REPUBLIK INDONESIA
KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

SURAT PENCATATAN
CIPTAAN

Dalam rangka pelindungan ciptaan di bidang ilmu pengetahuan, seni dan sastra berdasarkan Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta, dengan ini menerangkan:

Nomor dan tanggal permohonan	:	EC00202148971, 22 September 2021
Pencipta		
Nama	:	**Dr. Anindita Septiarini, S.T., M.Cs., Rizqi Saputra S.Kom dkk**
Alamat	:	Jl. P.M. Noor. Perumahan Bumi Sempaja City Blok AA No 15, Samarinda, KALIMANTAN TIMUR, 75119
Kewarganegaraan	:	Indonesia
Pemegang Hak Cipta		
Nama	:	**Dr. Anindita Septiarini, S.T., M.Cs., Rizqi Saputra S.Kom dkk**
Alamat	:	Jl. P.M. Noor. Perumahan Bumi Sempaja City Blok AA No 15, Samarinda, KALIMANTAN TIMUR, 75119
Kewarganegaraan	:	Indonesia
Jenis Ciptaan	:	**Program Komputer**
Judul Ciptaan	:	**SISTEM PENGENALAN POLA SARUNG SAMARINDA**
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia	:	22 September 2021, di Samarinda
Jangka waktu pelindungan	:	Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.
Nomor pencatatan	:	000276220

adalah benar berdasarkan keterangan yang diberikan oleh Pemohon.
Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.

a.n. MENTERI HUKUM DAN HAK ASASI MANUSIA
DIREKTUR JENDERAL KEKAYAAN INTELEKTUAL

Dr. Freddy Harris, S.H., LL.M., ACCS.
NIP. 196611181994031001

LAMPIRAN PENCIPTA

No	Nama	Alamat
1	Dr. Anindita Septiarini, S.T., M.Cs.	Jl. P.M. Noor. Perumahan Bumi Sempaja City Blok AA No 15
2	Rizqi Saputra S.Kom	Jl. Perintis, GG. Campursari No.75
3	Andi Tejawati, S. Si., M. Si.	Jl. Gunung Lingai GG. Berkat
4	Masna Wati, S. Si., M.T.	Jl. Perjuangan Baru No.4

LAMPIRAN PEMEGANG

No	Nama	Alamat
1	Dr. Anindita Septiarini, S.T., M.Cs.	Jl. P.M. Noor. Perumahan Bumi Sempaja City Blok AA No 15
2	Rizqi Saputra S.Kom	Jl. Perintis, GG. Campursari No.75
3	Andi Tejawati, S. Si., M. Si.	Jl. Gunung Lingai GG. Berkat RT 005
4	Masna Wati, S. Si., M.T.	Jl. Perjuangan Baru No.4

PROGRAM KOMPUTER

SISTEM PENGENALAN POLA SARUNG SAMARINDA

Oleh

Dr. Anindita Septiarini, S.T., M.Cs.

Rizqi Saputra S.Kom

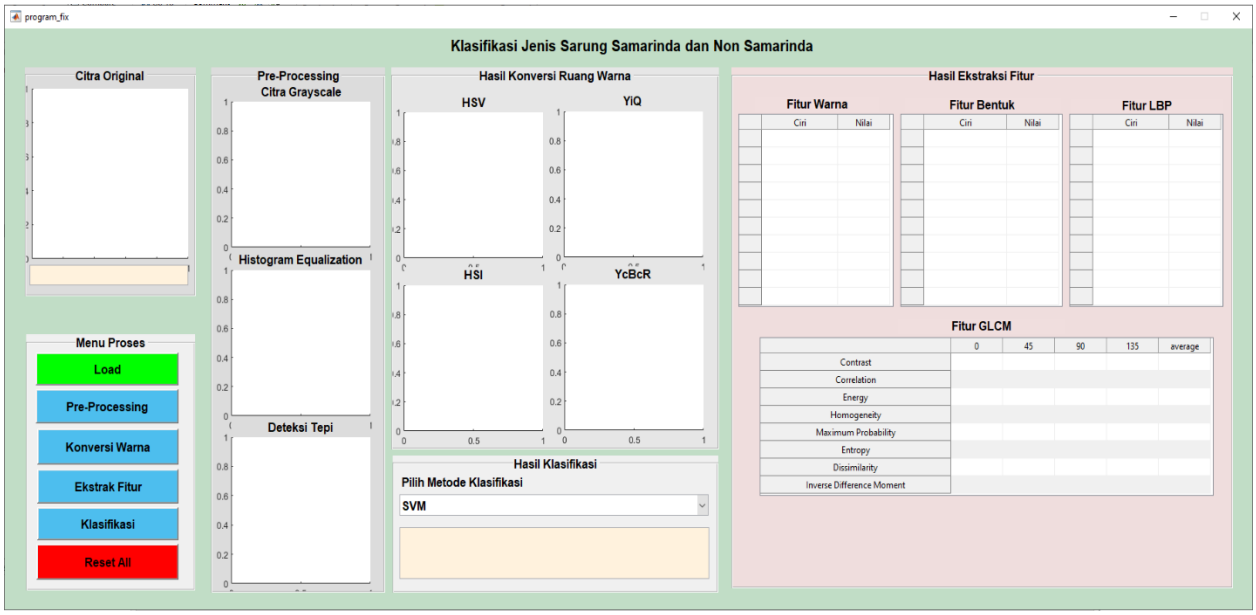
Andi Tejawati, S. Si., M. Si.

Masna Wati, S. Si., M.T.

MANUAL PENGGUNAAN PROGRAM

I. PROGRAM SISTEM PENGENALAN POLA SARUNG SAMARINDA

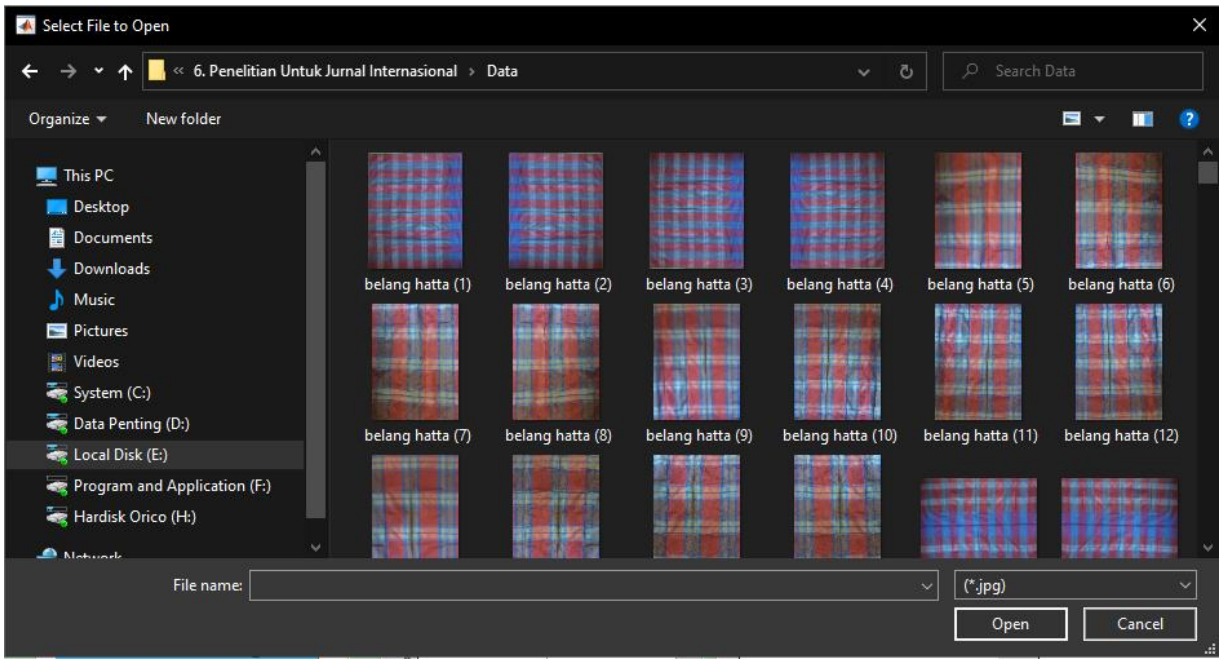
Sistem pengenalan pola sarung Samarinda dan non Samarinda saat pertama kali program dijalankan akan muncul tampilan sebagai berikut:



