

REDUCTION EYE RED DIGITAL IMAGE EFFECT WITH ALGORITHM INTENSITY COLOR CHECKING

Denni M Rajagukguk

Universitas Imelda Medan

Email: denni@gmail.com

ABSTRACT

The results of a photo either with a normal camera or a digital camera when taken from with high exposure to people, often produce red spots on the pupils of the term with the red-eye effect on digital photos. This of course causes the photos to be not good. With a particular software that functions as an image processor it can easily remove the red-eye just by using a tool called the red-eye effect that is reduced. So with this program the results of photos with a digital camera can be edited to eliminate the red-eye effect before printing. The red-eye effect is reduced using the intensity color checking algorithm in the process of replacing the red pixel images and then replacing them with grayish-black according to the resulting intensity process. Program that can reduce the red-eye effect with the intensity color checking algorithm by processing certain selected regions. The image results can then be printed or saved again in JPG format.

Keywords: *Checking Color Intensity, Image Processing, Reduction.*

1. INTRODUCTION

The rapid development of computer technology has brought significant changes to human life. With the development of computer technology, more and more human activities that previously had to be done manually can now be done with the help of computers to save time. One area that is also influenced by the development of computers is the field of photography. Previously, photos produced from camera shots had to be printed manually in a room called a dark room. However, along with the development of computers, the results of printing photos can be printed using printer media. Also, computers can also be used to manipulate photodamage resulting from shooting in such a way that the results can be better.

Of the several types of photodamage that often occurs when shooting is the occurrence of the red-eye effect. The red-eye effect is a phenomenon that occurs when taking photos using a camera that uses a flash (flash), exposed to the retina of the eye from the object being photographed. The reflection of the eye's retina is returned to the camera and recorded when shooting which results in the image displaying an effect as if the eye of the photographic object glows red. To overcome this problem, a computer can be used to eliminate the red-eye effect from photographs produced using image processing technology. One of the powerful image processing technologies to overcome this red-eye effect is the intensity color checking method. Intensity color checking is a method that works by calculating the opaque, brightness, contrast, and hue/saturation values of an image to determine at what position the image has inappropriate color composition.

This also means that the average information content will reach its maximum when the probabilities of pixels on the same block of the original image distributed on different blocks are the same. For this reason, it is necessary to develop a new process of intensity color checking because the classical method is mapped for the whole image. An approach introduced by Xue Yang, Xiaoyang YU, Qifeng Zou, and Jiaying Jia from China and published in 2010 in the Information

Technology Journal. This approach increases the intensity of color checking on digital photos more clearly in the implementation of the algorithm in the process of randomizing digital images. This approach also uses a chaotic mapping class (Chaotic Mapping) proposed by Kwok and Tang, 2007; Fan and Jiang, 2004; Huang and Feng, 2007 and Ren, 2008, which are based on the intensity of color checking to increase the number of photos. Broadly speaking, the algorithm introduced by Xue Yang and Partner distributes information from a pixel throughout the results on the resulting image and becomes random. This algorithm implements imaging operations on digital photographs to carry out logistical mapping of the pixel values of images. used is a photo-shaped color image with a JPEG image format with a maximum limit of 500X 500 pixels. [1]-[3]

2. METHODS

Image Processing

Image processing is a general term for sharing techniques that exist to manipulate and modify images in various ways. Photos are examples of two-dimensional images that can be easily processed. Every photo in the form of a digital image (for example coming from a digital camera) can be processed through certain software. For example, if the camera shots look rather dark, the image can be processed to be brighter, it is also possible to separate people's photos from their background. The picture shows simple things that can be done through digital image processing. [4]-[6]

Image processing is an important part that underlies a variety of real applications, such as pattern recognition, remote sensing via satellite or aircraft, and machine vision. In pattern recognition, image processing, for example, plays the role of objects from the background automatically. Next, the object will be processed by the pattern classifier. For example, a fruit object can be identified as an orange, apple, or papaya. In remote sensing, the texture or color in the image can be used to identify the objects contained in the image, and image processing has the role of recognizing special shapes seen by the machine. Motion processing can be the basis for reporting as recorded.

Image processing also allows a person's face to be dartered, for example, shown illustrated 1 Application like this allows the creation of cartoons based on real objects that include image processing facilities that allow each original image to be transformed into an image such as pencil, chalk, as shown in the image below this:



Figure 1. Image processing application

Intensity Color Checking

According to Rizon Intensity Color Checking is an algorithm used to change the value of RGB components by calculating the intensity factor. a technique that works by checking the color intensity value of the RGB value (Red, Green, Blue). This technique requires a range of values called tolerance values as the reference limit of determining the intensity of a color. Because the intensity color checking method is a method that measures or calculates the color quality of the pixels of a digital image,

it is first necessary to know how the color concept used in intensity color checking. In intensity color checking, there are three basic classifications of colors, namely primary colors, secondary colors and tertiary colors (complimentary). Primary colors are basic colors that cannot be produced from mixing other colors. From this understanding of primary colors, black, white, gold, and silver can be classified as primary colors.

However, because black, white, gold and silver do not show any particular chroma, these colors are considered not colors. Even some people who classify black and white as 'neutral colors' can be paired as neutralizers for any color. For this reason, the principal color consists of only yellow, red, and blue. This guideline is used by some printer manufacturers, where for color printing machines, generally only three cartridges are available, namely red, yellow, and blue.

