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+91 99405 72462



+9163819 07438



ijmrsetm@gmail.com



www.ijmrsetm.com

# Probabilistic Approach for Color Correction Mosaicking Application

DR.M.GEETHA, SIVASAKTHI M

Associate Professor, Department of Computer Applications (MCA), K.S.R. College of Engineering, (Autonomous),  
Tiruchengode, India

Department of Computer Applications (MCA), K.S.R. College of Engineering (Autonomous), Tiruchengode, India

**ABSTRACT:** Photo mosaic is a technique which uses to divide a photograph into equal sized rectangular sections. Each of rectangular section is replaced with another image that matches the target photo. Color layout and edge histogram was considered to perform the Mosaicking operations. It results with a low intensity value of pixel in the low resolution images. This paper proposes a filtering and convolution based processing for correcting the disparities in image. Images are color segmented using median filtering technique. The filtering operation is used to take away the disparities in image. Inverse color gradient algorithm is used to determine the layer that needs Mosaicking. Convolution and image Mosaicking is performed to all the region of the image. Then the image can be well scrutinized as a high resolution image.

**KEYWORDS:** Color correction, image mosaicking, color transfer, color palette mapping function

## I.INTRODUCTION

Photo Mosaic is a concept in which picture usually a photograph that has been divided into usually equal sized rectangular sections, each of rectangular section is replaced with another photograph that matches the target photo. Image

Mosaicking and other similar variations such as image compositing. And stitching had found a huge field of application ranging from aerial Imagery or satellite to medical imaging, street view Maps, city 3D modelling, texture synthesis or stereo reconstruction, to name a few. In general, whenever merging two or more images of the same scene was required for evaluation or integration purposes, a mosaic is built. Two problems are concerned in the computation of an image mosaic the geometric along with the photometric correspondence. Image mosaicking application is required both photometrical and geometrical registrations between the images that compose the mosaic. First, the image to be color corrected was segmented into several regions using mean shift. Then, connected regions is extracted by using the median filtering technique and local joint image histograms of each region was modelled as collections of truncated Gaussians using a maximum likelihood estimation procedure.

The geometric correspondence is usually referred to as image registration and this is the procedure of overlaying two or more images of the same scene taken at different times, maybe from different viewpoints and by different sensors. It should renowned so that the most cases the alignment that was produced by a registration method was never accurate to the pixel level. Hence, a pixel to pixel direct mapping of color is not a feasible solution. On the other hand, the photometrical correspondence between images deals with photometrical alignment of the images capturing devices. The same object under the same lighting condition should be represented to the same color in two different images. Whatever, even in set of images taken from the same camera and the colours representing an object may difference from picture to picture. This poses a problem to the fusion of information from several images. So the problem of how to balance the colour of one picture so that it matches the color of another must be tackled. This procedure of calibration and photometrical alignment is referred to as color correction between images is depicted in the paper and compare each to the baseline approach from. This paper proposes a new color correction algorithm presented several technical novelties while compared to the state of the art, Images are color segmented using median filtering technique. The filtering operation is used to take away the disparities in image. Inverse color gradient algorithm is used to determine the layer that needs Mosaicking. Convolution and image Mosaicking is performed to all the region of the image. Then the image can be well scrutinized as a high resolution image. A methodology to perform the expansion of the color palette mapping functions to the non overlapping regions of the images. To the best of our information, this paper also presents one of the most complete evaluations of color corrections algorithms for image mosaicking

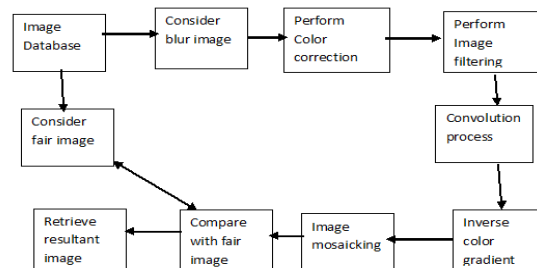
published in the literature. An extensive comparison, which includes the nine other approaches, two datasets and two distinct evaluation metrics with over sixty image pairs, is presented. The proposed color correction algorithm achieves very high-quality results when compared to state-of-the-art algorithms. The industrial applications are automatic 3D digital image metrology quality control (example Object alignment, offset displacement, 3D pose estimation)

## II. EXISTING WORK

The overlapping portion of the target image undergoes a mean-shift based color segmentation process. Then, color segmented regions are extracted using a region fusion algorithm. Each of the color segmented regions is then mapped to a local joint image histogram. Then, a set of Gaussian functions is fitted to the local joint image histogram using a Maximum Likelihood Estimation (MLE) process and truncated Gaussian functions as models. These Gaussians are then used to compute local color palette mapping functions. The next step is to expand the application of these functions from the overlapping area of target image to the entire target image. Finally, the entire color corrected image is produced by applying the color palette mapping functions to the target image.

## III. PROPOSED APPROACH

This paper proposes a filtering and convolution based process for correcting the disparities in image. Images are color segmented using median filtering technique. The filtering operation is used to take away the disparities in image. It preserves edge of the image while removing the noise. Convolution based processing is used to convert the image as matrix format. Inverse color gradient algorithm is used to determine the layer that needs Mosaicking image. Mosaicking is performed to all the region of the image. Then the image can be well scrutinized as a high resolution image.



