Silesian
University
of Technology

Faculty of Automatic Control,
Electronics and Computer Science

PRZETWARZANIE OBRAZÓW CYFROWYCH

STUDIUM PRZYPADKU - WYZNACZANIE CECH OBIEKTÓW

Autor:

Michał Siedlaczek

Gliwice 2021

Contents

Chapter 1

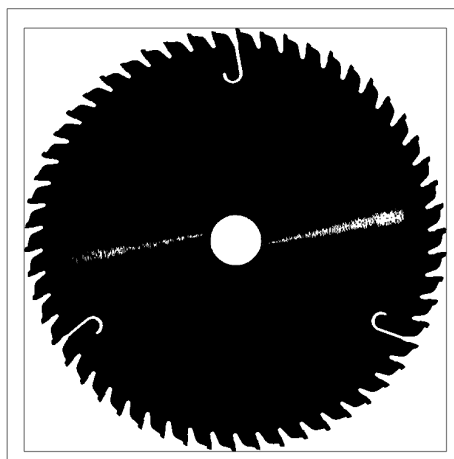# Przygotowanie obrazów testowych

(a) z1

(b) z2

(c) z3

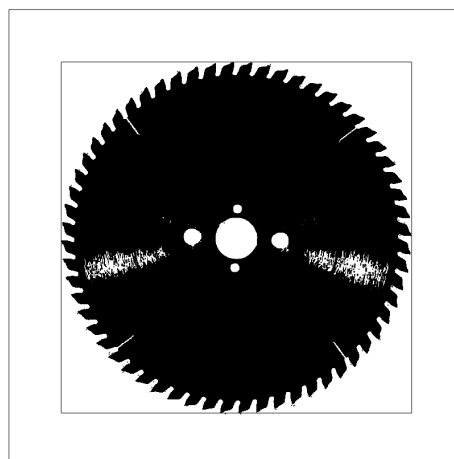

(d) z4

Chapter 2
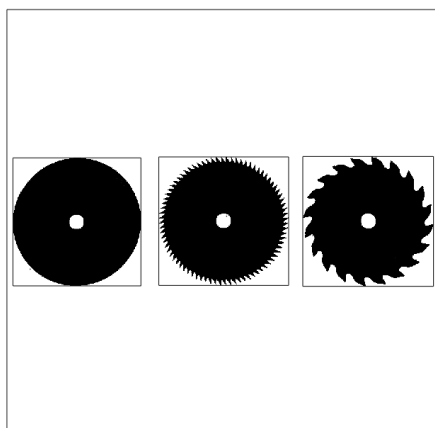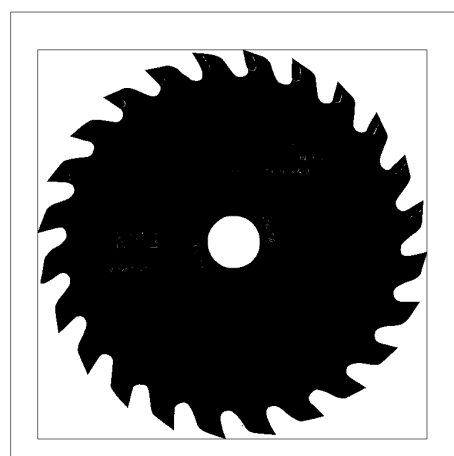
Zad1

(a) Tarcza z1

(b) Tarcza z2

(c) Tarcza z3

(d) Tarcza z4

Chapter 3

Zad1Ilosczebow

(a) Tarcza z1

(b) Tarcza z1 linie
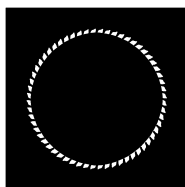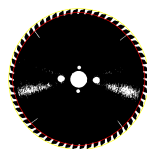

(a) Tarcza z2

(b) Tarcza z2 linie

(a) Tarcza z31

(b) Tarcza z31 linie

(c) Tarcza z32

(d) Tarcza z32 linie

(e) Tarcza z33

(f) Tarcza z33 linie
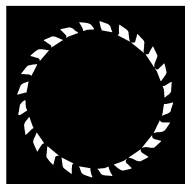
(a) Tarcza z4

(b) Tarcza z4 linie

ilosc_zebow_w_czwartej_tarczy	24
ilosc_zebow_w_drugiej_tarczy	60
ilosc_zebow_w_pierwszej_tarczy	54
ilosc_zebow_w_trzecim_zdjeciu	100