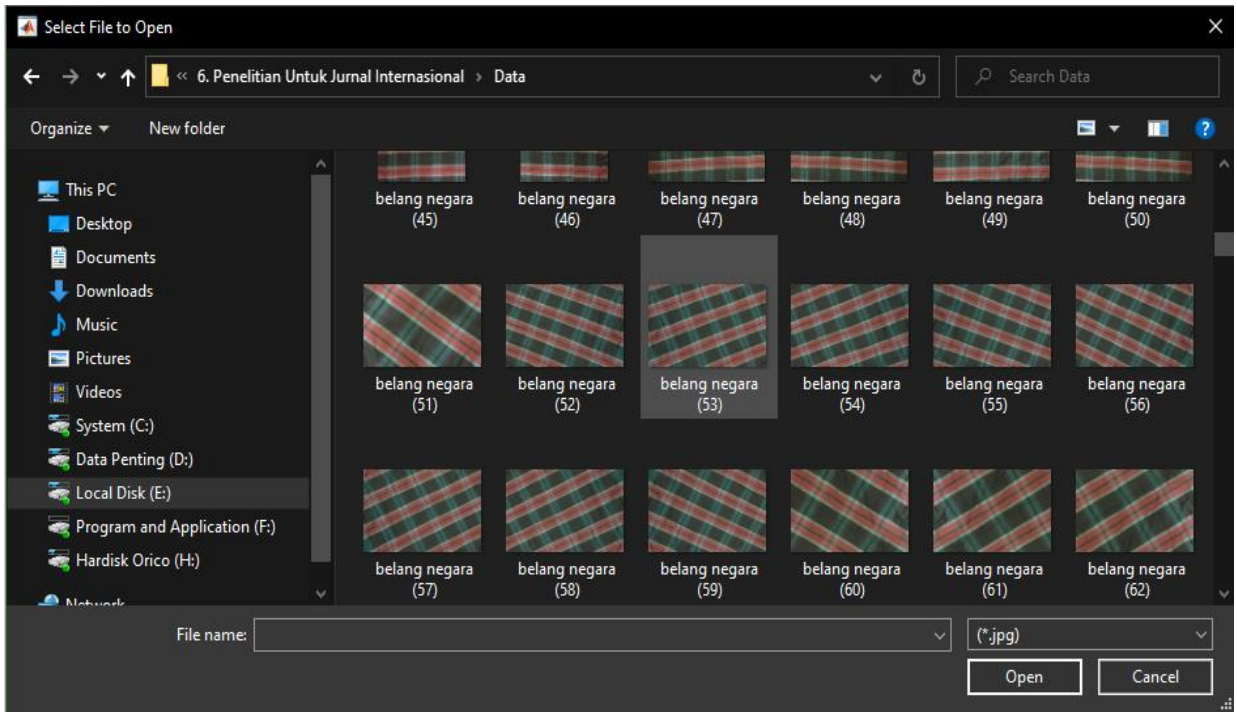
Gambar 1. Tampilan Awal Program

Program ini menerima masukan data berupa foto (citra) sarung Samarinda yang terbagi dalam 5 motif sarung Samarinda yaitu, Belang Hatta, Belang Negara, Kuningsau, Garanso, dan Belang Pengantin dan jenis sarung non Samarinda yang memiliki 5 jenis motif. Adapun langkah-langkah yang harus dilakukan untuk melakukan klasifikasi jenis sarung untuk menghasilkan keluaran berupa jenis sarung yang dimasukkan adalah sebagai berikut:

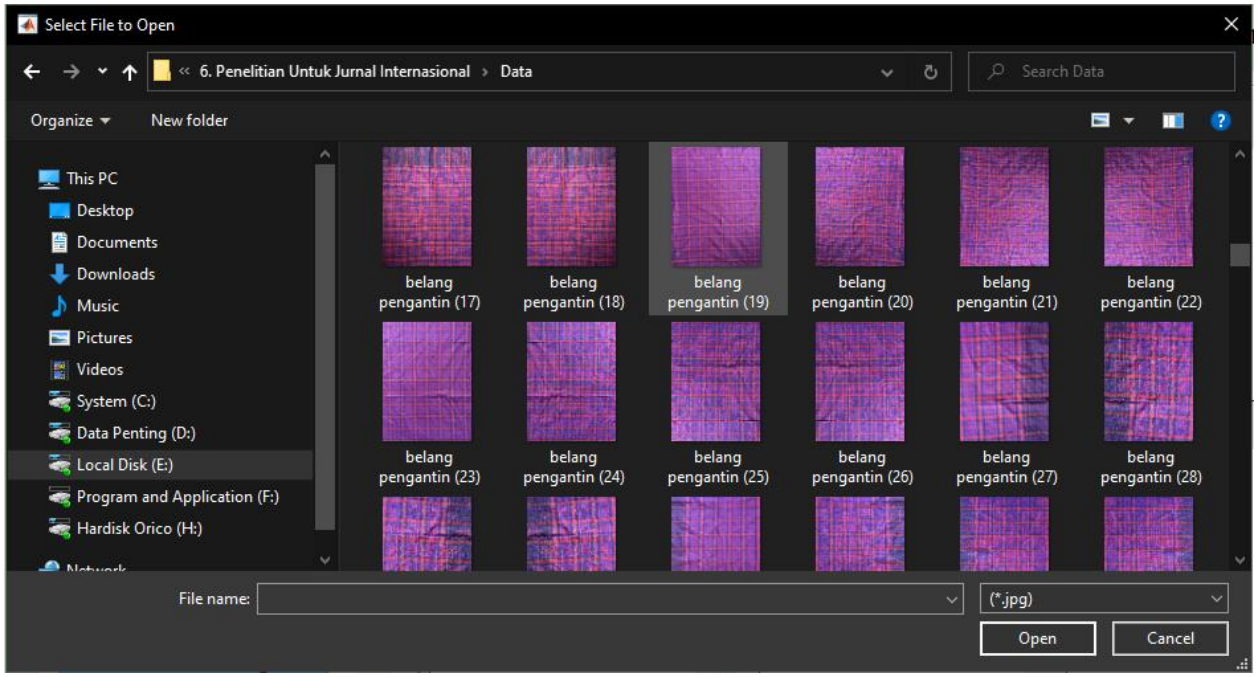
1. Tekan tombol **"Load"** untuk memilih citra sarung Samarinda yang akan diproses, setelah tombol tersebut ditekan maka akan muncul tampilan sebagai berikut:



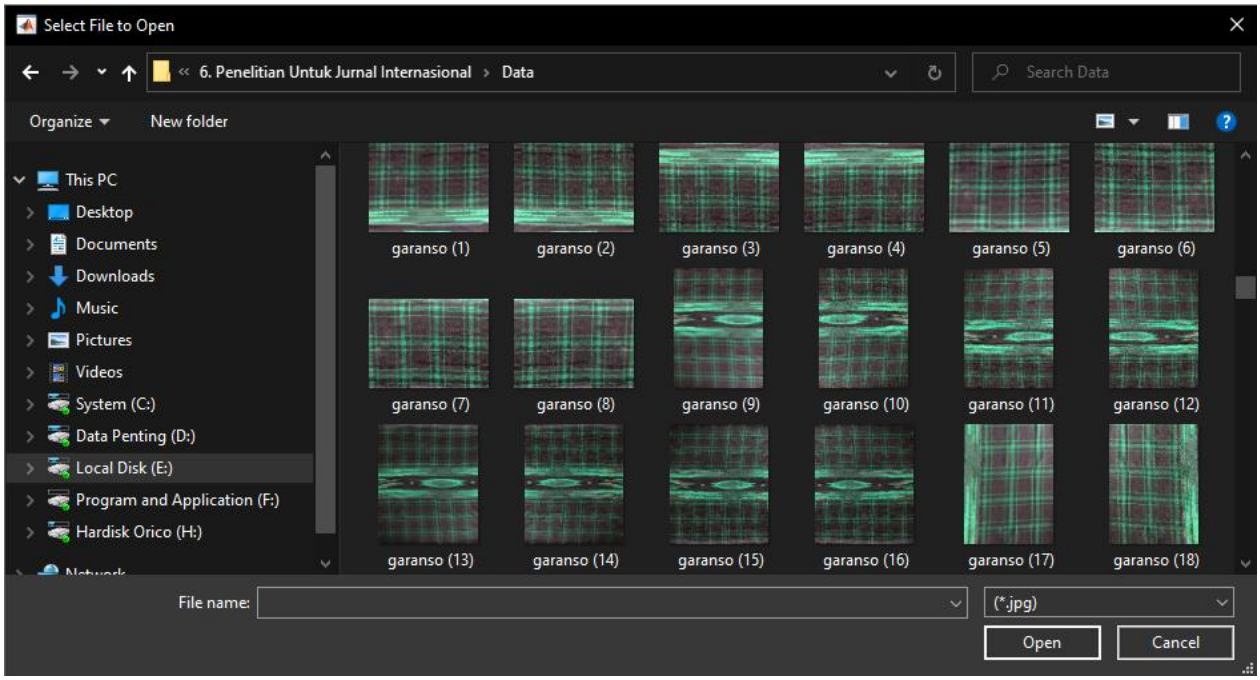
Gambar 2. Data Citra Sarung Motif Belang Hatta



