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%=====
=
%LOADS THE VIDEOS INTO MEMORY
%=====
=
pkg load image
pkg load communications

file = "/Users/charlesdavi/Desktop/Image_Sequence/Image_Sequence/Training_Set/"
i = 1;
j = 1;
directory = [file int2str(i) '/'];

gap_size = 500;

I = imread([directory num2str(j) '.jpg']);
x = double(((I(:, :, 1) + I(:, :, 2) + I(:, :, 3))/3) > 80); %converts image to a binary matrix
x = x(:)'; %reshapes the matrix into a row vector
M = size(x,2);

x = x(1:gap_size:M);

N = size(x,2); %this is the dimension of the vector

num_videos = 24; %the number of videos
counter = 1;
num_images = 10; %the number of frames per video

for i = 1 : num_videos

    directory = [file int2str(i) '/'];

    for j = 1 : num_images

        [i j]

        I = imread([directory num2str(j) '.jpg']);

        x = double(((I(:, :, 1) + I(:, :, 2) + I(:, :, 3))/3) > 80); %converts image to a binary matrix
        x = x(:)'; %reshapes the matrix into a row vector
        x = x(1:gap_size:M);

        %we store the video index and frame number of the image
        x(N+1) = i;
        x(N+2) = j;

        img_dataset(counter,:) = x;

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counter = counter + 1;

endfor

endfor

%=====
=
%IMITATE - NEAREST NEIGHBOR
%=====
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output_matrix = [];
num_rows = size(img_dataset,1);
imitate_row = randperm(num_rows,1);

temp_dataset = img_dataset;
temp_dataset(imitate_row,:) = []; %we remove the row we are imitating

input_vector = img_dataset(imitate_row,:);

video_index = input_vector(N+1);
frame_num = input_vector(N+2);

output_matrix(1,1) = video_index;
output_matrix(1,2) = frame_num;

temp_dataset = img_dataset;

temp_dataset((video_index-1)*num_images + frame_num,:) = [];

for i = 1 : num_images - 1

    [predicted_vector predicted_class] = find_NN(input_vector, temp_dataset,N);

    video_index = predicted_vector(N+1);
    frame_num = predicted_vector(N+2);

    output_matrix(i+1,1) = video_index;
    output_matrix(i+1,2) = frame_num;
    input_vector = predicted_vector;

    x = find(sum(temp_dataset .- predicted_vector,2) == 0);

    temp_dataset(x,:) = [];

endfor

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%=====
%DISPLAY RESULTS
%=====

for i = 1 : num_images

    video_index = output_matrix(i,1);
    frame_num = output_matrix(i,2);
    directory = [file int2str(video_index) '/'];

    I = imread([directory num2str(frame_num) '.jpg']);

    figure, imshow(I)

endfor
```