Histogram validated object removal strategy using spatiogramic technique

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ABSTRACT—*Image degradation usually occurs when certain image losses the stored information due to conversion or digitalization that decreases the quality of the image. Variation in brightness of color information in images is usually called as noise. Image usually subjects to noise of many types. Gaussian noises that occur in the image are concentrated. The principle of Fourier transformation is used so as to decompose the image into sine and cosine components for representing the image in particular frequency. Image histograms are an important technique for inspecting images that are used to spot the background and grey value range at a glance. The concepts of spatiogram with both first order and second order are to enhance the image with high definition clarity thereby removing the degradation in image. In addition, the images were pre-evaluated before image manipulation process*.

Keywords: Gaussian noise, Fourier transformation, Histogram, Spatiogram

1, INTRODUCTION

Image processing is the computer algorithm used to perform image processing in the digital images. It require more algorithm for processing the input data to avoid noise and signal distortion. The digital image processing focuses on the improvement of pictorial information and processing the bins int image.One of the most popular tools for global image processing is histogram equalization. It has been widely used for contrast enhancement, 3-D reconstruction (to compare objects or scenes that have been observed by different cameras under different illuminations), or for colorization. Histogram equalization techniques search for a transfer function that maps one image to another with an approximately uniform histogram

In this paper, we aim at doing local image editing through histogram transfer. In order to consider the spatial distribution of colors, we use the concept of spatiogram and propose a general formulation based on spatiogram transfer that allows dealing with various image editing problems through a single energy minimization. By applying the spatiogram technique we try to identify the object by edge detection approach and the identified image is removed .The removed image or the space should be filled by the transformation technique on the removed portion.

Identifying the background pixel and matching the image and the enhanced image is reaffixed .The concept of spatiogram is related to the mean and the covariance of the position of each color and was proposed as a useful descriptor of images for tracking applications.

2, RELATED WORK

In this section, we introduce the basic ingredients that will be necessary for spatiogram transfer purposes.

a) Introduction to Spatiograms

Let $I(x)$ be a color image defined on the spatial domain Ω,such that $I: x \in \Omega \rightarrow (I_1, I_2, I_3) \epsilon [0; 255]^3$.TheRGB color space is considered here. Other color spaces that have less correlated components such as $L\alpha\beta$ Lab or YUV could have been also used. However, we rather consider the general problem of color transfer in 3-D, since there exists no color space where the channels are completely uncorrelated.

For color $\lambda = (\lambda_1, \lambda_2, \lambda_3) \epsilon [0; 255]^3$, histogram h_I of I is defined as

$$h_I(\lambda) = \frac{1}{|\Omega|} \int_\Omega \delta(I(x) - \lambda)\, dx \qquad (1)$$

where $\delta(.)$is the Dirac function whose value is 1 if its argument is 0 and 0 otherwise. In practice, the histogram is discretized using a reduced number of $N = (N_1 \times N_2 \times N_3)$ bins, but we will keep the continuous formulation all along this paper to simplify our notation.

Spatiogram is a simplification of the histogram which contains the precise information as histograms with more spatial information for each bin. Histogram discarding all spatial information whereas spatiogram enlarge the histogram bins with the spatial means and the covariance of the pixels. Spatiogram combine the information of a histogram with spatial moment information.

Histograms give a global description of the color distribution of images. In order to add some spatial information to this description, Birchfield and Rangarajan proposed in [3] to also consider μ_I the mean position and the spatial covariance Σ_I of the pixels that contribute to each bin, i.e.,

$$\mu_I(\lambda) = \frac{1}{|\Omega| h_I(\lambda)} \int_\Omega x\delta(I(x) - \lambda)\, dx$$

$$\Sigma_I(\lambda) = \frac{1}{|\Omega| h_I(\lambda)} \int_\Omega (x - \mu_I(\lambda))$$

$$\times (x - \mu_I(\lambda))^T \delta(I(x) - \lambda)\, dx \qquad (2)$$

The spatiogram of image *I* is finally defined as $\quad S_I = (h_I, \mu_I, \Sigma_I) \qquad (3)$

Obviously, the aforementioned means and co variances are only defined for bins λ where $h_I(\lambda) > 0$, i.e., if there is at least one pixel of that contributes to the corresponding color. Edge detection is a set of statistical methods which identify the points in an image and it changes sharply. The points at which the brightness of image changed are structured into a set of curved line segments called *edges*. The difficulty to finding the discontinuities in 1D signal is acknowledged as step detection and the problem of finding signal discontinuities over time is acknowledged as change detection. Edge detection is a fundamental tool in image processing, machine vision and computer vision, particularly in the areas of feature detection and feature extraction The steps of edge detection:

- Smoothing: smother as much noise as possible, without destroy the true edges.

