4thICITB

Utilization of Content Based Image Retrieval with Histogram. Equalization (He) for Linking Heart Disease. Using Palm Images

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ABSTRACT

In CBIR based on images that are seen not the similarity of the image, but the similarity of the distribution of images in the compared image. In general, CBIR based on Histogram is known as Equivalent Histogram method. calculations using the Equivalent Histogram difference can set the order of the highest level of image similarity.
In Indonesia, the number of experts in the field of medicine that uses palm diagnosis skills is still very little, this expertise is usually controlled by doctors of traditional and natural medicine. Therefore this writing makes it possible for Doctors in Hospitals or other Medical Centers and Clinics to be able to master it and the program by being trained in advance on how to use it. Because of that the writer took the title "Image Processing to Know the Relationship of Heart Disease with the Image of the Palm Using the Content-Based Image Retrieval (CBIR) Method". The research methodology will use Data Collection : Before Detection performed Capturing Photo Images with a minimum Camera. 5 mega pixels HP ASUS Zenfone 5 on the patient's palm , Experiments : In the experiment, there are two processes, without using the Equalization Histogram and using the Equalization Histogram enhancement. , Image Search : After the Match Image is done and compared to the reference image, the histogram will appear. which can measure the similarity of the Reference Image with a Matching Image of Value that approaches the Reference Image., Design : At this stage the image retrival system is designed using Visual Basic.Net Programming. This research is useful for the knowledge of the community and also doctors because of the existence of a traditional, simple, inexpensive disease detection system for the community.

Keyword_ **palm image*****, Histogram Equalization (HE), CBIR (Content Based Image Retrieval ,*** **Heart Disease**

INTRODUCTION

Information technology is now growing rapidly, along with the increasing needs of society, companies and government for information technology. At present the technology is very useful both in all fields of military, scientific, health and industrial applications. Computers are one of the real forms of the development of science and technology that have an impact on people's lives. In the development of computer science, many experts concentrate on developing Image Processing. Image Processing or Image Processing is image processing, especially by using a computer, to be a better quality image. Many implementations of Image Processing in the field of computers, such as Content-Based Image Retrieval (CBIR), is a computer vision application used in searching digital images contained in a database. Content Based itself is the process of analyzing actual content (actual content) in a picture.

In CBIR based on images that are seen not the similarity of the image, but the similarity of the distribution of images in the compared image. In general, CBIR based on Histogram is known as Equivalent Histogram method. calculations using the Equivalent Histogram difference can set the order of the highest level of image similarity.

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LITERATURE REVIEW

Content-Based Image Retrieval (CBIR) is a method used to search digital images in an image database. The meaning of "Content-Based" here is: the object analyzed in the search process is actual contents (actual content) of an image. The term content in this context refers to the color, shape, texture, or other information obtained from the image.[1]. Image retrieval system based on image information or

better known as content-based image retrieval (CBIR) does not always provide satisfactory results[2].

Content Based Image Retrieval is a method that implements 3 (three) feature techniques. One of them is the Color Histogram feature. According to the study [3] Color histogram is one of the most widely used image content in conducting Content Based Image Retrieval research in the form of color distribution in an image. The distribution will be obtained by calculating the number of pixels in each part of the color range, typically in two dimensions or three dimensions.
Here is an image measuring 3x3 pixels with RGB values as follows:

(1,0,1) (1,3,0) (1,2,1)

(1,2,0) (2,3,0) (2,2,1)

(3,1,1) (3,2,1) (2,1,1)\

If the format H (r, g, b) starts from H (0,0,0) to H (3,3,3), the histogram is as follows

