Digital Makeup Face Generation

Team Adobe Literoom

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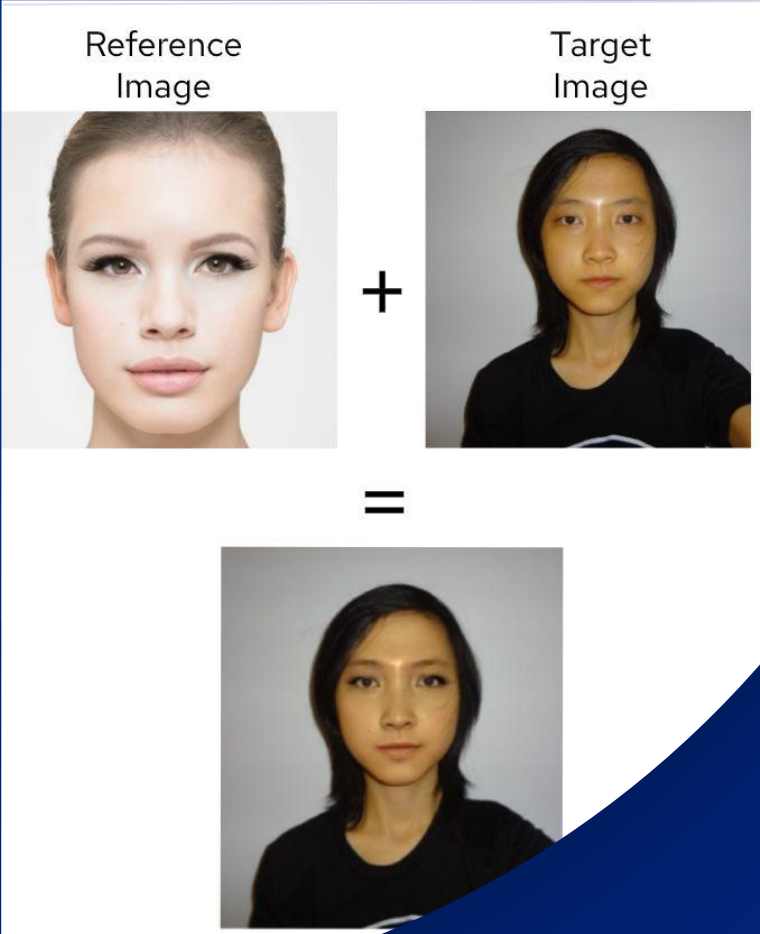


Aim

Transfer makeup from a particular reference image to a person (target image).

How do we achieve this ?

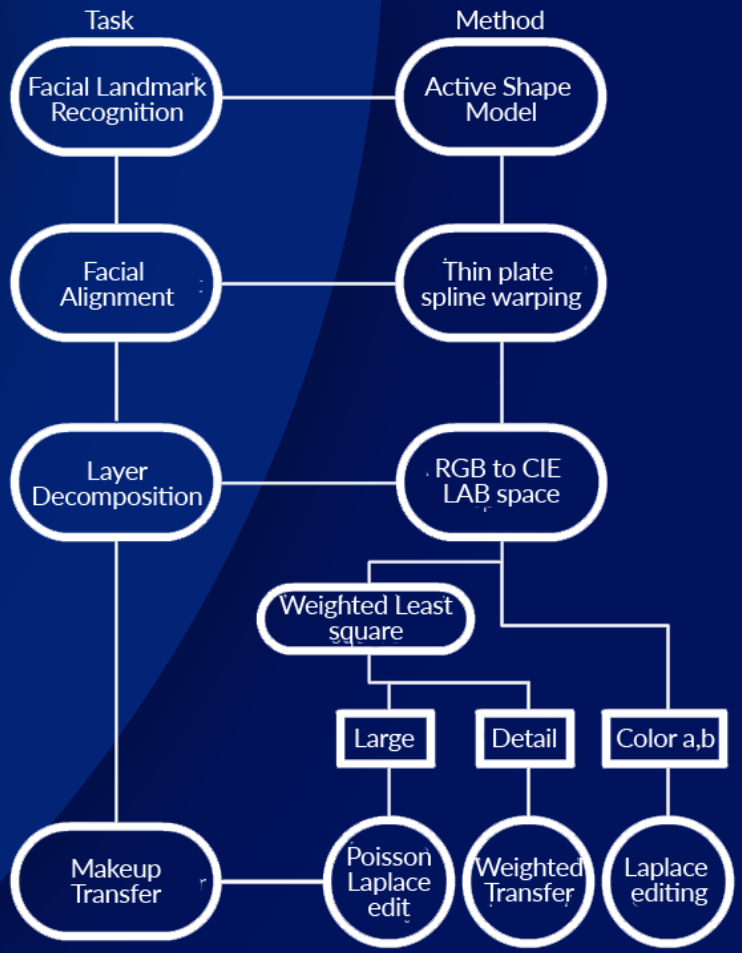
1. Recognize important facial landmarks in both pictures, e.g. boundary of nose, boundary of eye.

2. Warp the reference image wrt these points, such that these points are at the same position when both images are superimposed.

