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Salient Region Detection and Object Segmentation in Color Images Using Dynamic Mode Decomposition

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Abstract

Estimation of visual saliency in images has become an important tool since it allows the processing of images without knowing the actual contents. In this paper we introduce a novel method to detect salient regions of an image using Dynamic Mode Decomposition (DMD). The key idea is to utilize the analytical power of DMD, which is a powerful tool evolving in data science. The applicability of DMD in static image processing applications is made possible by developing a new way of image representation. The proposed algorithm utilizes color and luminance information to generate a full resolution saliency map. In order to model the non-linear behavior of human visual system we exploited the power of different color spaces including CIELab, YCbCr, YUV and RGB. The proposed method is computationally less expensive, simple and generates full resolution saliency maps.

The effectiveness of the generated saliency map is evaluated and confirmed on three benchmark data sets across fourteen existing algorithms based on the standard performance measures such as F-measure, Precision and Recall curve, Mean Absolute Error (MAE),Area Under ROC Curve (AUC-Borji),Normalized Scanpath Saliency (NSS) and Pearsons Correlation Coefficient(CC) . We also propose a Saliency Driven Transition Region [SDTR] based segmentation to segment the salient object from images.

1. Introduction

Human visual system is capable of judging the importance of specific image regions effortlessly and focus only on those parts. The filtered image regions are then processed in

[☆]Fully documented templates are available in the elsarticle package on CTAN.