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Generalized Equalization Model for Global Image Contrast Mapping

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Abstract: A generalized leveling model for image improvement. supported our analysis on the relationships between image bar chart and distinction improvement white reconciliation, we have a tendency to initial establish a generalized leveling model desegregation distinction improvement and white reconciliation into a unified framework of protrusive programming of image bar chart. We have a tendency to show that several image improvement tasks may be accomplished by the projected model exploitation totally different configurations of parameters. With 2 shaping properties of bar chart remodel, specifically distinction gain and nonlinearity, the model parameters for various improvement applications may be optimized. We have a tendency to then derive associate degree best image improvement formula that in theory achieves the most effective joint distinction improvement and white reconciliation result with trading-off between distinction improvement and tonal distortion.

Keywords: Generalized Equalization Model, Global Image Contrast Mapping, bar chart.

I. INTRODUCTION

With the quick advance of technologies and therefore the prevalence of imaging devices, billions of digital pictures square measure being created on a daily basis. Because of undesirable source of illumination, unfavorable weather or failure of the imaging device itself, the contrast and tone of the captured image might not invariably be satisfactory. Therefore, image improvement is usually needed for each the aesthetic and pragmatic functions.

In fact, image enhancement algorithms have already been wide applied in imaging devices for tone mapping. As an example, in a typical photographic camera, the CCD or CMOS array receives the photons passing through lens and then the charge levels square measure remodeled to the first image. Usually, the first image is kept in RAW format, with a bit-length too huge for traditional displays.

Thus tone mapping techniques, e.g. the wide identified gamma correction, are used to transfer the image into an acceptable dynamic vary. a lot of refined tone mapping algorithms were developed through the years, simply to call a few. Generally, tone mapping algorithms can be classified into two categories by their functionalities throughout the imaging method.

A. White Balancing

Because of the undesirable luminance or the physical limitations of cheap imaging sensors, the captured image might carry obvious color bias.1To calibrate the color bias of image, we want to estimate the worth of light source, the matter of that known as constancy. Mistreatment suitable physical imaging model, one will get associate approximated brightness, so a linear trans form are often applied to map the first image into an ideal one.

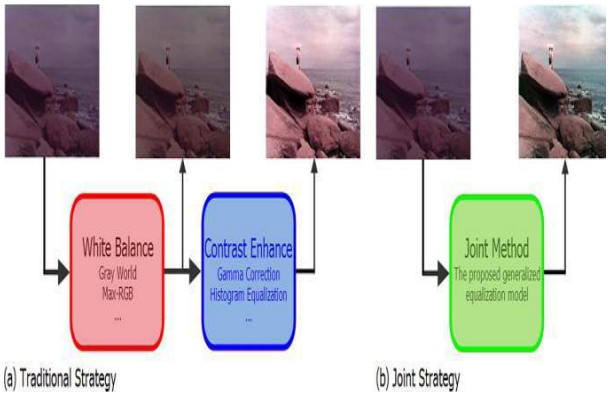

Fig.1. (a) is the illustration of traditional image enhancement strategy, (b) is the illustration of joint image enhancement strategy

B. Distinction Enhancement

Distinction improvement algorithms square measure wide used for the restoration of degraded media, among that international bar chart leveling is that the most popular choice as shown in Fig.1. Alternative variants include native bar chart equalization and therefore the abstraction filtering sort of strategies. As an example, in the half filter issued to market the variances of texture thus on enhance the image. In, a texture synthesis primarily based formula is proposed for degraded media, like recent photos or films. On the other hand, remodel primarily based strategies additionally exist, e.g. Curve let based algorithm associate adaptive steering regression kernels planned to combine image sharpening with de-noising. Despite of the plentiful literature on image improvement, including those representatives listed on top of, 2 challenging problems for image improvement square measure still not resolved first,

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how to reach distinction improvement whereas conserving an honest tone.

II. PROPOSED SCHEME

A. Image Quality and Preserving Color space for Human Visual System The blog transform smoothly modifies the gradient of the transformation so that in the region near zero it remains finite. A single constant C is provided to tune this behavior, so as to adjust the meaning of ―region near zero‖. The default value of this constant is 1/ ln(10); this gives a unity transfer function at zero but other values can be applied as wished, to focus into the region near zero or not. The modified logarithmic transformation called Bilog transform can be both one-sided and symmetric, and thus can transform negative data to scaled negative data. It can be applied to both the X and Y data, when it becomes a bi-symmetric log transform. Applying log transformation to an image will expand its low valued pixels to a higher level and has little effect on higher valued pixels so in other words it enhances image in such a way that it highlights minor details of an image Uses

- Used to expand the values of dark pixels in an image while compressing the higher values.
- It compresses the dynamic range of images with large variations in pixel values Proposed Design.

