International Journal of Contemporary Research in Computer Science and Technology (IJCRCST) e-ISSN: 2395-5325
Volume2, Issue 4 (April '2016)

AN ENHANCED IMAGE COLOR TRANSFER SCHEME USING THE CORRUPTIVE ARTIFACTS

Dr.S.V.Manisekaran,
Assistant Professor,
Department of Information Technology,
Anna University Regional Campus, Coimbatore.

T.Anuprabha,
PG Scholar,
Department of Information Technology,
Anna University Regional Campus, Coimbatore.

Abstract: Color transfer is an image processing method which can produce a new image combining the contents and color style taken from two different images. Color transfer is a realistic image editing technology, which is useful in various applications. Color transfer between images is very relevant in various areas like photography, CCTV camera, medical, Hubble telescope. In previous work, the method Histogram Matching is easy to use, but create unwanted result, Means and Variance method can effectively avoid grain but create color distortion. Gradient Preserving Model and Principal Component Analysis (PCA) are good methods by overall, but they posses large computational complexity. The color distortion artifact is a common problem with most of the methods. In the proposed work, a swatch based method is used to avoid the color distortion considering the drawback of existing approaches. The resultant image provides better color transfer for the target image.

Keywords: Image processing, Color Transfer, Color distortion

I. INTRODUCTION

Color transfer between images is very relevant in various areas like Photography, CCTV camera, medical, Hubble telescope, etc. Today's techniques develop many process is to transfer color between images but it creates some corruptive artifacts like color distortion, grain effect, loss of details.

A major problem in the place of creation industry is matching the color between different shots possibly taken at different times in a day. For color transfer , some automatic color transfer methods are developed. For edge preserving smoothing, some filters are examined for grain effect suppression and detail preservation but still they are not satisfying preferred goals. Today's methods develop many process to transfer color between images, but it creates some corruptive artifacts. The need for sufficient solutions is growing due to the increasing amount of digitally produced images in different areas. Color transferred between target and reference images is shown in Fig.1. Color manipulation is one of the most frequent tasks in image editing. The availability of high dynamic range images to increase due to advances in lighting model.

Figure 1: Color transfer from reference to target image.

Because of this, there is an increasing demand to display these images more clearly. Every image has its own character color that significantly influences the sensitivity of human observers. Rapid development has been witnessed in the last decade in the field of color transfer. Representative approaches contain classical histogram matching, statistical transfer, N - dimensional probability density function transfer, gradient-preserving transfer, non-rigid dense correspondence transfer, and progressive transfer and so on.

Figure 2 shows that problems occurred during transferring the color to the image. The problem occurred during color transfer are grain effect, color distortion and loss details. To avoid the problems occurred during color transfer from reference to the target image. The following method is used to avoid the problems occurred during color transfer. Here both color and gray images can be given as inputs. If the target image is a gray image, then convert gray image to ycbcr color space. After the normalization process, the correlations between three components can be measured through covariance. Meanwhile, the mean along each of the three axes of RGB space is calculated. This approach alters target image color through a series of transformations that include translation, scaling and rotation, resulting from the statistics mean and covariance of the target and reference images. The translation and scaling procedures are similar to [2] and rotation chase a matrix obtained by decomposing the covariance matrix using SVD algorithm. The luminance value of both target and reference images are compared for transferring the color to the target image. Finally, get a resultant image that takes on source images look and feel but target images scene. Preferably, color transfer between reference and target images should assure the goals like color fidelity, grain suppression, details preservation and enhancement.

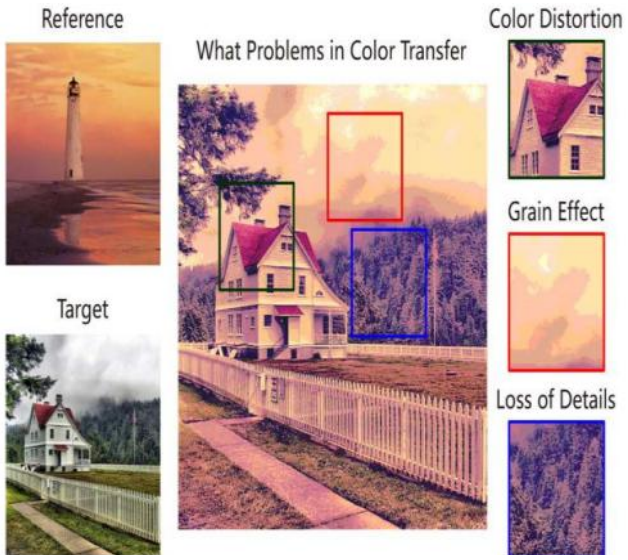


Figure 2: Grain effect, Color Distortion, Loss of Details in Color transfer

II. RELATED WORK

A color transfer method is used to achieve a combined corruptive artifacts suppression, which is particularly in grain suppression, color fidelity and detail manipulation. How to transfer the colors of the given reference to the target successfully is a challenging problem and is significant in color transfer. In previous work include classical histogram matching, statistical transfer, N -dimensional probability density function transfer, gradient-preserving transfer non-rigid dense correspondence transfer , progressive transfer, are listed few. Although these approaches are effective in transferring the color information, they would occasionally produce visual artifacts, due to the oppose the roles of color distribution preservation and image content distribution.

