# Lampiran VI
# Skrip Program

## Skrip Thresholding Manual

```
clc
clear all
close all
myPath = 'D:\TA\CRACK\New folder';
%'
fileNames = dir(fullfile(myPath,
'*.jpg'));
A = cell(length(fileNames), 1);
B = cell(length(fileNames), 1);
C = cell(length(fileNames), 1);
D = cell(length(fileNames), 1);
E = cell(length(fileNames), 1);
F = cell(length(fileNames), 1);
G = cell(length(fileNames), 1);
Figure=0;
data(1)=1;
data(2)=1;
data(3)=1;
data(4)=1;
data(5)=1;
data(6)=1;
data(7)=1;
data(8)=1;
data(9)=1;
data(10)=1;
data(11)=1;
data(12)=1;
data(13)=1;
data(14)=1;
data(15)=1;
data(16)=1;
data(17)=1;
data(18)=1;
data(19)=1;
data(20)=1;
data(21)=0;
data(22)=0;
data(23)=0;
data(24)=0;
data(25)=0;
data(26)=0;
data(27)=0;
data(28)=0;
data(29)=0;
data(30)=0;
data(31)=0;
data(32)=0;
data(33)=0;
data(34)=0;
data(35)=0;
data(36)=0;
data(37)=0;
data(38)=0;
data(39)=0;
data(40)=0;
benar=0;
for a = 1:length(fileNames)
    filenames = fileNames(a).name;
    I = imread(filenames);
    I = imresize(I,[120 160]);
%     [M N]=size(I)
    %[bar, kol, val]=size(I);
%     if val==3
    I=rgb2gray(I);
    %gaussianfilter
gaussianfilter=fspecial('gaussian'
,[10,5],1);
I=imfilter(I,gaussianfilter,'symme
tric','conv');
[M N]=size(I)
for(m=1:M)
    for(n=1:N)
        if (I(m,n)>125)
            bw(m,n)=255;
        elseif  (I(m,n)<=125)
             bw(m,n)=0;
        end
    end
end
figure, imshow(bw);
title('treshold')

area=bwarea(bw)
%[leb, pan]=size(NI);

Figure=Figure+1
if area<19100
    jawab='retak'
    hasil(a)=0;
else
    jawab='tidak'
    hasil(a)=1;
end
if data(a)==hasil(a)
    benar_salah(a)=0;
else
    benar_salah(a)=1;
end
benar=benar+benar_salah(a);
end

akurasi=benar/Figure*100
```

## Skrip Otsu

```
clc
clear all
close all
myPath = 'D:\TA\CRACK\New folder';
%'
fileNames = dir(fullfile(myPath,
'*.jpg'));
A = cell(length(fileNames), 1);
B = cell(length(fileNames), 1);
C = cell(length(fileNames), 1);
D = cell(length(fileNames), 1);
E = cell(length(fileNames), 1);
F = cell(length(fileNames), 1);
G = cell(length(fileNames), 1);
Figure=0;
data(1)=1;
data(2)=1;
data(3)=1;
data(4)=1;
data(5)=1;
data(6)=1;
data(7)=1;
data(8)=1;
data(9)=1;
data(10)=1;
data(11)=1;
data(12)=1;
data(13)=1;
data(14)=1;
data(15)=1;
data(16)=1;
data(17)=1;
data(18)=1;
data(19)=1;
data(20)=1;
data(21)=0;
data(22)=0;
data(23)=0;
data(24)=0;
data(25)=0;
data(26)=0;
data(27)=0;
data(28)=0;
data(29)=0;
data(30)=0;
data(31)=0;
data(32)=0;
data(33)=0;
data(34)=0;
data(35)=0;
data(36)=0;
data(37)=0;
data(38)=0;
data(39)=0;
data(40)=0;

benar=0;
for a = 1:length(fileNames)
    filenames = fileNames(a).name;
I = imread(filenames);
I = imresize(I,[120 160]);
I1=rgb2gray(I);
gaussianfilter=fspecial('gaussian'
,[50,5],1);
A=imfilter(I1,gaussianfilter,'symm
etric','conv');
%figure, imshow(A);
%title('gaussian');
I2 = im2uint8(A(:));
N=256;
[count,x]=imhist(I2,N);
xlabel('variasi level keabuan');
ylabel('jumlah piksel pada level
keabuan');
title('histogram');
% menghitung nilai histogram
ternormalisasi
p=(count/sum(count))';
L=length(x);
% menghitung jumlah kumulatif
p1k=cumsum(p);
% menghitung rerata kumulatif
kelas
m=cumsum((1:L).*p);