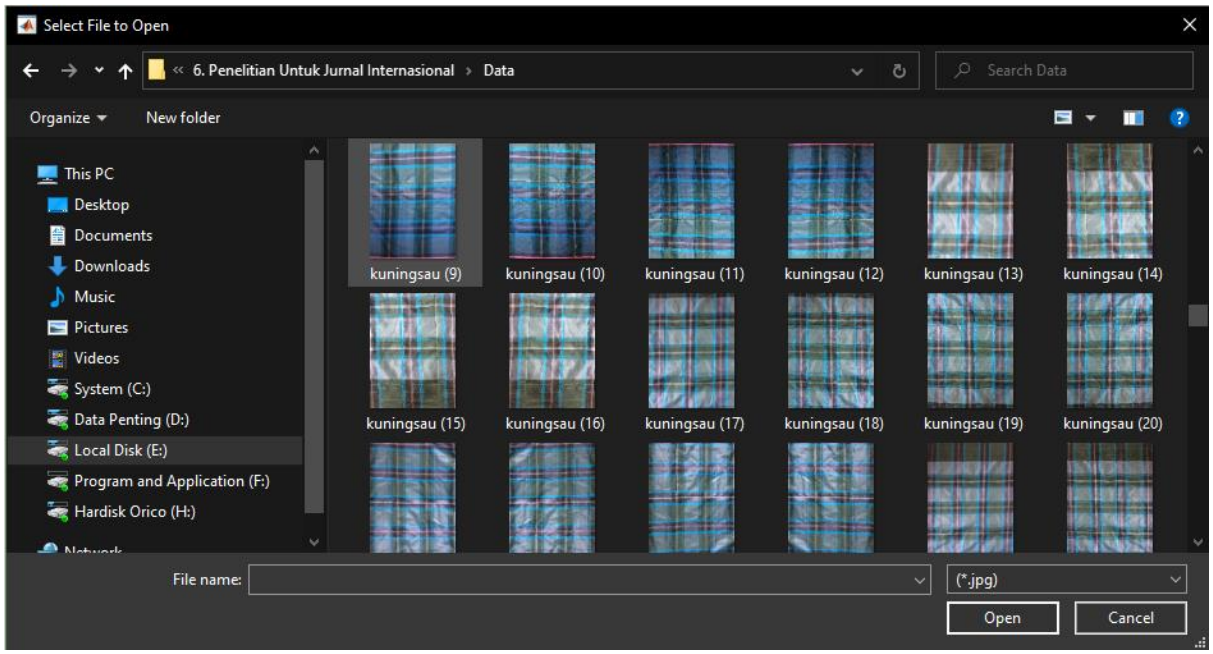
Gambar 3. Data Citra Sarung Motif Belang Negara



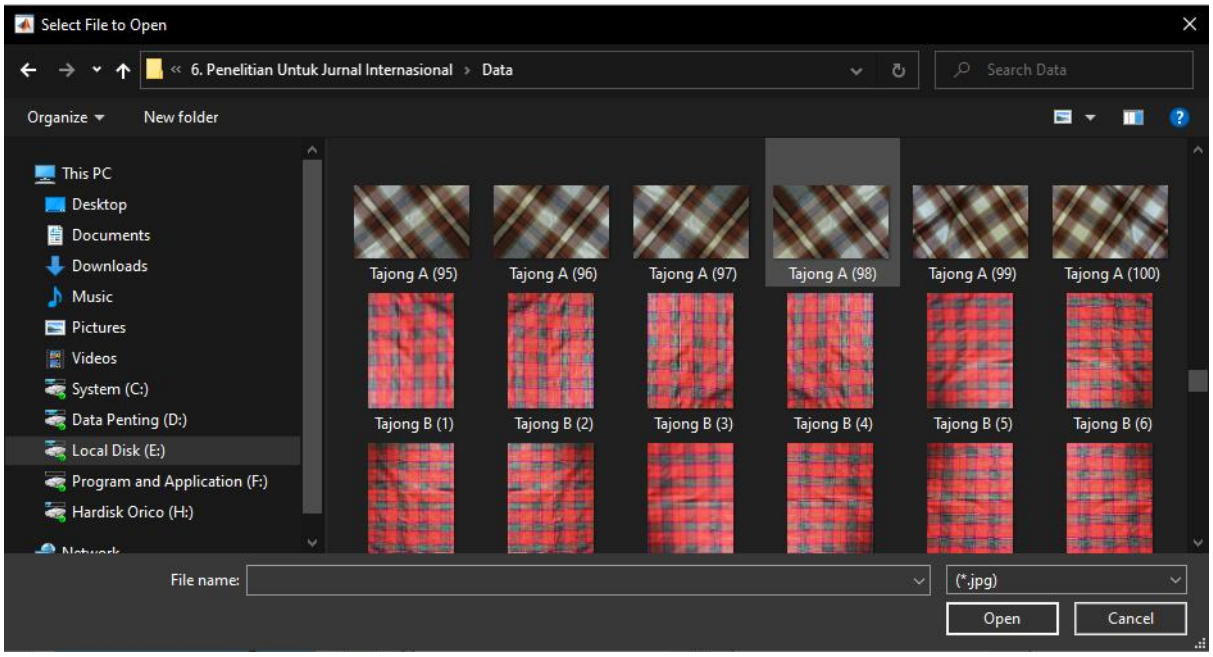
Gambar 4. Data Citra Sarung Motif Belang Pengantin



