


























LAMPIRAN 1










Data Uji Yang Digunakan Untuk Penelitian










1. Tabel data uji










NO	CITRA UJI	NILAI ENERGI CITRA	ASM	CON	COR	VAR	IDM	ENT
1	 BK7	0.0509	0.7879	0.0483	0.7092	0.0589	0.9759	0.6781
2	 BK8	0.0495	0.8200	0.0342	0.7675	0.0564	0.9829	0.9829
3	 BK9	0.0623	0.7694	0.0487	0.7356	0.0678	0.9756	0.7199
4	 BK10	0.0476	0.8085	0.0416	0.7256	0.0550	0.9792	0.6220
5	 BK11	0.0544	0.8107	0.0407	0.7293	0.0548	0.9797	0.6156
6	 BK12	0.0422	0.8360	0.0367	0.7150	0.0460	0.9817	0.5503
7	 BK13	0.0593	0.7876	0.0402	0.7687	0.0668	0.9799	0.6670
8		0.0482	0.8011	0.0452	0.7096	0.0552	0.9774	0.6440










								
	BK14							
9		0.0503	0.7998	0.0449	0.7148	0.0562	0.9776	0.6465
	BK15							
10		0.0461	0.8147	0.0422	0.7084	0.0513	0.9789	0.6083
	BK16							
11		0.0609	0.7607	0.0532	0.7186	0.0679	0.9734	0.7451
	BK17							
12		0.0598	0.7642	0.0550	0.7009	0.0644	0.9725	0.7397
	BK18							
13		0.0672	0.7391	0.0582	0.7173	0.0739	0.9709	0.7987
	BK19							
14		0.0423	0.8229	0.0410	0.7024	0.0484	0.9795	0.5874
	BK20							
15		0.0459	0.8126	0.0423	0.7122	0.0523	0.9789	0.6134
	BK21							
16		0.0470	0.8359	0.0385	0.6966	0.0442	0.9807	0.5528
	BK22							
17			0.8339	0.0335	0.7493	0.0501	0.9832	0.5509


		0.0426						
	BK23							
18		0.0364	0.8506	0.0330	0.7194	0.0423	0.9835	0.5098
	BK24							
19		0.0342	0.8546	0.0335	0.7041	0.0398	0.9833	0.5006
	BK25							
20		0.0482	0.8284	0.0338	0.7568	0.0526	0.9831	0.5643
	BK26							
21		0.0385	0.8450	0.0316	0.7464	0.0464	0.9842	0.5214
	BK27							
22		0.0445	0.8235	0.0365	0.7421	0.0525	0.9818	0.5798
	BK28							
23		0.0559	0.7931	0.0460	0.7179	0.7179	0.9770	0.6632
	BK29							
24		0.0513	0.7853	0.0502	0.6998	0.0584	0.9749	0.6864
	BK30							
25		0.0708	0.6973	0.0777	0.6638	0.0767	0.9612	0.9111
	BL8							
26		0.0761	0.7111	0.0632	0.7250	0.0833	0.9684	0.8647

	BL18							
36	 BL19	0.0647	0.7615	0.0501	0.7377	0.0704	0.9750	0.7391
37	 BL20	0.0586	0.7525	0.0584	0.6967	0.0671	0.9708	0.7700
38	 BL21	0.0825	0.6833	0.0801	0.6705	0.0815	0.9600	0.9434
39	 BL22	0.0768	0.7120	0.0599	0.7414	0.0859	0.9700	0.8580
40	 BL23	0.0472	0.7968	0.0474	0.7001	0.0553	0.9763	0.6566
41	 BL24	0.1106	0.6368	0.0779	0.7329	0.1068	0.9611	1.0343
42	 BL25	0.0746	0.6985	0.0760	0.6713	0.0776	0.9620	0.9069
43	 BL26	0.0642	0.7389	0.0637	0.0689	0.0689	0.9681	0.8061
44	 BL27	0.0749	0.7105	0.0697	0.6897	0.0775	0.9651	0.8742
45			0.6725	0.0792	0.6888	0.0877	0.9604	0.9648

	 BL28	0.0892						
46	 BL29	0.0614	0.7650	0.0529	0.7142	0.0661	0.9736	0.7355
47	 BL30	0.0430	0.8075	0.0507	0.6483	0.0468	0.9746	0.6349
	 BL31	0.0901	0.7650	0.0792	0.6888	0.0394	0.9813	0.5103
48	 DR 8	0.0461	0.8201	0.0374	0.7403	0.0533	0.9813	0.5891
49	 DR9	0.0316	0.8659	0.0280	0.7379	0.0394	0.9860	0.4650
50	 DR10	0.0360	0.8479	0.0348	0.7059	0.0418	0.9826	0.5189
51	 DR11	0.0336	0.8525	0.0374	0.6645	0.0370	0.9813	0.5103
52	 DR12	0.0300	0.8751	0.0263	0.7354	0.0365	0.9869	0.4389
53		0.0348	0.8585	0.0346	0.6803	0.0368	0.9827	0.4919

								
	DR13							
54		0.0359	0.8496	0.0377	0.6691	0.0382	0.9811	0.5180
	DR14							
55		0.0381	0.8353	0.0412	0.6706	0.0420	0.9794	0.5575
	DR15							
56		0.0292	0.8822	0.0252	0.7303	0.0341	0.9874	0.4191
	DR16							
57		0.0201	0.9155	0.0205	0.6818	0.0220	0.9897	0.3224
	DR17							
58		0.0202	0.9144	0.0191	0.7148	0.0239	0.9905	0.3239
	DR18							
59		0.0271	0.8981	0.0257	0.6665	0.0256	0.9872	0.3771
	DR19							
60		0.0204	0.9038	0.0243	0.6644	0.0241	0.9878	0.3599
	DR20							
61		0.0515	0.8078	0.0419	0.7246	0.0551	0.9791	0.6240
	DR21							





