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Processing in Image Interpolation and Motion Detection

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Abstract

This article discusses processing in Image Interpolation and Motion Detection. Image or image has become a common thing and has become part of everyday people's life. In a particular interest, image is used as a tool to express various kinds of feelings which for some people are difficult to express through words. Such as explaining a reason, interpretation, illustration, communication, memory, education, evaluation, entertainment, and others. Then the concept of image and its processing is associated with changing and improving the image. Image is a representation, similarity, or imitation of an object or object, for example your photo represents the entity of yourself on camera. X-ray photographs of the chest represent the inside of a person's body, the data in a BMP file represents what it represents.

Introduction

Nowadays, many applications from the computer field are growing rapidly. One of the interesting developments in the computer world is in the field of graphic design and multimedia. It is for this reason that the basic capabilities of a computer from the last generation are always associated with facilities in the field of graphic design and multimedia. This development is of course inseparable from the increasing ability for graphics and multimedia facilities both in hardware and also software. In terms of hardware, the increasing capacity of memory standards and graphics cards is a requirement that must be met given the increasingly sophisticated graphics and multimedia applications that are currently available (Sakai, 2012).

Image Processing

According to (Le et.al, 2011) image processing operations are applied to the image when: (1) Image repair or modification is carried out to improve the quality of image appearance / highlight several aspects of the information contained in the image. example: dark / light contrast correction, object edge correction, sharpening, false color rendering, etc. (2) There is a defect in the image that needs to be eliminated / minimized example: deblurring image appears blurred due to incorrect lens focus setting / camera shake, noise removal. (3) Elements in the image need to be grouped, matched or measured. This operation is closely related to pattern recognition. (4) It is necessary to extract certain features of the image to assist in object identification. The segmentation process is sometimes needed to localize the desired object from its surroundings (Lienhart & Wernicke, 2002). Example: edge detection of objects. (5) Some images need to be combined with other parts of the image example: some x-rays are used to reshape the image of the organs. (6) Image needs to be compressed. For example: a 258 KB BMP image file compressed by the JPEG method to a size of 49 KB. (7) Hiding confidential data (in the form of text / image) in the image so that the existence of the confidential data is not known to people (steganography & watermarking).

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Image Interpolation

When we have a small image, sometimes we want to enlarge the image we have to see the image more clearly. The process of enlarging an image in image processing has another term, namely interpolation. What is interpolation? Interpolation is a process carried out by software to resample the sample image data to determine the values between the specified pixels. The accuracy of the results of the interpolation calculation and the length of time required for the calculation of an interpolation algorithm is very dependent on the interpolation method used. There are actually many types of interpolation, but in this paper I will only discuss 2 types of interpolation, namely: nearest neighbor interpolation and biliary interpolation (Thévenaz & Unser, 2000).

Nearest Neighbors Interpolation

Interpolation of the nearest neighbor (nearest neighbor), the gray value of the result point is taken from the gray value at the origin point that is closest to the calculated coordinates of the spatial transformation. For a 2-dimensional image, the closest neighbors are chosen from among the 4 origin points that are adjacent to each other.

The use of this interpolation technique in image enlargement is a process of repeating image elements, while in image reduction it is a distance sampling process. In a large-scale image enlargement process, this method will produce an image that appears as blocks or collections of pixels with the same intensity. This is due to the absence of a refinement (Ni & Nguyen, 2009).

Bilinier Interpolation

Defined by (Gribbon & Bailey 2004) Biliary interpolation, the gray value of the four neighboring points contributes to the gray value of the results, with their respective weights linear with their distance to the coordinates in question. The closer the neighboring point is, the greater the weight, and vice versa, the smaller the weight. The biliary interpolation method is used in the registration process and uses two linear equations, the approach is also smoother than the nearest neighbor method, where the interpolation process is carried out by taking into account the effect of the gray level distribution of neighboring pixels used in the interpolation process is inversely proportional to the distance to the pixel being used. Interpolated. The difference between the two can be seen clearly from the results of the interpolated image and the pixel intensity value. The following are the results of the image that I processed using my own software (the result of my final project) so that it is clear that the difference between the nearest neighbor and the bilateral interpolation is clear.

Image Blending

Image merging is done by overwriting an image on another image. In other words, an addition operation is carried out on the existing image by giving weight to each image

$C(x, y) = wa * A(x, y) + wb * B(x, y)$

wa and wb are weights for images A and B, and the total value of the weights is 1

$wa + wb = 1$

Motion Detection

Paper by Sinclair et.al (2007) Motion Detection to detect the presence or absence of a movement. Every movement detected by the device is immediately sent to the user via a push notification on a smartphone based on the Android operating system. This system can detect movement well but will produce false positives when in the view of the camera there are objects that are easy to move such as trees, puddles, decorative lights, television and others (Marvit et.al, 2007). Several things can be done. (1) Simple motion detection can be done by looking

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for differences between 2 consecutive images in the image results using a digital video camera (2) The operator used is subtraction. (3) With this subtraction operation (4) The stationary part will result in the value = 0 (5) The moving part yields the value ≠ 0 C (x, y) = A (x, y) - B (x, y) (6) By evaluating the difference, it can be seen whether there are moving objects in the image (7) You can also use the formula for blending operations by giving the weights wa = 1 and wb = -.

Conclusion

The visible image is the light reflected from an object. The light source illuminates the object, the object reflects back part of the light beam and the light reflection is captured by optical instruments, such as the human eye, cameras, scanners, satellite sensors, etc., then recorded. Image is a representation, similarity, or imitation of an object or object, for example your photo represents the entity of yourself on camera. X-ray photographs of the chest represent the inside of a person's body, the data in a BMP file represents what it represents. Image, from a mathematical point of view, is a continuous function of light intensity in a 2-dimensional plane.

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