Extracted Pixels Similarity Features (EPSF) using Interactive Image Segmentation Techniques

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Abstract

Semi-automatic image segmentation methods are among the segmentation methods that are used to achieve high quality segmentation result. These techniques are said to be interactive because their processes required input from their users to distinguish between the foreground and background of the image via color makers. Therefore color and texture features are an important aspect for the improvement of those methods in order to achieve success. The reason is that, the addition of a vast range of color features can guide the region merging process to achieve accurate results.

In this paper, we proposed a new interactive image segmentation method based on extracted pixels similarity features with the aid of color parameters comprising of seven features. These are namely: Red, Green, Blue, Hue, Saturation, Value and Texture Features. In our method, the initial step is to pre-segment the image. The next is the extraction of the color features from the image. Finally our method then merge all the pre-segmented regions of the image background
to extract the contour. Our proposed method has successfully been implemented and achieve good quality segmentation results by measuring the similarity between a region and its neighboring regions. In this method, the image regions are acquired by means of a pre-segmentation process via mean-shift. The region merging process was carried out based on the highest similarity between regions. Thus, the regions were merged with their neighboring regions based on the fact that the highest similarity criteria was achieved.

From the various experiments that were performed on the nine test images, it is evident that our proposed method achieved an average of 98.99% from all experiment carried out on the nine test images, when compared with their ground truth. That shows that our proposed method produced better segmentation results than the Graph Cut and the Dimension-free Directional Filter Bank Thresholding and Multistage Adaptive Thresholding respectively. Finally, our proposed method have been proved to be robust enough to segment both color and greyscale images and based on the results produced it can be concluded that our proposed method have achieved good quality segmentation results for both color and greyscale images.

References

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Index Terms

Computer Science

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Keywords

Semi-automatic segmentation, color images, highest similarity, region merging, mean-shift.