Comparison of Signal to Noise Ratio of Colored and Gray Scale Image in Clustered Condition from the Contours of the Images with the Help of Different Image Filtering Method

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Abstract: As we know the image can be processed with the help of different types of coding for example mat-lab. Here in this paper we are primarily focusing on some common filtering methodologies [5] related to image contour in clustered conditions. For filtering purpose in this paper we have used three different filtering technologies such as prewitt [3], sobel [3], canny [3] filtering. But on the other hand we have used both colored [1] and non-colored [3] images for clustering operations. Our main aim in this paper to show variations of signal to noise ratios for the colored and non-colored contour images with and without filtering. As per my request study the discussion of results very carefully to realize the deeper meaning of the journal [4].

Keyword: RGB, Lab, Gray, Contour, Prewitt, Sobel, Canny Filtering, Median, Coefficient Filtering

I. INTRODUCTION

An image [1],[2] is a visual representation of a two dimensional data; an image can be formed by using million number of pixels which is an integrated unit of digital image analysis.

RGB image [1]consists of these independent image one in each of the primary colors red, green and blue.

Gray scale [1] image means one kind of black and white image with monochromatic nature of pixels.

LAB image [1] means lightness channel A, channel B, its global color model where you can specify any given color by giving numeric values.

Now lets talk about the image contour [2],[2]; which can be explained simply as a curve joining all the continuous points having same color or intensity.

As we move our main criteria is clustering [2],[3] of image which is a method to define group of pixels; therefore the pixels in the group define a class in the segmented image , segmentation is a process of partitioning n image into parts or region. Here in this method we have used very common filtering method for edge detection of contours they are prewitt [3], sobel [3] and canny filtering [3]. Here prewitt filtering [3] is a special filtering used in image processing to identify processes for subsequent processing of an image.

Canny filtering [3] method is used for multistage edge detector based on the derivative of a Gaussian in order to compute the intensity of the gradients.

Sobel [3] is an edge detector filter used as a gradient based method that look strong changes in the first derivative of the image.

1.Median filtering [1] (no filtering coefficient is required) 2. Image filtering [1] (need to set a filtering coefficient). Now the problem is to compare the two different contours of a same image after two different filtering methods; in that case we need to see the original contour of the same image without any filtering. After that we can do any comparison of filtering methods. That's why we have used normal contour of the original image as a comparison parameter. Let's talk about the noise we have used in our programming to make the image noisy. But before adding noise it is desired that you should make image more -sharp.

II. WHAT IS KMEANS CLUSTERING

K Means is a clustering algorithm [3]. Clustering algorithms are unsupervised algorithms which means that there is no labelled data available. It is used to identify different classes or clusters in the given data based on how similar the data is. Data points in the same group are more similar to other data points in that same group than those in other groups. K-means clustering is one of the most commonly used clustering algorithms. Here, k represents the number of clusters.

k-means is method of cluster analysis using a pre-specified no. of clusters. It requires advance knowledge of 'K'. k-means, using a pre-specified number of clusters, the method assigns records to each cluster to find the mutually exclusive cluster of spherical shape based on distance. Here k means clustering is just an example because syntaxes are easily available in matlab, and method of clustering is very easy. If you want to use any complex clustering method you can use it but results of image contour may be different for that reason signal to noise ratio of each contour of the image will be changed accordingly.

III. STEP BY STEP PROGRAMMING METHODS

[For all programming purpose we use only primary colored pixel image that is RGB image.]

