**Visual Computing and Image Processing:**

**21CSAI02I**

**Project : Vehicle Logo Recognition.**

Logo

Description automatically generated

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* **Description:**

Detecting the vehicles logo (front, rear, or both) to get its type or name of the vehicles for example, kia, Hyundai, and more. The user should enter the car or vehicle image to get its name or type. The output

* **Code:**

**Function veichlelogofeat():**

function [Feat] = veichlelogofeat()

Feat=zeros(4,10);

logo1=imread('Logos\opel.png');

logo1=rgb2gray(logo1);

f1=extractLBPFeatures(logo1,'upright',false);

Feat(1,:)=f1;

logo2=imread('Logos\hyundai.png');

logo2=rgb2gray(logo2);

f1=extractLBPFeatures(logo2,'upright',false);

Feat(2,:)=f1;

logo3=imread('Logos\kia.png');

logo3=rgb2gray(logo3);

f1=extractLBPFeatures(logo3,'upright',false);

Feat(3,:)=f1;

logo4=imread('Logos\hyundai.png');

logo4=rgb2gray(logo4);

f1=extractLBPFeatures(logo4,'upright',false);

Feat(4,:)=f1;

end

**Main file:**

%%READING IMAGES:

case1 = imread("TestCases\Case1\Case1-Front1.bmp");

case2 = imread("TestCases\Case2\Case2-Front2.jpg");

case3 = imread("TestCases\Case2\Case2-Rear1.jpg");

case4 = imread("TestCases\Case2\Case2-Rear2.jpg");

% bmw = imread("Logos\bmw.png");

% chevrolet = imread("Logos\chevrolet.png");

% hyundai = imread('Logos\hyundai.png');

% kia = imread ("Logos\kia.png");

% opel = imread ("Logos\opel.png");

% c3\_1 = imread("TestCases\Bounses\Case3\Case 3-1.jpg");

% c3\_2 = imread("TestCases\Bounses\Case3\Case 3-2.jpg");

% c3\_3 = imread("TestCases\Bounses\Case3\Case 3-3.jpg");

% c3\_4 = imread("TestCases\Bounses\Case3\Case 3-4.jpg");

% c4\_1 = imread("TestCases\Bounses\Case4\Case 4-1.jpg");

% c4\_2 = imread("TestCases\Bounses\Case4\Case 4-2.jpg");

% c4\_3 = imread("TestCases\Bounses\Case4\Case 4-3.jpg");

% c5\_1 = imread("TestCases\Bounses\Case5\1.jpg");

% c5\_2 = imread("TestCases\Bounses\Case5\7.jpg");

% c5\_3 = imread("TestCases\Bounses\Case5\8.jpg");

% c5\_4 = imread("TestCases\Bounses\Case5\9.jpg");

% c5\_5 = imread ("TestCases\Bounses\Case5\10.JPG");

case1g = rgb2gray(case1);

case2g = rgb2gray(case2);

case3g = rgb2gray(case3);

case4g = rgb2gray(case4);

% CASE 1 :

case1\_bw = imbinarize(case1g);

removeNoise1 = uint8(medfilt2(case1\_bw , [1 1]));

se = strel('square', 1);

case1\_bw = imdilate(removeNoise1, se);

case1\_cr = imcrop(case1g, [149.5 133.5 27 26]);

edgedetect1 = edge(case1\_cr, 'canny');

case1\_areafilt= bwareafilt( BWM,2);

%imshow(edgedetect1)

% CASE 2 :

case2\_bw = imbinarize(case2g);

removeNoise2 = uint8(medfilt2(case2\_bw , [1 1]));

se = strel('square', 1);

case2\_bw2 = imdilate(removeNoise2, se);

case2\_cr = imcrop(case2g, [1145.5 364.5 97 66]);

edgedetect2 = edge(case2\_cr, 'canny');

imshow(edgedetect2)