(a) Ilosc

Chapter 4

Kod

```
I1 = imread('z1.jpg');
I2=imread("z2.jpg");
I3=imread("z3.jpg");
I4=imread("z4.jpg");


I1=rgb2gray(I1);
I2=rgb2gray(I2);
I3=rgb2gray(I3);
I4=rgb2gray(I4);


bw1 = im2bw(I1, 0.9);
bw2 = im2bw(I2, 0.95);
bw3 = im2bw(I3, 0.9);
bw4 = im2bw(I4, 0.9);
```

$$\text{bw3}_1 = bw3(:, 1:305);$$
$$bw3_2 = bw3(:, 306:610);$$
$$bw3_3 = bw3(:, 611:915);$$

```
stats1 = [regionprops(bw1); regionprops(not(bw1))]
stats2 = [regionprops(bw2); regionprops(not(bw2))]
stats3 = [regionprops(bw3); regionprops(not(bw3))]
stats4 = [regionprops(bw4); regionprops(not(bw4))]
imshow(bw1);
hold on;
```

```matlab
bwW = imcomplement(bw1);
rp=regionprops(double(bwW), 'all');
xy=rp.ConvexHull;
line(xy(:,1),xy(:,2), 'Color','yellow', 'LineWidth',2);
[r,c]=size(bwW);
mask=poly2mask(xy(:,1),xy(:,2),r,c);
maskEroded=imerode(mask, ones(30));
rp=regionprops(double(maskEroded), 'all');
xy=rp.ConvexHull;
line(xy(:,1),xy(:,2), 'Color','red', 'LineWidth',2);
zebatka=bw1;
zebatka(maskEroded)=1;
zebatka=imcomplement(zebatka);
figure;
imshow(zebatka);
[L ilosc_zebow_w_pierwszej_tarczy] = bwlabel(zebatka,8);
hold off;

    figure;
imshow(bw2);
hold on;
bwW2 = imcomplement(bw2);
bwW2=medfilt2(bwW2);
rp=regionprops(double(bwW2), 'all');
xy=rp.ConvexHull;
line(xy(:,1),xy(:,2), 'Color','yellow', 'LineWidth',2);
[r,c]=size(bwW2);
mask=poly2mask(xy(:,1),xy(:,2),r,c);
maskEroded=imerode(mask, ones(34));
rp=regionprops(double(maskEroded), 'all');
xy=rp.ConvexHull;
line(xy(:,1),xy(:,2), 'Color','red', 'LineWidth',2);
bw2=medfilt2(bw2);
zebatka2=bw2;
zebatka2(maskEroded)=1;
zebatka2=imcomplement(zebatka2);
```

```matlab
figure;
imshow(zebatka2);
[L ilosc_zebow_w_drugiej_tarczy] = bwlabel(zebatka2, 8);
holdoff;
figure;

imshow(bw3_1);
holdon;
bwW3_1 = imcomplement(bw3_1);
bwW3_1 = medfilt2(bwW3_1);
rp = regionprops(double(bwW3_1), 'all');
xy = rp.ConvexHull;
line(xy(:,1), xy(:,2), 'Color', 'yellow', 'LineWidth', 2);
[r, c] = size(bwW3_1);
mask = poly2mask(xy(:,1), xy(:,2), r, c);
maskEroded = imerode(mask, ones(16));
rp = regionprops(double(maskEroded), 'all');
xy = rp.ConvexHull;
line(xy(:,1), xy(:,2), 'Color', 'red', 'LineWidth', 2);
bw3_1 = medfilt2(bw3_1);
zebatka3 = bw3_1;
zebatka3(maskEroded) = 1;
zebatka3 = imcomplement(zebatka3);
zebatka3 = medfilt2(zebatka3);
figure;
imshow(zebatka3);
[Lnum3] = bwlabel(zebatka3, 8);
num3 = num3 - 1;
holdoff;
figure;

imshow(bw3_2);
holdon;
bwW3_2 = imcomplement(bw3_2);
bwW3_2 = medfilt2(bwW3_2);
rp = regionprops(double(bwW3_2), 'all');
```