Gambar 5. Data Citra Sarung Motif Garanso



Gambar 6. Data Citra Sarung Motif Kuningsau



Gambar 7. Data Citra Sarung Motif Non Samarinda

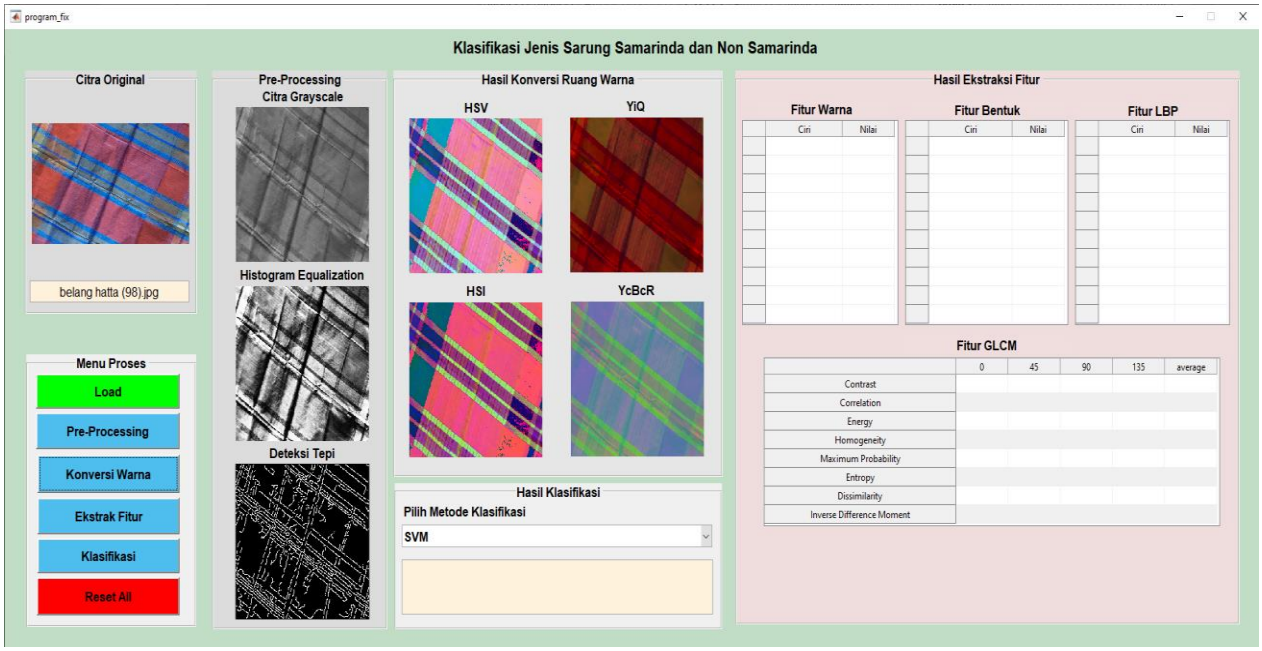
2. Pilih salah satu citra antara motif Belang Hatta, Belang Negara, Kuningsau, Garanso, Belang Pengantin atau Non Samarinda, kemudian tekan tombol "**Open**", citra yang dipilih akan muncul pada bagian citra awal seperti tampilan berikut:

Gambar 8. Tampilan Setelah Citra Dimasukkan

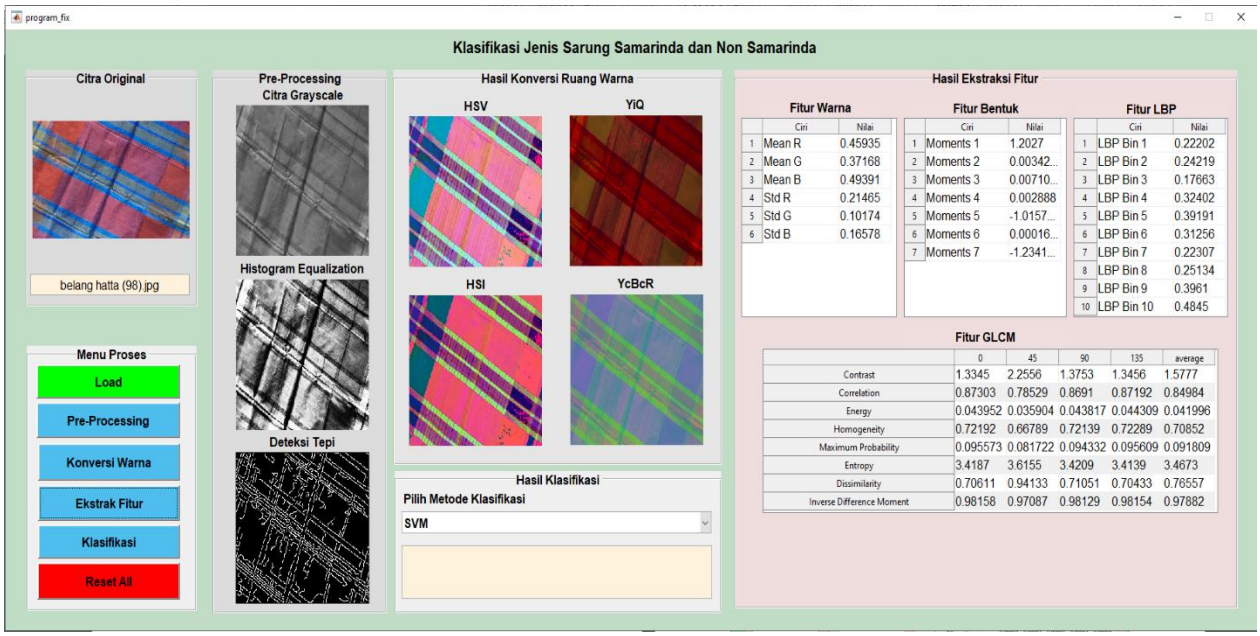
3. Setelah citra dimasukkan, pilih tombol "***Pre-Processing***" untuk melakukan proses *pre-processing* dan deteksi tepi. Proses yang dihasilkan seperti tampilan berikut:

Gambar 9. Tampilan Proses *Pre-Processing*

4. Setelah melakukan proses pre-processing, kemudian dilakukan proses konversi ruang warna kedalam beberapa ruang warna meliputi HSV, HSI, YIQ, dan YcBcR dihasilkan seperti tampilan berikut dengan menekan tombol "**Konversi Ruang Warna**".

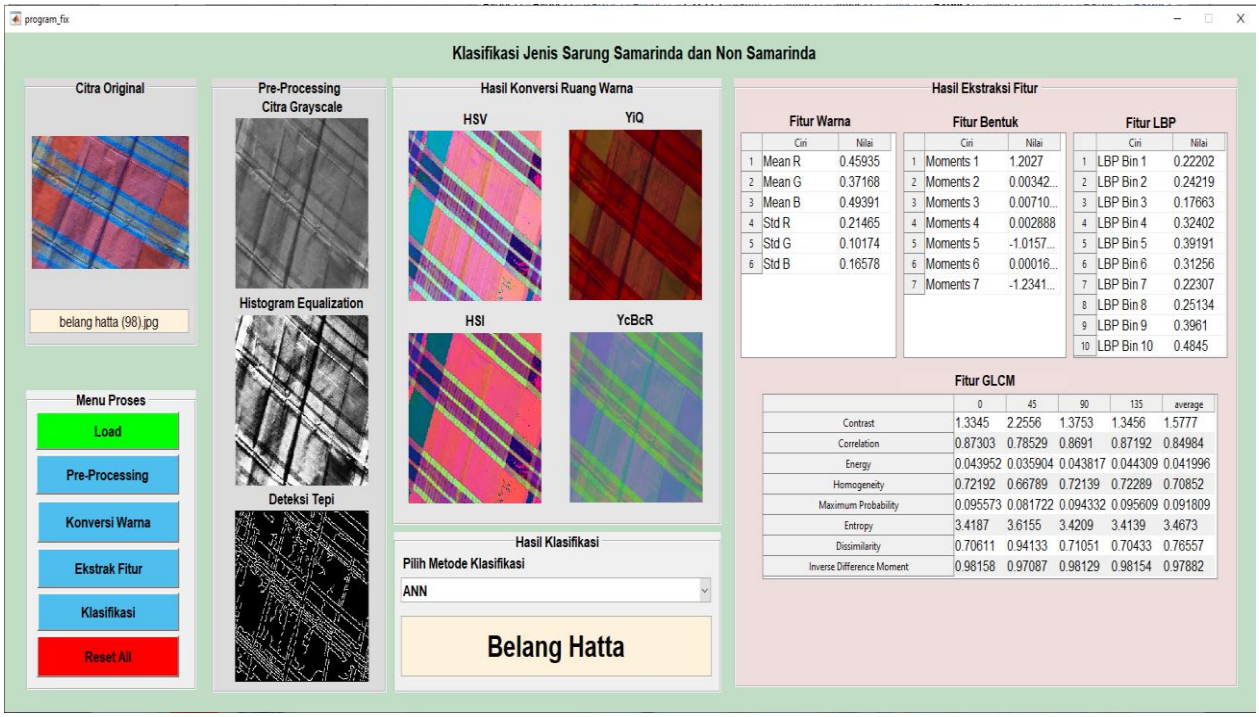


5. Citra yang sudah di proses pada tahapan sebelumnya, kemudian dilakukan proses ekstraksi fitur dengan menekan tombol "**Ekstrak Fitur**" dihasilkan seperti tampilan berikut:

