

```

%=====
=====
%=====
=====
%TOUCH SCREEN PRECISION ALGORITHM
%=====
=====
%=====
=====
%COPYRIGHT CHARLES DAVI 2021

%=====
=====
%LOADS DATASET
%=====
=====

clear
clc
pkg load image

num_images_per_dir = 10;
num_dirs = 4;

directory = "/Users/charlesdavi/Desktop/Datasets/Touch_Screen_Ext_Cam/"
counter = 1;

tic;
for i = 0 : num_dirs -1

    folder = int2str(i);

    for j = 1 : num_images_per_dir

        file = [directory folder "/" int2str(j) ".jpg"];
        I = imread(file);
        I = rgb2gray(I);

        raw_dataset{counter} = I;
        counter = counter + 1;

    endfor

endfor
toc

%=====

```

```

=====
%PARTITIONS EACH IMAGE IN THE DATASET
%=====
=====

N_grid = 20; %the number of rows and columns in the partitions of each image
N = N_grid^2;
dataset = zeros(num_dirs*num_images_per_dir,N+1); %sizes the dataset
counter = 1;

tic;
for i = 0 : num_dirs - 1

    for j = 1 : num_images_per_dir

        I = raw_dataset{counter};

        [avg_matrix final_indexes] = calc_avg_colors_fixed_N(I,N_grid);
        dataset(counter,1:N) = avg_matrix(:);
        dataset(counter, N + 1) = i; %hidden classifier
        counter = counter + 1;

    endfor

endfor
toc

%=====
=====
%CLASSIFIES THE DATASET
%=====
=====
num_rows = size(dataset,1);

tic;
nearest_neighbors = NN_fully_vectorized(dataset, N);
toc

predicted_class_vector = dataset(nearest_neighbors, N + 1);
actual_class_vector = dataset(:,N + 1);

num_errors = sum(predicted_class_vector != actual_class_vector)

accuracy = 1 - num_errors/num_rows

```