generates a group of particles, in which a particle is defined by a position and a velocity. Each particle moves with an adaptable velocity based on a fitness function within the search space, and retain the best position it ever visited in the past. The velocity decides the moving direction and distance for a particle. In PSO, two optimal constraint parameters g_{best} which is global parameter indicated the best position ever encountered by all particles and p_{best} which is local parameter for the best position ever attained by a proper particle are used to update the velocity for all particles. Finally, an approximating optimal solution can be obtained through previous actions iteratively. In paper Ahmed Afifi [8] explained the sky-scraping level features to extract the image using the over-complete wavelet decomposition which allows the

technique to precisely differentiate the desired tissue. Also, the inclusion of prior shape model in the figure of signify and its variability to increases the capability to capture the desired object variations without overlapping with the other objects. Moreover, the exploitation of the particle swarm optimization algorithm is to evolve a region based level set function which eliminates the need for deriving gradient of energy or solving difficult degree of difference equations and it do not require level set re-initialization. PSO algorithm can capably discover the search space to join to the desired object and its parameters can be easily adapted for any object. So the future PSO segmentation technique is very appropriate for the segmentation of abdominal CT scans and it shows promised results. In the future, enhancement of this PSO segmentation technique is required by employing the parallel PSO algorithm and extending the technique to the 3Dcases. In paper Fahd M. A. Mohsen [9] et. al proposed PSO that has been used to produce a new optimization-based image segmentation method, PSOTH. In the PSOTH method, the algorithm of PSO tries to find a near optimal segmentation for a given image using a fitness function. PSO is a flexible optimization method, where many objective functions can be used. For this reason, a new quantitative evaluation function for segmented images has been proposed in this paper. So in the PSOTH method, the new evaluation function has been used as a fitness function for the algorithm of PSO. The experimental results have illustrated that the efficiencies of the PSOTH method and the new evaluation function. Djerou et. al. [10] using a combination of thresholding and binary PSO. This approach determines the number of thresholds optimal. The objective function depends on the user's data set. In R. Yusnita, Fariza Norbaya [11] paper has offered an intelligent system for parking space detection which is based on image processing technique that confined and process the brown rounded figure drawn at parking lot and make the information of the vacant car parking spaces. It will be show at the display unit that consists of seven segments in

real time. The seven segments display shows the number of current obtainable parking lots in the parking area. This proposed system, has been developed in software and hardware platform.

3. Image Segmentation

Image segmentation is the process of partitioning the images into different types of regions. A region is collection of pixels of similar properties. The properties of the images include its gray level, texture, motion etc. There are two regions of image segmentation are as follow:

1. Region Segmentation
2. Edge Segmentation
3. Data Clustering

Region Segmentation: In region segmentation, the pixels of the same objects are grouped and marked to indicate the formation of the region. The pixels may be assigned to the same regions if they have same intensity values and close to one another. Edge canary operators are used in it. This method is mostly based upon the assumptions that neighboring pixels has similar values within same regions.

Edge Segmentation: In edge segmentation, it analyzes the gray value level of distribution and gives value them according to the level of gray scales.

Data Clustering: Data clustering is one of most important application of image segmentation. In this type of concept centroid are use to represent each cluster. The whole image is divided into clustering and partitioning. Image segmentation can be applied in various application filed like image compression, pattern recognition and image retrieval. Segmentation can also be achieved with the help of edge detection. In detection of edge various regions are

there which are normally tries to locate points of images. The principle of image segmentation is to division of an image into essential regions with value to a particular application [12]. The segmentation is depends upon dimensions engaged from the image and can be classified into grey level, shades, texture, depth or motion. Basically image segmentation is vital and initial stage. It is an important technique that comes under image processing. In application of image segmentation it includes identification of objects in object based measurements like its size and shape, to identify objects in moving scenes of object based video compression and also to identify objects which are far distance from the sensors using depth measurements [13]. EM algorithm, clustering, relaxation labelling and are all-purpose technique in computer vision are many of it applications.

Conclusion

In this paper, we conclude that image segmentation is a very important technique which is used in digital image processing. Image segmentation is a process in which the image is divided into different types of segments according to the requirement. There are three main techniques under image segmentation such as region segmentation, edge segmentation and data clustering. The main objective of this paper is to discuss different types of image segmentation. Now a day's edge segmentation technique is widely used. In this segmentation canary edge operator is used to find out the better results.

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