62	 DR22	0.0317	0.8752	0.0271	0.7242	0.0356	0.9864	0.4400
63	 DR23	0.0225	0.9012	0.0233	0.6944	0.0264	0.9884	0.3659
64	 DR24	0.0245	0.9117	0.0228	0.6546	0.0216	0.9886	0.3356
65	 DR25	0.0315	0.8626	0.0328	0.6894	0.0364	0.9836	0.4795
66	 DR26	0.0353	0.8549	0.0334	0.7044	0.0397	0.9833	0.4997
67	 DR27	0.0316	0.8707	0.0263	0.7465	0.0387	0.9869	0.4503
68	 DR28	0.0292	0.8765	0.0304	0.6773	0.0319	0.9848	0.4406
69	 DR29	0.0277	0.8790	0.0294	0.6821	0.0315	0.9853	0.4329
70	 DR29	0.0255	0.8950	0.0234	0.7152	0.0294	0.9883	0.3830

	DR30							
71	 DR31	0.0451	0.8078	0.0419	0.7246	0.0551	0.9791	0.6240




SET OF DATA

DATA ACUAN

1. Citra Acuan

NO	CITRA UJI	NILAI ENERGI CITRA	ASM	CON	COR	VAR	IDM	ENT
1	 BK1	0.0457	0.8218	0.0410	0.7050	0.0490	0.9795	0.5901
2	 BK2	0.0398	0.8385	0.0328	0.7473	0.0485	0.9836	0.5388
3	 BK3	0.0476	0.8122	0.0393	0.7377	0.0553	0.9803	0.6101
4	 BK4	0.0628	0.7809	0.0482	0.7220	0.0626	0.9759	0.6939

5	 BK5	0.0565	0.7893	0.0396	0.7710	0.0666	0.9802	0.6620
6	 BL1	0.0690	0.7633	0.0436	0.7766	0.0757	0.9782	0.7249
7	 BL2	0.0478	0.8247	0.0314	0.7836	0.0568	0.9843	0.5686
8	 BL3	0.0759	0.7472	0.0443	0.7893	0.0830	0.9778	0.7599
9	 BL4	0.0688	0.7618	0.0440	0.7756	0.0761	0.9780	0.7288
10	 BL5	0.0489	0.8133	0.0359	0.7643	0.0581	0.9821	0.6024
11	 DR1	0.0292	0.8822	0.0252	0.7303	0.0341	0.9874	0.4191
12	 DR2	0.0422	0.8337	0.0309	0.7738	0.0528	0.9846	0.5471
13			0.8739	0.0204	0.8081	0.0429	0.9898	0.4318

	 DR3	0.0346						
14	 DR4	0.0316	0.9026	0.0256	0.6478	0.0235	0.9872	0.3644
15	 DR5	0.0392	0.8439	0.0300	0.7636	0.0485	0.9850	0.5217

LAMPIRAN 2

Source Code

Source Code untuk Function Co-Occurrence Matrix

ko000.m

```
function MatriksHasil=ko000 (GambarAsli)
GambarAsli=double (GambarAsli);
Temp=zeros (256);
[tinggi, lebar]=size (GambarAsli);
for i=1:tinggi
for j=1:lebar-1
p=GambarAsli (i, j)+1;
q=GambarAsli (i, j+1)+1;
Temp (p, q) = Temp (p, q)+1 ;
Temp (q, p) = Temp (q, p)+1 ;
end
end
JumlahPixel=sum (sum (Temp));
MatriksHasil=Temp/JumlahPixel;
```

ko045.m

```
function MatriksHasil=ko045 (GambarAsli)
GambarAsli=double (GambarAsli);
Temp=zeros (256);
[tinggi, lebar]=size (GambarAsli);
for i=2:tinggi
for j=1:lebar-1
p=GambarAsli (i, j)+1;
q=GambarAsli (i-1, j+1)+1;
Temp (p, q) = Temp (p, q)+1 ;
Temp (q, p) = Temp (q, p)+1 ;
end
end
JumlahPixel=sum (sum (Temp));
MatriksHasil=Temp/JumlahPixel;
```

ko090.m

```
function MatriksHasil=ko090 (GambarAsli)
GambarAsli=double (GambarAsli);
Temp=zeros (256);
[tinggi, lebar]=size (GambarAsli);
for i=2:tinggi
for j=1:lebar
p=GambarAsli (i, j)+1;
q=GambarAsli (i-1, j)+1;
Temp (p, q) = Temp (p, q)+1 ;
Temp (q, p) = Temp (q, p)+1 ;
end
end
```

```
JumlahPixel=sum(sum(Temp));  
MatriksHasil=Temp/JumlahPixel;
```

ko135.m

```
function MatriksHasil=ko135(GambarAsli)  
GambarAsli=double(GambarAsli);  
Temp=zeros(256);  
[tinggi,lebar]=size(GambarAsli);  
for i=2:tinggi  
for j=2:lebar  
p=GambarAsli(i,j)+1;  
q=GambarAsli(i-1,j-1)+1;  
Temp(p,q) = Temp(p,q)+1 ;  
Temp(q,p) = Temp(q,p)+1 ;  
end  
end  
JumlahPixel=sum(sum(Temp));  
MatriksHasil=Temp/JumlahPixel;
```

CiriOrdeA.m

```
function CiriOrde(Citra)  
mk000=ko000(Citra);  
mk045=ko045(Citra);  
mk090=ko090(Citra);  
mk135=ko135(Citra);  
MatKook=(mk000+mk045+mk090+mk135)/4;  
I=[1:256];  
SumX=sum(MatKook); SumY=sum(MatKook');  
MeanX=SumX*I'; MeanY=SumY*I';  
StdX=sqrt((I-MeanX).^2*SumX');  
StdY=sqrt((I-MeanY).^2*SumY');  
CiriASM=sum(sum(MatKook.^2));  
CiriCON=0;CiriCOR=0;CiriVAR=0;CiriIDM=0;CiriENT=0;  
for i=1:256  
for j=1:256  
TempCON = (i-j)*(i-j)*MatKook(i,j);  
TempCOR = (i)*(j)*MatKook(i,j);  
TempVAR = (i-MeanX)*(j-MeanY)*MatKook(i,j);  
TempIDM = (MatKook(i,j))/(1+(i-j)*(i-j));  
TempENT = -(MatKook(i,j))*(log2(MatKook(i,j)+eps));  
CiriCON = CiriCON + TempCON;  
CiriCOR = CiriCOR + TempCOR;  
CiriVAR = CiriVAR + TempVAR;  
CiriIDM = CiriIDM + TempIDM;  
CiriENT = CiriENT + TempENT;  
end  
end  
CiriCOR=(CiriCOR-MeanX*MeanY)/(StdX*StdY);  
fprintf('\n\tASM :%13.4f\n',CiriASM);  
fprintf(' \tCON :%13.4f\n',CiriCON);  
fprintf(' \tCOR :%13.4f\n',CiriCOR);
```

```
fprintf(' \tVAR :%13.4f\n',CiriVAR);
fprintf(' \tIDM :%13.4f\n',CiriIDM);
fprintf(' \tENT :%13.4f\n',CiriENT);
```

