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Face Extraction, Feature Extraction and Edges in Face Beautification

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Abstract: In this paper, we present a new image processing structure for face recognition, feature extraction and landmark localization. The proposed method is used to extract the face by using adaptive region aware mask based on edge preserving energy minimization model with a spatially different parameter and a high quality of guided feature space for mask generation. Using region-aware masks, our method simplifies more flexible and accurate facial skin enhancement In our beautification structure, a image is decomposed into smoothness, lighting, and color layers by an edge-preserving filter. Next, facial land marks and important features are extracted as input constraints for mask generation. The Experimental results show that the proposed method determines the ability to beautify the face.

Keywords: Feature Extraction, Facial Beautification, Edge Preserving Energy Minimization**.**

I. INTRODUCTION

The automatic method for retouching digital pictures that aims to beautify faces by smoothing the skin in order to reduce wrinkles, blemishes, and other skin imperfections. Some commercial image-editing software systems are available (such as Adobe Photoshop) but face image improving is still a time-consuming task. Furthermore, image enhancements are becoming more predominant as social networks (e.g., Facebook, LinkedIn, and Flickr) become increasingly popularin this task. In contrast, our proposed method is facial skin beautification framework based on edge preserving energy minimization. Most users require immediate facialbeautification with the minimum number of operations to avoid tedious manipulations. Thus, it would be useful to develop a face image beatification technique that is effective, convenient, and flexible.

II. LITERATURE SURVEY

The face beautificationcomes from a recent study by Leyvand et al. [1], which presented a original computational photography technique to enhance the beautiful application of human face images The increasing demand for face image improving has led to many studies, such as facial geometric beautification [24], digital facial makeup [2], personal photo enhancement [8], and hair modeling [9] but in this paper we focus on facial skin beautification [10]-[12].In face beautification using region aware mask,our method make simpler and accurate for facial skin enhancement which builds on existing face detection to segment the significant areas of the face. These areas are then used in combination with a skin segmentation to determine the region wheresmoothing isto be applied. There has been a lot of research on skin segmentation. Basically skin segmentation method improves on such methods by using the face feature locations. Exactly, we create a skin map by segmenting the image using samples of the skin and non-skin data obtained from the associated face features. We then model the skin and non-skin color distributions as Gaussian mixture models (GMM) and use a Bayesian segmentation algorithm [10]-[12].

Another method is used for improving the maskis edit propagation technique has been proposed [3], [13]–[15] to achieve this goal, which spreads sparse user edits throughout the entire image according to the pixel affinity [15].To overcome the defects of these methods, we propose an automatic region-aware mask-generation method for facial skin beautification, which is based on the edge preserving energy minimization framework introduced by Lischiniski et al. [5]. The proposed method facial skin beautification framework based on the adaptive region- aware method.

According to the research, the skin homogeneity (smoothness), lighting, and color are three main features that affect the perception of facial attractiveness [16]–[18]. it provides two manipulation schemes: automatic and interactive.

III. FEATURE EXTRACTION

The first step of our proposed facial skin enhancement method is a preprocessing step in which all the faces contained in the images are located which generate a bounding box around each face and afterward it identifying the location of the chin, nose, mouth, eyes, and eyebrows of each person. Face detection is expert using a multi-view face detector based on the Viola-Jones technique which relies on cascading classifiers in such a way that the classifers in the early stage quickly discard simple non-face regions and the ones in the latter stage are designed to classify more complex cases.

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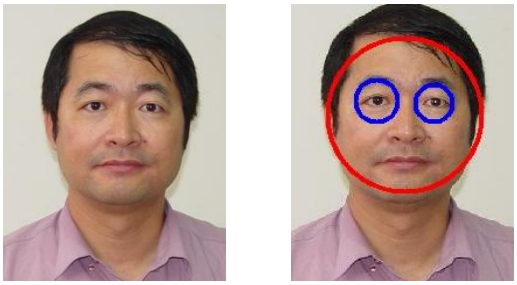
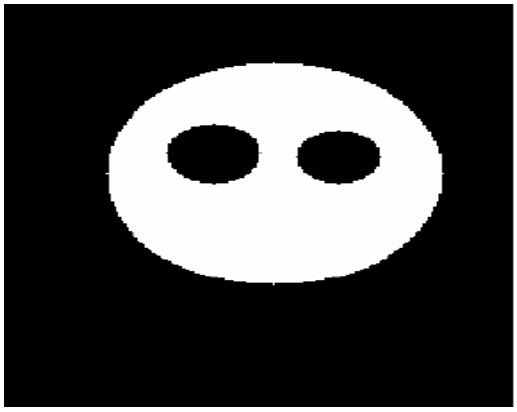
To extract human face from given image, algorithms have been proposed. Viola et al. proposed an proficient face detection approach [4]. There are three main principles in their algorithm, including the integral image, Ada boost, and cascade classifier .In this paper, apply Lienhart's frontal face classifier [6] and Hameed's eye classifier [7] toextract human face and human eyes from given image respectively.The objective of human eye detection is to deduct the effect of non-skin tone Element from detected human face. The outcome of human face detection and human eye detection is shown in Fig. The white color in Fig. 1(c) is the region of interest, which is a rough skin-color data.



(a) Input image(b) Red circle and blue circle mean face and eye regions



(c) White region represents interested skin color.
Fig.1. Face Feature Detection

IV. IMAGE LAYER DECOMPOSITION

Literature use an edge-preserving smoothing operator based on a WLS framework [19] to separate the lighting and detail layers. The WLS filter is more suitable for detail manipulation than an explicit filter, such as a bilateral filter [20] or a guided filter [21], which would introduce halo artifacts [19], [21] First, the input image.