**Fig 1: Image mosaicking architecture**

### 3.1 Median Filtering Technique

Median filtering in signal processing is often desirable to be able to carry out some kind of noise reduction on a picture or signal. The median filter is mostly used in nonlinear digital filtering technique; it is often used to remove noise. Such noise reduction was a typical pre-processing step to improve the results of later processing (for example an image and edge on). Median filtering was very widely used in digital image processing because, under certain conditions, it is preserving edges of the images when removing noise. Median was a nonlinear local filter whose output value was the middle element of a sorted array of pixel values from the filter window. Since median value was robust to outliers, the filter has been used for reducing the impulse noise. Now we would describe median filtering with the help of an example in which we will place some values for pixels. There was no entry preceding the first value, the first value was repeated, with the last values to handle the missing window entries at the boundaries of the signal, but there were other schemes that had different properties that might be preferred in particular circumstances. Handling out the boundaries, with or without cropping the signal and image boundary afterwards, fetching entries from other places in a signal takes images; entries from the far vertical or horizontal boundary might be selected.

### 3.2 Convolution Based Processing

Convolution was an important operation in signal and image processing. Convolution operates on two signals (in 1D) and two images (in 2D) we can think of one as the “input” signal (or image), and the other is called the “filter” on the input image, producing an output image (so convolution took two images as input and produces a third as output). Convolution was an incredibly important concept in many areas of engineering and math.

It is a general purpose filter effect for images. It is a matrix applied to the image and the mathematical operation comprised of integers. It works by determining the values of each central pixel by adding the weighted values of all it is



neighbours together. The output is a new modified filtered image. A convolution was done by multiplying a pixels and it is neighbouring pixels color value by a matrix. It uses Kernel. The kernel is defined as small matrix of numbers which is used in image convolutions. Differently sized kernels contain different patterns of numbers produced by different results under convolution. The dimension of a kernel is arbitrary but 3x3 is frequently used. It involves Smoothing, Gaussian Blur, Mean Removal, and Sharpen, Emboss layer, Edge Detector and Customizing operations. It implements smoothing of image so as to make the comparison more accurate.

### 3.3 Inverse Color Gradient Algorithm

To determine the layer that needs mosaicking and to determine which part of the image can be used for mosaicking we use Inverse color gradient algorithm. All dynamical system produces a sequence of values  $z_0, z_1, z_2 \dots z_n$ . Fractal images is created by producing one of these sequence to each pixel in the image the coloring algorithm was what interprets this is the sequence to produce a final color.

Typically, the coloring algorithm produces a single value to every pixel. Since color was a three-dimensional space, that one-dimensional value must be expanded to produce a colour image. The common method was to create a palette, a sequence of 3D colour values which are connected end to end and the colouring algorithm value is used as a position beside this multi-segmented line (the gradient). If the last palette colour was connected to the first, a closed segmented loop was formed and any real value from the coloring algorithm can be mapped to a defined color in the gradient. These are similar to the pseudo color renderings often used for infra red imaging. Gradient is normally linearly interpolated in RGB space (Red, Green, Blue), but it can also be interpolated in HSL space (Hue, Saturation, Lightness) & interpolated with spine curves instead of straight line segments.

The selection of the gradient was one of the most critical artistic choices in creating a high-quality fractal image. Color selection can emphasize one part of a fractal image while de emphasizing others. In extreme cases, two imagery with the same fractal parameters, but different color schemes will be appear totally different.

Some coloring algorithms produced discrete values, when some produce continuous values. Discrete values will produce visible stepping while used as a gradient position; until recently this is not terribly important, as the restriction of 8-bit color displays introduced an element of color stepping on gradients anyway and discrete coloring values are mapped to corresponding discrete color in the gradient with the introductions of inexpensive 24 bit displays, algorithms which are produce continuous values is becoming more important, as this is permit interpolating along the color gradient to any color precision desired.

### 3.4 Image Mosaicking

Photo Mosaic is a concept in which picture has been divided into equal sized rectangular sections; each of rectangular section is replaced with another photograph that matches the target photo.

To the best of our knowledge, this paper also included one of the most complete evaluations of colour correction algorithms for image mosaicking published in the literature. The extensive comparison, which includes other approaches, two datasets with number of image pairs and two distinct evaluation metrics, was presented. Image mosaicking and other similar variations such as image compositing have found a vast field of applications ranging from satellite or aerial imagery to medical imaging street view maps city super-resolution texture synthesis and also stereo reconstruction to name a few. In general, whenever merging two or more images of the same scene was required for comparison or integration purposes, a mosaic is built. Two problems are involved in the computation of an image mosaic: the geometric and the photometric correspondence.

## IV. CONCLUSION

This work proposes a novel color correction algorithm. Images are color segmented and extracted using median filtering technique. Each segmented region is used to consider a local color palette mapping function and convolution based processing. Inverse color gradient algorithm is used to determine the layer that's need mosaicking. Finally, by using an extension of the color palette mapping functions to the whole picture, it is achievable to make mosaics where no color transitions are noticeable.

For the proper assessment of the performance of the proposed algorithm, ten other color correction algorithms were evaluated (#2 through #11), next to with three alternatives to the proposed approach (#12b through #12d). Each of the algorithms was functional to two datasets, with a combined total of 63 image pairs. The proposed approach outperforms all other algorithms, in most of the image pairs in the datasets, considering the **PSNR** and **S-CIELAB** evaluation metrics. Not only has it obtained some of the best average scores but also shows to be more consistent and

robust. Results have shown that the proposed approach achieves very high-quality results even if no color segmentation preprocessing step is used. Results have also improves the effectiveness of the color correction algorithm. Finally, we show that the RGB along with the  $l\alpha\beta$  color spaces achieve like color correction performances.

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