Source Code untuk Function Filter Gabor

Menghitung energi (EN.m)

```
%EN.M - Program untuk menghitung energi suatu citra
function energi=en(X)
[m,n]=size(X);
z=m*n;
s=sum(sum(double(X).^2));
energi=s/z;
10
```

Gabor (gb.m)

```
%GB.M
%Program untuk menghitung matriks ciri menggunakan filter Gabor.
%Masukan untuk program ini adalah matriks citra (im), pangkat dari
% frekuensi ternormalisasi (power), dan jumlah orientasi (n).
%Keluaran dari program ini adalah matriks ciri yang merupakan
nilai
% magnituda dari bagian riil dan imajiner.
%Untuk B? = S? = 30°, nilai orientasi pada variabel z adalah
sebesar
% (0.1667*pi), sedangkan untuk B? = S? = 45° adalah (0.25*pi).
function [mag]=gb(im,power,n);
teta=(0.1667*pi)*n;
F=sqrt(2)/2^power;
fx=F;
z=(0.1667*pi)/2;
num=sqrt(log(2));
denum=sqrt(2)*pi*F*tan(z);
sigmay=num/denum;
Bf=1;
alfa=sqrt(0.5*log(2));
nom=sqrt(log(2))*(2^Bf+1);
denom=sqrt(2)*pi*F*(2^Bf-1);
sigmax=nom/denom;
[x,y]=meshgrid(-3:1:3, -3:1:3);
x=round(x);
y=round(y);
xx=x.*cos(teta)+y.*sin(teta);
yy=-x.*sin(teta)+y.*cos(teta);
hx=(1/(2*pi*sigmax*sigmay))*exp(-
0.5*((xx.^2/sigmax^2)+(yy.^2/sigmay^2)));
```

```

jx=cos(2*pi*fx*xx);
hc=hx.*jx;
kx=sin(2*pi*fx*xx);
hs=hx.*kx;
im_real=conv2(double(im),hc,'same');
im_imag=conv2(double(im),hs,'same');
mag=sqrt((im_real.^2)+(im_imag.^2));
mag=abs(mag)/(max(max(mag)));

```

Source Code Pengujian Sistem

Co-occurrence matrix

```

clear all, close all, clc;
% membaca file citra
I = imread('bk7.jpg');
%figure, imshow(I), title('citra asli');

% mengubah citra RGB menjadi citra gray
gray = rgb2gray(I);
%figure, imshow(gray), title('gray');

background = imopen(gray, strel('disk', 7));

% Display the Background Approximation as a Surface
%figure, surf(double(background(1:8:end, 1:8:end))), zlim([0 255]);
%set(gca, 'ydir', 'reverse');

I2 = imsubtract(gray, background);
%figure, imshow(I2);

I3 = imadjust(I2);
%figure, imshow(I3);

level = graythresh(I3);
bw = im2bw(I3, level);
%figure, imshow(bw);

% function untuk co-occurrence matrix CIRIORDE DUA
mk000=ko000(bw);
mk045=ko045(bw);
mk090=ko090(bw);
mk135=ko135(bw);
MatKook=(mk000+mk045+mk090+mk135)/4;
I=[1:256];
SumX=sum(MatKook); SumY=sum(MatKook');
MeanX=SumX*I'; MeanY=SumY*I';

```

```

StdX=sqrt((I-MeanX).^2*SumX');
StdY=sqrt((I-MeanY).^2*SumY');
CiriASM=sum(sum(MatKook.^2));
CiriCON=0;CiriCOR=0;CiriVAR=0;CiriIDM=0;CiriENT=0;
for i=1:256
for j=1:256
TempCON = (i-j)*(i-j)*MatKook(i,j);
TempCOR = (i)*(j)*MatKook(i,j);

TempVAR = (i-MeanX)*(j-MeanY)*MatKook(i,j);
TempIDM = (MatKook(i,j))/(1+(i-j)*(i-j));
TempENT = -(MatKook(i,j))*(log2(MatKook(i,j)+eps));
CiriCON = CiriCON + TempCON;
CiriCOR = CiriCOR + TempCOR;
CiriVAR = CiriVAR + TempVAR;
CiriIDM = CiriIDM + TempIDM;
CiriENT = CiriENT + TempENT;
end
end
CiriCOR=(CiriCOR-MeanX*MeanY)/(StdX*StdY);
fprintf('\n\tASM :%13.4f\n',CiriASM);
fprintf(' \tCON :%13.4f\n',CiriCON);
fprintf(' \tCOR :%13.4f\n',CiriCOR);
fprintf(' \tVAR :%13.4f\n',CiriVAR);
fprintf(' \tIDM :%13.4f\n',CiriIDM);
fprintf(' \tENT :%13.4f\n',CiriENT);

% ekstraksi ciri rempah sebagai acuan

ASMDR1 = 0.8822;
CONDR1 = 0.0252;
CORDR1 = 0.7303;
VARDR1 = 0.0341;
IDMDR1 = 0.9874;
ENTDR1 = 0.4191;

ASMDR2 = 0.8337;
CONDR2 = 0.0309;
CORDR2 = 0.7738;
VARDR2 = 0.0528;
IDMDR2 = 0.9846;
ENTDR2 = 0.5471;

ASMDR3 = 0.8739;
CONDR3 = 0.0204;
CORDR3 = 0.8081;
VARDR3 = 0.0429;
IDMDR3 = 0.9898;
ENTDR3 = 0.4318;

ASMDR4 = 0.9026;
CONDR4 = 0.0256;
CORDR4 = 0.6478;
VARDR4 = 0.0235;