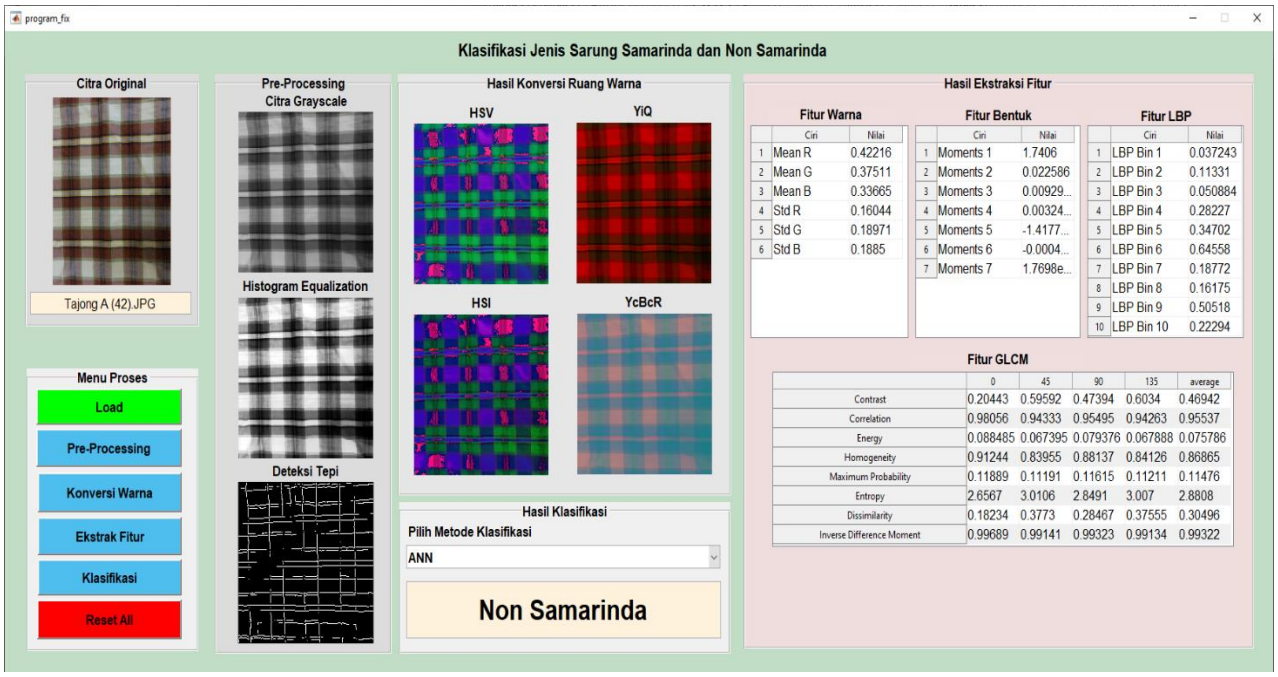


Gambar 10. Tampilan Proses Ekstraksi Fitur

6. Tekan tombol "**Klasifikasi**" untuk mengetahui hasil dari citra yang telah dimasukkan dan di proses. Sebelum menekan tombol klasifikasi, pilih metode yang diinginkan, dalam hal ini meliputi metode ANN (*Artificial Neural Network*), SVM (*Support Vector Machine*), Naive Bayes, KNN, c.45 dan *Decision tree*. Disajikan pada tampilan berikut:



Gambar 11. Tampilan Hasil Klasifikasi Pada Motif Sarung Samarinda

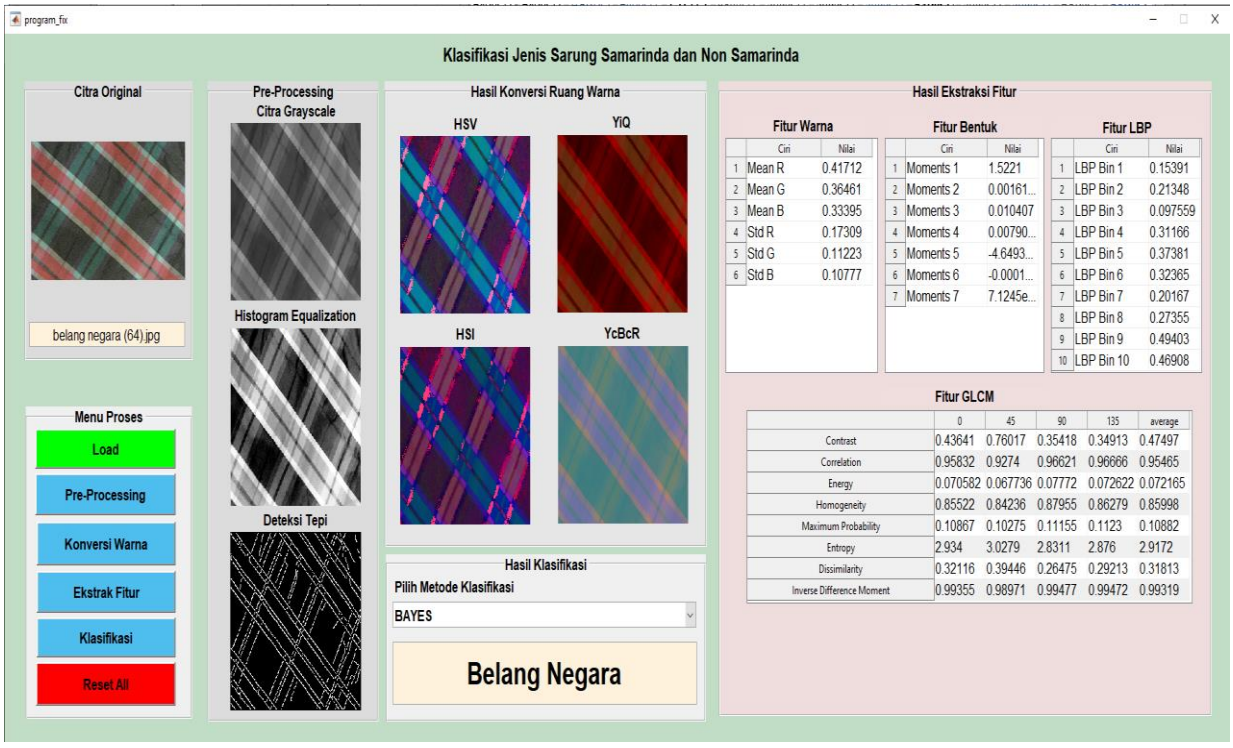


Gambar 12. Tampilan Hasil Klasifikasi Pada Motif Non Samarinda

Sistem ini terdiri dari 5 proses utama, yaitu Akuisisi Citra, pre-processing, deteksi tepi, konversi ruang warna, ekstraksi fitur, dan klasifikasi. Proses akuisisi citra bertujuan untuk memasukkan citra/foto kedalam sistem. Pre-processing bertujuan untuk mengkonversikan citra sarung ke ruang warna *grayscale* yang kemudian akan ditingkatkan kualitasnya menggunakan *histogram equalization*. Kemudian dilanjutkan ke tahapan deteksi tepi untuk menentukan batas

area garis pada citra sarung. Selanjutnya melakukan proses konversi ruang warna ke beberapa ruang warna yaitu HSV, HSI, YIQ, dan YcbCr. Ekstraksi fitur digunakan untuk mendapatkan nilai fitur dari masing-masing hasil *pre-processing*, deteksi tepi, dan konversi ruang warma yang kemudian nilai fitur tersebut dilanjutkan pada tahapan klasifikasi.