- Enhancement: It uses the filter to improve the quality of an edge in an image.
- Detection: conclude which edge pixels should be discarded as noise and which should be retain.
- Localization: decide the precise location of an edge *sub-pixel* resolution and approximate the location of an edge to better than the spacing between pixels. Edge tightening and relating are usually required in this step.

There are different ways to perform Edge detections; SVM classification is one of the ways to detect the edge. The choice required is between "the pixel is part of an edge "or "the pixel is not part of an edge". To obtain this decision the information is mine from the images since the entire image is not useful as the input to the SVM. The solution is to outline a vector with the pixels in a window around every one into the image. The window size may be changed to get better the detection. The formed vectors are used as inputs to the SVM in the training process and when it is applied to the images. In this paper, we will introduce a model to transfer spatiogram. Our approach is based on the principle of variational histogram transfer that we now shortly review.

3, SYSTEM DESIGN

System Design involves identification of classes their relationship as well as their collaboration. In objector, classes are divided into entity y classes and control classes. The Computer Aided Software Engineering (CASE) tools that are available commercially do not provide any assistance in this transition. CASE tools take advantage of Meta modeling that is helpful only after the construction of the class diagram. In the FUSION method some object-oriented approach likes Object Modeling Technique (OMT), Classes, and Responsibilities. Collaborators (CRC), etc, are used. Objector use "agent" to represent some of the hardware and software system. In Fusion method, there is no requirement phase, where a user will supply the initial requirement document.
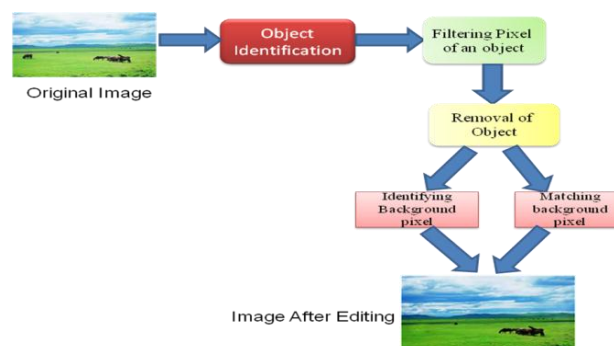

Fig 1: System Architecture

In this paper, consider the spatial distribution of colors by using spatiogram. Based on the spatiogram, that allows dealing with various image editing problems through a single energy minimization. In addition to this a specified portion of an image is removed or by selecting the area and apply the transformation technique on the removed portion without impacting the unused portion. Second order spatiogram will be processed automatically in cleaning up the image automatically.

3.1 Histogram generation

A histogram is a display of statistical information which uses rectangles to show the pixel intensity values in successive numerical intervals of equal size. It plots the number of pixel value in the image and the brightness of that pixel along in the vertical and horizontal axis.

The data appears as colored or shaded rectangles of variable area. The histogram is generated for the known image and based on that, the image is validated and check that image is suitable for image tuning process

Fig 2:Histrogram generation

3.2 Image Tune

The validated image is used for the removal of particular block and to improve the quality of the removed block. The process of improving the quality of digitally stored image is by manipulating the image which reduces the lowest grey values to black and the highest grey values to white. It also make a validated image lighter or darker, or to increase or decrease contrast and also supports many filters for altering the images in various ways.
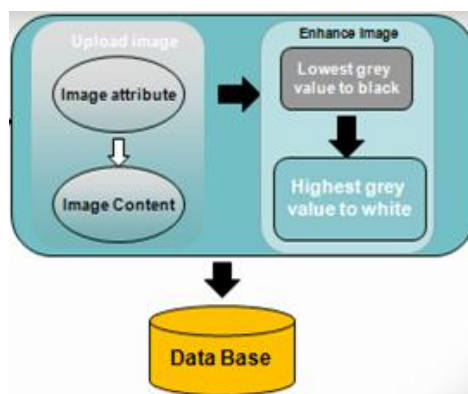
Fig 3: Image Tune

