Distance measurement using Enhanced Histogram Approach for Irregular Images

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***Abstract*— *Abstract*— Similarity measurement for images is one of the important problem of Digital Image processing. Similarity of a pair of images is expressed in terms of similarities of the corresponding image regions, obtained by uniform partitioning of the image area. Conventional methods matched the images based on region-wise similarity using a different combination of image features (color, shape, and texture). One of the important method of similarity measure is histogram and spationgrams. In the proposed paper we introduces new approach for computing histogram for irregular image which gives higher accuracy than the existing methods. In this paper we have used tongue images for experimental analysis.**

CR Categories: I.5.1 [Pattern Recognition]: Models – Statistical, I.4.6 [Image Processing and Computer Vision]: Segmentation - Edge and feature detection, I.4.7 [Image Processing and Computer Vision]: Feature Measurement - Feature representation.

Keywords-component; formatting; style; styling; insert (key words)

I. INTRODUCTION *(HEADING 1)*

In the recent era of digitization matching of images is one of the important problem. There are various algorithm exist based on probability, naïve bayes classifier which matches the occurrence of text from the training database. There is no standard method which matches the images. The image matching are possible based on shape, color and texture. They all are applied in different field and different applications. The shape, color, and texture method of matching gives a set of different features, these features are useful to differentiate one image to another. The challenge is if the two image have the same shape approximate same color and approximate same texture. One of the important problem is diagnosis of diseases with the help of Tongue texture.

II. PROBLEM DEFINITION

Given two images, the reference and the adjusted images, we compute their histograms. Compute the cumulative functions of the two images histograms. $F_1()$ for the reference image and $F_2()$ the target image. Then for each gray level $G_1 \in [0,255]$, The gray level $G_2()$ for which , $F_1(G_1) = F_2(G_2)$ and this is the result of histogram matching function: $M(G_1) = G_2$, then apply the function $M()$ on each pixel of the reference image.

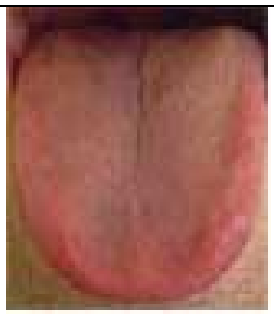


Fig 1 (a) Healthy Tongue

(b) Disease Tongue

Fig 1(a) shows the healthy tongue and fig (b) shows the tongue with diseases. In above both the figure the color , shape are same, the difference is only on texture.

III. HISTOGRAM SIMILARITY

Once we have constructed the histograms for all images in a database, we wish to match the images based on the similarity of their histograms. For this it require the similarity measure between two histograms. The existing methods are based on colour matching and reorganization of one of the histograms based on the results of the colour matching. The second is the quadratic colour histogram distance [5].

The histogram take all the pixel coordinates of rectangle image it compare the pixel value of each and every coordinates of rectangle. As in Fig 2 is shows that when the main region of tongue is extracted the major region that are not useful it shown by black region that affects the histogram of that image.

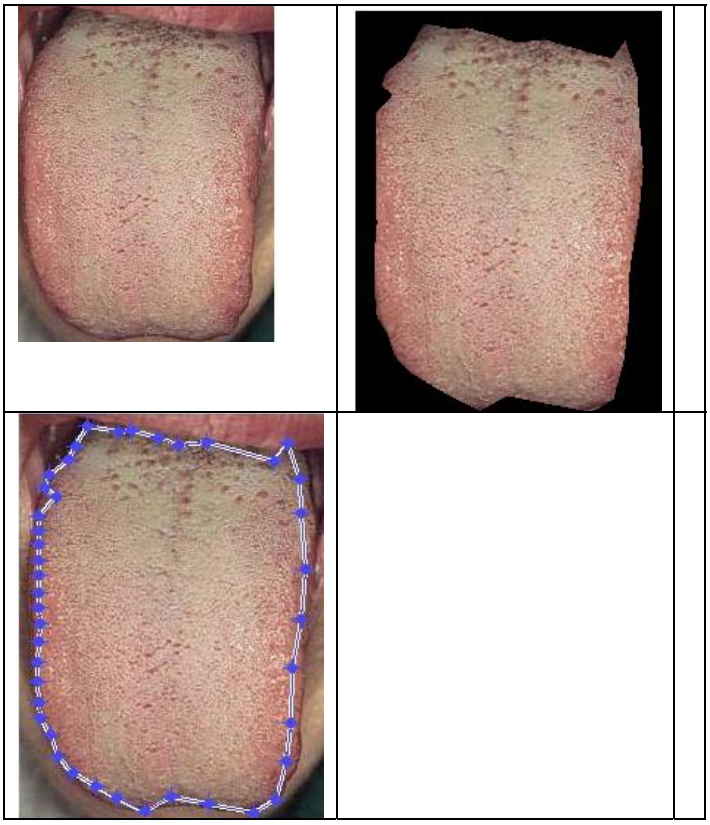


Fig 2(a) Tongue of Disease (b) Selecting the main region of Tongue (c) Cropping the main area