Proses terakhir adalah klasifikasi yang bertujuan untuk menentukan hasil klasifikasi pada jenis sarung. Hasil yang didapatkan pada proses klasifikasi yaitu menghasilkan keluaran berupa citra sarung Samarinda berupa Motif Belang Hatta, Belang Negara, Kuningsau, Garanso, Belang Pengantin atau Non Samarinda. Hasil klasifikasi diolah dari hasil nilai ekstraksi fitur. Metode yang digunakan dalam tahapan klasifikasi meliputi *Artificial Neural Network* (ANN), Support Vector Machine (SVM), Naive Bayes, K – *Nearest Neighbor* (KNN), C.45, *Decision Tree*. Berikut adalah contoh hasil deteksi dan klasifikasi jenis sarung Samarinda dan non Samarinda menggunakan jenis sarung yang berbeda dan penerapan metode yang berbeda:



program_fix

Klasifikasi Jenis Sarung Samarinda dan Non Samarinda

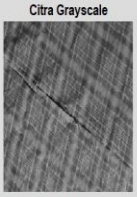
Citra Original

belang pengantin (56).jpg

Menu Proses

Load
Pre-Processing
Konversi Warna
Ekstrak Fitur
Klasifikasi
Reset All

Pre-Processing Citra Grayscale



Histogram Equalization

Deteksi Tepi

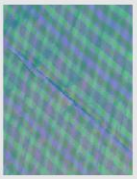
Hasil Konversi Ruang Warna

HSV

YiQ

HSI

YcBcR



Hasil Klasifikasi

Pilih Metode Klasifikasi

C.45

Belang Pengantin

Hasil Ekstraksi Fitur

Fitur Warna

	Ciri	Nilai
1	Mean R	0.5801
2	Mean G	0.29337
3	Mean B	0.58767
4	Std R	0.21112
5	Std G	0.066882
6	Std B	0.1432

Fitur Bentuk

	Ciri	Nilai
1	Moments 1	0.77145
2	Moments 2	0.00057...
3	Moments 3	0.00026...
4	Moments 4	1.8774e...
5	Moments 5	-7.1171...
6	Moments 6	1.3088e...
7	Moments 7	1.2776e...

Fitur LBP

	Ciri	Nilai
1	LBP Bin 1	0.17674
2	LBP Bin 2	0.27949
3	LBP Bin 3	0.1796
4	LBP Bin 4	0.31591
5	LBP Bin 5	0.48052
6	LBP Bin 6	0.35423
7	LBP Bin 7	0.23082
8	LBP Bin 8	0.25917
9	LBP Bin 9	0.31691
10	LBP Bin 10	0.42584

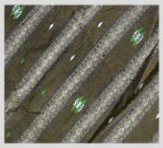
Fitur GLCM

	0	45	90	135	average
Contrast	2.5222	3.0837	1.4526	2.9718	2.5076
Correlation	0.75891	0.70515	0.8611	0.71585	0.76025
Energy	0.031072	0.028053	0.040007	0.028897	0.032007
Homogeneity	0.62174	0.59384	0.69301	0.60442	0.62825
Maximum Probability	0.08079	0.072095	0.088634	0.077847	0.079842
Entropy	3.7199	3.8035	3.4903	3.7819	3.6989
Dissimilarity	1.1001	1.2378	0.78908	1.2022	1.0823
Inverse Difference Moment	0.96559	0.9589	0.97941	0.96016	0.96601

program_fix

Klasifikasi Jenis Sarung Samarinda dan Non Samarinda

Citra Original

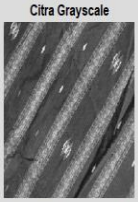


Tajong D (79).jpg

Menu Proses

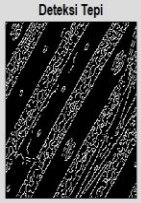
Load
Pre-Processing
Konversi Warna
Ekstrak Fitur
Klasifikasi
Reset All

Pre-Processing Citra Grayscale



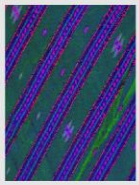
Histogram Equalization

Deteksi Tepi

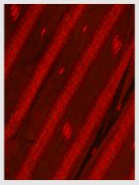


Hasil Konversi Ruang Warna

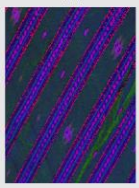
HSV



YiQ



HSI



YcBcR

Hasil Klasifikasi

Pilih Metode Klasifikasi

KNN

Non Samarinda

Hasil Ekstraksi Fitur

Fitur Warna

	Ciri	Nilai
1	Mean R	0.40287
2	Mean G	0.38821
3	Mean B	0.33445
4	Std R	0.13434
5	Std G	0.14194
6	Std B	0.15914

Fitur Bentuk

	Ciri	Nilai
1	Moments 1	1.158
2	Moments 2	0.00105...
3	Moments 3	0.011282
4	Moments 4	0.00696...
5	Moments 5	5.8342e...
6	Moments 6	0.00021...
7	Moments 7	-3.8294...

Fitur LBP

	Ciri	Nilai
1	LBP Bin 1	0.23962
2	LBP Bin 2	0.28793
3	LBP Bin 3	0.16964
4	LBP Bin 4	0.28666
5	LBP Bin 5	0.32488
6	LBP Bin 6	0.27906
7	LBP Bin 7	0.21915
8	LBP Bin 8	0.26479
9	LBP Bin 9	0.4246
10	LBP Bin 10	0.5166

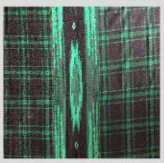
Fitur GLCM

	0	45	90	135	average
Contrast	1.6791	1.2655	1.1361	2.2434	1.581
Correlation	0.83954	0.8791	0.89148	0.78568	0.84895
Energy	0.037753	0.042282	0.045143	0.034414	0.039898
Homogeneity	0.67682	0.70453	0.72966	0.65567	0.69167
Maximum Probability	0.082307	0.091027	0.090947	0.076002	0.08507
Entropy	3.5301	3.4119	3.3643	3.6276	3.4834
Dissimilarity	0.85142	0.73249	0.66345	0.97243	0.80495
Inverse Difference Moment	0.97667	0.98193	0.9838	0.97023	0.97816

program_fix

Klasifikasi Jenis Sarung Samarinda dan Non Samarinda

Citra Original

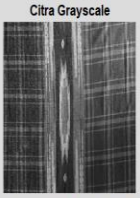


garanso (21).JPG

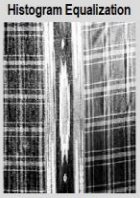
Menu Proses

Load
Pre-Processing
Konversi Warna
Ekstrak Fitur
Klasifikasi
Reset All

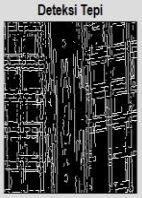
Pre-Processing Citra Grayscale



Histogram Equalization



Deteksi Tepi

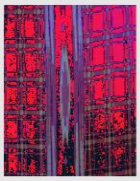


Hasil Konversi Ruang Warna

HSV

YiQ

HSI



YcBcR

Hasil Klasifikasi

Pilih Metode Klasifikasi

SVM

Garanso

Hasil Ekstraksi Fitur

Fitur Warna

	Ciri	Nilai
1	Mean R	0.27765
2	Mean G	0.35645
3	Mean B	0.31372
4	Std R	0.082161
5	Std G	0.19201
6	Std B	0.14522

Fitur Bentuk

	Ciri	Nilai
1	Moments 1	0.92377
2	Moments 2	0.00285...
3	Moments 3	0.00512...
4	Moments 4	0.00056...
5	Moments 5	-7.4787...
6	Moments 6	1.1826e...
7	Moments 7	4.3263e...

Fitur LBP

	Ciri	Nilai
1	LBP Bin 1	0.16177
2	LBP Bin 2	0.24718
3	LBP Bin 3	0.13567
4	LBP Bin 4	0.31696
5	LBP Bin 5	0.39251
6	LBP Bin 6	0.43932
7	LBP Bin 7	0.21279
8	LBP Bin 8	0.24551
9	LBP Bin 9	0.34602
10	LBP Bin 10	0.47066

Fitur GLCM

	0	45	90	135	average
Contrast	1.4276	1.8346	0.77177	1.8133	1.4618
Correlation	0.86441	0.82556	0.92659	0.82759	0.86104
Energy	0.040614	0.03568	0.053446	0.035826	0.041391
Homogeneity	0.70419	0.66587	0.77651	0.66657	0.70328
Maximum Probability	0.08727	0.079862	0.10388	0.080277	0.087821
Entropy	3.4782	3.592	3.2077	3.5877	3.4664
Dissimilarity	0.76199	0.90145	0.52017	0.89681	0.77011
Inverse Difference Moment	0.97995	0.97455	0.98864	0.97481	0.97949

program_fix

Klasifikasi Jenis Sarung Samarinda dan Non Samarinda

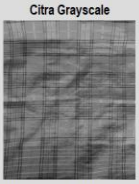
Citra Original

Tajong B (44).JPG

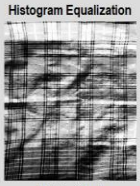
Menu Proses

Load
Pre-Processing
Konversi Warna
Ekstrak Fitur
Klasifikasi
Reset All

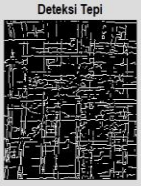
Pre-Processing Citra Grayscale



Histogram Equalization



Deteksi Tepi



Hasil Konversi Ruang Warna

HSV

YiQ

HSI

YcBcR

Hasil Klasifikasi

Pilih Metode Klasifikasi

Decision Tree

Non Samarinda

Hasil Ekstraksi Fitur

Fitur Warna

	Ciri	Nilai
1	Mean R	0.67566
2	Mean G	0.32863
3	Mean B	0.34304
4	Std R	0.23626
5	Std G	0.11867
6	Std B	0.091867

Fitur Bentuk

	Ciri	Nilai
1	Moments 1	0.93005
2	Moments 2	0.00100...
3	Moments 3	0.001272
4	Moments 4	0.00062...
5	Moments 5	-5.0627...
6	Moments 6	-1.7658...
7	Moments 7	5.5935e...

