Abstract

Image segmentation plays a significant role in computer vision. It aims at extracting meaningful objects lying in the image. Generally there is no unique method or approach for image segmentation. The goal of image segmentation is to cluster pixels into salient image regions i.e. regions corresponding to individual surfaces, objects, or natural parts of objects. The idea is to change the representation of an image into something that is more meaningful and easier to analyze. Clustering is a powerful technique that has been used in image segmentation. The cluster analysis partitions an image data set into a number of disjoint groups or clusters. The clustering methods such as K-means, Adaptive K-means, K-medoids and Modified k-means has been discussed in this work. K-means clustering is one of the popular methods because of its simplicity and computational efficiency. However, K-means clustering is dependent on the choice of the initial centroids and has the problem of giving different results on every run of the algorithm. In this work, we propose two center initialization methods for the use in K-means. We have tested our methods over several images. We have experimentally found that our Modified K-means method reduces the number of iterations compared to the traditional K-means algorithm. Also based on execution time, homogeneity index, separation index, davies bouldin index, and dunn's index, our proposed method achieve better results when used to segment images of various sizes.

Keywords

Segmentation, Thresholding, Region growing, Region splitting and merging, Edge detection, Clustering, Initialization, K-means, Adaptive K-means, K-medoids, Modified K-means, Davis Bouldin index, Dunn's index, Homogeneity and Separation index.