$xy = rp.ConvexHull;$

$line(xy(:,1), xy(:,2),' Color',' yellow',' LineWidth', 2);$

$[r, c] = size(bwW3_2);$

$mask = poly2mask(xy(:,1), xy(:,2), r, c);$

$maskEroded = imerode(mask, ones(13));$

$rp = regionprops(double(maskEroded),' all');$

$xy = rp.ConvexHull;$

$line(xy(:,1), xy(:,2),' Color',' red',' LineWidth', 2);$

$bw3_2 = medfilt2(bw3_2);$

$zebatka3_2 = bw3_2;$

$zebatka3_2(maskEroded) = 1;$

$zebatka3_2 = imcomplement(zebatka3_2);$

$zebatka3_2 = medfilt2(zebatka3_2);$

$figure;$

$imshow(zebatka3_2);$

$[Lnum33] = bwlabel(zebatka3_2, 8);$

$holdoff;$

figure;

imshow(bw3_3);

$holdon;$

$bwW3_3 = imcomplement(bw3_3);$

$bwW3_3 = medfilt2(bwW3_3);$

$rp = regionprops(double(bwW3_3),' all');$

$xy = rp.ConvexHull;$

$line(xy(:,1), xy(:,2),' Color',' yellow',' LineWidth', 2);$

$[r, c] = size(bwW3_3);$

$mask = poly2mask(xy(:,1), xy(:,2), r, c);$

$maskEroded = imerode(mask, ones(13));$

$rp = regionprops(double(maskEroded),' all');$

$xy = rp.ConvexHull;$

$line(xy(:,1), xy(:,2),' Color',' red',' LineWidth', 2);$

$bw3_2 = medfilt2(bw3_3);$

$zebatka3_3 = bw3_3;$

$zebatka3_3(maskEroded) = 1;$

$zebatka3_3 = imcomplement(zebatka3_3);$

$zebatka3_3 = medfilt2(zebatka3_3);$

$figure;$

$imshow(zebatka3_3);$

$[Lnum333] = bwlabel(zebatka3_3, 8);$

$holdoff;$

$ilosc_zebow_{wt}rzecim_zdjeciu = num3 + num33 + num333;$

$figure;$

$imshow(bw4);$

$holdon;$

$bwW4 = imcomplement(bw4);$

$bwW4 = medfilt2(bwW4);$

$rp = regionprops(double(bwW4),'all');$

$xy = rp.ConvexHull;$

$line(xy(:, 1), xy(:, 2),'Color','yellow','LineWidth', 2);$

$[r, c] = size(bwW4);$

$mask = poly2mask(xy(:, 1), xy(:, 2), r, c);$

$maskEroded = imerode(mask, ones(66));$

$rp = regionprops(double(maskEroded),'all');$

$xy = rp.ConvexHull;$

$line(xy(:, 1), xy(:, 2),'Color','red','LineWidth', 2);$

$bw4 = medfilt2(bw4);$

$zebatka4 = bw4;$

$zebatka4(maskEroded) = 1;$

$zebatka4 = imcomplement(zebatka4);$

$zebatka4 = medfilt2(zebatka4);$

$figure; imshow(zebatka4);$

$[Lilosc_zebow_{wc}zwartej_tarczy] = bwlabel(zebatka4, 8);$

$holdoff;$

figure;

imshow(bw1);

hold on;

for i = 1:numel(stats1)

rectangle('Position', stats1(i).BoundingBox);

end

```matlab
hold off;
figure;
imshow(bw2);
hold on;
for i = 1:numel(stats2)
rectangle('Position', stats2(i).BoundingBox);
end
hold off;
figure;
imshow(bw3);
hold on;
for i = 1:numel(stats3)
rectangle('Position', stats3(i).BoundingBox);
end
hold off;
figure;
imshow(bw4);
hold on;
for i = 1:numel(stats4)
rectangle('Position', stats4(i).BoundingBox);
end
hold off;

    hold off;
```

Bibliography