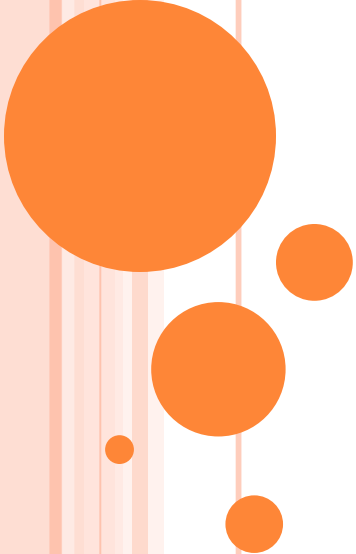




EYE GLASS REMOVAL GROUP 24

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PROJECT DESCRIPTION

- Identify the region occluded by glasses in an image and suitably replace it to generate a natural looking glassless image of the face.
- We did this in three parts
 - I. Reconstructed the glassless image by using eigen faces.
 - II. Accurately identified the region to be replaced.
 - III. Recursively reconstructed the glassless image to obtain natural looking results.



EIGEN FACE RECONSTRUCTION

- Eigen faces are obtained from the given test set, using a standard algorithm
- We can reconstruct given images as linear combinations of these eigen faces.
- If the input image has glasses, the reconstructed image will not have glasses, due to them being absent in the training set



FINDING THE OCCLUDED REGION

- Estimating the skin region from actual image
- Extraction of Eye from the reconstructed image.
- Removing Eye from the actual image .This gives us eye-excluded occluded image-(1)
- Calculation of Lower threshold is given by mean value of reconstructed errors in skin region.
- Calculation of Upper threshold by computing mean value of reconstructed errors greater than local threshold in upper region.



CONTINUED

- If reconstruction difference is higher than upper threshold than it is in the occluded region . This gives us occluded region(2)
- In order to get our final occluded image we took the intersection between the occluded region(1) and (2).
- Then we dilated this region and took the largest connected component of it as our final occluded image.



RESULTS



Original



Eigen Reconstruction



Thresholded



Skin Region



Eyes Removal



Final Occluded Region



RESULTS



Original



Eigen Reconstruction



Thresholded



Skin Region



Eyes Removal



Final Occluded Region



FILLING THE OCCLUDED IMAGE

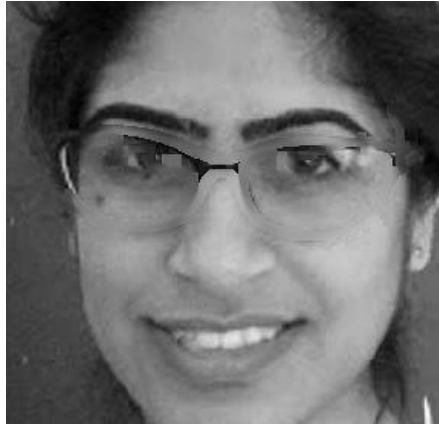
- The reconstruction difference is used to find the occluded region.
- The occluded region is replaced by a mean of the surrounding values
- Median Filtering and Smoothing is applied to obtain the glassless image.
- We keep recursively reconstructing for the region under consideration until the maximum pixel value difference between the reconstructed image and glassless image is below a certain threshold



RESULTS



Input image



First Iteration



Second Iteration



Third Iteration



Fourth Iteration



Fifth Iteration

RESULT



Input image



First Iteration



Second Iteration



Third Iteration



Fourth Iteration



Fifth Iteration

PROBLEMS

- We took the images using uneven lighting conditions which accounted for shadows in the image.
- Due to a large variation in the input images, the eigen face did not closely represent the actual image. The difference in shade did not permit us to immediately replace the corresponding pixels in the occluded region.
- Variations from Paper

VARIATIONS TO PAPER

- For final occluded region we took the intersection of occluded region(1) and (2) and then selected the largest connected component amongst them.
- We have applied the recursive algorithm to a certain region instead of the whole image.



REFERENCES

Glasses Removal from Facial Image Using Recursive PCA Reconstruction, Jeong-Seon Park, You Hwa Oh, Sang Chul Ahn, Seong-Whan Lee
Systemics, Cybernetics and Informatics Volume1 - Number 3 , 2003