Algorithm for Finding the Histogram of Irregular part :

1. Read The Image
2. Obtain the size of Image
3. Initilize the beans by zero value of zeros(256,1);
4. Select the irregular part of the image with roipoly function
5. for i = 1: Row of Image
6. x(1:No. of columns)= i;
7. y = 1:No. of column of image;
8. in = inpolygon(x,y,xv,yv); // INPOLYGON True for points inside or on a polygonal region.
9. inout(k,:)= in;
10. k= k+1;

%inout(:,i)= in;
end

11. for k = 0: 255
12. val =0;
13. for i = 1 : No.of rows
14. for j = 1 :No. of Columns
15. if ((I1(i,j) == k) && (inout(i,j) ==1))
16. val = val+1;//Increment the beans value by 1

end of if
end of for loop
end of for loop

17. bins1(l) = val;
18. val =0;
19. l= l+1;

end of outer for loop

20. hist1= bins1;
21. x= 0:255;
22. plot(x,hist1);

A. *EXPERIMENTAL RESULTS*

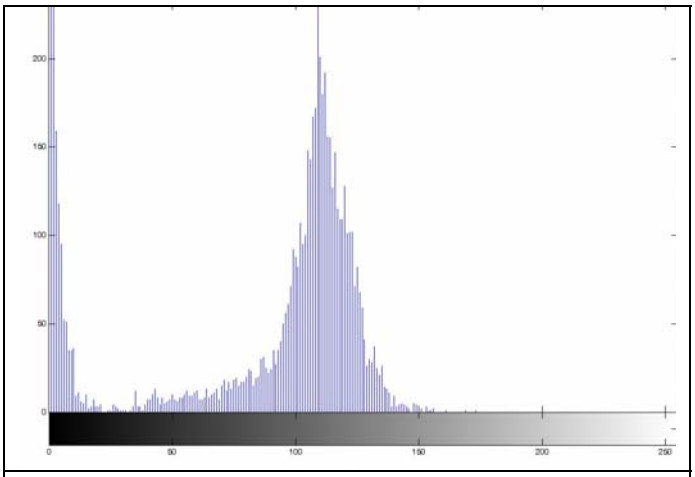
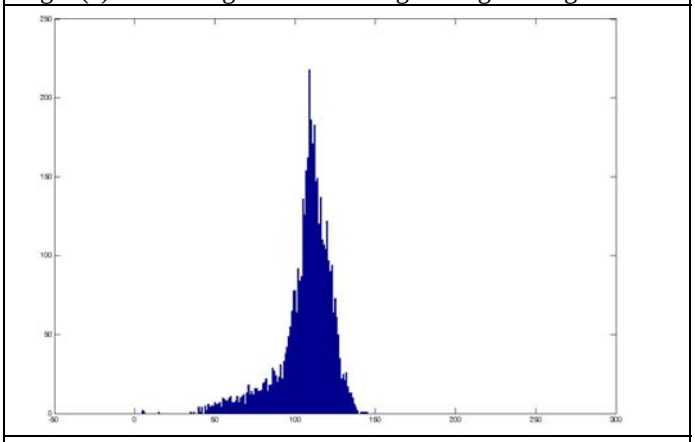


Fig 3 (a) The Histogram for Rectangle Tongue Image



(b) Histogram for Irregular Image of Tongue part Fig 2(c)

Figure shows that the histogram of two healthy image are same.