```


IDMDR4 = 0.9872;
ENTDR4 = 0.3644;

ASMDR5 = 0.8439;
CONDR5 = 0.0300;
CORDR5 = 0.7636;
VARDR5 = 0.0485;
IDMDR5 = 0.9850;
ENTDR5 = 0.5217;

ASMBK1 = 0.8218;
CONBK1 = 0.0410;
CORBK1 = 0.7050;
VARBK1 = 0.0490;
IDMBK1 = 0.9795;
ENTBK1 = 0.5901;

ASMBK2 = 0.8385;
CONBK2 = 0.0328;
CORBK2 = 0.7473;
VARBK2 = 0.0485;
IDMBK2 = 0.9836;
ENTBK2 = 0.5388;

ASMBK3 = 0.8122;
CONBK3 = 0.0393;
CORBK3 = 0.7377;
VARBK3 = 0.0553;
IDMBK3 = 0.9803;
ENTBK3 = 0.6101;

ASMBK4 = 0.7809;
CONBK4 = 0.0482;
CORBK4 = 0.7220;
VARBK4 = 0.0626;
IDMBK4 = 0.9759;
ENTBK4 = 0.6939;

ASMBK5 = 0.7893;
CONBK5 = 0.0396;
CORBK5 = 0.7710;
VARBK5 = 0.0666;
IDMBK5 = 0.9802;
ENTBK5 = 0.6620;

ASMBL1 = 0.7633;
CONBL1 = 0.0436;
CORBL1 = 0.7766;
VARBL1 = 0.0757;
IDMBL1 = 0.9782;
ENTBL1 = 0.7249;

ASMBL2 = 0.8247;

```
CONBL2 = 0.0314;
CORBL2 = 0.7836;
VARBL2 = 0.0568;
IDMBL2 = 0.9843;
ENTBL2 = 0.5686;
```

```
ASMBL3 = 0.7472;
CONBL3 = 0.0443;
CORBL3 = 0.7893;
VARBL3 = 0.0830;
IDMBL3 = 0.9778;
ENTBL3 = 0.7599;
```

```
ASMBL4 = 0.7618;
CONBL4 = 0.0440;
CORBL4 = 0.7756;
VARBL4 = 0.0761;
IDMBL4 = 0.9780;
ENTBL4 = 0.7288;
```

```
ASMBL5 = 0.8133;
CONBL5 = 0.0359;
CORBL5 = 0.7643;
VARBL5 = 0.0581;
IDMBL5 = 0.9821;
ENTBL5 = 0.6024;
```

```
% perhitungan square euclidean
```

```
DR1 = ((CiriASM-ASMDR1)^2+(CiriCON-CONDR1)^2+(CiriCOR-  
CORDR1)^2+(CiriVAR-VARDR1)^2+(CiriIDM-IDMDR1)^2+(CiriENT-  
ENTDR1)^2)
```

```
DR2 = ((CiriASM-ASMDR2)^2+(CiriCON-CONDR2)^2+(CiriCOR-  
CORDR2)^2+(CiriVAR-VARDR2)^2+(CiriIDM-IDMDR2)^2+(CiriENT-  
ENTDR2)^2)
```

```
DR3 = ((CiriASM-ASMDR3)^2+(CiriCON-CONDR3)^2+(CiriCOR-  
CORDR3)^2+(CiriVAR-VARDR3)^2+(CiriIDM-IDMDR3)^2+(CiriENT-  
ENTDR3)^2)
```

```
DR4 = ((CiriASM-ASMDR4)^2+(CiriCON-CONDR4)^2+(CiriCOR-  
CORDR4)^2+(CiriVAR-VARDR4)^2+(CiriIDM-IDMDR4)^2+(CiriENT-  
ENTDR4)^2)
```

```
DR5 = ((CiriASM-ASMDR5)^2+(CiriCON-CONDR5)^2+(CiriCOR-  
CORDR5)^2+(CiriVAR-VARDR5)^2+(CiriIDM-IDMDR5)^2+(CiriENT-  
ENTDR5)^2)
```

```
BK1 = ((CiriASM-ASMBK1)^2+(CiriCON-CONBK1)^2+(CiriCOR-  
CORBK1)^2+(CiriVAR-VARBK1)^2+(CiriIDM-IDMBK1)^2+(CiriENT-  
ENTBK1)^2)
```

```
BK2 = ((CiriASM-ASMBK2)^2+(CiriCON-CONBK2)^2+(CiriCOR-  
CORBK2)^2+(CiriVAR-VARBK2)^2+(CiriIDM-IDMBK2)^2+(CiriENT-  
ENTBK2)^2)
```

```
BK3 = ((CiriASM-ASMBK3)^2+(CiriCON-CONBK3)^2+(CiriCOR-  
CORBK3)^2+(CiriVAR-VARBK3)^2+(CiriIDM-IDMBK3)^2+(CiriENT-  
ENTBK3)^2)
```

```
BK4 = ((CiriASM-ASMBK4)^2+(CiriCON-CONBK4)^2+(CiriCOR-  
CORBK4)^2+(CiriVAR-VARBK4)^2+(CiriIDM-IDMBK4)^2+(CiriENT-  
ENTBK4)^2)
```

```

BK5 = ((CiriASM-ASMBK5)^2+(CiriCON-CONBK5)^2+(CiriCOR-
CORBK5)^2+(CiriVAR-VARBK5)^2+(CiriIDM-IDMBK5)^2+(CiriENT-
ENTBK5)^2)
BL1 = ((CiriASM-ASMBL1)^2+(CiriCON-CONBL1)^2+(CiriCOR-
CORBL1)^2+(CiriVAR-VARBL1)^2+(CiriIDM-IDMBL1)^2+(CiriENT-
ENTBL1)^2)
BL2 = ((CiriASM-ASMBL2)^2+(CiriCON-CONBL2)^2+(CiriCOR-
CORBL2)^2+(CiriVAR-VARBL2)^2+(CiriIDM-IDMBL2)^2+(CiriENT-
ENTBL2)^2)
BL3 = ((CiriASM-ASMBL3)^2+(CiriCON-CONBL3)^2+(CiriCOR-
CORBL3)^2+(CiriVAR-VARBL3)^2+(CiriIDM-IDMBL3)^2+(CiriENT-
ENTBL3)^2)
BL4 = ((CiriASM-ASMBL4)^2+(CiriCON-CONBL4)^2+(CiriCOR-
CORBL4)^2+(CiriVAR-VARBL4)^2+(CiriIDM-IDMBL4)^2+(CiriENT-
ENTBL4)^2)
BL5 = ((CiriASM-ASMBL5)^2+(CiriCON-CONBL5)^2+(CiriCOR-
CORBL5)^2+(CiriVAR-VARBL5)^2+(CiriIDM-IDMBL5)^2+(CiriENT-
ENTBL5)^2)
%pencocokan ciri tekstur dan output
if ((DR1 <= DR1) & (DR1 < DR2) & (DR1 < DR3) & (DR1 < BK1) &
(DR1 < BK2) ...
& (DR1 < BK3) & (DR1 < BL1) & (DR1 < BL2) & (DR1 < BL3))
set(skripsi.text7,'string','KERANG DARAH')
end
if ((DR2 < DR1) & (DR2 <= DR2) & (DR2 < DR3) & (DR2 < BK1) &
(DR2 < BK2) ...
&(DR2 < BK3) & (DR2 < BL1) & (DR2 < BL2) & (DR2 < BL3))
set(skripsi.text7,'string','KERANG DARAH')
end
if ((DR3 < DR1) & (DR3 < DR2) & (DR3 <= DR3) & (DR3 < BK1) &
(DR3 < BK2) ...
& (DR3 < BK3) & (DR3 < BL1) & (DR3 < BL2) & (DR3 < BL3))
set(skripsi.text7,'string','KERANG DARAH')
end
if ((BK1 < DR1) & (BK1 < DR2) & (BK1 < DR3) & (BK1 <= BK1) &
(BK1 < BK2) ...
& (BK1 < BK3) & (BK1 < BL1) & (BK1 < BL2) & (BK1 < BL3))
set(skripsi.text7,'string','KERANG PASIR')
end
if ((BK2 < DR1) & (BK2 < DR2) & (BK2 < DR3) & (BK2 < BK1) &
(BK2 <= BK2) ...
& (BK2 < BK3) & (BK2 < BL1) & (BK2 < BL2) & (BK2 < BL3))
set(skripsi.text7,'string','KERANG PASIR')
end
if ((BK3 < DR1) & (BK3 < DR2) & (BK3 < DR3) & (BK3 < BK1) &
(BK3 < BK2) ...
& (BK3 <= BK3) & (BK3 < BL1) & (BK3 < BL2) & (BK3 < BL3))
set(skripsi.text7,'string','KERANG PASIR')
end
if ((BL1 < DR1) & (BL1 < DR2) & (BL1 < DR3) & (BL1 < BK1) &
(BL1 < BK2) ...
& (BL1 < BK3) & (BL1 <= BL1) & (BL1 < BL2) & (BL1 < BL3))
set(skripsi.text7,'string','KERANG BULU')
end
if ((BL2 < DR1) & (BL2 < DR2) & (BL2 < DR3) & (BL2 < BK1) &
(BL2 < BK2) ...

