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Deep Image Harmonization using ML

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ABSTRACT

Blending or stitching one image on another e ectively is considered as a challenging task. There are various photo compositing and editing techniques available nowadays which provide subpar results when applied. In this report we propose an e ective way for blending the input images seamlessly. We ensure the color correctness and smoothness after the stitching of the images to render the output image.
To deal with the inconsistencies obtained after the stitching or blending of the input images we provide a constructive way to produce signi cantly better re-sults than previous photo compositing or stylization techniques. The main steps include image acquisi-tion, image blending, smoothness.
Our proposed way should be able to blend two in-put images and generate an output image as desired by the user. The objective is to make the composit-ing inconspicuous, for instance, to add an object into a photograph in a way that makes it look like the ob-ject was present in the original scene. This approach should be able to provide better results than the pre-vious algorithms.

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I. INTRODUCTION

Image Blending is a key operation to create new vi-sual content. It allows users to remix existing mate-rials into new pieces. It can be used in di erent con-texts. In some cases like photo collages seams are vis-ible after stitching of images where they are needed.

But in other cases of image blending the composition needs to be inconspicuous such that the rendering of the images should not be visible to the user. Many technologies have been developed to remove the in-consistencies such as boundary seams, color di er-ences and ne texture. But these techniques generate only subpar results. To overcome the problems occur-ring in previous algorithms we present our approach towards image stitching and further smoothing of the generated image according to the user's need.

II. RELATED WORK

Often there is a need for merging of two images into a single one and while doing it removing the incon-sistencies that arose during the merger of the images. There have been a number of algorithms designed for this particular operation. Basic requirement of these models is to produce an output image by process-ing the composite image with the foreground image by adjusting the foreground appearances. This op-eration is mainly carried out by linear interpolation along with Alpha-Matting. Alpha matting is con-sidered as the simplest way to fuse two images , it basically combines the absolute pixel values. Pois-son blending considers the boundary conditions for seamless cloning of images.

Pixel based color blending is one of the widely used technique for blending of images at pixel level. It analyses the boundary region and calculates the av-erage of the pixels present in the target region and applies the calculated average value to all the pix-els surrounding the target region. This operation re-moves the inconsistencies and creates a gradient effect around the stitched area.

Graph cut method and pixel level graph cut, these methods are used to achieve spatially coherent har-monization. Here the mean hue values of the targeted region to the associated template using the color har-

monization equation proposed by Cohenor. Using this equation a central hue of the sector is determined for a particular region.

Smooth histogram matching :Here we harmonize the images by transforming the source image pixels in such a way that matches their statistics to those of the target pixels of the background image.The main tool for modifying the source sub bands in order that their statistics are similar to the target sub bands is histogram matching.

III. METHODOLOGY

1. Image Acquisition : User is required to input two images , one as background and the other as the foreground image. For choosing input im-ages two buttons are provided using which the user can choose the desired images or the user can directly drag and drop the image les in the dropzone provided.

2. Image Blending: To blend two images into one, the necessary steps is required is to combine the colors of corresponding pixels of the images. The RGB values of the pixels to be blended are added together using a percentage of the color each pixel.The blending operation is performed using the following algorithms;

Blending

X and Y o set overlapping Masking

Threshold

3. Machine learning : The system proposed by our group will be able to do the stitching oper-ation autonomously and will generate the result based on the learning it has done using (based upon) the previous results. The newly generated output images are automatically recited.

Figure 1:

and corrected so that a more accurate and er-rorless output is produced.

We are using Keras from TensorFlow package to implement the machine learning part. This part can be divided into following phases:

(a) Data Set Preparation

(b) Building the Model

(c) Training the Model

(d) Generating Result.

Data Set Preparation:

Figure 2: Preparation of data set

Building the Model:

Figure 3: Preparation of Convolutional layer Model

Training the Model:

Figure 4: Fitting of the Model

Generating Result:

```
predictions = model.predict(test_images)
```

IV. PROPOSED SYSTEM

We propose a system that tries to overcome the limi- 7 System Design tations of previous image processing algorithms along with multiple image processing techniques. We try to generate an image that is a result of processing on two input images such that the harmonization and stitching looks genuine.

V. ALGORITHM

1. Blending :Blending is done through the ad-dWeighted function that uses both images and combine them : to blend we use the following algorithm :

new pixel = pixel 1+ pixel 2+ (1)

For example, for img 1 the alpha function deter-mines the visibility of the rst image after the blending same is also determined for img2 by the beta function.

converted img = cv2:addW eighted(

src1 = img1; alpha = 0:5; src2 = img2;

beta = 0:9; gamma = 0) (2)

2. X and y o set overlapping : in this function use de ne the starting point of overlapping and smaller image is overlapped over larger image.

3. Masking: Masking by calculating ROI(region of interest) of the image and pasting foreground image on that particular area .To use calculate ROI X and Y o set function is used get co-ordinates of ROI.

4. Threshold:We use thresholding function is very useful for segmenting an image into di erent parts. Threshold converts into two values black and white .

Figure 5: Prediction of Result T hreshold = cv2:threshold(img; 127; 255; cv2:T HRESH BIN ARY) (3)

VI. SYSTEM DESIGN

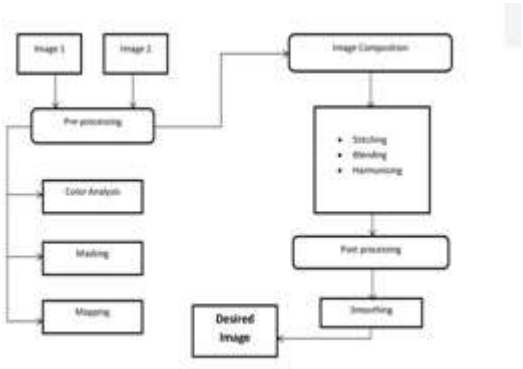

Figure 6: System Architecture

VII. Expected Outcome

The expected outcome should be the desired image that will be processed after the blending of the two input images such that the user should not be able to identify that the image has been rendered. The harmonization should remove the inconsistencies that arises after the stitching of the input images.

VIII. Conclusion

Image editing is a famous practice nowadays. Blending, masking , mapping ,detection are some of the functions utilized in image editing. Many major corporations are using such image editing techniques to advertise their product such as Nike and Lenskart. Here we implement such image blending techniques that will primarily merge two input images and then smoothen the inconsistencies in it. We also utilize machine learning to improve the results by referring the previous results. There are plenty of previous works available in this domain. We implemented our application by referring those and try to better their results.

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