

Accepted Manuscript

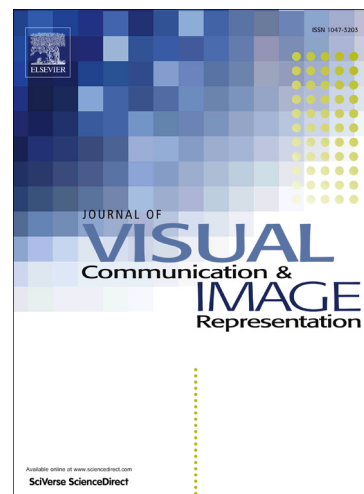
Improving Image Segmentation by using Energy Function based on Mixture of Gaussian Pre-processing

Nima Vakili, Mansoor Rezghi, S. Mohammad Hosseini

PII: S1047-3203(16)30209-7
DOI: <http://dx.doi.org/10.1016/j.jvcir.2016.10.003>
Reference: YJVC I 1871

To appear in: *J. Vis. Commun. Image R.*

Received Date: 1 May 2016
Accepted Date: 4 October 2016



Please cite this article as: N. Vakili, M. Rezghi, S. Mohammad Hosseini, Improving Image Segmentation by using Energy Function based on Mixture of Gaussian Pre-processing, *J. Vis. Commun. Image R.* (2016), doi: <http://dx.doi.org/10.1016/j.jvcir.2016.10.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Improving Image Segmentation by using Energy Function based on Mixture of Gaussian Pre-processing

Nima Vakili^a, Mansoor Rezghi^b, S.Mohammad Hosseini^a

^a*Department of Applied Mathematics, University of Tarbiat Modares, P.O. Box, 14115-175, Tehran, Iran*

^b*Department of Computer Science, University of Tarbiat Modares, P.O. Box, 14115-175, Tehran, Iran*

Abstract

In this paper, by proposing a two-stage segmentation method based on active contour model, we improve the procedure of former image segmentation methods. The first stage of our method is computing weights, means and variances of image by utilizing Mixture of Gaussian distribution which parameters are obtained from EM-algorithm. Once they are obtained, in the second stage, by incorporating level set method for minimizing energy function, the segmentation is achieved. We use an adaptive direction function to make the curve evolution robust against the curves initial position and a nonlinear adaptive velocity to speed up the process of curve evolution and also a probability-weighted edge and region indicator function to implement a robust segmentation for objects with weak boundaries. The paper consists of minimizing a functional containing a penalty term in an attempt to maintain the signed distance property in the entire domain and an external energy term such that it achieves a minimum when the zero level set of the function is located at desired position.

Keywords: Active contour, Image segmentation, Level set, Gaussian Mixture distribution, EM-algorithm, Pre-processing.

1. Introduction

The variational, active contour/level set formalism leads to effective segmentation algorithms. This formalism has been developed and mainly applied to intensity data acquired by conventional cameras [1, 2]. For such images, the piecewise constant and Gaussian models are often sufficient and almost in all investigations have been used.

The level set method (LSM), originally used as numerical technique for tracking interfaces and shapes, has been applied to image segmentation in last two decades [3, 4, 5]. In LSM, contours or surfaces are represented as the zero level set of a higher dimensional function which commonly named a level set function. With the level set representation, the image segmentation problem could be simply formulated and solved with mathematical theories, comprising calculus of variations and partial differential equations (PDE). An important advantage of using LSM is that numerical computations including curves and surfaces could be performed on a fixed Cartesian grid without having to parameterize these objects besides

Email addresses: nima.vakili@modares.ac.ir (Nima Vakili), rezghi@modares.ac.ir (Mansoor Rezghi), hossei_m@modares.ac.ir (S.Mohammad Hosseini)

Download English Version:

<https://daneshyari.com/en/article/4969430>

Download Persian Version:

<https://daneshyari.com/article/4969430>

[Daneshyari.com](https://daneshyari.com)