% menghitung rerata kumulatif
intensitas global
mg=sum((1:L).*p);
% menghitung varians antar kelas
varB=(mg*p1k-m).^2./(p1k.*(1-
p1k));
% mendapatkan threshold
val=max(varB);
idx=mean(find(varB==val));
T=(idx-1)/(N-1);
% menghitung separability measure
varG=sum(((1:L)-mg).^1).*p);
sm=varB(T*255)/varG;
% threshold
Ii=im2bw(A,T);
figure, imshow(Ii);
title('otsu method');
area=bwarea(Ii)
% [leb, pan]=size(Ii);
Figure=Figure+1
if area<19100
    jawab='retak'
    hasil(a)=0;
else
    jawab='tidak'
    hasil(a)=1;
end
if data(a)==hasil(a)
    benar_salah(a)=0;
else
    benar_salah(a)=1;
end
benar=benar+benar_salah(a);
end

akurasi=benar/Figure*100
```

## Skrip Bernsen

```
clc
clear all
close all
myPath = 'D:\TA\CRACK\New folder';
%'
fileNames = dir(fullfile(myPath,
'*.jpg'));
A = cell(length(fileNames), 1);
B = cell(length(fileNames), 1);
C = cell(length(fileNames), 1);
D = cell(length(fileNames), 1);
E = cell(length(fileNames), 1);
F = cell(length(fileNames), 1);
G = cell(length(fileNames), 1);
Figure=0;
data(1)=1;
data(2)=1;
data(3)=1;
data(4)=1;
data(5)=1;
data(6)=1;
data(7)=1;
data(8)=1;
data(9)=1;
data(10)=1;
data(11)=1;
data(12)=1;
data(13)=1;
data(14)=1;
data(15)=1;
data(16)=1;
data(17)=1;
data(18)=1;
data(19)=1;
data(20)=1;
data(21)=0;
data(22)=0;
data(23)=0;
data(24)=0;
data(25)=0;
data(26)=0;
data(27)=0;
data(28)=0;
data(29)=0;
data(30)=0;
data(31)=0;
data(32)=0;
data(33)=0;
data(34)=0;
data(35)=0;
data(36)=0;
data(37)=0;
data(38)=0;
data(39)=0;
data(40)=0;
%data(41)=0;
% data(42)=0;
benar=0;

for a = 1:length(fileNames)
    filenames = fileNames(a).name;
    I = imread(filenames);
    I = imresize(I,[120 160]);
    [bar, kol, val]=size(I);
    if val == 3
    I=rgb2gray(I);
    end
% I=imread('train_c (1).jpg');
% I=imresize(I,[480 640]);
% figure, imshow(I);
% title('citra asli');
% [bar, kol, val] = size(I);
%
% if val == 3
%     gray = rgb2gray(I);
% else
%     gray = I;
% end
%gray=wthresh(I,'s',1);
%figure, imshow(g);
gaussianfilter=fspecial('gaussian'
,[6,5],1);
I=imfilter(I,gaussianfilter,'symme
tric','conv');
%bernsen
L = 15; %contrast threshold
GT = otsuthres(I); %global
threshold
box = 5;
buff = padarray(I, [box box],
'symmetric', 'both');
newI = zeros(bar + 2 * box, kol +
2 * box);

for m = box + 1 : bar + box
    for n = box + 1: kol + box
        bar1 = m - floor(box / 2 -
.5); bar2 = m + floor(box / 2);
        kol1 = n - floor(box / 2 -
.5); kol2 = n + floor(box / 2);
        temp =
buff(bar1:bar2,kol1:kol2);
        Imax = max(max(temp));
        Imin = min(min(temp));
        Ttemp = ( Imax + Imin ) /
2;

        if Imax - Imin > L
            T = Ttemp;
        elseif Imax - Imin < L
            T = GT;
        end

        if buff(m,n) <= T
            newI(m,n) = 0;
```

```
        else
            newI(m,n) = 1;
        end
    end
end

newI = newI(box +1 : bar + box,
box +1 : kol + box);
figure, imshow(newI);
title('Thresholded image');
area=bwarea(newI)
% [leb, pan]=size(newI);

Figure=Figure+1
if area<19100
    jawab='retak'
    hasil(a)=0;
else
    jawab='tidak'
    hasil(a)=1;
end
if data(a)==hasil(a)
    benar_salah(a)=0;
else
    benar_salah(a)=1;
end