Propose a generalized equalization model for image & video enhancement; based on our analysis on the relationships between image histogram and contrast enhancement/ white balancing, we first establish a generalized equalization model integrating contrast enhancement and white balancing into a unified framework of convex programming of image histogram. The enhanced system flow is shown below. The processes carried out here are

- RGP Panel Splitting
- White Balancing
- FFT & IFT
- Bi-log Transform
- RGP restoration and
- NTSC

White Balancing: White balance (WB) is the process of removing unrealistic color casts, so that objects which appear white in person are rendered white in your photo. Proper camera white balance has to take into account the "color temperature" of a light source, which refers to the relative warmth or coolness of white light. Our eyes are very good at judging what is white under different light sources, but digital cameras often have great difficulty with auto white balance (AWB), and can create unsightly blue, orange, or even green color casts. Understanding digital white balance can help you avoid these color casts, thereby improving your photos under a wider range of lighting conditions.

FFT: The Fourier transform is a representation of an image as a sum of complex exponentials of varying magnitudes, frequencies, and phases. The Fourier transform plays a critical role in a broad range of image processing applications, including enhancement, analysis, restoration, and compression. The Fourier transform can also be used to perform correlation, which is closely related to convolution. Correlation can be used to locate features within an image; in this context correlation is often called template matching. The Fourier Transform is an important image processing tool, which is used to decompose an image into its sine and cosine components.

The output of the transformation represents the image in Fourier or frequency domain. In the Fourier domain image each point represents a particular frequency contained in spatial domain image. The FT is used in a wide range of application, such as image analysis, image filtering, image reconstruction and image compression. The FT is used if we want to access the geometric characteristics of a spatial domain image. It is easy to examine or process certain frequency of the image in Fourier domain. In most implementations Fourier image is shifted in such a way that the DC-value F (0,0) is displayed in centre of the image. The further away from the center an image point is the higher is its corresponding frequency.

Bilog Transformation: Still there may be some presence of negative frequency components (zero frequency components). Bilog transformation is made use of here to perform action on low frequency information. The region near zeros is to be highlighted for the enhancement and brightness preservation. Hence, after the application of this transform, the region around zeros is enhanced. This is followed by grouping of pixels, where clustering is done to increase the high resolution pixels. At this stage, the image pixels are converted back to RGB color model and pixels highlighted to a certain level Property:

- The bilog transform smoothly modifies the gradient of the transformation so that in the region near zero it remains finite. A single constant C is provided to tune this behavior, so as to adjust the meaning of ―region near zero‖.
- The default value of this constant is 1/ ln(10); this gives a unity transfer function at zero but other values can be applied as wished, to focus into the region near zero or not.
- The modified logarithmic transformation called Bilog transform can be both one-sided and symmetric, and thus can transform negative data to scaled negative data.
- It can be applied to both the X and Y data, when it becomes a bi-symmetric log transform. Applying log transformation to an image will expand its low valued pixels to a higher level and has little effect on higher valued pixels so in other words it enhances image in such a way that it highlights minor details of an image.

NTSC: At the end process the NTSC technique is operated on the pre-processed input image and video to ensure the coloring effect on both. The NTSC is especially for the video signal by means of using the YIQ model.

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III. EXTENSION TO HISTOGRAM EQUALIZATION

In 2006 to 2012 many works supported the significance a contrast enhancement has an important role in image processing applications. They described that conventional contrast enhancement technique either often fail to produce satisfactory results for a broad variety of low-contrast images. They described a new automatic method for contrast enhancement. First of all they grouped the histogram components of a low-contrast image into a proper number of bins according to a selected criterion, then redistributed these bins uniformly over the grayscale, and finally ungroup the previously grouped gray-levels.

Accordingly, these new technique is named gray-level grouping (GLG). GLG not only produces results superior to conventional contrast enhancement techniques, but is also fully automatic in most incidents, and is suitable to a broad differences of images. An extension of GLG is selective GLG (SGLG). SGLG selectively groups and ungroup histogram components to achieve specific application purposes. GLG was a general and powerful technique, which can be suitable manner, applied to a explicit variety of low-contrast images and generates satisfactory results. HE method could be conducted with full automation at fast speeds. In 2007 a modified Histogram equalization (HE) has proved to be a simple and effective image contrast enhancement technique. It worked on a novel technique called Multi-HE, which uniformly of decomposing the input image into various sub-images, and then devoting the classical HE process to each one. This scheme performs a less increase produce image contrast enhancement, in a way that the output image presents a more natural look.

It proposed two discrepancy functions for image decomposing, imagining two new Multi-HE methods. A cost function was also used for automatically deciding in how many sub-images the input image will be decomposed on. The work was tested a new framework called MHE for image contrast enhancement and brightness preserving which generated natural looking images. The results showed that there methods was better on preserving the brightness of the processed image (in relation to the original one) and yields images with natural appearance, at the cost of contrast enhancement.