Intensity color checking works by calculating the RGB (Red, Green, Blue) values of pixels in a digital image. Based on this RGB value, a tolerance value is set which will be used as a reference in assessing the color intensity of the pixel. [7]-[10]

The equation used in Intensity color checking for measuring the pixel color intensity in a digital image is as follows:

$$I1 \leq I \leq I2$$

where

$$I1 = (RGB - T)$$

$$I2 = (RGB + T)$$

Information

RGB = R, G or B values processed

T = Red eye tolerance value desired (Rijon, 2000: 55).

For example, to check the intensity of black (RGB: 0,0,0) with a tolerance value of 10, this technique will categorize all colors that have a range of values from (0 - 10) to (0 + 10). However, because the RGB value is never smaller than 0, the color detected as black with a tolerance of 10 is a color that has an RGB value in the range of values from 0 to 10.

From the example above, if a color with an RGB value (10,0,10) is found, the color will be detected as black. This is caused by the values of R, G, and B of the color being in the predetermined range of values.

The basic algorithm of the intensity color checking technique is as follows:

1. Determine the value of R, G, and B colors to be detected.
2. Determine the color tolerance value.
3. Set $R1 = R - \text{Tolerance Value}$, $G1 = G - \text{Tolerance Value}$ and $B1 = B - \text{Tolerance Value}$.
4. Set $R2 = R + \text{Tolerance Value}$, $G2 = G + \text{Tolerance Value}$ and $B2 = B + \text{Tolerance Value}$.
5. Read the color R, G, and B values.
6. If $R1 \leq R \leq R2$, $G1 \leq G \leq G2$ and $B1 \leq B \leq B2$, the color is detected as a predetermined color.
7. If not, then the color is not a predetermined color

3. RESULT AND DISCUSSION

The process of replacing Pixels is done by calculating the intensity of color checking arranged in the main equation as follows

$$I = (R + G + B) \setminus 3$$

$$\text{Gray} = (22 = R + 707 * G + 71 * B) \setminus 100$$

$$R = | \text{Gray} - I |$$

$$G = | \text{Gray} - I |$$

$$B = | \text{Gray} - I |$$

Where R = Red, G = Green, B = Blue is a pixel color component, namely for red, green, and blue colors produced by dividing round and modules with a value of 256. I is a parabel for calculating the average pixel intensity with round division use the back slash sign while gray is a gray level pixel value as a temporary value used to subtract the intensity value I. Konstanta 222,707, and 71 are the constants

For the above algorithm to be more easily understood, the following research includes an example calculation using the above algorithm by only including an example of the input image of the red-eye effect on a digital photo seen in the image below: 1. Input the red-eye image on a digital photo



Figure 2 Postion of red eye in a digital photo

Image of eye color that has been seperated from the eye image above

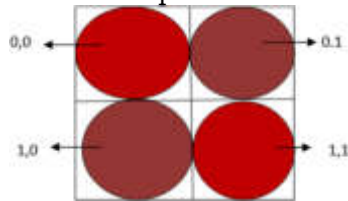


Figure 3 .pixel input image after being seperated from aye images

To get a comparison of the intensity value after and before it is reduced it will be analyzed with Euclidean Distance. Comparisons will be made between Pixels 1 and Pixels 2, Pixels from the example above. For this analysis only use Pixels with red components only because in images containing red eyes, Pixels are usually the dominant ones. The initial step is to calculate the value of L with the Euclidean Distance formula for the image that has not been reduced. The proces of reducing the red eye effect on digital photo

- for pixels(0,0) with pixels (0,1)
- red value for pixels (0,0) R=255
- red value for pixels (0,1) R=204
- A1=255;B1=204
- For pixels (0,0) with pixsel (1,0)
- red value for pixels (0,0) R=255
- red value for pixels (1,0) R=255
- A2=255;B2=255
- for pixsel (0,0) with pixsel (1,1)
- red value for pixels (0,0) R=255
- red value for pixels (1,0) R=255
- A3=255;B3=255

The calculation will use the Euclidean Distance formula as follows:

$$L_1 = (A_i, B_i) = \sum_{i=1}^3 (A_i - B_i)^2$$

$$L_1 = (255 - 204)^2 + (255 - 255)^2 + (255 - 255)^2$$

$$L_1 = 2601 + 0 + 0$$

$$L_1 = 2601$$

The next step is to calculate the L value again, but for the same pixel position as the reduced image. For pixels (0,0) with pixels (0,1)

red value for pixels (0,0) R=9
 red value for pixels (0,1) R=4 A1=9;B1=4
 For pixels (0,0) with pixels (1,0)
 red value for pixels (0,0) R=9
 red value for pixels (1,0) R=4 A2=9;B2=4
 For pixels (0,0) with pixels (1,1)
 red value for pixels (0,0) R=9
 red value for pixels (1,0) R=8 A3=9;B3=8

The calculation will use the Euclidean Distance formula as follows:

$$L_2 = \sqrt{\sum_{i=1}^3 (A_i - B_i)^2}$$

$$L_2 = \sqrt{(9 - 4)^2 + (9 - 4)^2 + (9 - 8)^2}$$

$$L_2 = \sqrt{25 + 25 + 1}$$

$$L_2 = 51$$

So the total reduction value that has been done is equal to:

Or $\frac{2550}{2601} \times 100\% = 98\%$

Pixel results after reducing the red-eye effect on digital photos



Figure 4. Example of pixel result after a reduction

4. Conclusion

Good or not the intensity of color checking results in reducing the red-eye effect on digital photos is one to improve photos when taking photos using a camera that uses a flash (flash), the processed image is a red-eye effect image on a digital photo that is reduced using the method Euclidean distance.

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