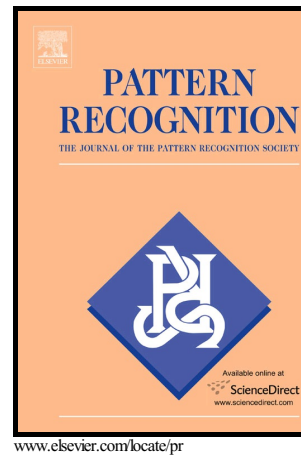


Author's Accepted Manuscript

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PII: S0031-3203(15)00310-6
DOI: <http://dx.doi.org/10.1016/j.patcog.2015.08.022>
Reference: PR5499

To appear in: *Pattern Recognition*

Received date: 1 May 2014
Revised date: 10 July 2015
Accepted date: 19 August 2015

Cite this article as: Haider Ali, Noor Badshah, Ke Chen and Gulzar Ali Khan, A Variational Model with Hybrid Images Data Fitting Energies for Segmentation of Images with Intensity Inhomogeneity, *Pattern Recognition*, <http://dx.doi.org/10.1016/j.patcog.2015.08.022>

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A Variational Model with Hybrid Images Data Fitting Energies for Segmentation of Images with Intensity Inhomogeneity

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Abstract

Level set functions based variational image segmentation models provide reliable methods to capture boundaries of objects/regions in a given image, provided that the underlying intensity has homogeneity. The case of images with essentially piecewise constant intensities is satisfactorily dealt with in the well-known work of Chan-Vese (2001) and its many variants. However for images with intensity inhomogeneity or multiphases within the foreground of objects, such models become inadequate because the detected edges and even phases do not represent objects and are hence not meaningful. To deal with such problems, in this paper, we have proposed a new variational model with two fitting terms based on regions and edges enhanced quantities respectively from multiplicative and difference images. Tests and comparisons will show that our new model outperforms two previous models. Both synthetic and real life images are used to illustrate the reliability and advantages of our new model.

Keywords. Image Segmentation, Calculus of Variations, Level Set Method, Partial Differential Equations, Edges, Objects.

1 Introduction

Image segmentation is the task of dividing an image into different regions such that each region is homogeneous in color, intensity or texture. The aim is to select specific features out of an image from distinguishing them from the background [1, 2, 3, 4, 5, 6,

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