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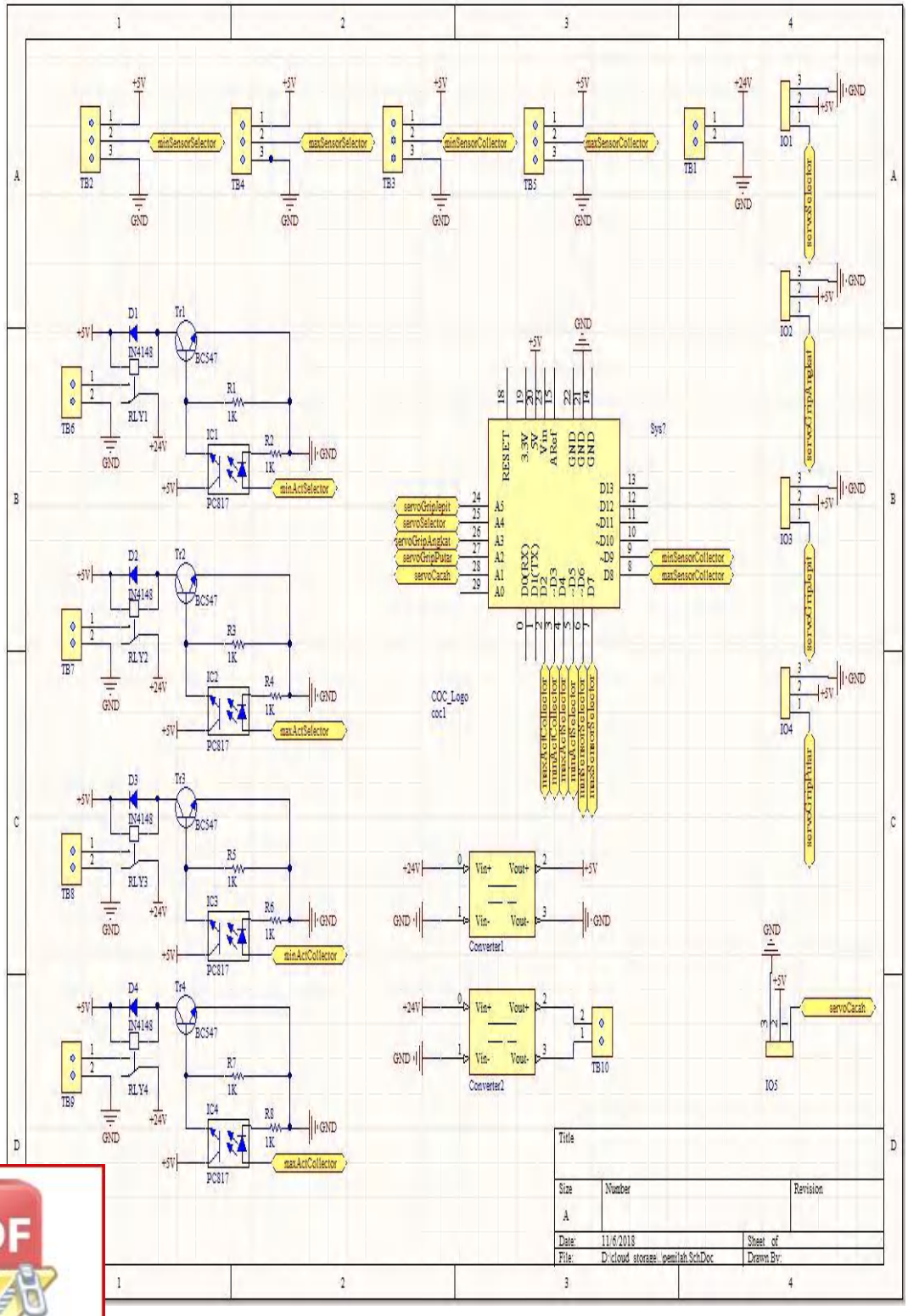
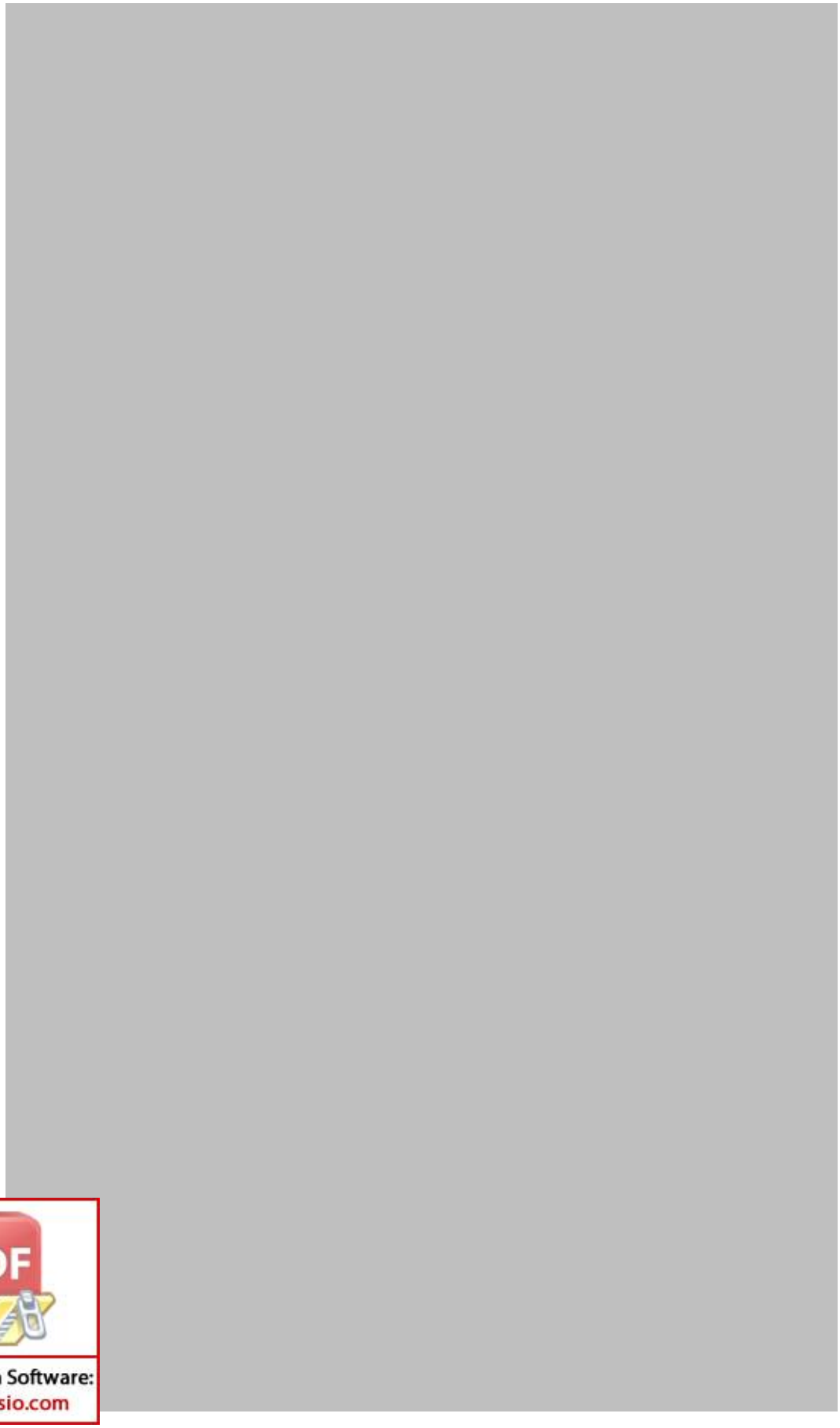
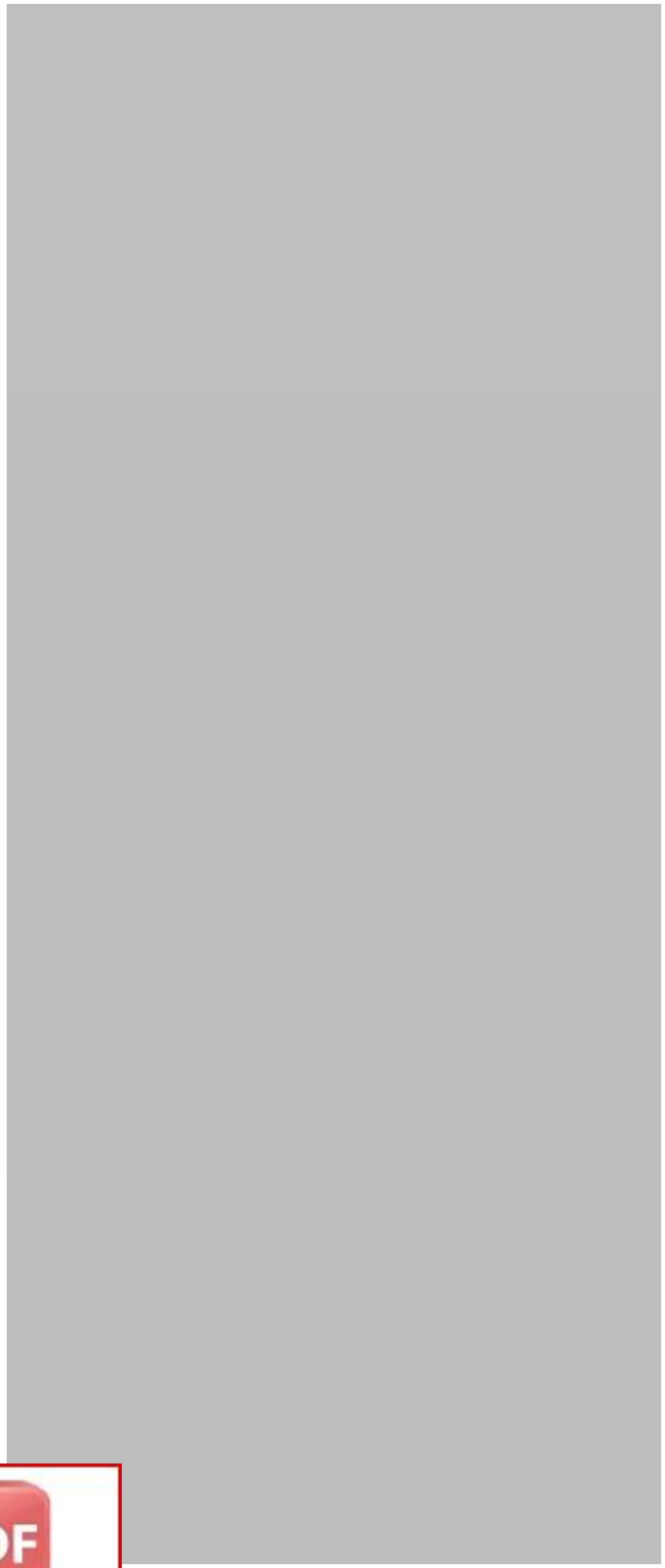
LAMPIRAN

A. SCHEMATIC MESIN PEMILAH BUAH MARKISA







MATRIKS HASIL TRAINING MSVM PADA MATLAB

No	Matang	Mengkal	Mentah
1	-1.0002	-1.0755	-1.0000
2	-0.9996	-1.0000	-1.0001
3	-0.9998	-0.9998	-0.9998
4	-1.0530	-1.0004	-1.2298
5	-1.1427	-1.1363	-1.0268
6	-1.0001	-0.9997	-1.0003
7	-1.3795	-1.2964	-1.1610
8	-0.9994	-0.9998	-0.9998
9	-1.2580	-1.1911	-1.0760
10	-1.2196	-1.1650	-1.1533
11	-0.9996	-1.0001	-0.9997
12	-0.9999	-0.9999	-0.9997
13	-1.2102	-1.1683	-1.0535
14	-0.9997	-1.0003	-0.9997
15	-0.9999	-0.9999	-0.9998
16	-1.0004	-1.0003	-0.9999
17	-0.9996	-1.0019	-1.0009
18	-0.9998	-1.0000	-0.9998
19	-1.0003	-0.9999	-1.0400
20	-1.0897	-1.1237	-1.0515
21	-0.9997	-0.9994	-1.0002
22	-1.3557	-1.2740	-1.1298
23	-1.0748	-1.0792	-1.0667
24	-0.9992	-1.0000	-0.9999
25	-0.9994	-0.9999	-1.0003
26	-0.9998	-0.9998	-0.9999
27	-0.9998	-1.0001	-1.0003
28	-1.0001	-0.9998	-1.0001
29	-1.1892	-1.1400	-1.1293
30	-1.1007	-1.0927	-1.0801
31	1.0001	0.9998	-1.1916
32	1.0007	1.0000	-1.1040
33	1.0008	0.9997	-1.0000
34	1.0007	0.9999	-0.9998
35	1.0002	0.9996	-1.0001
36	1.0001	0.9999	-1.0000
37	1.1055	1.0003	-0.9998
38	1.0002	1.0000	-0.9998
39	1.2758	1.3186	-1.0681
40	1.0003	1.0001	-0.9999
41	1.0005	1.0000	-0.9996
42	1.1564	1.0390	-0.9999
	1.3956	1.5266	-1.2038
	1.0000	0.9999	-1.0002
	1.1187	1.1937	-1.1063
	1.0002	1.0001	-0.9998

47	1.0003	1.0000	-1.0000
48	1.4991	1.7256	-1.3492
49	1.0220	1.0224	-1.0277
50	1.0006	1.0005	-1.0000
51	1.0008	0.9997	-0.9999
52	1.0002	0.9999	-0.9999
53	1.0799	1.0935	-1.1094
54	0.9999	0.9998	-0.9998
55	1.1280	1.1605	-1.1011
56	1.0261	1.0066	-0.9999
57	1.0000	1.0001	-0.9998