benar=benar+benar_salah(a);
end
akurasi=benar/Figure*100

%otsu for thresholding
function T = otsuthres(I)

I2 = im2uint8(I(:));
N=256;
[count,x]=imhist(I2,N);

% menghitung nilai histogram
ternormalisasi
p=(count/sum(count))';
L=length(x);

% menghitung jumlah kumulatif
p1k=cumsum(p);

% menghitung rerata kumulatif
kelas
m=cumsum((1:L).*p);

% menghitung rerata kumulatif
intensitas global
mg=sum((1:L).*p);

% menghitung varians antar kelas
varB=(mg*p1k-m).^2./(p1k.*(1-
p1k));

% mendapatkan threshold
val=max(varB);
idx=mean(find(varB==val));
T=(idx-1)/(N-1);


% menghitung separability measure
varG=sum((((1:L)-mg).^1).*p);
sm=varB(T*255)/varG;
```

## Skrip Sauvola

```
clc
clear all
close all

myPath = 'D:\TA\CRACK\New folder';
%'
fileNames = dir(fullfile(myPath,
'*.jpg'));
A = cell(length(fileNames), 1);
B = cell(length(fileNames), 1);
C = cell(length(fileNames), 1);
D = cell(length(fileNames), 1);
E = cell(length(fileNames), 1);
F = cell(length(fileNames), 1);
G = cell(length(fileNames), 1);
Figure=0;
data(1)=1;
data(2)=1;
data(3)=1;
data(4)=1;
data(5)=1;
data(6)=1;
data(7)=1;
data(8)=1;
data(9)=1;
data(10)=1;
data(11)=1;
data(12)=1;
data(13)=1;
data(14)=1;
data(15)=1;
data(16)=1;
data(17)=1;
data(18)=1;
data(19)=1;
data(20)=1;
data(21)=0;
data(22)=0;
data(23)=0;
data(24)=0;
data(25)=0;
data(26)=0;
data(27)=0;
data(28)=0;
data(29)=0;
data(30)=0;
data(31)=0;
data(32)=0;
data(33)=0;
data(34)=0;
data(35)=0;
data(36)=0;
data(37)=0;
data(38)=0;
data(39)=0;
data(40)=0;
benar=0;

for a = 1:length(fileNames)
    filenames = fileNames(a).name;
    I = imread(filenames);
    I = imresize(I,[120 160]);
    [bar, kol, val]=size(I);
    if val == 3
    I=rgb2gray(I);
    end

%gaussianfilter
gaussianfilter=fspecial('gaussian'
,[6,5],1);
I=imfilter(I,gaussianfilter,'symme
tric','conv');
%sauvolateknik
R = 128;
k = .1;
box = 15;
buff = padarray(I, [box box],
'symmetric', 'both');
%membuat ukuran metriks dengan
nilai awal 0
NI = zeros(bar + 2 * box, kol + 2
* box);

for m = box + 1 : bar + box %
scanning pixel
    for n = box + 1: kol + box
        bar1 = m - floor(box / 2);
bar2 = m + floor(box / 2);
        kol1 = n - floor(box / 2);
kol2 = n  + floor(box / 2);
        temp = buff(bar1 : bar2,
kol1 : kol2 );
       rerata = mean2(temp);
        stdv = std2(temp);
        Thres = rerata * ( 1 + k *
(( stdv / R ) - 1 ));
        if buff(m, n) <= Thres
           NI(m, n) = 0;
        else
            NI(m,n) = 1;
        end
    end
end
NI = NI(box +1 : bar + box, box +1
: kol + box);
figure, imshow(NI);
title('Thresholded image');
% histo1=imhist(F{a});
% sumhis=sum(histo1(1:150));
% figure,imhist(F{a});
% title('histogram')

% [M N]=size(D{a});
% for(m=1:M)
%     for(n=1:N)
%       if F{a}(m,n)==0     % jika
per pixel m,n nol hitam crack
%
pixel_crack=pixel_crack+1;
%scanning m,n bertambah
```

```
%        end
%      end
% end
area=bwarea(NI)
%[leb, pan]=size(NI);

Figure=Figure+1
if area<19100
    jawab='retak'
    hasil(a)=0;


else
    jawab='tidak'
    hasil(a)=1;
end
if data(a)==hasil(a)
    benar_salah(a)=0;
else
    benar_salah(a)=1;
end
benar=benar+benar_salah(a);
end

akurasi=benar/Figure*100
```