Table 1: Calculation of Histograms

H(0,0,0)=0	H(0,0,1)=0	H(0,0,2)=0	H(0,0,3)=0
H(0,1,0)=0	H(0,1,1)=0	H(0,1,2)=0	H(0,1,3)=0
H(0,2,0)=0	H(0,2,1)=0	H(0,2,2)=0	H(0,2,3)=0
H(0,3,0)=0	H(0,3,1)=0	H(0,3,2)=0	H(0,3,3)=0
H(1,0,0)=0	H(1,0,1)=1	H(1,0,2)=0	H(1,0,3)=0
H(1,1,0)=0	H(1,1,1)=0	H(1,1,2)=0	H(1,1,3)=0
H(1,2,0)=1	H(1,2,1)=1	H(1,2,2)=0	H(1,2,3)=0
H(1,3,0)=1	H(1,3,1)=0	H(1,3,2)=0	H(1,3,3)=0
H(2,0,0)=0	H(2,0,1)=0	H(2,0,2)=0	H(2,0,3)=0
H(2,1,0)=0	H(2,1,1)=1	H(2,1,2)=0	H(2,1,3)=0
H(2,2,0)=0	H(2,2,1)=1	H(2,2,2)=0	H(2,2,3)=0
H(2,3,0)=1	H(2,3,1)=0	H(2,3,2)=0	H(2,3,3)=0
H(3,0,0)=0	H(3,0,1)=0	H(3,0,2)=0	H(3,0,3)=0
H(3,1,0)=0	H(3,1,1)=1	H(3,1,2)=0	H(3,1,3)=0
H(3,2,0)=0	H(3,2,1)=1	H(3,2,2)=0	H(3,2,3)=0
H(3,3,0)=0	H(3,3,1)=0	H(3,3,2)=0	H(3,3,3)=0

So if the histogram is written from the data above are as follows: H = {0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0, 0,0,0,
1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,0,0,0,1,0,0,1,0, 0,
0,0,0,0,0,0,1,0,0,0,1,0,0,0,0,0,0}

According to Disease [4] is a virus or bacteria that infects a person's body that can cause the body to be weak, paralyzed and also until the person dies. The hand is the nerve end of the human body. Anything that applies to the organs of the human body will be seen in the hand. Among the parts of the hand that can indicate the condition of a disease that applies to the human body are: palms, back of hands, all fingers (from pinkie to thumb), internodes finger to nail. Observations on the palm of the hand involve changes in color and physical changes (usually bent to the left, right, forward or backward).[5]

RESEARCH METHOD

The research method consists of several stages:

Before Detection performed Capturing Photo Images with a minimum Camera. 5 mega pixels HP ASUS Zenfone 5 on the palm of the patient in the Hospital, Medical Center, Clinic and Health Social Service to be collected to become a database. This process requires a considerable amount of time because there are 100 to 1000 photos of the palm of the hand with a collection of palm palms.

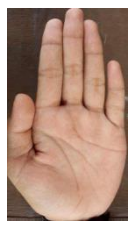
In conducting experiments there are two processes, namely without using an increase in Histogram Equalization and using an increase in Histogram Equalization. After the Match Image is done and compared to the reference image, the histogram will appear. which can measure the similarity of the Reference Image with a Matching Image of Value that approaches the Reference Image.

At this stage the image retrival system is designed using Visual Basic.Net Programming. The researcher made the palm detection detection processing program only the Tool Software, so that the user understood it from the Doctors and Health Experts.

FINDINGS AND DISCUSSION

CBIR application by applying the Color Retrieval and Shape Retrieval methods has developed using the Visual Basic.Net programming language Figure 1 shows the display for training image data into the database.

The following data has been taken.



(a) (b)

Figure 4.1: The following picture (a) the left palm of the middle finger is bent right related to heart disease, (b) the left palm of the middle finger is straight straight. associated with a healthy heart