58	0.9997	1.0001	-0.9999
59	1.0074	1.0003	-1.0000
60	1.0002	0.9995	-1.0002
61	1.1408	-1.2173	1.3428
62	1.0995	-1.0744	1.1496
63	1.0000	-1.0002	1.0002
64	1.0005	-0.9997	1.0001
65	1.0002	-1.0001	1.0000
66	1.0141	-0.9997	1.0004
67	1.0002	-1.0002	0.9999
68	1.1825	-1.2209	1.3712
69	1.0982	-1.2444	1.3120
70	1.2255	-1.2397	1.4299
71	1.1321	-1.2181	1.3434
72	1.1180	-1.0697	1.1488
73	1.0002	-0.9998	1.0001
74	1.0044	-1.0260	1.0365
75	1.1469	-1.0852	1.2107
76	1.0627	-1.0570	1.0960
77	1.0000	-1.0001	1.0000
78	1.0002	-0.9995	1.0001
79	0.9996	-1.0001	0.9996
80	0.9998	-1.0720	0.9998
81	1.0003	-1.0000	1.0004
82	1.1191	-1.1984	1.2792
83	0.9999	-1.0004	1.0001
84	1.1044	-1.1378	1.2194
85	0.9997	-0.9999	0.9997
86	1.0003	-1.0951	1.0647
87	1.0263	-1.0001	1.0131
88	1.2103	-1.1831	1.3676
89	1.1635	-1.1159	1.2549
90	1.1622	-1.1253	1.2829

MATRIKS HASIL TESTING MSVM PADA MATLAB

No	Matang	Mengkal	Mentah
1	-0.35297	-0.08142	-2.12247
2	-1.21092	-0.98334	-1.53287
3	-1.50556	-1.18125	-1.71516
4	-1.63858	-1.61328	-1.82788
5	-1.77996	-1.31518	-2.02256
6	0.001006	0.075268	-1.18327
7	-1.36016	-1.08513	-1.8007
8	-0.76757	-0.96744	-1.06806
9	-1.9693	-1.69055	-1.84637
10	-1.09156	-0.40096	-1.82088
11	3.012975	1.022005	-0.31955
12	0.300875	0.448543	-2.01394
13	0.050885	0.283081	-1.76057
14	1.831077	0.957462	-0.74998
15	1.014461	1.040118	-1.28
16	1.421888	1.522252	-1.52582
17	1.662041	1.083666	-1.03323
18	1.908603	1.201456	-1.29805
19	1.841302	1.42674	-1.63832
20	0.306263	0.495192	-2.11488
21	2.504119	-1.4763	1.507916
22	2.427836	-1.59973	1.414643
23	2.599134	-1.32047	1.183283
24	2.41543	-1.17121	1.317994
25	2.197881	-1.5959	1.454627
26	1.755436	-1.47175	1.420234
27	2.401092	-2.03333	1.749961
28	2.424658	-0.30194	0.5093
29	2.350075	-0.75785	0.579406
