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FLUORESCENCE ENHANCEMENT OF VIDEOS ADAPTED TO BACKGROUND ILLUMINATION

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ABSTRACT

In this proposed paper a model that we have enhanced the image or video from low ambient exposure to a high ambient exposure as per the application or the image or video specifically required. In this paper we mainly concentrated on the process of luminance enhancement of the video or groups of frames. Group of frames are known as a video file. We separate video as a group of frames and the frame details are calculated according to our process. After calculating the frame details the luminance enhancement process will occur on each frame. In this paper we use the algorithm of Adaptive histogram equalization to enhance the luminance of the data either brighter or less brighter.

Keywords: windows XP/7/8, MATLAB8.3 R2015a, Any Intel (or), AMD X 86/X64 Processor.

INTRODUCTION

Image processing is a method to perform some operation on an image .The video and image processing were to improve the quality of captured images. It is the method to get an enhanced image or to extract some useful information from it. It is the type of signal processing in which input is an video and output may be image or features associated with that image. Deblurring is the process of removing blurring artifacts from images such as blur caused by defocus aberration or motion blur .Movement during the image capture process by the camera or when long exposure times are used by the subject. Contrast is the difference in luminance or color that makes an object distinguishable. In visual perception of the real world, contrast is determined by the difference in the color and brightness of the object and other object within the same field of view. The human visual system is more sensitive to contrast than absolute luminance. The maximum contrast of an image is the contrast ratio or dynamic range. High Contrast means the blacks are really dark and whites are really bright. Low contrast looks like it has a gray wash to it and the blacks more like a dark gray and the white a light gray.

PROPOSED SYSTEM

In this system, we have proposed a system to enhance a video file also to spilt into frames and work luminance exposure on each frame and to finalize a video output**.** Adaptive histogram equalization to enhance the luminance of the data either brighter or less bright. In this system, we can use or work on video as itself.

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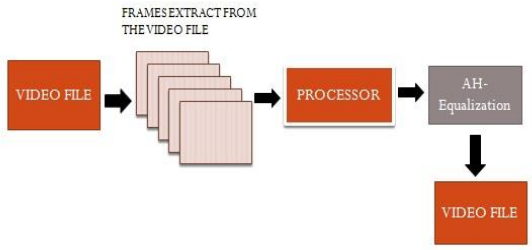
Fig.1 Flow diagram of video file



1. Adaptive Equalization Algorithm

The histogram equalization algorithm has been a conventional image enhancement algorithm for its simplicity and efficiency. It adjusts the gray level of an image according to the probability distribution function of the image and enlarges the dynamic range of the gray distribution to improve visual effects of the image. The histogram equalization algorithm may be divided into two types: local histogram equalization and global histogram equalization. The local histogram equalization may well enhance local details of the image and it may be divided into three types: overlapping sub-block, non-overlapping sub-block, and partially overlapping sub-block. The non-overlapping sub-block method is very rarely used for its obvious square effects; the overlapping sub-block method is also not used in practice for its large amount of calculation and low processing speed; the partially overlapping sub-block method can speed up the calculation, but it is relatively complex Compared to the local histogram equalization algorithm, the global algorithm has certain advantages in processing speed, but has disadvantages in enhancing effects. To improve enhancing effects, references introduce many improved algorithm. Based on the conventional histogram equalization algorithm and the prophase study of, we analyze the relationship of the mapping gray level and introduce the definition of different gray level, gray threshold setting and identification methods. Then, we use the information entropy as the target function to get parameter ù in the gray level mapping formula. According to the threshold, the improved algorithm may automatically identify the gray level of the image and adaptively adjust the spacing of two adjacent gray levels in the new histogram. Thus, it may effectively improve visual effects for any image under the premise of the same information entropy.

2. Analysis of the Histogram Equalization Algorithm

Based on the probability theory, the histogram equalization algorithm realizes the gray mapping of pixels in the image by using gray operations and transforms the histogram to one that is uniform, smooth, and has clear gray levels, so that the purpose of image enhancement can be achieved Suppose the gray value of the pixel in the original image is r (0”r”1) and its probability density is p(r), the gray value of the pixel in the enhanced image is s (0”s”1) and its probability density is p(s), and
the mapping function is s=T(r). According to the physics meaning of the histogram, it is clear that every bar on the equalized histogram is of the same height. That is Suppose s=T(r) is a monotonically increasing function in the interval and its inverse function r =T-1(s) is a monotonic function also. According to, we can deduce
The mapping relationship of the conventional histogram equalization algorithm: In discrete conditions, the relationship between i (the gray value of the pixel in the original image) and if (the gray value of the pixel in enhanced the image) is where, m is the number of gray levels presented in the original image, k q is the number of pixels in the image with k th gray level, Q is the total number of pixels in the image.

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Suppose an image has n different gray levels, and the occurrence probability of ith gray level is ip , so the entropy of the gray level may be defend It can be proved that E will achieve its maximum if and only if that is to say the entropy of the whole image achieves its maximum when the histogram of the image has uniform distribution. The dynamic range has been enlarged after equalization. The essence of the equalization is to expand the quantization interval.

Results of the conventional histogram equalization, it is clear that visual effects of the original image are relatively dark and the distribution range of the histogram of the image is relatively small .It is clear that the brightness of the enhanced image has increased and visual effects have been improved, but some local areas are too bright and some details of the image are lost. It is clear that the distribution range is enlarged, but excessive mergers of gray levels make some white stripes appear in the equalized histogram. According to the entropy theory, the bigger the entropy of an image is, the richer the information and details of the image. The entropy of the original image is 7.6321 and the entropy of the enhanced image is 7.5451. So the information of the image is lost in the process of histogram equalization.