1. Upload the original colored [1] image in matlab.
2. Find out the LAB, GRAY [2], version of the original colored image [2].[If we use RGB image directly then after clustering[3] we will get some blurred version of images of which contour [1],[2] creation cannot be done because as per definition of contour of an image color intensity [7] must be same although out the image to get a fine contour of the image. Syntaxes are easily available in matlab for image color conversion of for contour detection [8].
3. Perform prewitt [3], sobel [3], canny [3], median, coefficient filtering. [we perform all the filtering technology after performing clustering of images in order to get sharp contour of clustered images only. Here also filtering is necessary to make the contour of the image clearly visible. But matlab syntaxes are available as per the matlab help options.]
4. Find out the contour of the images for the case of filtered and non- filtered version of the converted images, Before that perform clustering , here we have used K MEANS CLUSTERING [3] as an example as such so many clustering processes are there, but remember contour must be obtained in clustered condition s[6] of gray scale images only because LAB image will give contour in blurred [6] version even if images are in clustered condition.
5. Find out the signal to noise ratio of the contour [1][2] both filtered and non- filtered images.
6. Prepare a table of signal to noise ratio [1][2] of both the contours of filtered and non-filtered images in order to make a comparison.

IV. MATLAB CODES FOR IMAGE PROCESSING

A. Matlab Codes for Contours of The Images

```
Subplot (2,2,1)
x=imread('vit.jpg');
y=imsegkmeans(x,2);
z=imcontour(y);
title ('contour of rgb image');
subplot (2,2,2)
y=rgb2gray(x);
y=imsegkmeans(x,2);
z=imcontour(y);
title ('contour of gray image');
subplot (2,2,3)
y=rgb2lab(x);
y=imsegkmeans(x,2);
z=imcontour(y);
title ('contour of lab image');
```

B. Matlab Codes for Clustering of The Images

```
x=imread('vit.jpg');
subplot (2,2,1)
imresize(x,5);
imshow(x);
l=imsegkmeans(x,2);
b=labeloverlay(x,l);
imshow(b);
title ('clustering of color image');
subplot (2,2,2)
k=rgb2gray(x);
```

```
imresize(k,5);
imshow(k);
l=imsegkmeans(k,2);
b=labeloverlay(l,l);
title ('clustering of gray image');
subplot (2,2,3)
k1=rgb2gray(x);
k1=rgb2lab(x);
imresize(k1,5);
imshow(k1);
l=imsegkmeans(k1,2);
b=labeloverlay(k1,l);
imshow(b);
title ('clustering of lab image');
```

C. Matlab Codes for Common Filtering of The Images

```
x=imread('vit.jpg');
y=rgb2gray(x);
subplot (2,2,1)
imresize(x,5);
imshow(y);
l=imsegkmeans(y,2);
BW1=edge(l,'sobel');
k1=contour (BW1);
title ('contour of color image by sobel');
subplot (2,2,2)
imresize (y,5);
imshow(y);
l=imsegkmeans(y,2);
BW1=edge(l,'canny');
k1=contour (BW1);
title ('contour of color image by canny');
subplot (2,2,3)
imresize(y,5);
imshow (y);
l=imsegkmeans(y,2);
BW1=edge(l,'prewitt');
k1=contour (BW1);
title('contour of color image by prewitt');
```

D. Matlab Codes for Signal to Noise Ratios

```
ref = imread('abir11.jpg');
A = imnoise(ref,'salt & pepper', 0.02);
[peaksnr, snr] = psnr(A, ref);
fprintf('\n The Peak-SNR value is %0.4f', peaksnr);
Enter->The Peak-SNR value is
fprintf('\n The SNR value is %0.4f \n', snr);
  Enter->The SNR value is
```

E. Matlab Codes for Clustering by Normal Filtering

```
x=imread('vit.jpg');
y=rgb2gray(x);
subplo t (2,2,1)
imresize(x,5);
imshow(y);
l=imsegkmeans(y,2);
x3=medfilt2(l);
x4=imcontour(x3);
```

title ('segmentation by median filtering');
subplot (2,2,2)
l=imsegkmeans(y,2);
h=.8;
e=imfilter(l,h);
e1=imcontour(e);
title ('segmentation by coeficient filtering')