30	2.788748	-0.77118	0.806641

C. CODING MATLAB

C.1 SEGMENTASI FCM

```
clc; clear; close all;
save fitur_hsv_training
%memanggil frame
        files=dir('D:\Disertasi Terbaru\Disertasi\Coding
Markisa\Maret 19, 2018\SEGMENTASI FCM - Coba2\Training\frame
training 2\*.jpg');
        n =numel(files);
for i=1:n;
        str = strcat('D:\Disertasi Terbaru\Disertasi\Coding
Markisa\Maret 19, 2018\SEGMENTASI FCM - Coba2\Training\frame
training 2\', files(i).name);

        Img =imread(str);
    Img = imresize(Img,0.3);

    %Mengubah palet warna dari RGB menjadi L*a*b untuk segemntasi
menggunakan K-Means
            cform = makecform('srgb2lab'); %membuat struct
transformasi warna sesuai type di dlm kurung
            lab_markisa = applycform(Img,cform); %mengubah color
space Img sesuai type yg dipilih

            file_name=strcat('z1hasil lab_',num2str(i),'.jpg');
            imwrite(lab_markisa,file_name);

            %Memetakan nilai a*b* tiap-tiap piksel
            ab = double(lab_markisa(:,:,2:3)); %mengonversi ke
double nilai semua piksel di dimensi 2 (a) dan 3 (b)
            nrows = size(ab,1); %ukuran baris matriks ab
            ncols = size(ab,2); %ukuran kolom matriks ab
            ab = reshape(ab,nrows*ncols,2); %menjadikan matriks ab
menjadi ukuran nrows*ncols x 2

    nColors = 2;
    [centers,U] = fcm(ab,nColors);

    maxU = max(U);
    index1 = find(U(1,:) == maxU);
    index2 = find(U(2,:) == maxU);

cluster_idx = zeros(nrows,ncols);
cluster_idx(index1) = 1;
cluster_idx(index2) = 2;
pixel_labels = reshape(cluster_idx,nrows,ncols);

        abung tiap-tiap kluster yang terdapat markisa menjadi satu

        %markisa
```

```
            area_cluster1 = sum(sum(pixel_labels==1)) %jumlah dari
jumlah pixel_labels yang pikselnya bernilai 1 di setiap kolom