```

```

    & (BL2 < BK3) & (BL2 < BL1) & (BL2 <= BL2) & (BL2 < BL3))
    set(skripsi.text7,'string','KERANG BULU')
end
if ((BL3 < DR1) & (BL3 < DR2) & (BL3 < DR3) & (BL3 < BK1) &
(BL3 < BK2)...
    & (BL3 < BK3) & (BL3 < BL1) & (BL3 < BL2) & (BL3 <= BL3))
    set(skripsi.text7,'string','KERANG BULU')
end

```

Filter Gabor

```

clear all, close all, clc;
% membaca file citra
I = imread ('DR22.jpg');
%figure, imshow(I), title ('citra asli');

% mengubah citra RGB menjadi citra gray
gray = rgb2gray(I);
%figure, imshow(gray), title ('gray');
Ia = Adapthisteq(gray);
%figure, imshow (Ia), title ('adapthisteq');

background = imopen(Ia,strel('disk',7));

% Display the Background Approximation as a Surface
%figure, surf(double(background(1:8:end,1:8:end))),zlim([0 255]);
%set(gca,'ydir','reverse');

I2 = imsubtract(Ia,background);
%figure, imshow(I2);
%figure, imhist(I2);

I3 = imadjust(I2);
%figure, imshow(I3);

level = graythresh(I3);
bw = im2bw(I3,level);
%figure, imshow(bw);

%fungsi Filter Gabor
%-----
G = gb(bw,0,4);
%figure, imshow(G),title('Hasil Filter Gabor');

% menghitung energi
%-----
E = en(G)

%perhitungan
if E > 0.0290

```

```
if E < 0.0422
    set(skripsi.text6, 'string', 'KERANG DARAH')
else
    if E > 0.0422
        if E < 0.0695
            set(skripsi.text6, 'string', 'KERANG PASIR')
        else
            set(skripsi.text6, 'string', 'KERANG BULU')
        end
    end
end
end
```