Fitur LBP

	Ciri	Nilai
1	LBP Bin 1	0.13786
2	LBP Bin 2	0.26789
3	LBP Bin 3	0.14197
4	LBP Bin 4	0.33559
5	LBP Bin 5	0.43192
6	LBP Bin 6	0.44724
7	LBP Bin 7	0.24467
8	LBP Bin 8	0.2545
9	LBP Bin 9	0.3215
10	LBP Bin 10	0.40234

Fitur GLCM

	0	45	90	135	average
Contrast	1.174	2.4969	1.6844	2.6351	1.9976
Correlation	0.88735	0.75989	0.83802	0.74659	0.80796
Energy	0.051015	0.033133	0.040996	0.032183	0.039332
Homogeneity	0.76609	0.64273	0.69883	0.63306	0.68518
Maximum Probability	0.10095	0.08895	0.10032	0.088474	0.094674
Entropy	3.3188	3.6908	3.5108	3.7139	3.5586
Dissimilarity	0.60826	1.0516	0.82083	1.0912	0.89298
Inverse Difference Moment	0.98358	0.96645	0.9765	0.96473	0.97281

SOURCE CODE PROGRAM SISTEM PENGENALAN POLA SARUNG SAMARINDA

```
% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[filename,pathname] = uigetfile('*.jpg');

if ~isequal(filename,0)
    ImgA = imread(fullfile(pathname,filename));
    axes(handles.axes1)
    Img = imresize (ImgA, [256 256]);
    cla('reset')
    imshow(ImgA)
    set(handles.edit1,'String',filename)
else
    return
end
handles.Img = Img;
guidata(hObject, handles)


function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%        str2double(get(hObject,'String')) returns contents of edit1 as a
double


% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
Img = handles.Img;

% RGB to Grayscale
Img_gray = rgb2gray(Img);
axes(handles.axes2)
```

```
imshow(Img_gray)

%Histogram Equalization
Img_histeq = histeq(Img_gray);
axes(handles.axes3)
imshow(Img_histeq)

%deteksi tepi canny
Img_canny = edge(Img_gray,'canny');
axes(handles.axes4)
imshow(Img_canny)

handles.Img_gray = Img_gray;
handles.Img_histeq = Img_histeq;
handles.Img_canny = Img_canny;
guidata(hObject, handles)

% --- Executes on button press in pushbutton6.
function pushbutton6_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
Img = handles.Img;

%Ruang Warna HSV
HSV = rgb2hsv(Img);
axes(handles.axes6)
imshow(HSV)

%Ruang Warna HSI
%Represent the RGB image in [0 1] range
I =double(Img)/255;
R = I(:,:,1);
G = I(:,:,2);
B = I(:,:,3);
%Hue
numi=1/2*((R-G)+(R-B));
denom=((R-G).^2+((R-B).*(G-B))).^0.5;
%To avoid divide by zero exception add a small number in the denominator
H=acosd(numi./(denom+0.000001));
%If B>G then H= 360-Theta
H(B>G)=360-H(B>G);
%Normalize to the range [0 1]
H=H/360;
%Saturation
S=1- (3./(sum(I,3)+0.000001)).*min(I,[],3);
%Intensity
I=sum(I,3)./3;
%HSI
HSI = zeros(size(Img));
HSI(:,:,1)= H;
HSI(:,:,2)= S;
HSI(:,:,3)= I;
axes(handles.axes7)
imshow(HSI)

%Ruang Warna YIQ
YIQ = rgb2ntsc(Img);
axes(handles.axes8)
imshow(YIQ)
```

```
%Ruang Warna YcBcR
YCBCR = rgb2ycbcr(Img);
axes(handles.axes9)
imshow(YCBCR)


function edit2_Callback(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit2 as text
%        str2double(get(hObject,'String')) returns contents of edit2 as a
double


% --- Executes during object creation, after setting all properties.
function edit2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
try
Img = handles.Img;
Img_histeq = handles.Img_histeq;
Img_canny = handles.Img_canny;
Img = im2double(Img);

%fitur warna
R = Img(:,:,1);
G = Img(:,:,2);
B = Img(:,:,3);

meanR = mean2(R);
meanG = mean2(G);
meanB = mean2(B);

stdR = std2(R);
stdG = std2(G);
stdB = std2(B);

data_tabel = cell(6,2);
data_tabel{1,1} = 'Mean R';
data_tabel{2,1} = 'Mean G';
data_tabel{3,1} = 'Mean B';
```

```
data_tabel{4,1} = 'Std R';
data_tabel{5,1} = 'Std G';
data_tabel{6,1} = 'Std B';
data_tabel{1,2} = num2str(meanR);
data_tabel{2,2} = num2str(meanG);
data_tabel{3,2} = num2str(meanB);
data_tabel{4,2} = num2str(stdR);
data_tabel{5,2} = num2str(stdG);
data_tabel{6,2} = num2str(stdB);
set(handles.uitable2,'Data',data_tabel,'RowName',1:6)

%fitur Tekstur
[height, width] = size(Img_canny);

xgrid = repmat((-floor(height/2):1:ceil(height/2)-1)',1,width);
ygrid = repmat(-floor(width/2):1:ceil(width/2)-1,height,1);

[x_bar, y_bar] = centerOfMass(Img_canny,xgrid,ygrid);

xnorm = x_bar - xgrid;
ynorm = y_bar - ygrid;

mu_11 = central_moments(Img_canny ,xnorm,ynorm,1,1);
mu_20 = central_moments(Img_canny ,xnorm,ynorm,2,0);
mu_02 = central_moments(Img_canny ,xnorm,ynorm,0,2);
mu_21 = central_moments(Img_canny ,xnorm,ynorm,2,1);
mu_12 = central_moments(Img_canny ,xnorm,ynorm,1,2);
mu_03 = central_moments(Img_canny ,xnorm,ynorm,0,3);
mu_30 = central_moments(Img_canny ,xnorm,ynorm,3,0);

moments1   = mu_20 + mu_02;
moments2   = (mu_20 - mu_02)^2 + 4*(mu_11)^2;
moments3 = (mu_30 - 3*mu_12)^2 + (mu_03 - 3*mu_21)^2;
moments4  = (mu_30 + mu_12)^2 + (mu_03 + mu_21)^2;
moments5  = (mu_30 - 3*mu_12)*(mu_30 + mu_12)*((mu_30 + mu_12)^2 - 3*(mu_21
+ mu_03)^2) + (3*mu_21 - mu_03)*(mu_21 + mu_03)*(3*(mu_30 + mu_12)^2 -
(mu_03 + mu_21)^2);
moments6  = (mu_20 - mu_02)*((mu_30 + mu_12)^2 - (mu_21 + mu_03)^2) +
4*mu_11*(mu_30 + mu_12)*(mu_21 + mu_03);
moments7 = (3*mu_21 - mu_03)*(mu_30 + mu_12)*((mu_30 + mu_12)^2 - 3*(mu_21
+ mu_03)^2) + (mu_30 - 3*mu_12)*(mu_21 + mu_03)*(3*(mu_30 + mu_12)^2 -
(mu_03 + mu_21)^2);

data_tabel = cell(7,2);
data_tabel{1,1} = 'Moments 1';
data_tabel{2,1} = 'Moments 2';
data_tabel{3,1} = 'Moments 3';
data_tabel{4,1} = 'Moments 4';
data_tabel{5,1} = 'Moments 5';
data_tabel{6,1} = 'Moments 6';
data_tabel{7,1} = 'Moments 7';
data_tabel{1,2} = num2str(moments1);
data_tabel{2,2} = num2str(moments2);
data_tabel{3,2} = num2str(moments3);
data_tabel{4,2} = num2str(moments4);
data_tabel{5,2} = num2str(moments5);
data_tabel{6,2} = num2str(moments6);
data_tabel{7,2} = num2str(moments7);
set(handles.uitable3,'Data',data_tabel,'RowName',1:7)
```

```
%fitur tekstur
offsets = [0 1; -1 1; -1 0; -1 -1];
GLCM2 = graycomatrix(Img_histeq,'Offset',offsets);
stats = GLCM_Features1(GLCM2);

contrast = stats.contr;
correlation = stats.corrm;
energy = stats.energ;
homogeneity = stats.homom;
maximumprob = stats.maxpr;