            area_cluster2 = sum(sum(pixel_labels==2))

            [~,cluster_markisa] =
min([area_cluster1,area_cluster2]); %cluster_markisa berisi posisi
baris dimana nilai minimum dari area_cluster1 dan 2
            markisa_bw = (pixel_labels==cluster_markisa);

            file_name=strcat('z2hasil
cluster_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

            %Mengisi lubang2 yang terdapat di dalam objek sehingga
menghasilkan objek
            %yang utuh
            markisa_bw = imfill(markisa_bw,'holes'); %mengisi
piksel yang tersambung tapi kosong
%
            file_name=strcat('z3setelah
imfill_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

            %Menghilangkan noise dengan menghapus objek yang area
nya berukuran kurang dari 3000
            if area_cluster1 >5000 && area_cluster2 >1000
            markisa_bw = bwareaopen(markisa_bw,1000);
            elseif area_cluster1 >5000 && area_cluster2 <1000
            markisa_bw = bwareaopen(markisa_bw,500);
            elseif area_cluster1 <5000
            markisa_bw = bwareaopen(markisa_bw,500);
            elseif area_cluster1 >50000 && area_cluster2 <500
            markisa_bw = bwareaopen(markisa_bw,1000);
            end

            file_name=strcat('z4setelah
hapusNOISE_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

        h = regionprops(markisa_bw, 'BoundingBox')
            if ~isempty(h)
            bb = h.BoundingBox;
                if length(h)== 1
                    if bb(1) > 1.00 && bb(2) > 10.00
                       jenis(i,:)=1;
                       s = h;
                       bb = s.BoundingBox;
                       markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
(4)),...

