LAMPIRAN I

Listing Program

```
%load rgb image
img = 'pep.bmp';
rgb = imread(img);


%convert to LAB
labTransformation = makecform('srgb2lab');
labI = applycform(rgb,labTransformation);


%separate L,M,N
LI = labI(:,:,1);
aI = labI(:,:,2);
bI = labI(:,:,3);


%local neighboring
radius = 70;
NHOOD = fspecial('disk',radius)>0;
A = stdfilt(LI, NHOOD);
B = 3;
dpcmType = '1D';
[Height,Width,Depth] = size(A);
if Depth > 1
A1 = double(A(:,:,1));
else
A1 = double(A);
end



L = 2^B;
switch dpcmType
case '1D'
[alfa,E] = PrediksiLinier(A1);
case '2D'
[alfa,E] = PrediksiLinier_2D(A1);
end



E = E/std2(E); %standard deviation variable E
dMin = mean2(E) - 3*std2(E);
dMax = mean2(E) + 3*std2(E);
q = 2*dMax/L;
q2 = q/2;
dR = linspace(dMin,dMax,L+1);
rL = zeros(L,1);
for k = 1:L
rL(k) = dR(k)+q2;
end

%cone

gama = 0.2; %b = 1.1711; fB = 2^(-b*B);
a1 = (1-gama);


Mu = mean2(A1);
pe = zeros(Height,Width);
```

```
A2 = zeros(Height,Width);
peq = zeros(Height,Width);
A1 = A1 - Mu;% citra input dikurangi mean
SigVar = (std2(A1))^2;

switch dpcmType

    case '1D'

    for r = 1:Height
            A2(r,1) = A1(r,1) + Mu;
            x1 = A1(r,1);
            varE = 0;

    for c = 2:Width
            xhat = alfa*x1;
            pe(r,c) = A1(r,c) - xhat;
            varE = a1*pe(r,c)*pe(r,c) + gama*varE;
            sigmaE = sqrt(varE);
            e1 = pe(r,c)/sigmaE;

    for k = 1:L

    if e1>dR(k) && e1<=dR(k+1)
       peq(r,c) = rL(k);

    elseif e1<= dR(1)
           peq(r,c) = rL(1);

    elseif e1 > dR(L+1)
           peq(r,c) = rL(L);

    end

end
    x1 = peq(r,c)*sigmaE + xhat;

    A2(r,c) = x1 + Mu;

end

end

case '2D'

    x1 = zeros(Height+1,Width+2);
    A2(1,:) = A1(1,:) + Mu;
    A2(:,1) = A1(:,1) + Mu;
    A1 = padarray(A1,[1 2],'symmetric','pre');

    x1(1,:) = A1(1,:);
    x1(:,1) = A1(:,1);


    for r = 2:Height
    varE = 0;
```

```
    for c = 2:Width
        xhat = alfa(1)*x1(r,c-1) + alfa(2)*x1(r-1,c) + ...
        alfa(3)*x1(r-1,c-1)+ alfa(4)*x1(r-1,c+1);
        pe(r,c) = A1(r,c) - xhat;
        varE = a1*pe(r,c)*pe(r,c) + gama*varE;
        sigmaE = sqrt(varE);
        e1 = pe(r,c)/sigmaE;


        for k = 1:L

    if e1>dR(k) && e1<=dR(k+1)
       peq(r,c) = rL(k);

    elseif e1<= dR(1)
           peq(r,c) = rL(1);

    elseif e1 > dR(L+1)
           peq(r,c) = rL(L);

    end

end

    x1(r,c) = peq(r,c)*sigmaE + xhat;

    A2(r,c) = x1(r,c) + Mu;

end

end

end

%L and AB become LAB

figure
subplot(2,3,1)
imshow(rgb,[])

%rgbdouble = double(rgb,[]);
subplot(2,3,2)
hist(A)
%subplot(2,3,2)
%hist(rgb,[I]);


subplot(2,3,3)
imshow(LI)



subplot(2,3,4)
imshow(A2,[]) %y setelah GainControl
%imshow(bI,[])
%%
```

```
A3 = double(A2); %y
A4 = double(labI(:,:,1)); %yAmbient
A5 = A4 - A3;


oo = zeros(size(labI),'uint8');
oo(:,:,1) = A5;
oo(:,:,2) = labI(:,:,2);
oo(:,:,3) = labI(:,:,3);


%LAB to RGB


labTransformation = makecform('lab2srgb');
rgbI = applycform(oo,labTransformation);


pp = zeros(size(labI),'uint8');
pp(:,:,1) = rgbI(:,:,1);
pp(:,:,2) = rgbI(:,:,2);
pp(:,:,3) = rgbI(:,:,3);


subplot(2,3,5)
imshow(rgbI);


A5double = double(A5);
subplot(2,3,6)
hist(A5double);
%imshow(aI,[])

%figure
%disp('pp')
%disp(pp)
```