LAMPIRAN 3

Hasil Uji menggunakan Nilai 45° pada Fungsi Filter Gabor

NO	CITRA UJI	NAMA CITRA	HASIL UJI GABOR	KT
1	BK7	KERANG PASIR	KERANG BULU	TS
2	BK8	KERANG PASIR	KERANG BULU	TS
3	BK9	KERANG PASIR	KERANG BULU	TS
4	BK10	KERANG PASIR	KERANG PASIR	S
5	BK11	KERANG PASIR	KERANG PASIR	S
6	BK12	KERANG PASIR	KERANG PASIR	S
7	BK13	KERANG PASIR	KERANG BULU	TS
8	BK14	KERANG PASIR	KERANG BULU	TS
9	BK15	KERANG PASIR	KERANG BULU	TS
10	BK16	KERANG PASIR	KERANG BULU	TS
11	BK17	KERANG PASIR	KERANG BULU	TS
12	BK18	KERANG PASIR	KERANG BULU	TS
13	BK19	KERANG PASIR	KERANG BULU	TS
14	BK20	KERANG PASIR	KERANG PASIR	S
15	BK21	KERANG PASIR	KERANG BULU	TS
16	BK22	KERANG PASIR	KERANG PASIR	S
17	BK23	KERANG PASIR	KERANG PASIR	S
18	BK24	KERANG PASIR	KERANG PASIR	S
19	BK25	KERANG PASIR	KERANG PASIR	S
20	BK26	KERANG PASIR	KERANG PASIR	S
21	BK27	KERANG PASIR	KERANG PASIR	S
22	BK28	KERANG PASIR	KERANG PASIR	S
23	BK29	KERANG PASIR	KERANG BULU	TS
24	BK30	KERANG PASIR	KERANG PASIR	S
25	BL8	KERANG BULU	KERANG BULU	S
26	BL9	KERANG BULU	KERANG BULU	S
27	BL10	KERANG BULU	KERANG BULU	S
28	BL11	KERANG BULU	KERANG BULU	S
29	BL12	KERANG BULU	KERANG BULU	S
30	BL13	KERANG BULU	KERANG BULU	S
31	BL14	KERANG BULU	KERANG BULU	S
32	BL15	KERANG BULU	KERANG BULU	S
33	BL16	KERANG BULU	KERANG BULU	S

34	BL17	KERANG BULU	KERANG BULU	S
35	BL18	KERANG BULU	KERANG BULU	S
36	BL19	KERANG BULU	KERANG BULU	S
37	BL20	KERANG BULU	KERANG BULU	S
38	BL21	KERANG BULU	KERANG BULU	S
39	BL22	KERANG BULU	KERANG BULU	S
40	BL23	KERANG BULU	KERANG BULU	S
41	BL24	KERANG BULU	KERANG BULU	S
42	BL25	KERANG BULU	KERANG BULU	S
43	BL26	KERANG BULU	KERANG BULU	S
44	BL27	KERANG BULU	KERANG BULU	S
45	BL28	KERANG BULU	KERANG BULU	S
46	BL29	KERANG BULU	KERANG BULU	S
47	BL30	KERANG BULU	KERANG BULU	S
48	BL31	KERANG BULU	KERANG BULU	S
49	DR8	KERANG DARAH	KERANG BULU	TS
50	DR9	KERANG DARAH	KERANG PASIR	TS
51	DR10	KERANG DARAH	KERANG PASIR	TS
52	DR11	KERANG DARAH	KERANG PASIR	TS
53	DR12	KERANG DARAH	KERANG PASIR	TS
54	DR13	KERANG DARAH	KERANG PASIR	TS
55	DR14	KERANG DARAH	KERANG PASIR	TS
56	DR15	KERANG DARAH	KERANG PASIR	TS
57	DR16	KERANG DARAH	KERANG PASIR	TS
58	DR17	KERANG DARAH	KERANG DARAH	S
59	DR18	KERANG DARAH	KERANG PASIR	TS
60	DR19	KERANG DARAH	KERANG PASIR	TS
61	DR20	KERANG DARAH	KERANG PASIR	TS
62	DR21	KERANG DARAH	KERANG BULU	TS
63	DR22	KERANG DARAH	KERANG PASIR	TS
64	DR23	KERANG DARAH	KERANG DARAH	S
65	DR24	KERANG DARAH	KERANG DARAH	S
66	DR25	KERANG DARAH	KERANG PASIR	TS
67	DR26	KERANG DARAH	KERANG PASIR	TS
68	DR27	KERANG DARAH	KERANG PASIR	TS
69	DR28	KERANG DARAH	KERANG PASIR	TS
70	DR29	KERANG DARAH	KERANG PASIR	TS
71	DR30	KERANG DARAH	KERANG DARAH	S
72	DR31	KERANG DARAH	KERANG PASIR	TS

Jenis Kerang	Sesuai	Tidak Sesuai
Kerang Pasir	12	12
Kerang Bulu	24	0
Kerang Darah	4	20

Hasil akurasi tabel dari setiap kelas dapat diperoleh dari perhitungan dibawah ini:

- Akurasi Kerang Pasir

$$\frac{f_{00}}{f_{01}} = \frac{12}{24} = 0.5$$

- Akurasi Kerang Bulu

$$\frac{f_{11}}{f_{12}} = \frac{24}{24} = 1$$

- Akurasi Kerang Darah

$$\frac{f_{22}}{f_{23}} = \frac{4}{24} = 0.166$$

- Akurasi Total

$$\frac{f_{00} + f_{11} + f_{22}}{F} = \frac{0.5 + 1 + 0.166}{3} \times 100\% = 55.53\%$$

LAMPIRAN 4

Perhitungan pencarian nilai kombinasi orientasi dan frekuensi

dara1

frekuensi	orientasi 30 - 0		60	90	120	150
	0	30				
0	0.0403	0.043	0.0434	0.0393	0.0431	0.0432
1	0.0294	0.0076	0.0072	0.0242	0.0102	0.0097
2	0.0125	0.0074	0.0096	0.0094	0.009	0.012
3	0.0184	0.014	0.0121	0.0114	0.0132	0.0256
4	0.0343	0.0291	0.0278	0.0312	0.029	0.031
5	0.0296	0.0291	0.029	0.0291	0.0293	0.0296
6	0.0286	0.0285	0.0284	0.0289	0.0284	0.0285

dara2

frekuensi	orientasi 30 - 0		60	90	120	150
	0	30				
0	0.0615	0.0642	0.0647	0.0600	0.0647	0.0640
1	0.0450	0.0167	0.0154	0.0375	0.0126	0.0129
2	0.0138	0.0127	0.0093	0.0103	0.0119	0.0153
3	0.0283	0.0221	0.0189	0.0126	0.0267	0.0363
4	0.0616	0.0494	0.0421	0.0438	0.0457	0.0530
5	0.0437	0.0422	0.0407	0.0407	0.0420	0.0435
6	0.0403	0.0400	0.0396	0.0396	0.0399	0.0403

