

Segmentation

Natalia Andrea Durán Castro
Universidad de los Andes
na.duran@uniandes.edu.co

Ana M. Velosa Orduz
Universidad de los Andes
am.velosa@uniandes.edu.co

Abstract

In this paper is shown

1. Introduction

Image segmentation it's the prosses of portioning a digital imagen into multiple segments by a computer. The aim to do segmentation on images is to make them more meaningful and easier to analyze obtaining only the part of the image that we want to observe. In addition, we could combine segmentation with contours recognition to have a more accurate result because these two areas are complementary.[2]

The methods we are going to be working on are K-means, Gaussian Mixture Models, Hierarchical and watersheds. K-means its one of the most common hard classification clustering algorithms,[1]

K-means is a hard classification clustering technique that each one of the pixels on the image belongs to a cluster. In contrast, the Gaussian Misture model is a soft classification technique because each one of the pixels on the image is express on terms of a probability of been in a specific cluster.[1]

A hierarchical segmentation is a group of image segmentation that are different from each other because of the level of details that each one has. This type of segmentation has the property that preserve spatial and neighboring information but if the image has to many details you end up with over-segmentation.[3]

2. Methodology

For the segmentation of the dataset BSDS_small.zip we implement a function were the input parameters are the image, the colorScape, the number of clusters and finally the clustering method.

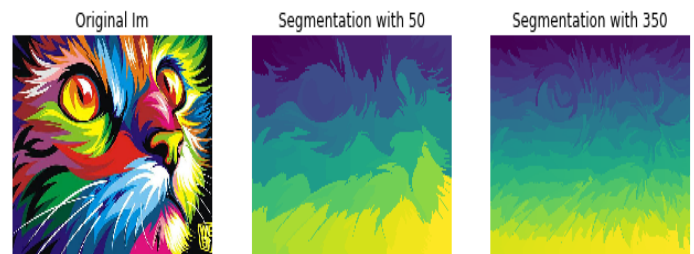


Figure 1. Segmentation with Watersheds of a Cat

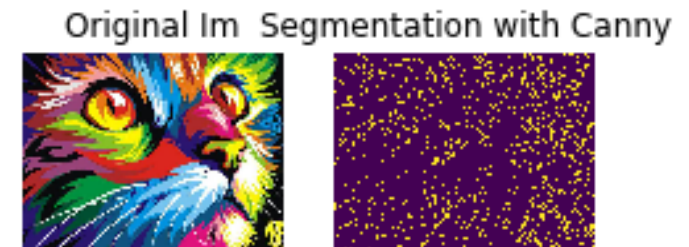


Figure 2. Segmentation with Canny of a Cat

For the clustering method we use are K-means, Gaussian Mixture Models, Hierarchical and watersheds, but if the user put any of the clustering methods name wrong we decided that would be interesting use canny.

Once we have implemented each one of the clustering methods we decided that was time to see if the function was working properly so we start to test it with a cat image took form the internet and we observed what we can see below, The figure 1 shows the segmentation by watershed of a really colorfull cat with one marker of 50 and the other one with 350. Now we proceed to observed what happened when we missed spell any of the clustering methods said before, and realizing on figure 2 that it's Canny.

Realizing that the algorithm it's working we start tasting it with the real dataset.

After observing the result we evaluate the accuracy of our function with the jaccar similarity score.

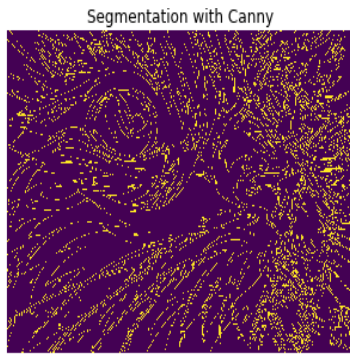


Figure 3. Segmentation with Canny of a Cat

3. Anexo

Anexo 1

References

- [1] E. Demidenko. The next-generation k-means algorithm. statistical analysis and data mining. *The Asa Data Science Journal*, pages 153–166, 2018. [1](#)
- [2] L. G. Shapiro and G. C. Stockman. Computer vision. *Prentice-Hall*, pages 279–325, 2001. [1](#)
- [3] Y. K. L. N. Silvio Jamil Ferzoli Guimarães, Jean Cousty. A hierarchical image segmentation algorithm based on an observation scale. *Lecture Notes in Computer Science*, pages 116–125, 2012. [1](#)