entropy = stats.entro;
dissimilarity = stats.dissi;
inversediffmoment = stats.idmnc;

data = get(handles.uitable4,'Data');
%contrast
data{1,1} = num2str(contrast(1));
data{1,2} = num2str(contrast(2));
data{1,3} = num2str(contrast(3));
data{1,4} = num2str(contrast(4));
data{1,5} = num2str(mean(contrast));
%correlation
data{2,1} = num2str(correlation(1));
data{2,2} = num2str(correlation(2));
data{2,3} = num2str(correlation(3));
data{2,4} = num2str(correlation(4));
data{2,5} = num2str(mean(correlation));
%energy
data{3,1} = num2str(energy(1));
data{3,2} = num2str(energy(2));
data{3,3} = num2str(energy(3));
data{3,4} = num2str(energy(4));
data{3,5} = num2str(mean(energy));
%homogeneity
data{4,1} = num2str(homogeneity(1));
data{4,2} = num2str(homogeneity(2));
data{4,3} = num2str(homogeneity(3));
data{4,4} = num2str(homogeneity(4));
data{4,5} = num2str(mean(homogeneity));
%maximum probability
data{5,1} = num2str(maximumprob(1));
data{5,2} = num2str(maximumprob(2));
data{5,3} = num2str(maximumprob(3));
data{5,4} = num2str(maximumprob(4));
data{5,5} = num2str(mean(maximumprob));
%entropy
data{6,1} = num2str(entropy(1));
data{6,2} = num2str(entropy(2));
data{6,3} = num2str(entropy(3));
data{6,4} = num2str(entropy(4));
data{6,5} = num2str(mean(entropy));
%dissimilarity
data{7,1} = num2str(dissimilarity(1));
data{7,2} = num2str(dissimilarity(2));
data{7,3} = num2str(dissimilarity(3));
data{7,4} = num2str(dissimilarity(4));
data{7,5} = num2str(mean(dissimilarity));
%inverse difference moment
data{8,1} = num2str(inversediffmoment(1));
data{8,2} = num2str(inversediffmoment(2));
data{8,3} = num2str(inversediffmoment(3));
```

```
data{8,4} = num2str(inversediffmoment(4));
data{8,5} = num2str(mean(inversediffmoment));
set(handles.uitable4,'Data',data,'ForegroundColor',[0 0 0])

contrast0 = stats.contr(1);
contrast45 = stats.contr(2);
contrast90 = stats.contr(3);
contrast135 = stats.contr(4);
correlation0 = stats.corrm(1);
correlation45 = stats.corrm(2);
correlation90 = stats.corrm(3);
correlation135 = stats.corrm(4);
energy0 = stats.energ(1);
energy45 = stats.energ(2);
energy90 = stats.energ(3);
energy135 = stats.energ(4);
homogeneity0 = stats.homom(1);
homogeneity45 = stats.homom(2);
homogeneity90 = stats.homom(3);
homogeneity135 = stats.homom(4);
maximumprob0 = stats.maxpr(1);
maximumprob45 = stats.maxpr(2);
maximumprob90 = stats.maxpr(3);
maximumprob135 = stats.maxpr(4);
entropy0 = stats.entro(1);
entropy45 = stats.entro(2);
entropy90 = stats.entro(3);
entropy135 = stats.entro(4);
dissimilarity0 = stats.dissi(1);
dissimilarity45 = stats.dissi(2);
dissimilarity90 = stats.dissi(3);
dissimilarity135 = stats.dissi(4);
inversediffmoment0 = stats.idmnc(1);
inversediffmoment45 = stats.idmnc(2);
inversediffmoment90 = stats.idmnc(3);
inversediffmoment135 = stats.idmnc(4);

lbpBricks1 = extractLBPFeatures(Img_histeq,'Upright',false);
LBPbin1 = lbpBricks1(1);
LBPbin2 = lbpBricks1(2);
LBPbin3 = lbpBricks1(3);
LBPbin4 = lbpBricks1(4);
LBPbin5 = lbpBricks1(5);
LBPbin6 = lbpBricks1(6);
LBPbin7 = lbpBricks1(7);
LBPbin8 = lbpBricks1(8);
LBPbin9 = lbpBricks1(9);
LBPbin10 = lbpBricks1(10);

data_tabel = cell(10,2);
data_tabel{1,1} = 'LBP Bin 1';
data_tabel{2,1} = 'LBP Bin 2';
data_tabel{3,1} = 'LBP Bin 3';
data_tabel{4,1} = 'LBP Bin 4';
data_tabel{5,1} = 'LBP Bin 5';
data_tabel{6,1} = 'LBP Bin 6';
data_tabel{7,1} = 'LBP Bin 7';
data_tabel{8,1} = 'LBP Bin 8';
data_tabel{9,1} = 'LBP Bin 9';
data_tabel{10,1} = 'LBP Bin 10';
data_tabel{1,2} = num2str(LBPbin1);
```

```
data_tabel{2,2} = num2str(LBPbin2);
data_tabel{3,2} = num2str(LBPbin3);
data_tabel{4,2} = num2str(LBPbin4);
data_tabel{5,2} = num2str(LBPbin5);
data_tabel{6,2} = num2str(LBPbin6);
data_tabel{7,2} = num2str(LBPbin7);
data_tabel{8,2} = num2str(LBPbin8);
data_tabel{9,2} = num2str(LBPbin9);
data_tabel{10,2} = num2str(LBPbin10);
set(handles.uitable5,'Data',data_tabel,'RowName',1:10)

%untuk memanggil di hasil klasifikasi
input =  [meanR; meanG; meanB; stdR; stdG; stdB; contrast0; contrast45;
contrast90; contrast135; correlation0; correlation45; correlation90;
correlation135;
             energy0; energy45; energy90; energy135;  homogeneity0;
homogeneity45; homogeneity90; homogeneity135;
             maximumprob0; maximumprob45; maximumprob90; maximumprob135;
entropy0; entropy45; entropy90; entropy135;
             dissimilarity0; dissimilarity45; dissimilarity90;
dissimilarity135; inversediffmoment0; inversediffmoment45;
inversediffmoment90; inversediffmoment135
             moments1; moments2; moments3; moments4; moments5; moments6;
moments7;];

handles.input = input;
guidata(hObject, handles)
set(handles.edit2,'String','')
catch
end

% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
try
    input = handles.input;
    load hasil_latih

    output = round(sim(net,input));
    if output == 1
    kelas = 'Belang Hatta';
    elseif output == 2
    kelas = 'Belang Negara';
    elseif output == 3
    kelas = 'Kuningsau';
    elseif output == 4
    kelas = 'Belang Pengantin';
    elseif output == 5
    kelas = 'Garanso';
    elseif output == 6
    kelas = 'Non Samarinda';
    else
       kelas = 'Unknown';
    end
    set(handles.edit2,'String',kelas)
catch
end
```

```
% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% Bagian Original Image
axes(handles.axes1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

% Bagian Grayscale Image
axes(handles.axes2)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

% Bagian Histogram Equalization
axes(handles.axes3)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

% Bagian Deteksi Canny
axes(handles.axes4)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

set(handles.edit1,'String',[])
set(handles.edit2,'String',[])
set(handles.uitable2,'Data',[])
set(handles.uitable3,'Data',[])
set(handles.uitable4,'Data',[])
guidata(hObject, handles)
```