In 2001, Erik Reinhard et al[2] provided method for a more generic form of color correction that borrows one image's color characteristics from another. In 2002, Tomihisa Welsh et al. [3] has been introduced a general technique for "colorizing" grayscale images by moving color between a source, color image and a destination, grayscale image. In 2004, G.Petschnigg et al.[4] introduced a Joint bilateral filter (JBF) which is the first guided edge-preserving smoothing approach. The JBF uses the pixel intensity of the reference which is correlated to the target to recover the filtering effect. However, like the bilateral filter (BLF), JBF cannot avoid the radiance artifact and gradient reversal problem. The grain effect can be considered as a special type of noises and it would be eliminated by linear smoothing. Although the linear smoothing can eliminate the grains, the over-blurring would demolished the original image details and lower the sharpness of edges. In 2007, Chang et al.[5] proposed a color category-based approach that categorized each pixel as one of the basic categories to stop from the grain effect. Then a convex hull was generated in Lαβ(Lab) color space which is known as L for lightness, a and b for color-opponent, for each group of the pixel place, and the color transformation was applied with each pair of convex hull of the same category. In 2007, for the color distortion Tai et al.[6] proposed a modified EM algorithm to segment probabilistically the input images and create Gaussian Mixture Models (GMMs) for them, and the relationship was constructed by each Gaussian element match up between the target and the reference under Reinhard's approach. In 2010, Dong et al[7] proposed a dominant color idea for color transfer. When the amount of prevailing colors of the target was consistent with that of the reference, the color of the reference would be transmitted to obtain a acceptable result. However, when the amount of dominant colors was not balanced, the unacceptable result would be produced. This approach is an improved approach distribution-aware conception to consider the partial color distribution in the reference image. In 2011, Wang et al. [8] Developed the learning based color transfer methods to instruct the proper color mapping relationship. Tone and color adjustment rules as mappings has been defined, and proposed to approximate complicated spatially varying nonlinear mappings in a piecewise mannerSome Common Mistakes.In 2014, Zhuo Su, et al[1] proposed a novel unified color transfer framework with corruptive artifacts suppression which achieves iterative probabilistic color mapping with self-learning filtering scheme and multiscale detailed manipulation method in minimizing the normalized Kullback-Leibler distance. First, an iterative probabilistic color mapping is applied to create the mapping relationship between the reference and target images. Then, a self-learning filtering system is applied into the transfer process to avoid from artifacts and extract details. The transferred output and the extracted multi-level features are integrated by the measurement minimization to yield the final result.

III.AN ENHANCED IMAGE COLOR TRANSFER SCHEME USING THE CORRUPTIVE ARTIFACTS

The following is the model of the proposed work where the input is taken as target image is to transfer color from the reference image. This can be achieved by the image processing technique. There are on any color change softwares, but all are having some defects, like the gray image to color has many types to change the color, it has some color distortion. Here is some idea to avoid this color distortion. The target image and the reference image are given as input. The target image may be gray or color image and the reference must be the color image for transferring the color. In this, mainly concentrates on gray images. The steps that are followed are as: Converting gray image to yc_bc_r color space and normalize it. After that finding the mean and covariance, then decompose the covariance and transformation like translation and scaling are occurring. Then the luminance comparison is occurred to transfer the color. The output provides better color transfer for the target images. Fig.3 shows that the process of the color transfer from reference images to the target image.

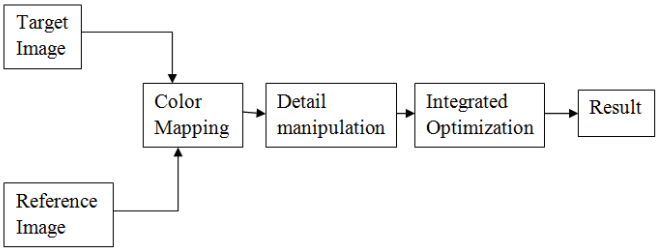


Figure 3: Process of color transfer.

A.Color Mapping Stage

A probabilistic color mapping is useful to achieve the basic color corresponding and a self-learning filtering is inserted to avoid the artifacts and to separate the transferred target into levels. From target image, the structure of the image and the details of the images are taken. The reference image then created. After this color is matched with the target images.

B.Detail manipulation stage

A multiscale detail manipulation scheme is applied to preserve or enhance the details. The details of the target images preserved or enhance the image details.

C.Integrated optimization stage

The transferred result and the modified details combine into an optimal solution with the normalization Kullback-Leibler measurement to yield the output. The resultant output is like an original image.

IV.RESULT

The results of the proposed method are compared with the existing method as given in the below Figure 4.