3.3 Object Removal

The tuned image is fed into the system to segment a particular entity from the recognized image. Object detectors mechanism involves marking coarsely where the individual object of a certain class can be expected, but they lack the power to exactly localize the availability of the object. It is basically due to the need of the detector to generalize over object instances, which leads to a loss of precise shape information. In our case, we are trying to identify the object based on the user requisite and remove the object from the picture with the usage of Image Contours segmentation algorithm. Based on image contour segmentation the object available in an image is identified and blocked by their edges.It may be either single object or multiple objects in some case it may be foreground object or background image

Fig 4: Object Removal

3.4 Pixel matching and refix

In the pixel matching, the pixel values are transformed with the help of a mask. The entire algorithm revolves around the grouping of pixels and transforming those pixels with the usage of a simple neighbourhood operation. In our method, transformation of pixel is performed according to the neighbourhood pixels. Hence there are no major rapid changes found in the morphed image. The greatest advantage is its usefulness to morph two sequences of live action apart from two still images.
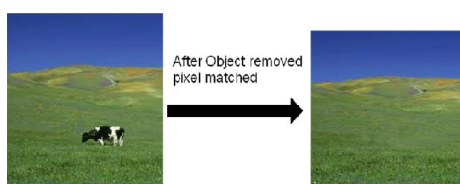

Fig 5: After object

Simulated annealing algorithm we are using the spatiogram information that can be used to reconstruct an image whose topology and colors are relatively close to the original image. on the high level. Consider I got a specific color which needs to be replaced with another color. In that case, the algorithm will simulate the relative pixels and anneal(attach or replace) with the relative pixels.This proposed model can be successfully applied to specific image processing problems.

$$I = (I_1, I_2, I_3)$$

$$I_i^{k+1} = I_i^k - \tau \nabla_{I_i^k} E$$

$$\nabla_{l_i^k} E_T\left(I(x)\right)$$

$$= \nabla_{l_i^k} \int_D (H_{I^k}(\lambda) - H_{I^r}(\lambda))^2 d\lambda$$

$$= -\frac{1}{|\Omega|} \int_{I_j(x)}^{255} \int_{I_k(x)}^{255} [\, H_{I^k}(I_i(x),\lambda_j,\lambda_k)$$

$$H_{I^r}\left(I_i(x),\lambda_j,\lambda_k\right)]\, d\lambda_k\, d\lambda_j$$

In proposed solution framework can be applied on the specified portion of an image by refixing the existing pixels of the cropped images on the original image.The specified output image is obtained after image correction or portion image correction in the previous module. It involves the amendment of header information of the cropped image and the original image.

The greatest advantage is its usefulness to morph two sequences of live action apart from two still images
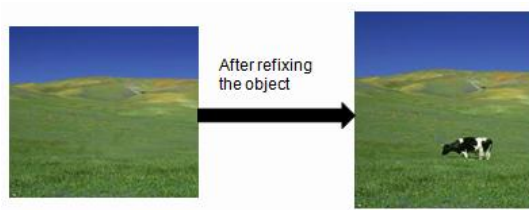

Fig 6: After refixing object

The pixel data type will be manipulated. If no pixel data type is specified then the highest precedence data type in the input images is used. Mixed integer manipulation on the pixel and real images default to a real output image. The exposure time, if specified, will be updated as the weighted average (or sum for the sum option) of the input images.Identifying the background pixel and matching the image are done so as to refix the enhanced image.

IV.CONCLUSION

The proposed variational formalism to realize spatiogram transfer and addressed different image processing problems such as image completion or shadow and flash removal. We

have shown with various examples and comparisons that the methodology allows improving inpainting results obtained with diffusion- or patch-based methods. We have also applied the process to shadow removal and obtained some significant results.

The extension to highlight removal is more complex and will be studied in the near future. The enhancement of the proposed model also deserves further attention. Spatiogram representation could benefit from the use of multimodal Gaussian densities to capture more information on the spatial distribution of colors

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