

Title	appearance ベースとmodel ベースによる眼鏡顔画像からの眼鏡なし顔画像の推定
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Estimation of eyeglassless facial image from eyeglassed facial image by appearance-based and model-based methods

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Abstract

We know through experience that faces play important roles in human communication and this has been verified through psychological experiments. Useful systems, based on synthesis and analysis of facial images, have been in practical use as user interface, communication, computer graphics, security and so on.

It is necessary to extract automatically such facial information as individualities, attributes, expressions and intentions for synthesis and analysis of a facial image by using a computer. It is normal to get the gray values of a face from the image for processing the face by computer. A desired application which uses the facial image is realized by clarifying the relationship between gray values and the above information. However, the facial image contains both some regions related to the above information and also unnecessary regions which hinder synthesis and analysis of the facial image. Although hair, beard and scars belong to unnecessary regions, these can not be removed from the facial image, since these are the characteristic parts of the face. On the other hand, eyeglasses have few individualities, hence even if they are removed from the face, the facial information still remains.

This paper presents methods which estimate eyeglassless facial images from eyeglassed facial images. The eyeglasses which hinder facial image processing, analysis and synthesis, is only removed on the condition that the individualities and the expressions are not lost. This is the first research which estimates the original pattern automatically by removing the unnecessary regions in the facial image. This research proposes the following two methods:

- appearance-based estimation method (extracting only face regions from eyeglassed faces by replacing gray values of the facial image)
- model-based estimation method (modeling the eyeglass shape, and extracting and removing the eyeglass region by using interpolation with gray levels of skin region).

These methods can estimate the original pattern of eyeglassless facial images without losing individualities. The appearance-based method can estimate the facial image without the eyeglass region, and the model-based method, which does not need a normalized process, is flexible and stable.

This paper also explains the feature of each method, and shows applications.

Key Words: eyeglasses, eyeglassed facial images, eyeglassless facial images, appearance-based image estimation, model-based image estimation