Identification Systems

Exercises 5

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1. Using dlib (or other selected face localization module) write a script that detects all the faces on the In-the-Wild set of CelebA. Then repeat the procedure for images that are:

   - blurred with Gaussian Noise (with $\mu = 0$, $\sigma = 0.45$)
   - blurred with Gaussian Noise (with $\mu = 0$, $\sigma = 0.6$)
   - noised with Salt and Pepper noise ($p_s = p_p = 0.05$)
   - rescaled in X axis by factor of 0.25 and in Y factor of 0.3

   Which of the operations have the severest impact on the efficiency and which of them does not influence the method at all? Try to justify the claim.

2. Add several pictures of your own face to the cropped images of CelebA (or any other selected database)[1] and train a FisherFace clasifier (use `cv2.createFisherFaceRecognizer()` or follow the idea presented here). Verify the effect of facial mimic and accessories like glasses and hats on the identification accuracy.

3. Reduce the database from the previous task to 8 subjects (including yourself) and use LBP method with closest image selection as a proper subject. Check which mimic or accessory affects the minimal distance the most.

4. Clone and run FaceNet model (use pretrained weigths) in order to test the accuracy of the model on the dataset. Repeat the process for verification samples that are:

   - blurred with Gaussian Noise (with $\mu = 0$, $\sigma = 0.5$)
   - noised with Salt and Pepper noise ($p_s = p_p = 0.05$)

[1] Take care to keep the data consistent.

- have all their pixel intensities transformed using $\hat{i} = i^2$ and $\tilde{i} = \log i$ (and linearly adjusted to the range [0, 255])

How do the operations affect the identification process? Think of ways to mitigate the effect.

Alternative image dataset may be requested at NIST's IJB.