dara3

frekuensi	orientasi 30 - 0		60	90	120	150
	0	30				
0	0.0470	0.0491	0.0491	0.0464	0.0490	0.0489
1	0.0329	0.0079	0.0080	0.0300	0.0062	0.0063
2	0.0105	0.0104	0.0063	0.0065	0.0110	0.0096
3	0.0195	0.0170	0.0156	0.0131	0.0177	0.0200
4	0.0451	0.0392	0.0358	0.0405	0.0376	0.0399
5	0.0352	0.0346	0.0342	0.0344	0.0348	0.0353
6	0.0331	0.0330	0.0329	0.0330	0.0331	0.0332

dara4

frekuensi	orientasi 30 - 0		60	90	120	150
	0	30				
0	0.0311	0.0333	0.0339	0.0293	0.0338	0.0332
1	0.0242	0.0093	0.0092	0.0178	0.0087	0.0088
2	0.0085	0.0101	0.0046	0.0089	0.0066	0.0080
3	0.0182	0.0140	0.0074	0.0077	0.0080	0.0188
4	0.0257	0.0221	0.0257	0.0295	0.0280	0.0255
5	0.0308	0.0316	0.0313	0.0307	0.0311	0.0315
6	0.0311	0.0311	0.0308	0.0307	0.0307	0.0310

dara5

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0568	0.0595	0.0604	0.0547	0.0598	0.0590
1	0.0398	0.0134	0.0144	0.0332	0.0119	0.0127
2	0.0101	0.0099	0.0074	0.0110	0.0114	0.0174
3	0.0257	0.0205	0.0138	0.0133	0.0181	0.0373
4	0.0559	0.0444	0.0369	0.0401	0.0421	0.0501
5	0.0409	0.0392	0.0379	0.0381	0.0397	0.0411
6	0.0380	0.0377	0.0374	0.0374	0.0378	0.0381

bulu1

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0894	0.0951	0.0947	0.0902	0.0963	0.0960
1	0.0553	0.0166	0.0157	0.0612	0.0144	0.0142
2	0.0133	0.0209	0.0268	0.0183	0.0172	0.0189
3	0.0191	0.0402	0.0503	0.0257	0.0275	0.0244
4	0.0744	0.0795	0.0833	0.0838	0.0641	0.0620
5	0.0666	0.0690	0.0698	0.0682	0.0657	0.0649
6	0.0643	0.0648	0.0650	0.0646	0.0641	0.0639

bulu2

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0644	0.0685	0.0686	0.0646	0.0646	0.0691
1	0.0396	0.0121	0.0120	0.0400	0.0141	0.0145
2	0.0078	0.0168	0.0163	0.0076	0.0106	0.0133
3	0.0184	0.0327	0.0327	0.0273	0.0175	0.0173
4	0.0552	0.0546	0.0558	0.0574	0.0478	0.0460
5	0.0469	0.0478	0.0480	0.0473	0.0463	0.0461
6	0.0449	0.0451	0.0451	0.0450	0.0447	0.0447

bulu3

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0979	0.1035	0.1033	0.0984	0.1049	0.1049
1	0.0625	0.0166	0.0172	0.0619	0.0187	0.0187
2	0.0128	0.0244	0.0198	0.0127	0.0173	0.0201
3	0.0267	0.0610	0.0644	0.0395	0.0240	0.0233
4	0.0847	0.0904	0.0925	0.0873	0.0684	0.0678
5	0.0731	0.0759	0.0763	0.0739	0.0711	0.0707
6	0.0704	0.0710	0.0711	0.0706	0.0699	0.0699

bulu4

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0906	0.0954	0.0954	0.0902	0.0969	0.0966
1	0.0611	0.0170	0.0169	0.0574	0.0160	0.0173
2	0.0145	0.0228	0.0209	0.0137	0.0174	0.0184
3	0.0293	0.0580	0.0527	0.0323	0.0196	0.0186
4	0.0761	0.0794	0.0796	0.0787	0.0646	0.0637
5	0.0671	0.0688	0.0691	0.0676	0.0659	0.0656
6	0.0647	0.0650	0.0651	0.0648	0.0644	0.0643

bulu5

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0673	0.0727	0.0723	0.0684	0.0727	0.0729
1	0.0426	0.0110	0.0110	0.0471	0.0127	0.0123
2	0.0115	0.0154	0.0136	0.0164	0.0154	0.0133
3	0.0215	0.0288	0.0452	0.0262	0.0272	0.0178
4	0.0555	0.0547	0.0596	0.0647	0.0515	0.0469
5	0.0477	0.0489	0.0498	0.0495	0.0481	0.0472
6	0.0459	0.0462	0.0464	0.0463	0.0460	0.0458

pasir1

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0644	0.0644	0.0672	0.0575	0.0675	0.0655
1	0.0542	0.0114	0.0128	0.0350	0.0104	0.0106
2	0.0200	0.0142	0.0144	0.0100	0.0113	0.0134
3	0.0465	0.0393	0.0129	0.0179	0.0088	0.0299
4	0.0532	0.0467	0.0446	0.0408	0.0439	0.0439
5	0.0462	0.0457	0.0451	0.0448	0.0453	0.0460
6	0.0453	0.0452	0.0451	0.0451	0.0452	0.0453

pasir2

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0599	0.0604	0.0618	0.0618	0.0621	0.0604
1	0.0497	0.0081	0.0083	0.0303	0.0103	0.0099
2	0.0194	0.0133	0.0109	0.0075	0.0124	0.0128
3	0.0493	0.0401	0.0155	0.0128	0.0122	0.0311
4	0.0542	0.0463	0.0387	0.0384	0.0394	0.0447
5	0.0405	0.0398	0.0389	0.0387	0.0392	0.0401
6	0.0385	0.0384	0.0382	0.0381	0.0383	0.0384

pasir3

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0705	0.0704	0.0726	0.0636	0.0728	0.0715
1	0.0590	0.0140	0.0140	0.0365	0.0083	0.0086
2	0.0205	0.0151	0.0152	0.0074	0.0141	0.0147
3	0.0597	0.0472	0.0137	0.0145	0.0155	0.0341
4	0.0622	0.0522	0.0478	0.0476	0.0452	0.0525
5	0.0488	0.0476	0.0465	0.0466	0.0469	0.0483
6	0.0469	0.0466	0.0464	0.0464	0.0465	0.0468

