Friend-Blend

PROJECT ID: 12

GitHub ID

https://github.com/Digital-Image-Processing-IIITH/dip-m22-project-big-dipper-22

Team Members

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Main goals of the project

The main goal of this project is to implement FriendBlend, an application that merges two portraits of different people to create a single, multi-person photo. To do this, say Person A takes a photo of Person B, and Person B takes a photo of Person A with the same background. Given these two input images, our goal is to programmatically create a third image with both Person A and Person B in the photo together using our knowledge of digital image processing.

Problem Definition

The problem involves the composition of two images that are taken in similar lighting and spatial conditions, of different subjects. The subjects in question are people. Given two images of different people in the picture at different positions in frame, but in the same spatial location, the desired output is a single image consisting of the different people in the two pictures.

Procedure

A. Pre-Processing

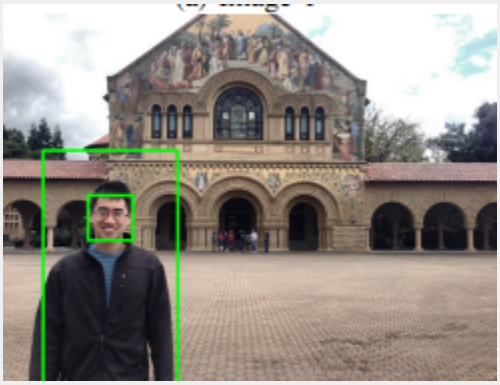
We pre-process the image before applying any other algorithm to ensure the final composed image contains the least artifacts, and looks as realistic as possible.
Most difference comes from lighting and hence we plan on histogram matching the L values in the CIELAB color space. Necessary enhancements to the image will also be performed to make the images easier to process.

Original image

Colour corrected image

B. Face and body detection

Next we use face and body detection to estimate the position of the subjects in the images. This is important to decide on which image merging process to use. For this we use face detection by Haar feature based cascade classifiers.



C. Keypoint estimation & Homography

To avoid undue artifacts, we register both the images. This is planned to be done using a key-point detector to find the major points of the images (we could use a Harris Corner detector for this). Then, these keypoints are to be matched based on their spatial positions allowing some error. Using homographic transform and the matched keypoints, we can warp one of the images to have the same perspective as the other. This can be done with the help of RANSAC.

Matching the key points of images

Warping on of the images to match perspective of the other

D. Image blending

Finally, the process of blending the images can be separated into two cases.
First case is when the subjects are far apart. Here we use alpha blending to blend the region between the two subjects to achieve a smooth transition.
Second case is when the subjects are very close to each other. Here we cut out the subject with the largest bounding box and place him in front of the second wrt locations in the pictures.

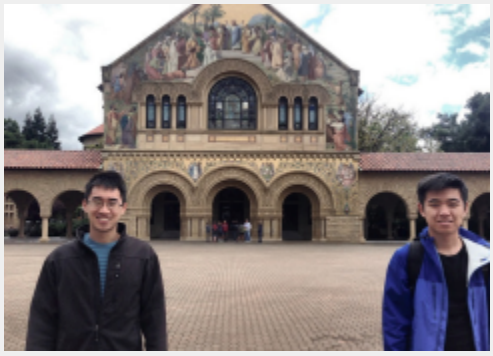
Expected results of the project

We will mostly be using images we capture for testing our algorithm. A wide variety of images in different locations and lighting conditions will be used to test the limits of the algorithm. We will also test the limits on how different the two images can be before the program fails.

Image 1

Image 2

Expected Result



Result - The expected result is to combine two images taken of different people with the same backgrounds into one singular image which looks like it was taken with the given background.

Milestones/Timeline

1. **Present to October 30 -** Reading relevant papers and learning about the algorithms used in the paper
2. **October 30 to November 8 -** Implementing few of the individual components of the project including color correction, face and body detection
3. **November 8 to November 15 -** Implementing the last component which is keypoint detection and homography, and, integrating them together

4. **November 15 to November 22 -** Testing the project with different input images, finding test cases where the objective fails
5. **November 22 to November 25 -** Try to build an app integrating the project
6. **November 25 to November 27 -** Fine-tuning and polishing the project, making a presentation for the final submission

Reference Paper

FriendBlend