

Digital Make-up Face Generation

EE 368/ CS232: Digital Image Processing

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Goal

Current make-up applications rely on using photoshop tools to apply them on user's digital faces and generate results. While these applications allow customization, a person who wants to quickly decide on the type of makeup kit to buy at a store will not find it useful. The customer might just want to find out how the make-up look on the cover or billboard will look like on her face. The goal of this project is to use an existing reference image of another subject with a make-up applied, and transfer the reference's make up on the user's face. Many make-up stores will find this application useful. Due to time constraints, this project will not use a droid phone and will be developed with MATLAB.

Methodology

The following steps will be performed. They will change as new discoveries are made during implementation.

1. Alignment and transform of the face shape, eye, nose and mouth of the reference image by using Active Shape Model (ASM) [1]
2. Decomposition into two layers in CIELAB color space by using WLS operator [2]
 - Illumination Layer decomposed by Canny edge detector [3]
 - Large Structure (highlights, lips, and others) - transferred through gradient based methods [3]
 - Skin Detail -transferred through addition and subtraction [4]
 - Color Layer - transferred through alpha blending [4]

It will be assumed that the input image does not have any make up applied. The reference image will be using models with makeup taken from public domains. Both images will face straight and upright with eyes open and mouths closed.

References

- [1] S. Milborrow and F. Nicolls, "Locating Facial features with an Extended Active Shape Model," in *EECV*, 2008.
- [2] Z. e. a. Farbman, "Edge-preserving decompositions for multi-scale tone and detail manipulation," *ACM Transactions on Graphics (TOG)*, vol. 27, no. 3, p. 67, 2008.

- [3] X. Chen and e. al., "Face illumination transfer through edge-preserving filters," in *Computer Vision and Pattern Recognition (CVPR)*, 2011.
- [4] D. Guo and T. Sim, "Digital face makeup by example," in *Computer Vision and Pattern Recognition*, 2009.