International Journal of Computer Systems (ISSN: 2394-1065), Volume 04– Issue 02, February, 2017
Available at http://www.ijcsonline.com/

Fast and Hybrid Image Segmentation Based on Level set and Normalized Graph Cut

Basavaprasad B[A], Ravindra S Hegadi[B]

[A]Research and Development Center, BharathiarUniversity, Coimbatore-641046, India
[B]Department of Computer Applications, Solapur University, Solapur-413255, India

Abstract

Image segmentation is an important issue still challenging for this in computer Vision application. The methods based on active contour method are one of the most successful techniques. It has received a tremendous amount of attention in computer vision processing. The operation can be carried out manually or automatically. In the proposed work, the three-phase construction of the level set evolution (LSE) and estimation of bias field for image back- ground in the occurrence of intensity. The three-phase formulation is used to separate an image into three regions. Intensity in homogeneousness frequently arises in real-world images. The proposed method is a hybrid technique which is a combination of the Level Set Algorithm and Graph Cut Theory which is applicable to both gray and color image segmentation. To begin with, the color image is converted into ***ycbcr****. Afterwards we implemented the level set method to separate the background from foreground. Thereafter we build a model of and implemented the maximum flow algorithm to obtain the minimum cut which we call as the initial segmentation of an image. At the end we used a recursive process to accomplish the outcome of image segmentation. The core idea of our method is to build a perfect graph model and reuse the existing segmentation techniques.*

Keywords: *Image, segmentation, hybrid, level set, normalized cut.*

I. INTRODUCTION

In biomedical application, image processing becoming an interesting area that considered as important role to perform further diagnosis or other task. Image segmentation is an important steps in image processing techniques that has been surveyed, and so far there is no appropriate solution is achieved for digital image processing due to its wide spread usage and applications. Observing this as the first step, it is a difficult process which is normally used in analysis of medical images. The goal of image segmentation is a partition of an image into a set of image regions, used to locate objects and boundaries (lines, curves, etc…) in images. More precisely, image segmentation in the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.

Clustering is most commonly used automated segmentation techniques implemented in the diverse fields of bioinformatics applications precisely used in the microscopic image processing.

An effective image segmentation method, is Level Set segmentation, in this paper we are going to implement a level set approach for active contour image segmentation. Level set method is originally developed by Osher and Sethian and then applied to image segmentation by Malladi.

Present level set approaches for image segmentation can be characterized into two major classes: edge-based models and region-based models [7]. Firstly region-based models which targets to aim to identify all regions of interest by spending a convinced region descriptor to lead the motion of the active contour. Nevertheless, it is very problematic to define a region descriptor for homogeneities images with intensity. Furthermost, region-based models depend on the supposition of intensity homogeneity. A distinctive illustration is piecewise constant (PC) models proposed in [4], [5, 6]. In [8, 9], level set approaches are projected based on an overall piecewise smooth (PS) formulation initially proposed by Mumford and Shah [13]. These techniques do not undertake homogeneity of image intensities and consequently are able to segment images with intensity in homogeneities. Conversely, these techniques are computationally over costly and are rather profound to the initialization of the contour [10], which significantly bounds their services. An edge-based model uses the edge information of the pixel to segment the image. Such models do not undertake homogeneity of image intensities and therefore can be realistic to images with intensity in homogeneities. Conversely, these types of techniques are in general moderately complex to the early conditions and often suffer from severe boundary outflow problems in images where the weak object boundaries exists.

In this paper, we propose a novel region-based method for image segmentation. After commonly recognized model of images with intensity in homogeneities, we develop a property of local intensity clustering and then define a local clustering benchmark function for the intensities in a neighborhood of all points. The local clustering benchmark is combined over the neighborhood center to define an energy function, which later is converted to a formulation of level set. This energy minimization is accomplished by an interweaved development of level set evolution and approximation of