(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))

                    elseif bb(1) < 1.00 || bb(2) < 1.00
                        if bb(3) <300
                        jenis(i,:)=2;
```

```
                        bb = [173 108 56 56];
                        markisa_bw = imcrop (markisa_bw,bb);
                        else
                        bb = [173 100 56 56];
                        markisa_bw = imcrop (markisa_bw,bb);
                        end
                        end
                elseif length(h) > 1 && length(h) <5
                    jenis(i,:)=3;
                     s = h(2,:);
                     bb = s.BoundingBox;
                    if bb(3) > 200
                        jenis(i,:)=2;
                        bb = [173 108 56 56];
                        markisa_bw = imcrop (markisa_bw,bb);
                     else
                     markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
dingBox(4)),...

round(s(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))
);
                    end
                    elseif length(h) >= 5
                     jenis(i,:)=4;
                    s = h(4,:);
                      bb = s.BoundingBox;
                      markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
dingBox(4)),...

round(s(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))
);
                  end
              elseif isempty(h)
                  jenis(i,:)=5;
                  bb = [175 100 56 56];
             markisa_bw = imcrop (markisa_bw,bb);
             else
                 jenis(i,:)=6;
                  bb = [175 100 56 56];
                 markisa_bw = imcrop (markisa_bw,bb);
            end

            zzNILAI_H(i,:)=length(h);

            file_name=strcat('z5setelah
cropBBox_',num2str(i),'.bmp');
          imwrite(markisa_bw,file_name);
%

      %Membuat matriks 'Markisa' yang berisikan nilai Img
ntinya akan
      %digunakan untuk ekstraksi fitur warna

  Markisa = imcrop(Img,bb);
```

```
%Membuat Matriks R,G dan B
            R = Markisa(:,:,1); %memanggil matriks nilai R
            G = Markisa(:,:,2); %memanggil matriks nilai G
            B = Markisa(:,:,3); %memanggil matriks nilai B

            lab_markisa = applycform(Markisa,cform);
            ab = double(lab_markisa(:,:,2:3)); %mengonversi ke
double nilai semua piksel di dimensi 2 (a) dan 3 (b)
            nrows = size(ab,1); %ukuran baris matriks ab
            ncols = size(ab,2); %ukuran kolom matriks ab
            ab = reshape(ab,nrows*ncols,2);
            A = ab(:,1); %nilai A saja,

            %Inisialisasi matriks dengan nilai 0 ??
            R(~markisa_bw) = 0; %titik di R yang sama dgn
markisa_bw dan nilainya tidak ada atau 0, maka dijadikan 0
            G(~markisa_bw) = 0; %sama dgn R
            B(~markisa_bw) = 0; %sama dgn R

            markisa_rgb = cat(3,R,G,B); %menggabungkan array RGB
menjadi matriks 3 dimensi

            file_name=strcat('z6setelah jadi
rgb_',num2str(i),'.jpg');
            imwrite(markisa_rgb,file_name);

            dim = size(markisa_rgb);
            if dim(:,1) <= 70 && dim(:,2) > 70
                markisa_rgb = imcrop(markisa_rgb, [0 0 55 55]);
            elseif dim(:,1) > 70 && dim(:,1) <= 100
                markisa_rgb = imcrop(markisa_rgb, [20 12 60 60]);
            elseif dim(:,1) >= 100 && dim(:,2) > 150
                markisa_rgb = imcrop(markisa_rgb, [50 30 60 60]);
            end
            markisa_rgb = imresize(markisa_rgb, [56 56]);

            zzNILAI_DIM(i,:)=dim;

            file_name=strcat('z7setelah crop dan
resize_',num2str(i),'.jpg');
            imwrite(markisa_rgb,file_name);

            CiriR(i) = mean2(markisa_rgb(:,:,1)); %mencari rata-
rata Red di markisa_rgb
            CiriG(i) = mean2(markisa_rgb(:,:,2));
            CiriB(i) = mean2(markisa_rgb(:,:,3));
            CiriA(i) = mean2(A);
end

= [CiriR;CiriG;CiriB;CiriA];
= reshape(input1,[],90);

tur_rgb_training input1
```

C.2 SEGMENTASI K-MEANS

```
clc; clear; close all;

%memanggil frame
        files=dir('D:\Disertasi Terbaru\Disertasi\Coding
Markisa\Maret 19, 2018\SEGMENTASI KMEANS\training\frame
training\*.jpg');
        n =numel(files);
for i=1:n
        str = strcat('D:\Disertasi Terbaru\Disertasi\Coding
Markisa\Maret 19, 2018\SEGMENTASI KMEANS\training\frame
training\', files(i).name);

    Img =imread(str);
    Img = imresize(Img,0.3);

          %Mengubah palet warna dari RGB menjadi L*a*b untuk
segemntasi menggunakan K-Means
           cform = makecform('srgb2lab'); %membuat struct
transformasi warna sesuai type di dlm kurung
           lab_markisa = applycform(Img,cform); %mengubah color
space Img sesuai type yg dipilih

           file_name=strcat('z1hasil lab_',num2str(i),'.jpg');
           imwrite(lab_markisa,file_name);

           %Memetakan nilai a*b* tiap-tiap piksel
           ab = double(lab_markisa(:,:,2:3)); %mengonversi ke
double nilai semua piksel di dimensi 2 (a) dan 3 (b)
           nrows = size(ab,1); %ukuran baris matriks ab
           ncols = size(ab,2); %ukuran kolom matriks ab
           ab = reshape(ab,nrows*ncols,2); %menjadikan matriks ab
menjadi ukuran nrows*ncols x 2

           %Memilih jumlah kluster
           nColors = 2; %jumlah cluster  warna = 2
           %ulangi klustering sebanyak 3 kali untuk menghindari
lokal minima ??