3. Cut eyes and lips from reference. Decompose the makeup warped image into lightness and color layers.

4. Combine these layers in some form to get the desired output.

A more formal explanation



Step 1 : Facial Landmark Recognition

Shape

A **N x 2** vector, representing points on image containing high curvature or are distinct corners.

Active Shape Model

A model containing pre-trained data of faces which on input, an image representing some face, returns the shape.

Advantage

Generates face contours very effectively, eliminating the need of face segmentation.

Step 1 : Facial Landmark Recognition

Image

Shape

[[127. 276.]
[133. 346.]
[145. 406.]
[164. 464.]
[199. 521.]
[249. 564.]
[302. 576.]
[355. 566.]
.....]

Image with landmarks

Step 2: Facial Alignment

Problem statement

Aligning the two images w.r.t shapes (landmarks).

Arsenal

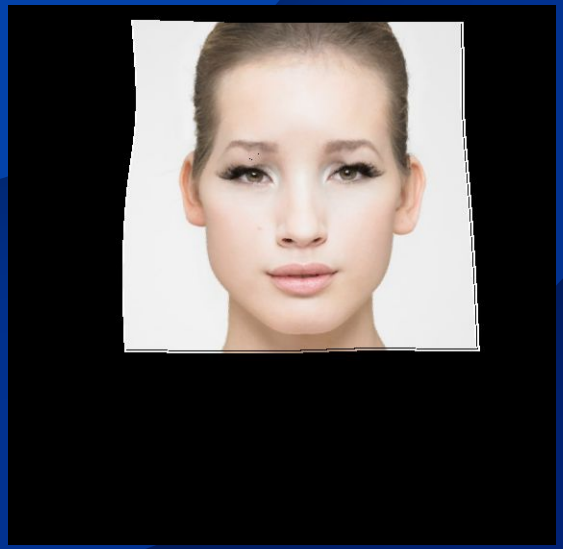
A warping method called thin plate spline warping, which uses the inverse distance weighted interpolation method to warp the reference w.r.t target

Implementation

Writing python code for the same.

Step 2: Facial Alignment

Warped image wrt reference landmarks



Target (dotted)

Warped image

Step 3 : Layer decomposition

First step

Convert warped image obtained into Lightness and color (a, b) layers.

Second step

Further decompose the lightness layer into large scale layer and a detail layer.

Step 4 : Makeup transfer

Large scale layer

Contains the smoothed face image with only highlights and contours.

Detail layer

Contains moles, skin texture, wrinkles and etc.

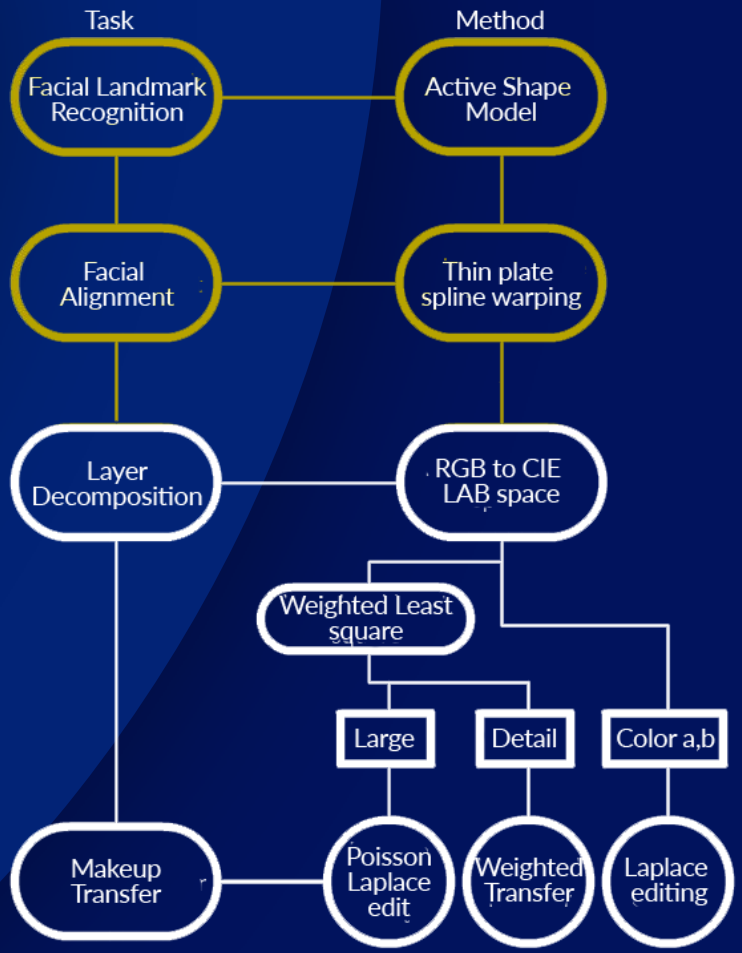
Color a,b layer

Apply laplace editing

Finally

Combine all the images using circular averaging filter.

Progress so far



Questions?

We'll answer them, but hesitantly.