%ECE 4580 Final Project

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function licenseNumberRecognition(input,numChar)

orig=imread(input); % Reading the license plate

figure(1),imshow(orig);

orig=imresize(orig,[400 NaN]); % Resize the image

gray=rgb2gray(orig); %Convert RGB to gray

figure(2),imshow(gray);

gray=medfilt2(gray,[3 3]); % Median filtering to remove noise.

figure(3),imshow(gray);

filter=strel('disk',1);

dilation=imdilate(gray,filter); % gray image dilation

figure(4), imshow(dilation);

erosion=imerode(gray,filter); % gray image erosion

figure(5), imshow(erosion);

edge\_enhanced=imsubtract(dilation,erosion); % edge enhancement

figure(6),imshow(edge\_enhanced);

edge\_enhanced=mat2gray(edge\_enhanced); % Converting the class to double.

edge\_enhanced=conv2(edge\_enhanced,[1 1;1 1]); % Convolution of the double image for brightening the edges.

intensity\_scaled=imadjust(edge\_enhanced,[0.5 0.7],[0 1],0.1); % Intensity scaling between the range 0 to 1.

figure(7), imshow(edge\_enhanced);

B=logical(intensity\_scaled); % double to binary

filter1 = strel('line',50,0);

line=imerode(B,filter1);

filterHorizontal=imsubtract(B,line);

figure(8), imshow(filterHorizontal);

Filled=imfill(filterHorizontal,'holes'); %fill in the holes

figure(9),imshow(Filled);

Thin=bwmorph(Filled,'thin',1); %thin between each characters

figure(10),imshow(Thin);

filter2 = strel('line',3,90);

Thin=imerode(Thin,filter2);

final=bwareaopen(Thin,2000); %delete pixels that are less than 2000

BoundingBox=regionprops(final,'BoundingBox','Image');

figure(11), imshow(final)

hold on

for n=1:size(BoundingBox,1) %display bounding box for each character

rectangle('Position',BoundingBox(n).BoundingBox,'EdgeColor','r','LineWidth',2)

end

hold off

AllBoxes=cat(1,Iprops.BoundingBox); %all bounding boxes

indices=extractIndices(AllBoxes, numChar);

I={Iprops.Image};

PlateNum=[];

for i=1:length(indices) %for each indices, check with template

N=I{1,indices(i)};

letter=compare(N);

PlateNum=[PlateNum letter];

end

X = ['The license number is: ',PlateNum]; %output to screen

disp(X)

end