           [cluster_idx,cluster_center] =
kmeans(ab,nColors,'distance','sqEuclidean','Replicates',3);
               %cluster_idx berisi indikasi cluster setiap titik.
               %jika ukuran matriks ab = n x p, maka ukuran idx
adalah n x 1
               %cluster_center berisi lokasi piksel centroid
setiap cluster
               %jika ukuran matriks ab = n x p dan k = jumlah
cluster, maka ukuran C adalah k x p

           data ab

           (cluster_idx==1,1),ab(cluster_idx==1,2),'r.','MarkerSize',1

           on
```

```
%
plot(ab(cluster_idx==2,1),ab(cluster_idx==2,2),'b.','MarkerSize',1
2)
% plot(cluster_center(:,1),cluster_center(:,2),'kx',...
%      'MarkerSize',12,'LineWidth',2)
% plot(cluster_center(:,1),cluster_center(:,2),'ko',...
%      'MarkerSize',12,'LineWidth',2)

            %Tandai tiap pixel pada citra dengan 'cluster_index'-
nya masing2.
            pixel_labels = reshape(cluster_idx,nrows,ncols);
                %menjadikan  matriks cluster_idx berukuran nrows x
ncols
                %sehingga setiap titik piksel memiliki nilai idx

%                 %Mengelompokkan tiap-tiap piksel ke dalam
kluster masing-masing
%             segmented_images = cell(1,3); %membuat cell array
berisi matriks ksong berukuran 1 x 3
%             rgb_label = repmat(pixel_labels, [1 1 3]);
%                 %membuat array rgb_label multidimensi terdiri
dari isi
%                 %matriks piksel_labels.
%                 %ukuran rgb_label = [ukuran baris piksel_labels
x 1, ukuran
%                 %kolom piksel_labels x 1, ukuran dimensi
piksel_labels x 3]
%
%             for k = 1:nColors %perulangan sebanyak 2 kali
%                 color = Img;    %membuat variabel color berisi
matriks Img
%                 color(rgb_label ~=k) =0; %semua titik di color
yang sama titiknya di rgb_label dan nilainya tidak sama dgn k,
diubah menajdi 0
%                 segmented_images{k} = color; %mengisi cell ke k
segmented images dgn matriks color
%
%             end

            %Object segmentation (tiap-tiap isi dari kluster
digabungkan di tiap2 kluster)
            area_cluster1 = sum(sum(pixel_labels==1)) %jumlah dari
jumlah pixel_labels yang pikselnya bernilai 1 di setiap kolom
            area_cluster2 = sum(sum(pixel_labels==2))   %jumlah
dari jumlah pixel_labels yang pikselnya bernilai 2 di setiap kolom

            zzNILAI_area_cluster1(i,:)=area_cluster1;
            zzNILAI_area_cluster2(i,:)=area_cluster2;

            %Menggabung tiap-tiap kluster yang terdapat markisa
        satu citra
            %markisa
            [~,cluster_markisa] =
        ea_cluster1,area_cluster2]); %cluster_markisa berisi posisi
        imana nilai minimum dari area_cluster1 dan 2
```

```
            markisa_bw = (pixel_labels==cluster_markisa);
%markisa_bw1 nilainya 1 jika titik piksel matriks pixel_labels
sama dengan cluster_markisa, jika tidak diberi nilai 0

            file_name=strcat('z2hasil
cluster_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

            %Mengisi lubang2 yang terdapat di dalam objek sehingga
menghasilkan objek
            %yang utuh
            markisa_bw = imfill(markisa_bw,'holes'); %mengisi
piksel yang tersambung tapi kosong
%
            file_name=strcat('z3setelah
imfill_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

            %Menghilangkan noise dengan menghapus objek yang area
nya berukuran kurang dari 3000
            if area_cluster1 >5000 && area_cluster2 >1000
            markisa_bw = bwareaopen(markisa_bw,1000);
            elseif area_cluster1 >5000 && area_cluster2 <1000
            markisa_bw = bwareaopen(markisa_bw,500);
            elseif area_cluster1 <5000
            markisa_bw = bwareaopen(markisa_bw,500);
            elseif area_cluster1 >50000 && area_cluster2 <500
            markisa_bw = bwareaopen(markisa_bw,1000);
            end

            file_name=strcat('z4setelah
hapusNOISE_',num2str(i),'.bmp');
            imwrite(markisa_bw,file_name);

           h = regionprops(markisa_bw, 'BoundingBox')
            if ~isempty(h)
            bb = h.BoundingBox;
                if length(h)== 1
                    if bb(1) > 1.00 && bb(2) > 10.00
                        jenis(i,:)=1;
                        s = h;
                        bb = s.BoundingBox;
                        markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
dingBox(4)),...