The conventional histogram equalization algorithm has three flaws:

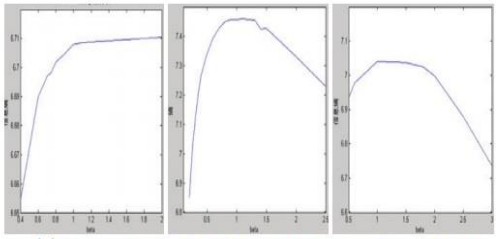
(1) Gray levels of the enhanced image are decreased, and some details disappear;

(2) Some local areas will be too bright in certain enhanced images;

(3) Excessive mergers of gray levels make false contours appear in the image.

The paper presented an adaptive histogram-based algorithm which may effectively improve visual effects under the premise of the same information entropy.

3.Adaptive Gray Level Mapping Algorithm



(a) Low gray levels (b) Middle gray levels (c) High gray levels

Suppose a gray image has 256 gray levels. It can be divided into three types: low gray levels, middle gray levels and high gray levels. Set threshold TL=85, TH=170. If the gray value is less than 85, it may be classified as low gray levels; if the gray value is larger than 85 and less than 170, it may be classified as middle gray levels; if the gray value is larger than 170, it may be classified as high gray levels. At the same time, the pixel numbers of low, middle and high gray levels are respectively counted and recorded as num low, num mid, and num high. The maximum of the three is found to decide the image type. If num low is the largest one, it is clear that low gray level pixels are dominant in the image; the image is a very dark image. This kind image is called low gray level image, otherwise called middle gray level image or high gray level image.

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Fig 3: Extracted Frames

The original image which has bright edges but details of intracranial structures cannot be seen clearly and edge boundaries are not clear. Shows the enhanced image using the conventional histogram equalization algorithm, details of intracranial structures can be seen clearly but the edge boundaries are relatively blurred. According to the improved algorithm, statistics results are num_high = 8540, num_mid=4620, num_low = 3360, and ù is automatically equal to 1.5. As shown in details of the intracranial structures can be seen clearly and the edge boundaries are relatively clear. From the above analyses, it is clear that the algorithm proposed in this paper can automatically identify the image gray type, automatically select parameter ù, adaptively adjust the spacing of two adjacent gray levels, and improve the image quality.

MATLAB

MATLAB® is the high-level language and interactive environment used by millions of engineers and scientists worldwide. It lets you explore and visualize ideas and collaborate across disciplines including signal and image processing, communications, control systems, and computational finance. MATLAB (matrix laboratory) is a multi-paradigm numerical computing environment and fourth-generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, FORTRAN and Python.

Image Enhancement

Image enhancement techniques in Image Processing Toolbox enable you to increase the signal-to-noise ratio and accentuate image features by modifying the colors or intensities of an image. The toolbox includes specialized filtering routines and a generalized multidimensional filtering function that handles integer image types, offers multiple boundary-padding options, and performs convolution and correlation. Using predefined filters and functions you can:

- Filter with morphological operators
- Deblurred and sharpen
- Remove noise with linear, median, or adaptive filtering
- Perform histogram equalization
- Remap the dynamic range
- Adjust the gamma value
- Adjust contrast

Morphological Operators

Morphological operators enable you to enhance contrast, remove noise, thin regions, or perform skeletonization on regions. Morphological functions in Image Processing Toolbox include:

- Dilation and erosion
- Opening and closing

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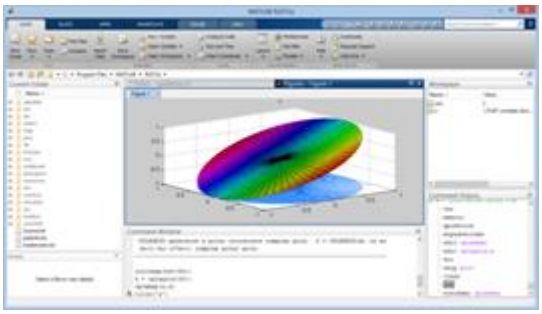

Image Deblurring

Image deblurring algorithms in Image Processing Toolbox include blind, Lucy-Richardson, Wiener, and regularized filter deconvolution, as well as conversions between point spread and optical transfer functions. These functions help correct blurring caused by out-of-focus optics, movement by the camera or the subject during image capture, atmospheric conditions, short exposure time, and other factors. All deblurring functions work with multidimensional images.

Image Analysis

Image analysis is the process of extracting meaningful information from images such as finding shapes, counting objects, identifying colors, or measuring object properties. Image Processing Toolbox provides a comprehensive suite of reference-standard algorithms and visualization functions for image analysis tasks such as statistical analysis, feature extraction, and property measurement.

Image Transforms

Image transforms play a critical role in many image processing tasks, including image enhancement, analysis, restoration, and compression. Image Processing Toolbox provides several image transforms, including Hough, Radon, FFT, DCT, and fan-beam projections. You can reconstruct images from parallel-beam and fan-beam projection data (common in tomography applications). Image transforms are also available in MATLAB and Wavelet Toolbox.

CONCLUSION

We proposed Adaptive equalization histogram to improve contrast in images. It differs from ordinary histogram equalization in the respect that the Adaptive method compute several histogram, each corresponding to a distinct section of the image and uses them to redistribute the lightness value of the images. We compared with the method of tone mapping operator to enhance the luminance and details of images and videos shown in bright ambient illumination. Our proposed method boost the background illumination from low exposure to the high exposure .The methods can be extended to high range videos.

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