LAMPIRAN II

Data Exif

Data Exif Citra 1:

```
>> output = exifread('12.jpg')
Warning: EXIFREAD will be removed in a future release.Please use IMFINFO instead.
> In exifread at 20

    output =

        SceneCaptureType: 0
        WhiteBalance: 0
        ExposureMode: 1
        CustomRendered: 0
        FocalPlaneResolutionUnit: 2
        FocalPlaneYResolution: 5.8084e+003
        FocalPlaneXResolution: 5.7282e+003
        ColorSpace: 1
        SubSecTimeDigitized: '88'
        SubSecTimeOriginal: '88'
        FocalLength: 18
        Flash: 16
        MeteringMode: 5
        ApertureValue: 3.6147
        ShutterSpeedValue: 6.6439
        DateTimeDigitized: '2014:11:11 16:44:14'
        DateTimeOriginal: '2014:11:11 16:44:14'
        ExifVersion: '0230'
        ISOSpeedRatings: 200
        ExposureProgram: 1
        FNumber: 3.5000
        ExposureTime: 0.0100
        Copyright: '1FRAME'
        Artist: 'samidanggara'
        DateTime: '2014:11:28 14:36:12'
        Software: 'Adobe Photoshop Lightroom 5.0 (Windows)'
        ResolutionUnit: 2
```

YResolution: 300

XResolution: 300

Model: 'Canon EOS 600D'

Make: 'Canon'

Thumbnail: [1x1 struct]

Data Exif Citra 2:

>> output = exifread('123.jpg')

Warning: EXIFREAD will be removed in a future release.Please use IMFINFO instead.

> In exifread at 20

output =

SceneCaptureType: 0

WhiteBalance: 0

ExposureMode: 0

CustomRendered: 0

FocalPlaneResolutionUnit: 2

FocalPlaneYResolution: 5.8084e+003

FocalPlaneXResolution: 5.7282e+003

PixelYDimension: 457

PixelXDimension: 1000

ColorSpace: 1

SubSecTimeDigitized: '89'

SubSecTimeOriginal: '89'

FocalLength: 18

Flash: 16

MeteringMode: 5

MaxApertureValue: 3.6250

ExposureBiasValue: 0

ApertureValue: 5.6556

ShutterSpeedValue: 6.9658

DateTimeDigitized: '2015:04:12 06:15:28'

DateTimeOriginal: '2015:04:12 06:15:28'

ExifVersion: '0230'

ISOSpeedRatings: 100

ExposureProgram: 2

FNumber: 7.1000

ExposureTime: 0.0080

DateTime: '2015:08:25 06:34:08'

Software: 'Adobe Photoshop CS6 (Windows)'

ResolutionUnit: 2

YResolution: 240

XResolution: 240

SamplesPerPixel: 3

Orientation: 1

Model: 'Canon EOS 600D'

Make: 'Canon'

PhotometricInterpretation: 2

BitsPerSample: [8 8 8]

ImageLength: 3456

ImageWidth: 5184

Thumbnail: [1x1 struct]

Data Exif Citra 3:

```
>> output = exifread('1234.jpg')
Warning: EXIFREAD will be removed in a future release.Please use IMFINFO instead.
> In exifread at 20

output =

        SceneCaptureType: 0
        WhiteBalance: 0
        ExposureMode: 0
        CustomRendered: 0
        FocalPlaneResolutionUnit: 2
        FocalPlaneYResolution: 5.8084e+003
        FocalPlaneXResolution: 5.7282e+003
        PixelYDimension: 425
        PixelXDimension: 1000
        ColorSpace: 1
        SubSecTimeDigitized: '56'
        SubSecTimeOriginal: '56'
        FocalLength: 18
        Flash: 16
        MeteringMode: 5
        MaxApertureValue: 3.6250
        ExposureBiasValue: 0
        ApertureValue: 6.6439
        ShutterSpeedValue: 7.9658
        DateTimeDigitized: '2015:04:12 06:17:13'
        DateTimeOriginal: '2015:04:12 06:17:13'
         ExifVersion: '0230'
```

ISOSpeedRatings: 100

ExposureProgram: 2

FNumber: 10

ExposureTime: 0.0040

DateTime: '2015:08:25 06:34:30'

Software: 'Adobe Photoshop CS6 (Windows)'

ResolutionUnit: 2

YResolution: 240

XResolution: 240

SamplesPerPixel: 3

Orientation: 1

Model: 'Canon EOS 600D'

Make: 'Canon'

PhotometricInterpretation: 2

BitsPerSample: [8 8 8]

ImageLength: 3456

ImageWidth: 5184

Thumbnail: [1x1 struct]

Data Exif Citra 4:

>> output = exifread('12345.jpg')

Warning: EXIFREAD will be removed in a future release.Please use IMFINFO instead.

> In exifread at 20

output =

SceneCaptureType: 0

WhiteBalance: 0

ExposureMode: 0

CustomRendered: 0

FocalPlaneResolutionUnit: 2

FocalPlaneYResolution: 5.8084e+003

FocalPlaneXResolution: 5.7282e+003

PixelYDimension: 428

PixelXDimension: 1000

ColorSpace: 1

SubSecTimeDigitized: '58'

SubSecTimeOriginal: '58'

FocalLength: 18

Flash: 16

MeteringMode: 5

MaxApertureValue: 3.6250

ExposureBiasValue: 0

ApertureValue: 5.6556

ShutterSpeedValue: 7.3219

DateTimeDigitized: '2015:04:12 06:20:29'

DateTimeOriginal: '2015:04:12 06:20:29'

ExifVersion: '0230'

ISOSpeedRatings: 100

ExposureProgram: 2

FNumber: 7.1000

ExposureTime: 0.0063

DateTime: '2015:08:25 06:34:47'

Software: 'Adobe Photoshop CS6 (Windows)'

ResolutionUnit: 2

YResolution: 240

XResolution: 240

SamplesPerPixel: 3

Orientation: 1

Model: 'Canon EOS 600D'

Make: 'Canon'

PhotometricInterpretation: 2

BitsPerSample: [8 8 8]

ImageLength: 3456

ImageWidth: 5184

Thumbnail: [1x1 struct]