round(s(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))
);
                    elseif bb(1) < 1.00 || bb(2) < 1.00
                        if bb(3) <300
                        jenis(i,:)=2;
                        bb = [173 108 56 56];
                        markisa_bw = imcrop (markisa_bw,bb);
                        else
                        bb = [173 100 56 56];
                        markisa_bw = imcrop (markisa_bw,bb);
```

```
                    end
                end
            elseif length(h) > 1 && length(h) <5
                jenis(i,:)=3;
                s = h(2,:);
                bb = s.BoundingBox;
                if bb(3) > 200
                    jenis(i,:)=2;
                    bb = [173 108 56 56];
                    markisa_bw = imcrop (markisa_bw,bb);
                else
                markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
dingBox(4)),...

round(s(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))
);
                end
            elseif length(h) >= 5
                jenis(i,:)=4;
                s = h(4,:);
                bb = s.BoundingBox;
                markisa_bw =
markisa_bw(round(s(1).BoundingBox(2):s(1).BoundingBox(2)+s(1).Boun
dingBox(4)),...

round(s(1).BoundingBox(1):s(1).BoundingBox(1)+s(1).BoundingBox(3))
);
                end
        elseif isempty(h)
            jenis(i,:)=5;
            bb = [175 100 56 56];
            markisa_bw = imcrop (markisa_bw,bb);
        else
            jenis(i,:)=6;
            bb = [175 100 56 56];
            markisa_bw = imcrop (markisa_bw,bb);
        end

        zzNILAI_H(i,:)=length(h);

        file_name=strcat('z5setelah
cropBBox_',num2str(i),'.bmp');
        imwrite(markisa_bw,file_name);


        %Membuat matriks 'Markisa' yang berisikan nilai Img
yang nantinya akan
        %digunakan untuk ekstraksi fitur warna

        Markisa = imcrop(Img,bb);

        %Membuat Matriks R,G dan B
        R = Markisa(:,:,1); %memanggil matriks nilai R
        G = Markisa(:,:,2); %memanggil matriks nilai G
        B = Markisa(:,:,3); %memanggil matriks nilai B
```

```
            lab_markisa = applycform(Markisa,cform);
            ab = double(lab_markisa(:,:,2:3)); %mengonversi ke
double nilai semua piksel di dimensi 2 (a) dan 3 (b)
            nrows = size(ab,1); %ukuran baris matriks ab
            ncols = size(ab,2); %ukuran kolom matriks ab
            ab = reshape(ab,nrows*ncols,2);
            A = ab(:,1); %nilai A saja,

            %Inisialisasi matriks dengan nilai 0 ??
            R(~markisa_bw) = 0; %titik di R yang sama dgn
markisa_bw dan nilainya tidak ada atau 0, maka dijadikan 0
            G(~markisa_bw) = 0; %sama dgn R
            B(~markisa_bw) = 0; %sama dgn R

            markisa_rgb = cat(3,R,G,B); %menggabungkan array RGB
menjadi matriks 3 dimensi

            file_name=strcat('z6setelah jadi
rgb_',num2str(i),'.jpg');
            imwrite(markisa_rgb,file_name);

            dim = size(markisa_rgb);
            if dim(:,1) <= 70 && dim(:,2) > 70
                markisa_rgb = imcrop(markisa_rgb, [0 0 55 55]);
            elseif dim(:,1) > 70 && dim(:,1) <= 100
                markisa_rgb = imcrop(markisa_rgb, [20 12 60 60]);
            elseif dim(:,1) >= 100 && dim(:,2) > 150
                markisa_rgb = imcrop(markisa_rgb, [50 30 60 60]);
            end
            markisa_rgb = imresize(markisa_rgb, [56 56]);

            zzNILAI_DIM(i,:)=dim;

            file_name=strcat('z7setelah crop dan
resize_',num2str(i),'.jpg');
            imwrite(markisa_rgb,file_name);

            CiriR(i) = mean2(markisa_rgb(:,:,1)); %mencari rata-
rata Red di markisa_rgb
            CiriG(i) = mean2(markisa_rgb(:,:,2));
            CiriB(i) = mean2(markisa_rgb(:,:,3));
            CiriA(i) = mean2(A);
end

input1 = [CiriR;CiriG;CiriB;CiriA];
input = reshape(input1,[],90);

      fitur_rgba_training input
```

C.3 KLASIFIKASI DECISION TREE