I is converted into CIELAB color space, which has been used widely in human perceptual and facial attractiveness studies [17], [25]. The converted input image comprises a luminance channel L* (I_L*) and chromaticity channels a*(I_a*), b* (I_b*). The chromaticity channels are viewed as the color layer I_c. Second, we apply an edge preserving smoothing filter to the luminance channel to capture its large-scale lighting variations, which is regarded as the lighting layer I_L. Finally, the lighting layer is subtracted from I_L* and the residual is regarded as the detail layer I_S.

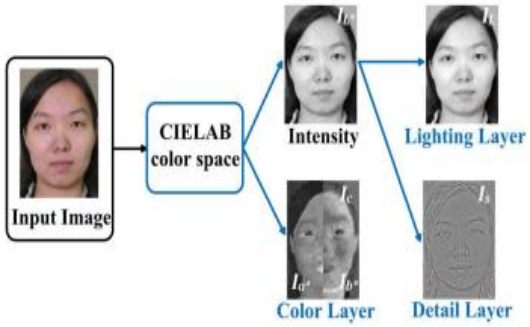


Fig.2.Process to separate the input image into three specific facial layers using an edge-preserving smoothing filter [19].

V. ADAPTIVE REGION AWARE MASK

During skin manipulation, assume that a user wants to remove unwanted minutiae (such as spots) or to adjust facial attributes skin color in certain face image regions while preserving unchanged information in other regions (such as the background).Therefore to separate the edited region and adjust the degree of parameter. To avoid monotonous mask painting, literature proposes a region aware mask generation method using the adaptive edit propagation technique. In our method, the extracted facial features described in Section III are treated as input constrictions.The pixel values of the constrictions regions are propagated adaptively throughout the entire image according to the guided information and facial priors.

VI. LAYER MASKS

After feature extraction from the image as well as layer decomposition for smoothing different layer of mask is generate such as lighting mask, smoothness mask, color mask.

A. Lighting Mask:
The intensity of the mask indicates the edit degree of the process, where brighter region will be adjusted more.

B. Smoothness Mask:
During skin smoothness enhancement, we need to handle some highly complex situations. For example, unwanted textures such as wrinkles or spots need to be removed whereas significant facial information must be preserved, such as details of the eyes, hair, or beards. To generate the smoothness mask, the guided feature is constructed using the facial lighting and the color feature as follows:

$G = G_s = (I_L^*, I_a^*, I_b^*)$

where I_L*, $Ia^*$and $I_b^*$are the normalized luminance and chromaticity channels of the input image in CIELAB space and guided feature Gs.

C. Color Mask:
The process used to generate the color mask is similar to that employed to produce thesmoothness mask.

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VII. EXPERIMENTAL RESULTS

Skin smoothing must reduce the insufficiencies of the skin while preserving the important details of the face. We obtain this effect by delicately spreading the color of some strategic areas of the skin, following a manual procedure [4] commonly performed in graphics editing programs such as Adobe Photoshop.

The performance of the facial skin beautification system is estimated by subjective examination. Based on several original input portraits, it can be observed that the proposed system generates visually attractive pictures, and the resultant portraits are more attractive than the original ones. Overall, our proposed human facial beautification system is quite useful for beautifying the pictures.

The qualitative experimental evaluation for our method was performed on three representative face datasets, that is, the Caltech [23], the Lifespan [24],LIANG et al, To evaluate our facial beautification system under a real-world condition, we only eliminated the testing faces with extreme lighting, expression, and pose modifications in the experiments.At first the input image is taken from the dataset. dataset is the folder which consist several images, after the input image is getting from the data set, image is undergone for the process of image layer decomposition or simountounsely image is undergone for the process of feature extraction .

Fig.3.Extracted Face

In the image layer decomposition is the process of image layer decomposition into three different layer. First one is based on the color intensity, second one is based on the compression, third one is intensity of layer.Feature is extracted in the point, this point is called as mask region, face region we need taken as point called as mask region, also the edge of the image is taken. Feature extraction is nothing but carried out the details from the image.the carried out details is nothing but the extraction of features from the image.Here we use the DWT for the feature extraction.DWT is nothing but the discrete wavelet transform after extracting features from the image,the extracted features in the form of numerical.

Fig.4.Features Extraction

Fig.5.Edge Detection

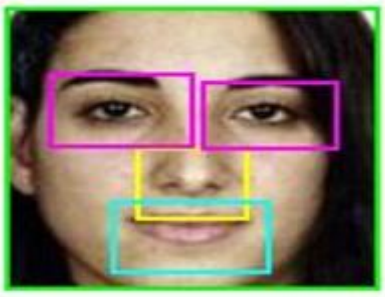

Fig.6.Features Extraction

VIII. CONCLUSION

In this paper, by using facial technique first to extract face from the input image, after extracting the face it can be decompose into the different layer byusing anedge-preserving smoothing operator based on a WLS framework [19] to separate the lighting and detail layers as well as to extract features of face region. The important facial features include facial components.(e.g., eyes, nose and mouth) which assume that significant edges in the face regions are caused by using a Canny operator for edge detection. Further we proceed to enhance the image using adaptive region aware mask as well as using GUI system that facilitates automatic and interactive facial skin beautification.

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BIOGRAPHY

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