**Assignment #2 Report – EigenFaces, Adaboost, Detection**

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**P1)**

Eigen-Face was computed from the corpus of images, and the mean and divided by subsequent zero-mean variance to obtain the normalized Eigen-face:



Figure : Eigen-Face

The dot product of the normalized eigen-face was taken against the image, cornered at every pixel of the image except the corners using a sliding window.

The maximum values of the dot product can be seen in an image of the scores obtained.

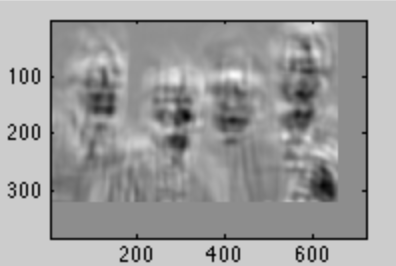


Figure :DotProductImage

However, due to the high intensity of features like the hand, false positives is possible. Thus, a normalized dot product of the faces with the eigenface might produce better results, by not only subtracting the mean of the patches, but also dividing by the sum of each zero mean patch. The resulting score is more informative as the brighter regions correspond to patches cornered at that area.

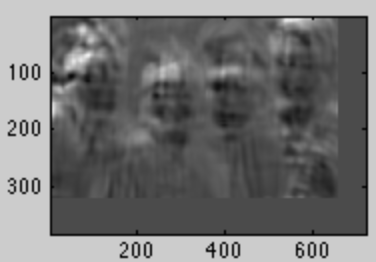


Figure :Zero-Mean, 1 variance patches dot product

Dividing each zero mean patch with the sum of the patch before the mean normalization, however, gives better distinction of the faces:

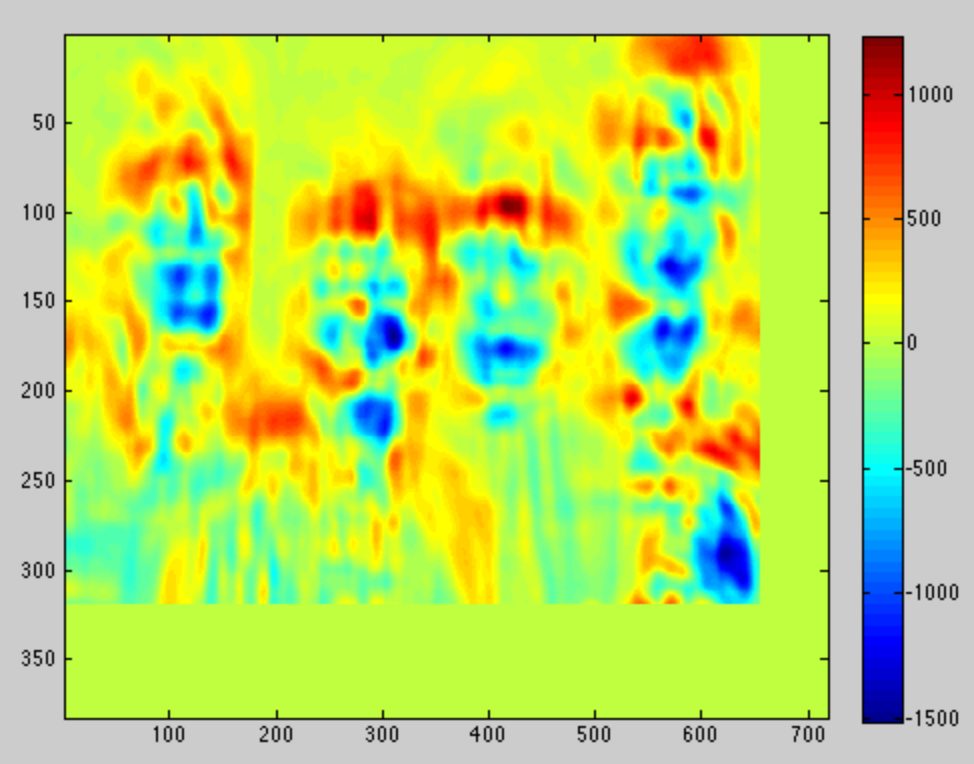
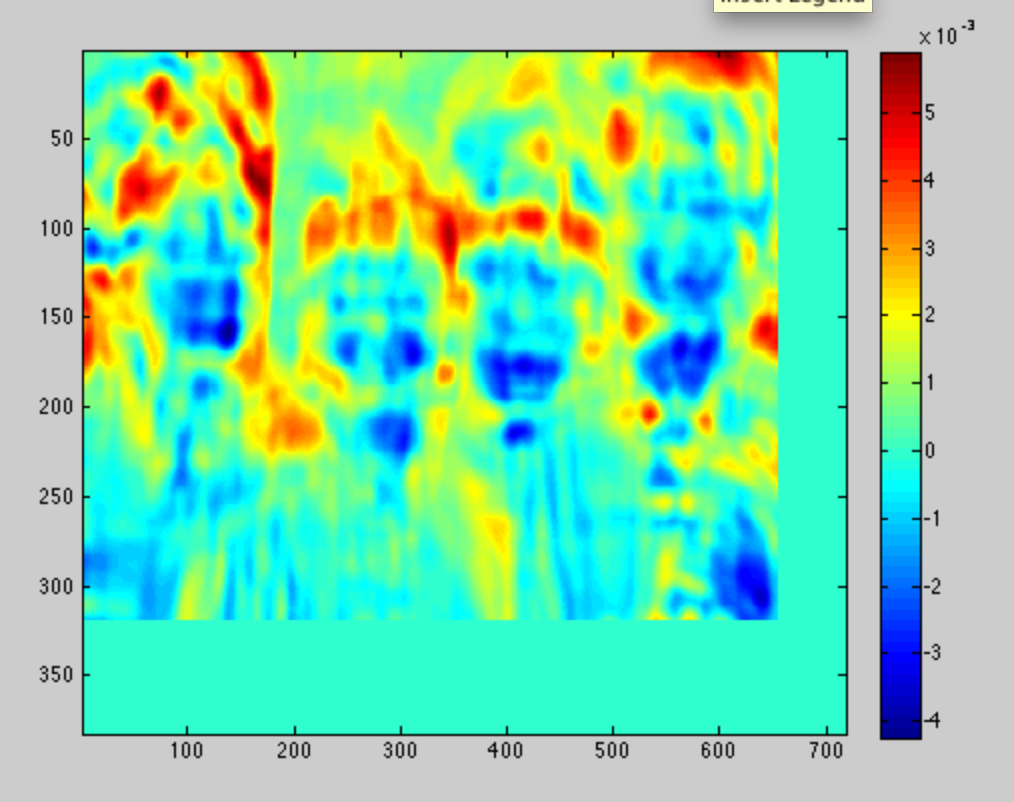