pasir4

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0815	0.0837	0.0845	0.0755	0.0859	0.0845
1	0.0647	0.0146	0.0138	0.0423	0.0199	0.0202
2	0.0204	0.0270	0.0092	0.0144	0.0151	0.0151
3	0.0505	0.0712	0.0240	0.0173	0.0146	0.0242
4	0.0690	0.0664	0.0562	0.0564	0.0526	0.0592
5	0.0620	0.0628	0.0621	0.0612	0.0597	0.0600
6	0.0612	0.0616	0.0616	0.0611	0.0607	0.0608

pasir5

frekuensi	orientasi		30 - 0			
	0	30	60	90	120	150
0	0.0821	0.0833	0.0844	0.0766	0.0844	0.0833
1	0.0682	0.0123	0.0119	0.0427	0.0124	0.0129
2	0.0339	0.0159	0.0127	0.0091	0.0162	0.0201
3	0.0635	0.0516	0.0124	0.0087	0.0119	0.0405
4	0.0834	0.0665	0.0545	0.0526	0.0533	0.0661
5	0.0578	0.0565	0.0543	0.0535	0.0544	0.0566
6	0.0538	0.0535	0.0530	0.0528	0.0531	0.0535

NO	CITRA UJI	NAMA CITRA	HASIL UJI	KETERANGAN
1	BK7	KERANG PASIR	KERANG PASIR	SESUAI
2	BK8	KERANG PASIR	KERANG BULU	TIDAK SESUAI
3	BK9	KERANG PASIR	KERANG PASIR	SESUAI
4	BK10	KERANG PASIR	KERANG PASIR	SESUAI
5	BK11	KERANG PASIR	KERANG PASIR	SESUAI
6	BK12	KERANG PASIR	KERANG PASIR	SESUAI
7	BK13	KERANG PASIR	KERANG PASIR	SESUAI
8	BK14	KERANG PASIR	KERANG PASIR	SESUAI
9	BK15	KERANG PASIR	KERANG PASIR	SESUAI
10	BK16	KERANG PASIR	KERANG PASIR	SESUAI
11	BK17	KERANG PASIR	KERANG PASIR	SESUAI
12	BK18	KERANG PASIR	KERANG PASIR	SESUAI
13	BK19	KERANG PASIR	KERANG BULU	TIDAK SESUAI
14	BK20	KERANG PASIR	KERANG PASIR	SESUAI
15	BK21	KERANG PASIR	KERANG PASIR	SESUAI
16	BK22	KERANG PASIR	KERANG PASIR	SESUAI
17	BK23	KERANG PASIR	KERANG PASIR	SESUAI
18	BK24	KERANG PASIR	KERANG PASIR	SESUAI
19	BK25	KERANG PASIR	KERANG PASIR	SESUAI
20	BK26	KERANG PASIR	KERANG DARAH	TIDAK SESUAI
21	BK27	KERANG PASIR	KERANG DARAH	TIDAK SESUAI
22	BK28	KERANG PASIR	KERANG PASIR	SESUAI
23	BK29	KERANG PASIR	KERANG PASIR	SESUAI
24	BK30	KERANG PASIR	KERANG PASIR	SESUAI
25	BL8	KERANG BULU	KERANG BULU	SESUAI
26	BL9	KERANG BULU	KERANG BULU	SESUAI
27	BL10	KERANG BULU	KERANG BULU	SESUAI
28	BL11	KERANG BULU	KERANG PASIR	TIDAK SESUAI
29	BL12	KERANG BULU	KERANG BULU	SESUAI
30	BL13	KERANG BULU	KERANG BULU	SESUAI
31	BL14	KERANG BULU	KERANG BULU	SESUAI
32	BL15	KERANG BULU	KERANG BULU	SESUAI
33	BL16	KERANG BULU	KERANG BULU	SESUAI
34	BL17	KERANG BULU	KERANG BULU	SESUAI
35	BL18	KERANG BULU	KERANG PASIR	TIDAK SESUAI
36	BL19	KERANG BULU	KERANG BULU	SESUAI
37	BL20	KERANG BULU	KERANG PASIR	TIDAK SESUAI
38	BL21	KERANG BULU	KERANG BULU	SESUAI
39	BL22	KERANG BULU	KERANG BULU	SESUAI
40	BL23	KERANG BULU	KERANG PASIR	TIDAK SESUAI
41	BL24	KERANG BULU	KERANG BULU	SESUAI
42	BL25	KERANG BULU	KERANG BULU	SESUAI
43	BL26	KERANG BULU	KERANG BULU	SESUAI
44	BL27	KERANG BULU	KERANG BULU	SESUAI
45	BL28	KERANG BULU	KERANG BULU	SESUAI
46	BL29	KERANG BULU	KERANG PASIR	TIDAK SESUAI

48	DR8	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
49	DR9	KERANG DARAH	KERANG DARAH	SESUAI
50	DR10	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
51	DR11	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
52	DR12	KERANG DARAH	KERANG DARAH	SESUAI
53	DR13	KERANG DARAH	KERANG DARAH	SESUAI
54	DR14	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
55	DR15	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
56	DR16	KERANG DARAH	KERANG DARAH	SESUAI
57	DR17	KERANG DARAH	KERANG DARAH	SESUAI
58	DR18	KERANG DARAH	KERANG DARAH	SESUAI
59	DR19	KERANG DARAH	KERANG DARAH	SESUAI
60	DR20	KERANG DARAH	KERANG DARAH	SESUAI
61	DR21	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
62	DR22	KERANG DARAH	KERANG DARAH	SESUAI
63	DR23	KERANG DARAH	KERANG DARAH	SESUAI
64	DR24	KERANG DARAH	KERANG DARAH	SESUAI
65	DR25	KERANG DARAH	KERANG DARAH	SESUAI
66	DR26	KERANG DARAH	KERANG PASIR	TIDAK SESUAI
67	DR27	KERANG DARAH	KERANG DARAH	SESUAI
68	DR28	KERANG DARAH	KERANG DARAH	SESUAI
69	DR29	KERANG DARAH	KERANG DARAH	SESUAI
70	DR30	KERANG DARAH	KERANG DARAH	SESUAI
71	DR31	KERANG DARAH	KERANG DARAH	SESUAI