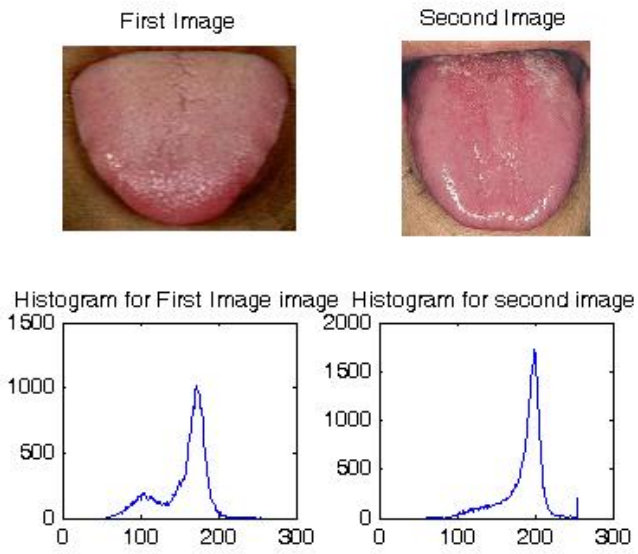


Fig 5. Comparison of Healthy Image with Disease Image
Figure show that the healthy image histogram is different from unhealthy image.

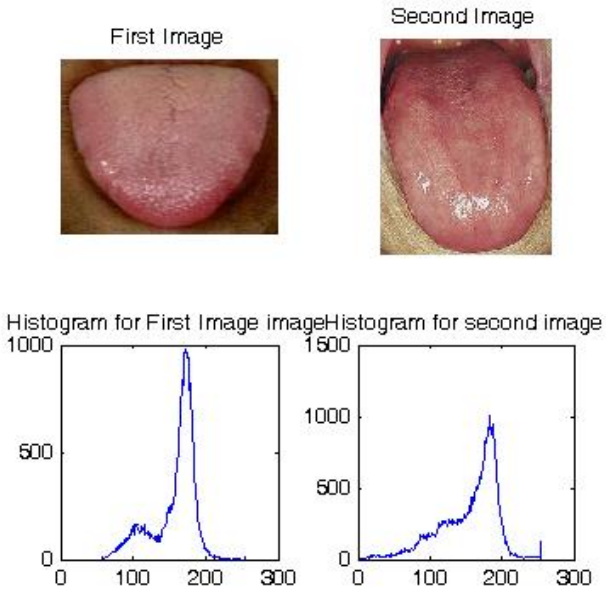


Fig 6. Comparison of Healthy Image with Disease Image

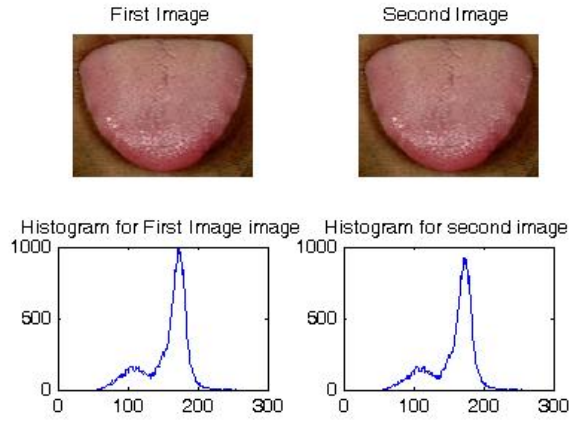


Table 1. ChiSquaredDistance and Bhattachraya distance

Image	Image normalization factor	chiSquaredDistance	Bhhattacharya distance
Healthy	279	279.223924	0.001252
Disease	6135.106764	6135.106764	0.045592
Disease	2520.831609	2520.831609	0.011022
Disease	3735.171080	3735.171080	0.016876
Disease	3451.587026	3451.587026	0.030040
Disease	3107.380408	3107.380408	0.038410
Disease	2557.489003	2557.489003	0.024833
Disease	2772.115979	2772.115979	0.013560
Disease	1151.766469	1151.766469	0.012343
Disease	2627.859585	2627.859585	0.006934
Disease	3266.525218	3266.525218	0.385534
Disease	2631.593054	2631.593054	0.160506

In experiment we found that the Bhattacharya distance for healthy image to another healthy image is <= .001 where as the bhattachraya distance from health image to disease image is >.001, thus the distance value from second image up to last image shows higher which represent disease image.

5.CONCLUSION

In this paper we present a novel approach for histogram processing of irregular images. When the histogram for irregular shape object is drawn it takes the corner value from the rectangle image which predict incorrect value for medical image analysis. In our proposed approach the intensity value of exact image is compared with base image so the it gives more accurate result. In experimental part it shows that the histogram for irregular shape is different if we have taken only the specific ROI and for rectangle it is different.

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