4.3 Image Processing

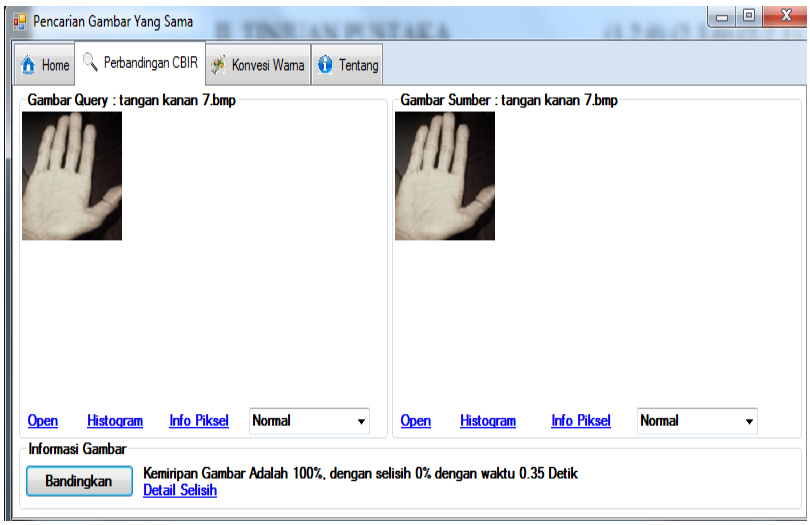
A. Setting up the image

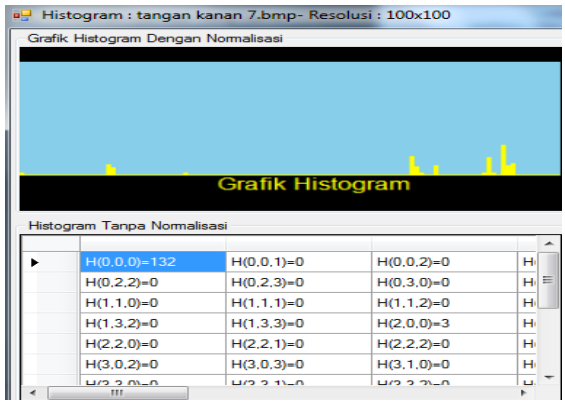
Prepare 30 images, the left and right hand that are bent middle finger associated with BMP format and then reduce the image to H 100 x V 100 pixels then cropping to facilitate the recognition of the image histogram and named 1.BMP hand until it is complete.

(a) (b)

Figure 4.2: The following reference image (a) 640 x 480 pixels before cropping and (b) 100 x 100 pixels) after cropping

A. Comparing the Image Histogram with Histogram Equalization





In this study, matching the reference image with the test image using a histogram to determine the maturity of the test image whether the test image included in the category of heart disease or healthy will get a value of 80-100%.

No.	Reference Image	Source / Test Image	Histogram results	Similarity in Images 80-100%
1	TT1.bmp	TT1.bmp	80	similar
2	TT2.bmp	TT2.bmp	90	similar
3	TT3.bmp	TT3.bmp	30	not similar
4	TT4.bmp	TT4.bmp	40	not similar
5	TT5.bmp	TT5.bmp	60	not similar
6	TT6.bmp	TT6.bmp	40	not similar
7	TT7.bmp	TT7.bmp	100	similar
8	TT8.bmp	TT8.bmp	30	not similar
9	TT9.bmp	TT9.bmp	60	not similar
10	TT10.bmp	TT10.bmp	70	not similar

CONCLUSION

Based on the research that has been done, it can be concluded as follows:

1. Utilization of color-based image-based image retrieval histograms with histogram equalization (HE) and Euclidean Distance to determine the similarity in the palm of the correct hand is 80-100%
2. With a color based image retrieval based histogram with histogram equalization (HE) to determine the similarity in the palm, the accuracy is 80% - 100% of the 10 new images.
3. Thus the use of Histogram Equalization image quality enhancement is very influential and can maximize the true level of similarity accuracy.

Based on the results of the research that has been done and to improve the quality of good research, the researcher gives suggestions for further research as follows:

1. Further research can change the number of test images. Will the results of the correct level of similarity later affect or not.
2. Adding Content Texture to determine palms of different colors, shapes.
3. Adding the image capture angle of each object.
4. Adding categories of similar palms of different sizes, and others, so that applications are made even better in determining the similarity of the palms.

VI. REFERENCES

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