Similarly init was stated that the HE technique was not very well suited to be implemented in consumer electronics. They discussed that one of the solutions to overcome this weakness is by preserving the mean brightness of the input image inside the output image. They provided the modified dualistic sub image HE method which preserves the brightness of the image as shown in Fig.2. They discussed results of first five methods that are available for contrast enhancement and brightness preservation such as conventional global HE, local HE, ADPHE, BBHE, DSIHE. The last method as MDSIHE gives better results than all other.

IV. EXPERIMENTAL RESULTS

Tone mapping for HDR Image is another natural application for the proposed model. Many tone mapping algorithms have been proposed through the years, e.g. those. Although the methods, based on local adaptive filtering achieve encouraging results, the global method, such as gamma correction, is still the most popular choice because of its robustness and lower complexity. We test our method on the HDR images captured by Nikon D7005 and map them into 8-bit and compare the results with those from the default tone mapping process in MATLAB and gamma correction. Although the default tone mapping in MATLAB can reveal some image details, it cannot recover the color of image correctly. In other words, the contrast is enhanced but the tone bias is raised.

Fig.2. To each sub-figure, the left one shows original image which has obvious tonal distortion. The right one is the result gotten by the proposed method

V. CONCLUSION

In this paper, we have a tendency to analyze the relationships between image bar chart and contrast/tone. We have a tendency to establish a generalized effort model for world image tone mapping. intensive experimental results recommend that the projected technique has sensible performances in several typical applications together with image distinction sweetening, tone correction, white reconciliation and post-processing of de-hazed pictures. Within the future, besides world image sweetening, we have a tendency to expect to unify additional native image sweetening strategies into the model through native image feature analysis.

REFERENCES

[1] T. Arici, S. Dikbas, and Y. Altunbasak, ―A histogram modification framework and its application for image contrast enhancement,‖ IEEE Trans. Image Process., vol. 18, no. 9, pp. 1921–1935, 2009.
[2] M. Ashikhmin, ―A tone mapping algorithm for high contrast images,‖ in Proc. 13th Eurographics Workshop Rendering, 2002.

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[3] K. Barnard, L. Martin, B. Funt, and A. Coath, ―A data set for colour research,‖ Color Res. Applicat., vol. 27, no. 3, pp. 147–151, 2002.

[4] G. Buchsbaum, ―A spatial processor model for object colour perception,‖ J. Frank. Inst., vol. 310, 1980.

[5] Z. Chen, B. Abidi, D. Page, and M. Abidi, ―Gray-level grouping (glg): An automatic method for optimized image contrast enhancement—Part i: The basic method,‖ IEEE Trans. Image Process., vol. 15, no. 8, pp. 2303–2314, 2006.

[6] F. Ciurea and B. Funt, The SunBurst Resort, Scottsdale, AZ, USA, ―A large image database for color constancy research,‖ in Proc. IS&T/SIDs Color Imaging Conf., 2004, pp. 160–164.

[7] D. Coltuc, P. Bolon, and J.-M. Chassery, ―Exact histogram specification,‖ IEEE Trans. Image Process., vol. 15, no. 5, pp. 1143–1152, 2006.

[8] F. Drago, K. Myszkowski, T. Annen, and N. Chiba, ―Adaptive logarithmic mapping for displaying high contrast scenes,‖ in Proc. Computer Graphics Forum, 2003, vol. 22, no. 3.

[9] E. D. P. et al., ―Contrast limited adaptive histogram image processing to improve the detection of simulated speculations in dense mammograms,‖ J. Digital Imag., vol. 11, no. 4, pp. 193–200, 1998.

[10] J. K. et al., ―Deep photo: Model-based photograph enhancement and viewing,‖ ACM Trans. Graph.—Proc. ACM SIGGRAPH, vol. 27, no. 5, 2008.

[11] Z. Farbman, R. Fattal, D. Lischinski, and R. Szeliski, ―Edge-preserving decompositions for multi-scale tone and detail manipulation,‖ ACM Trans. Graph., vol. 27, no. 3, 2008.

[12] H. Farid, ―Blind inverse gamma correction,‖ IEEE Trans. Image Process., vol. 10, no. 10, pp. 1428–1433, 2001.

[13] R. Fattal, ―Single image dehazing,‖ ACM Trans. Graph.—Proc. ACM SIGGRAPH, vol. 27, no. 3, 2008.

[14] R. Fattal, M. Agrawala, and S. Rusinkiewicz, ―Multiscale shape and detail enhancement from multi-light image collections,‖ ACM Trans. Graph., vol. 26, no. 3, pp. 51–59, 2007