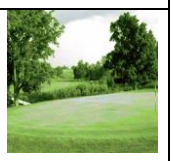
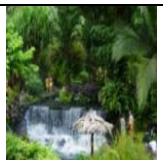
TARGET IMAGE	REFERENCE IMAGE	EXISTING METHOD	PROPOSED METHOD
			
			
			

Figure 4: Color Transfer of Existing and proposed Method

Transformation of color has many applications but they have some artifacts. Some comparisons are given below.

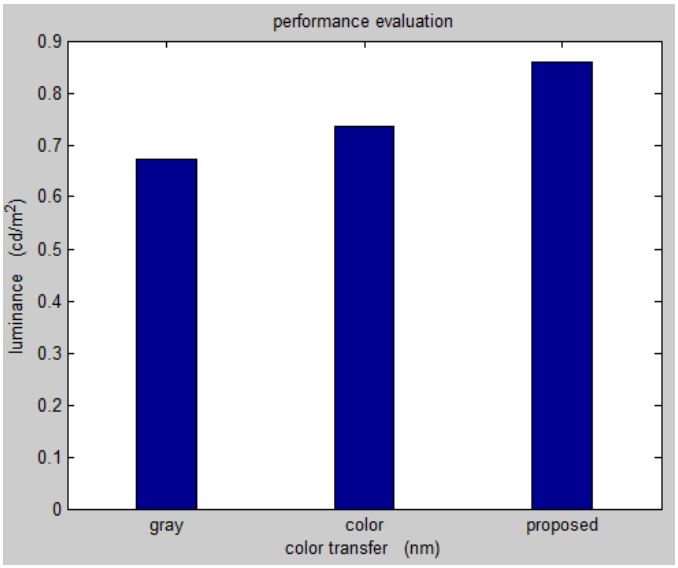


Figure 5: Performance Evalution

In Figure 5 the performance evaluation of the gray, color and proposed method. From the Fig.5 comes to know that the luminance of the proposed method is high compared to other methods.

V.CONCLUSION

The color transfer between images is very significant in various areas. The work is used to minimizes these corruptive artifacts using a color transfer method. This method employs self-learning filtering scheme and iterative probabilistic color mapping model. The method not only prevents the color distortion and grain effect in the process of color transfer but also enhances the effect of detail preserving. It also supports Multiple-reference color transfer instead one-to-one color transfer. The resultant output is similar to the real image.

VI.REFERENCES

[1]. Zhuo Su , Kun Zeng ,Li Liu, Bo Li & Xiaonan Luo, "Corruptive Artifacts Suppression For Example-Based Color Transfer" IEEE Trans. Multimedia, vol. 16, no. 3, pp. 988-999, 2014.

[2]. E .Reinhard, M .Ashikhmin, B .Gooch and P.Shirley, "Color transfer between images", IEEE Comput. Graph., Applicat., vol. 21, no. 5, pp.34–41, 2001.

[3]. T.Welsh,M .Ashikhmin & K .Mueller, "Transferring color to grayscale images," ACM Trans. Graph., vol. 21, no. 3, pp. 277–280, 2002.

[4]. G .Petschnigg, R .Szeliski, M .Agrawala, M .Cohen, H.Hoppe & K .Toyama, "Digital photography with flash and no-flash image pairs", ACM Trans. Graph., vol. 23, no. 3, pp. 664–672, 2004.

[5]. Y .Chang, S Saito & M .Nakajima, "Example Based color transformation of image and video Using basic color categories," IEEE Trans Image Process., vol. 16, no. 2, pp. 329-336, 2007.

[6]. Y .Tai, J .Jia & C .Tang, "Soft Color segmentation and its applications," IEEE Trans. Pattern Anal. Mach .Intell., vol. 29, no. 9, pp. 1520–1537, 2007.

[7]. W.Dong, G.Bao, Zhang,X & J.-C.Paul , "Fast local color transfer via dominant colors mapping", ACM SIGGRAPH Asia , pp. 46:1–46:2, 2010.

[8]. B.Wang, Y .Yu & Y. Q. Xu, "Example-Based image color and tone style enhancement," ACM Trans. Graph., vol. 30, no. 4, pp. 64:1–64:12, 2011.

AUTHOR PROFILE

S.V.Manisekaran was born in Tamilnadu, India in 1981. He received his B.E. degree in Information Technology from Bharathiyar University, Coimbatore in 2003. He completed his M.E. in Computer Science and Engineering from Anna University Chennai in 2005. He has received his Ph.D. from Anna University in the Faculty of Information and Communication Engineering. He is currently working as Assistant Professor in the Department of Information Technology at Anna University Regional Campus, Coimbatore, India. His research areas include mobile computing, sensor networks and pervasive computing.

T.Anuprabha was born in Tamilnadu, India in 1992. She received her B.E. degree in Electronics and Communication Engineering from Vivekanandha Institute of Engineering and Technology for Women, Thiruchengode in 2014. She is currently doing her M.E. in Information Technology in Anna University Regional Campus, Coimbatore. Her area of interest include Digital Image Processing, Digital Signal Processing and Embedded systems.