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Color Image Processing using Histogram Analysis

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Abstract. In this report, a new color combination method is proposed. Test results with natural images are presented to compare and analyze presented method's performance.

Keywords: Image, histogram, color image.

1 Introduction

Image processing change images in different ways, and they include photographs, photochemical photographs, or illustrations. The higher image quality enables researchers to develop state-of-art approaches for image enhancement [add]. The histogram equalization has been employed due to its simplicity and efficiency. The histogram equalization modifies the pixel intensities and the intensity histogram of the resulting image becomes uniform.

We assume gray scale image and color image are 1-D and 3-D approach as color image has three color channels. The rest of this report is composed as follows. In Section 2, we introduce the flowchart of the proposed method. Section 3 shows simulation results. Conclusion is shown in Section 4.

2 Proposed algorithm

Figure 1 shows the flowchart of the proposed method. The presented method consists of following steps:

Step 1: Channel separation: Color image to gray scale image
Step 2: Histogram investigation
Step 3: Histogram modification in each color channel
Step 4: Reconstruct color images with different color combination
Step 5: Image display

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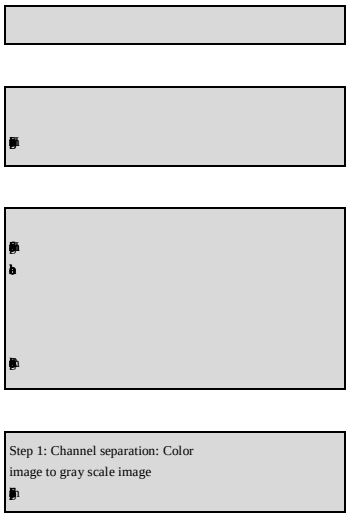
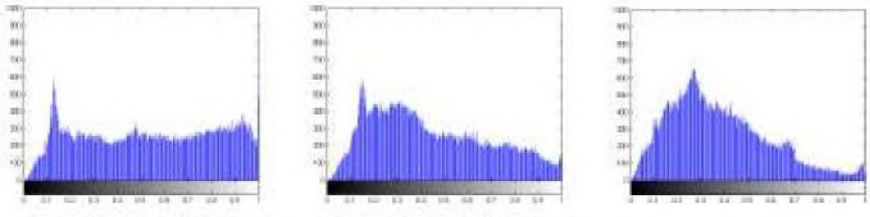


Fig. 1. Flowchart of the proposed method.



with different color combination

(a) (b) (c)

Fig. 2. Histogram of #30 LC image. (a) R channel, (b) G channel, and (c) B channel.

3 Simulation Results

The experiments were conducted on LS test images. Figure 2 shows the histogram of R, G, B channels for #30 LC image. Figure 3 shows the reconstructed color images with different color combination.

4 Conclusion

A new color combination approach was presented in this report. Simulation results obtained by natural images are presented to assess the visual performance.

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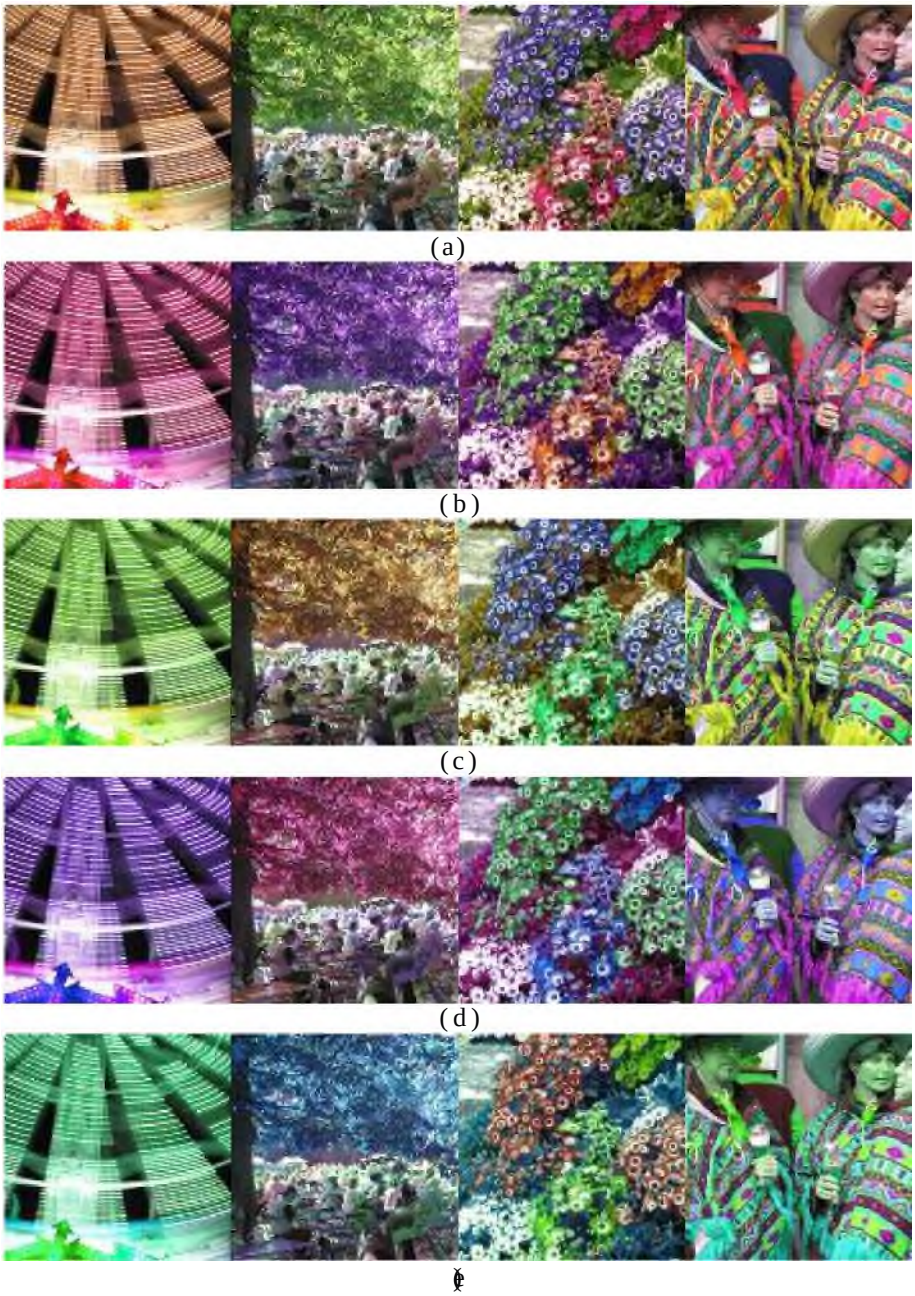

