Automatic face replacement in photographs

Advances in digital photography have enabled the collection of large image libraries for publicly available technologies such as Google Street View and EveryScape. These developments have created a need for a face replacement technique that can de-identify photos of people who have not consented to be photographed. Although techniques exist to either blur or completely censor the face region in photos, these approaches diminish the visual appeal of the images. This technology outlines a method for automated replacement to enable faces in photographs to be replaced with faces from a collection of stock images.

Fully automated algorithm enables seamless face replacement in photographs

This technology enables the de-identification of individuals in photographs via a 2D face alignment algorithm. The technology replaces the face in a given photograph with a face from a collection of stock images. After swapping the faces, the technology corrects for the color and lighting, resulting in a de-identified photo that appears natural and is aesthetically pleasing. Furthermore, this algorithm can be employed with or without manual input from the user. While the automation of this technique is highly beneficial for large image libraries, it could also be applied to personal photo collections in which face replacement can improve photo quality.

This software’s efficacy has been demonstrated in a user study in which 58% of the “fake” images were identified as real by participants.

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Applications:

- De-identification of photographs containing non-consenting individuals
- Improvement of personal images through replacement of an unflattering facial expression with a more flattering expression
- Face swapping games (entertainment)
Advantages:

- Does not require user input
- Uses a 2D spatial alignment approach
- Generates seamless composite images using critical appearance adjustments

Patent Information:

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Related Publications:


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