Cluster-Based Image Segmentation

George Marlon Roberts, Georgia Institute of Technology
Chandrika Kamath, CASC, Lawrence Livermore National Laboratory
http://www.llnl.gov/casc/sapphire

In this project, we attempt to effectively segment images by using clustering algorithms.

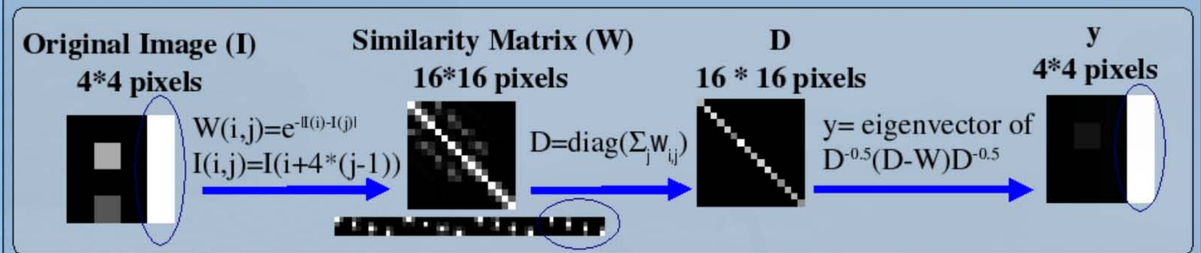
1. Introduction

Clustering algorithms are often used to perform image segmentation. We implemented both the kMETIS and pMETIS methods. kMETIS performs k-way partitioning directly, while pMETIS performs partitioning through repeated bisections. Both algorithms took approximately 10 seconds to process a synthetic 30*30 pixel image.

Results

2. Method

The Normalized Cut algorithm clusters image pixels based on similarities in intensity and spatial location. The diagram below illustrates the first bisection of a small image. Note the correspondence between the circled regions.



3. Results

We implemented the Normalized cut algorithm, comparing its performance with intensity and texture. This algorithm took 33 seconds, or 3 times as long as METIS, when used on our synthetic image

4. Discussion

The Normalized Cut algorithm can be used to effectively segment images. Segmentations could be further improved through a direct k-way implementation of the normalized cut algorithm. However, the algorithm is significantly more computationally expensive than some other less effective algorithms.

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