(a)

(b)

(c)

(d)

(f)

Fig. X. Color channel exchanged images on #21, #22, #29, #30 LC images. (a) RGB pair, (b) RBG pair, (c) GRB pair, (d) GBR pair, (e) BRG pair, and (f) BGR pair.

References

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing, 3rd ed. Upper Saddle River, NJ: Prentice- Hall, 2009.
2. P. E. Trahanias and A. N.Venetsanopoulos, “Color image enhancement through 3-D histogram equalization,” in Proc. 15th IAPR Int. Conf. Pattern Recognit., Aug.–Sep. 1992, vol. 1, pp. 545–548.
3. G. Healey, “Segmenting images using normalized color,” IEEE Trans. Syst., Man, Cybern., vol. 22, pp. 64–73, 1992.
4. T. Kim and H. S. Yang, “A Multidimensional histogram equalization by fitting an isotropic Gaussian mixture to a uniform distribution,” in Proc. Int. Conf. Image Process., Oct. 2006, pp. 2865–2868.
5. D. Menotti, L. Najman, A. de Araújo, and J. Facon, “A fast hue-preserving histogram equalization method for color image enhancement using a Bayesian framework,” in Proc. 14th Int.Workshop Syst., Signal Image Process. (IWSSIP), Jun. 2007, pp. 414–417.
6. C. L. Huang, T. Y. Cheng, and C. C. Chen, “Color image segmentation using scale space filter and Markov random fields,” Pattern Recognit., vol. 25, pp. 1217–1229, 1992.
7. A. K. Forrest, “Colour histogram equalisation of multichannel images,” in Proc. IEEE Vis. Image Signal Process., Dec. 2005, vol. 152, no. 6, pp. 677–686.
8. I. Pitas and P. Kinikilis, “Multichannel techniques in color image enhancement and modeling,” IEEE Trans. Image Process., vol. 5, no. 1, pp. 168–171, Jan. 1996.
9. F. Pitié, A. C. Kokaram, and R. Dahyot, “N-dimensional probability density function transfer and its application to color transfer,” in Proc. IEEE Int. Conf. Comput. Vis., Oct. 2005, vol. 2, pp. 1434–1439.
10. L. Shafarenko, “Perception-driven automatic segmentation of color images using mathematical morphology,” Ph.D. dissertation, Univ. Surrey, Guildford, U.K., 1996.
11. P. A. Mlsna and J. J. Rodriguez, “A multivariate contrast enhancement technique for multispectral images,” IEEE Trans. Geosci. Remote Sens., vol. 33, no. 1, pp. 212–216, Jan. 1995.
12. P. A. Mlsna, Q. Zhang, and J. J. Rodriguez, “3-D histogram modification of color images,” in Proc. IEEE Int. Conf. Image Process., Sep. 1996, vol. 3, pp. 1015–1018.
13. J. Morovic and P.-L. Sun, “Accurate 3-D image colour histogram transformation,” Pattern Recognit. Lett., vol. 24, no. 11, pp. 1725–1735, Jul. 2003.

