Research on a Face recognition system using image processing

Matlab Code required for Implementation

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RGB to greyscale conversion in Adobe

Face image from the 2-megapixel camera

Image preprocessing in Adobe

2D-DCT

Image adjusted in mat lab (64\*1 feature vector

Image resize in MATLAB

Resized with nearest-neighbor interpolation

Image adjustments

SOM neural network

First 3 steps are to be done in adobe although it is also possible through matlab but Adobe Photoshop makes for an ideal software for that purpose.

Matlab Codes:

Pre-requisites: Matlab R2021b, Image Processing toolbox, Deep Learning Toolbox

**Converting a RGB image to greyscale in Matlab:**

Imread(‘\ImageRGB’);

Image = rgb2gray([RGB](https://www.mathworks.com/help/matlab/ref/rgb2gray.html#buiz8mj-1-RGB))

More related codes can be found at

<https://www.mathworks.com/help/matlab/ref/rgb2gray.html#buiz8mj-1-RGB>

**Image resize in MATLAB with nearest neighbor:**

Image2 = imresize(Image,0.4,'nearest');

More related codes can be found at

<https://www.mathworks.com/help/matlab/ref/imresize.html>

**2D-DCT Conversion in Matlab**

Image3 = dct2(Image2)

returns 2DCT. B contains the discrete cosine transform coefficients B(k1,k2).

More related codes can be found at

<https://www.mathworks.com/help/images/ref/dct2.html#d123e52341>

**Image adjustment to feature vector:**

Size = size(Image3);

patchSize = [64 1];

xIdxs = [1:patchSize(2):Size(2) Size(2)+1];

yIdxs = [1:patchSize(1):Size(1) Size(1)+1];

patches = cell(length(yIdxs)-1,length(xIdxs)-1);

for i = 1:length(yIdxs)-1

Isub = I(yIdxs(i):yIdxs(i+1)-1,:);

for j = 1:length(xIdxs)-1

patches{i,j} = Isub(:,xIdxs(j):xIdxs(j+1)-1);

end

end

Referenced from:

<https://www.mathworks.com/matlabcentral/answers/216708-convert-image-into-patches-of-size-64-64-and-get-each-patch>

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SOM Nural network:

net = selforgmap([8 8]);

net = train(net,Image3);

view(net)

y = net(Image3);

classes = vec2ind(y);

This code is referenced from :

<https://www.mathworks.com/help/deeplearning/ug/cluster-with-self-organizing-map-neural-network.html>

<https://www.mathworks.com/help/deeplearning/ref/selforgmap.html>

We can pick the number of training epochs that we want. The examples refered in the paper use 850 epochs.