V. RESULTS OF MATALAB CODES
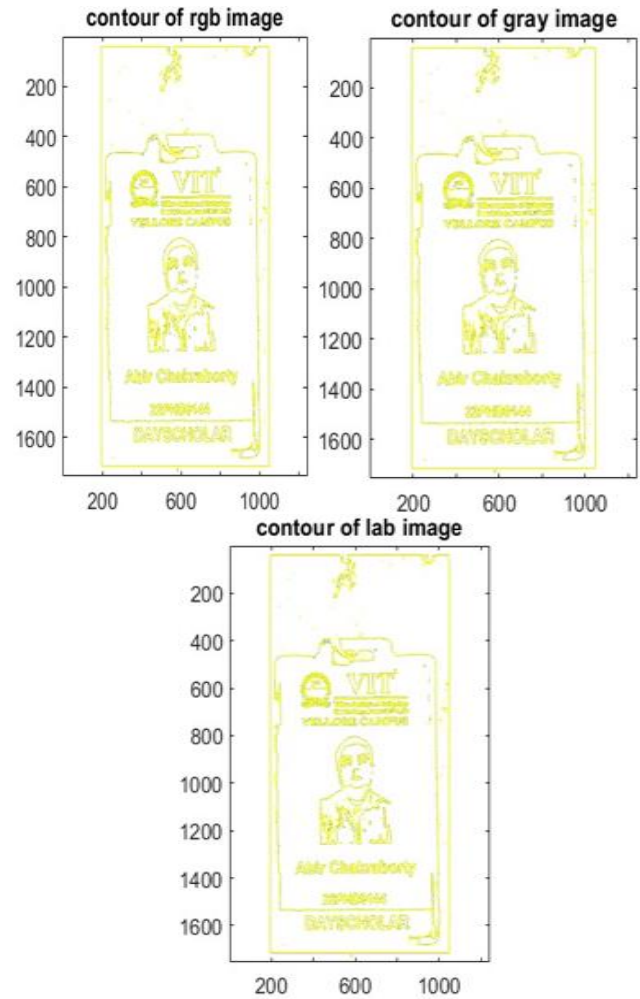
A. Original Image

B. Results of Clustering of Images

For LAB image we have got the clustering in a blurred version, fine results we have got in colored version of the image that means RGB image. That's why we use only gray image for further clustering based contour operations.

C. Results of Clustering of Normal Contour of Images Without Filtering
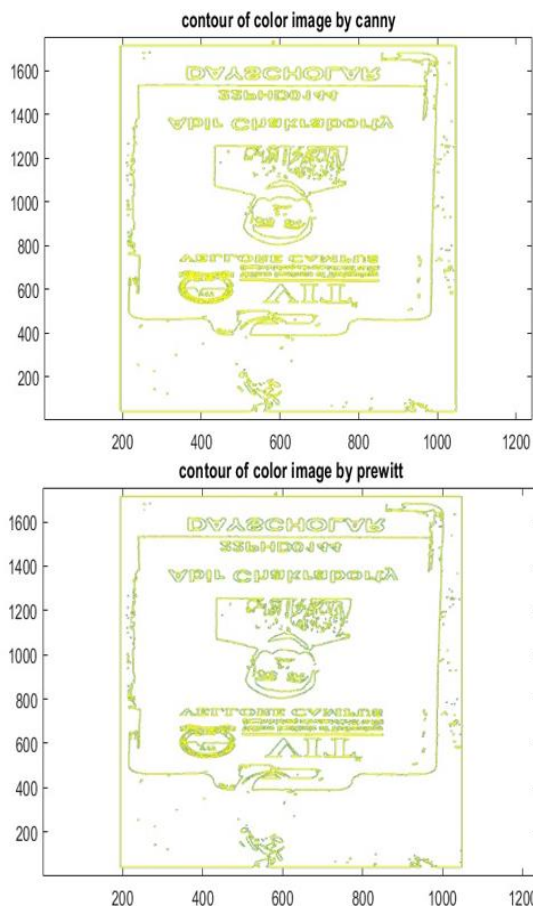

Without filtering clustered [7] version the images of contours [7],[8] have become little bit of blurred or invisible in terms of image color pattern that's why in next version we have used filtered version of images for clustering [8],[9].