% CASE 3 :

case3\_bw = imbinarize(case3g);

removeNoise3 = uint8(medfilt2(case3\_bw , [1 1]));

se = strel('square', 1);

case3\_bw = imdilate(removeNoise3, se);

case3\_cr = imcrop(case3g, [156.5 245.5 38 25]);

edgedetect3 = edge(case3\_cr, 'canny');

imshow(edgedetect3)

% CASE 4 :

case4\_bw = imbinarize(case4g);

removeNoise4 = uint8(medfilt2(case4\_bw , [1 1]));

se = strel('square', 1);

case4\_bw = imdilate(removeNoise4, se);

case4\_cr = imcrop(case4g, [480.5 441.5 51 33]);

edgedetect4 = edge(case4\_cr, 'canny');

% imshow(edgedetect4)

% % LOGOS:

hyundai = imread('Logos\hyundai.png');

kia = imread ("Logos\kia.png");

opel = imread ("Logos\opel.png");

hyundai\_g = rgb2gray(hyundai);

kia\_g = rgb2gray(kia);

% opel\_g = rgb2gray(opel);

% hyundai logo:

h\_bw = imbinarize(hyundai\_g);

removeNoise\_l1 = uint8(medfilt2(h\_bw , [1 1]));

se = strel('square', 1);

h\_bw = imdilate(removeNoise\_l1, se);

edgedetect\_l1 = edge(hyundai\_g, 'canny');

imshow(edgedetect\_l1)

%

% % kia logo:

kia\_bw = imbinarize(kia\_g);

removeNoise\_l2 = uint8(medfilt2(kia\_bw , [1 1]));

se = strel('square', 1);

kia\_bw = imdilate(removeNoise\_l2, se);

edgedetect\_l2 = edge(kia\_g, 'canny');

imshow(edgedetect\_l2)

O = imread ("Logos\opel.png");

H = imread('Logos\hyundai.png');

K = imread ("Logos\kia.png");

%Op = rgb2gray(O);

Hy = rgb2gray(H);

Ki = rgb2gray(K);

%

% fftOP = fft2(double(O));

% Opfeatures = abs(fftOP(:));

% Opfeatures = sort(Opfeatures,'descend');

% Opfeatures = Opfeatures(1:3);

%

%

% fftHy = fft2(double(Hy));

% Hyfeatures = abs(fftHy(:));

% Hyfeatures = sort(Hyfeatures,'descend');

% Hyfeatures = Hyfeatures(1:3);

%

%

% fftKi = fft2(double(Ki));

% Kifeatures = abs(fftKi(:));

% Kifeatures = sort(Kifeatures,'descend');

% Kifeatures = Kifeatures(1:3);

% image = edgedetect4;

% fftI=fft2(double(image));

% imagefeatures=abs(fftI(:));

% imagefeatures=sort(imagefeatures,'descend');

% imagefeatures=imagefeatures(1:3);

%

% features= [Opfeatures,Hyfeatures,Kifeatures];

% New\_Image\_features = extractLBP+ Features(case4g,'Upright' ,false);

% [Features] = Feature\_Extraction\_1();

%

vechile\_logos = ["opel","kia","Hyundai","Hyundai"];

distances= zeros(1,4);

for i = 1 :4

s =0; % sumation.

for j = 1 : 10

d = (feature2(j)- feat(i,j))^2;

s = s + d;

end

distances(i) = sqrt(s);

end

[~,col] = min(distances);

classify= vechile\_logos{1,col};

dis (classify);

**Code Description:**

1. Changing the original images to grayscale images. (Test cases and logos).

2. Get the binarized images using imbinarize().

3. Using the median filter medfilt2() to remove the noises from all images such as blur.

4. Get morphological structuring element strel() to use the dilates as it’s an essential part of it.

5. To get the logo easily, apply cropping the logo from the binarized image to focus on the logo.

6. Detecting the edges of the logos by using edge canny.

7. To compare the test cases and the logos, I used features.

* **Difficulties:**

1. I tried to use ssim() to compare the two images, the testcase image and car logo image, but it did not work.

2. There were a lot of problems and difficulties with features as I tried to use feature detection and it did not work and I do not understand the errors and the problem to fix it.

3.