Figure 5: After dividing by sum of patch (before mean norm)

Figure :Without dividing by sum

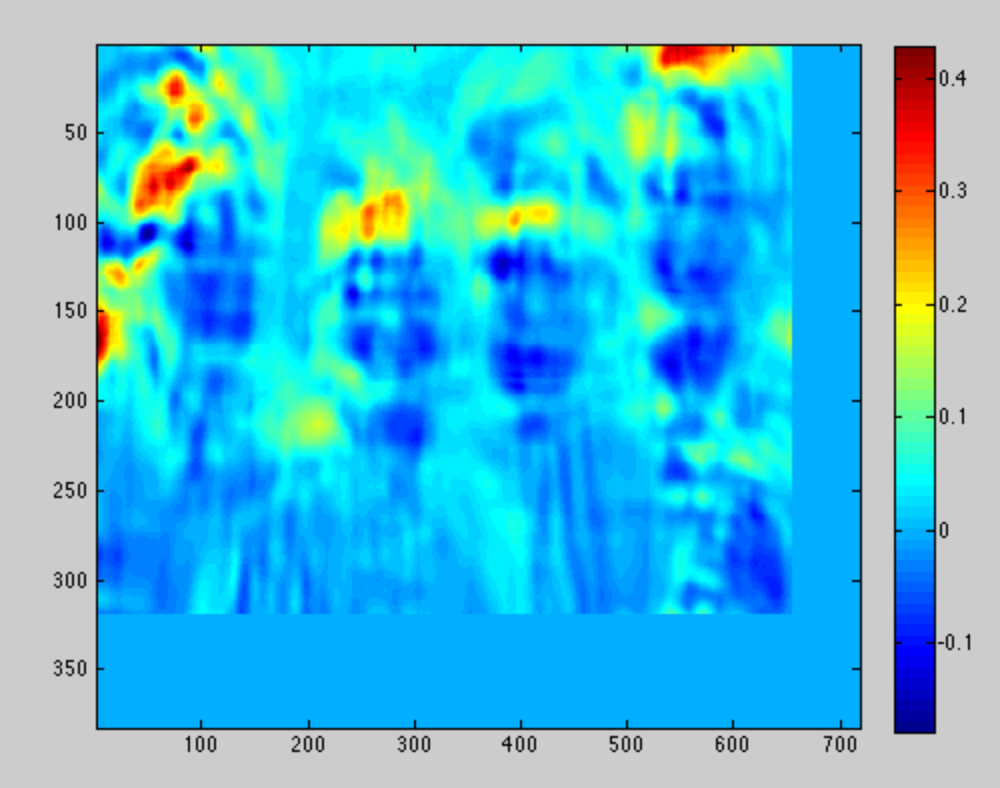


Figure 6: after dividing by sum of mean norm patch

However, the approach taken in figure 6 does not work well on the other image, so the approach was taken to carry out the normalized dot product on each patch after subtracting the patch mean and without dividing by norm, using the eigenface learned after mean and standard deviation normalization.