### D. Results of Normal Contour of Images with Filtering
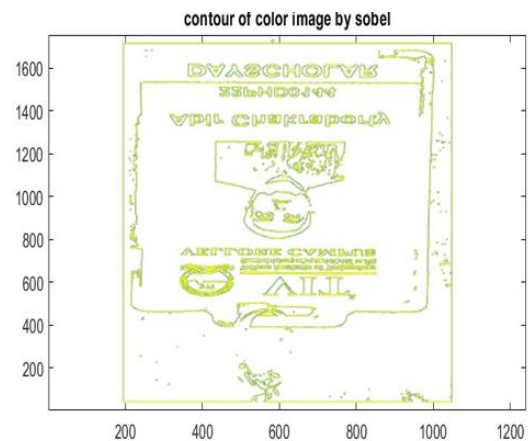
contour of color image by canny

contour of color image by prewitt

After filtering the clustered version of the image contours become much more traceable and recognizable.

E. Clustering of Image Median and Coeficient Filtering Method

segmentation by median filtering

segmentation by coeficient filtering
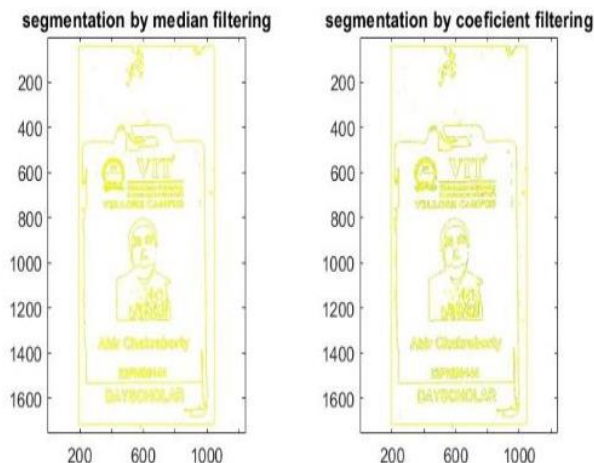
Here clustering results are really good compare to prewitt sobel or canny filtering as you compare all of them.

F. Example of Some Additional Images on Which Same Programming Can Be Done

Table of Signal to Noise Ratio of With and Without Filtering Contour

Contour Without Filtering			Contour With Filtering		
Type of Image	Peak Snr	Normal Snr	Type of Filtering	Peak Snr	Normal Snr
Rgb image	20.2492	19.7666	Prewitt	20.1081	19.9253
Gray image	20.1926	19.8791	Sobel	20.1117	19.9299
Lab image	20.0361	19.4412	Canny	20.1022	19.9169

VI. DISCUSSION ON RESLUTS

As we see and compare from the above table that the peak SNR [1],[2] values are higher for contour without filtering values ; but lower level fluctuations we have found out in normal SNR for contour [2] with filtering method. But for clustering purpose we have used k-means segmented clustering technology; now if you people want you can use some other methods of clustering also for example K-means adaptive clustering [3].

VII. FUTURE SCOPE OF WORK

Total I have used 5 different filtering technologies in this article, in future I will try to use all the filtering technologies for image recognition purpose. Apart from RGB [1], LAB [1] and GRAY [1] images I will try to use other form of images like binary images etc.

VIII. CONCLUSIONS

Here I have three common form of image filtering related to image processing like PREWITT [3], SOBEL [3] AND CANNY [3] MEDIAN [1], [2] AND COEFFICIENT [1],[2];

because already we have implemented several other image processing filtering [10] techniques like median, average and coefficient filtering in my other research articles ; so try to analyze and compare those results with my other image processing where I have used these form of image filtering like median, average and coefficient filtering . But here I have not focused on any type of implementation of image noises [8],[9] [11] [12] [13] [14] [15].

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13

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14

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