```
clc; clear; close all; warning off all;
save TREE_FCM
%Training Session
load fitur_rgba_training;
t = length(input);
input = input';
target = zeros(1,90);
target(:,1:30) = 1;
target(:,31:60) = 2;
target(:,61:90) = 3;
target = target';
tree = classregtree(input, target);
view(tree);
save TREE_FCM tree -append
output = eval(tree,input);

hasil = confusionmat(target,output);
akurasi = sum(diag(hasil))/t*100
```

C.4 KLASIFIKASI NEURAL NETWORK

```
clc; clear; close all; warning off all;

save NET_FCM
%Training Session
load fitur_rgba_training
ndata=length(input);
target = zeros(1,90);
target(:,1:30) = 1;
target(:,31:60) = 2;
target(:,61:90) = 3;
net = newff(input,target,[50 10],{'tansig','tansig'},'trainscg');
net.trainParam.epochs = 1000;
net.trainParam.goal = 1e-3;
net.trainParam.lr = 0.01;
net.trainParam.lr_inc = 1.05;
net.trainParam.show = 25;
net.TrainParam.showWindow;
net.trainParam.time = inf;
net.trainParam.min_grad = 1e-10;
net.trainParam.max_fail = 100;

net_NEW= train(net,input,target);

output = round(sim(net_NEW,input));
save NET_FCM net_NEW -append
```


```
find(output==target);

= sum(m)/ndata*100;
```

C.5 KLASIFIKASI MULTI-CLASS SVM

```
clc
clear all

save MODEL_FCM
load fitur_rgba_training;
data_latih = input;
data_latih = data_latih';
%Ganti label kelas dengan matriks nomor indeks kelas
%load kelas;
kelas_1 = double(ismember(KelasTraining, 'Matang'));
kelas_2 = double(ismember(KelasTraining, 'Mengkal'));
kelas_3 = double(ismember(KelasTraining, 'Mentah'));

kelas_latih = [kelas_1 kelas_2 kelas_3];
kelas_latihT = kelas_latih';
%[a, kelas_latih] = max(kelas_latih');
[a, kelas_latih] = max(kelas_latihT);
kelas_latih = kelas_latih';


%membentuk klasifikator 1
kelas_latih_1_1 = kelas_1;
kelas_latih_1_0 = kelas_2 + kelas_3;
kelas_latih_1 = [kelas_latih_1_1 kelas_latih_1_0];
[a1, kelas_latih_1] = max(kelas_latih_1');
kelas_latih_1 = kelas_latih_1';
kelas_latih_1 = 2 - kelas_latih_1;
%pembangunan model klasifikasi
ModelSVM_1 = svmtrain(data_latih, kelas_latih_1,...
'BoxConstraint',5,'Kernel_Function','rbf','RBF_Sigma',5);
display('Klasifikator 1');


%membentuk klasifikator 2
kelas_latih_2_1 = kelas_1 + kelas_3;
kelas_latih_2_0 = kelas_2;
kelas_latih_2 = [kelas_latih_2_1 kelas_latih_2_0];
[a2, kelas_latih_2] = max(kelas_latih_2');
kelas_latih_2 = kelas_latih_2';
kelas_latih_2 = 2 - kelas_latih_2;
ModelSVM_2 = svmtrain(data_latih, kelas_latih_2,...
'BoxConstraint',5,'Kernel_Function','rbf','RBF_Sigma',5);
display('Klasifikator 2');

%membentuk klasifikator 3
kelas_latih_3_1 = kelas_1 + kelas_2;
kelas_latih_3_0 = kelas_3;
atih_3 = [kelas_latih_3_1 kelas_latih_3_0];
las_latih_3] = max(kelas_latih_3');
atih_3 = kelas_latih_3';
atih_3 = 2 - kelas_latih_3;
gunan model klasifikasi
M_3 = svmtrain(data_latih, kelas_latih_3,...
```

```
'BoxConstraint',5,'Kernel_Function','rbf','RBF_Sigma',5);
display('Klasifikator 3');

model1_kmean = ModelSVM_1;
model2_kmean = ModelSVM_2;
model3_kmean = ModelSVM_3;

save MODEL_FCM ModelSVM_1 -append
save MODEL_FCM ModelSVM_2 -append
save MODEL_FCM ModelSVM_3 -append

%MELAKUKAN PREDIKSI
kelas_1 = [1 1 1];
kelas_2 = [0 0 1];
kelas_3 = [0 1 0];

n=90;
for i=1:n
    prediksi(1) = svmclassify(ModelSVM_1, data_latih(i,:));
    prediksi(2) = svmclassify(ModelSVM_2, data_latih(i,:));
    prediksi(3) = svmclassify(ModelSVM_3, data_latih(i,:));
    jarak(1) = sum(xor(prediksi, kelas_1));
    jarak(2) = sum(xor(prediksi, kelas_2));
    jarak(3) = sum(xor(prediksi, kelas_3));
    [a, idx_kelas] = min(jarak);
    kelas_uji_hasil(i) = idx_kelas;
end
kelas_uji_hasil = kelas_uji_hasil';
hasil_prediksi = confusionmat(kelas_latih, kelas_uji_hasil)
akurasi = sum(diag(hasil_prediksi))/n*100
```

D. CODING PYTHON

```
from PyQt5 import QtCore, QtGui, QtWidgets
from PyQt5.QtCore import QDir, Qt
from PyQt5.QtWidgets import QGraphicsScene, QFileDialog,
QMessageBox
from PyQt5.QtGui import QPixmap, QImage
import sys
import cv2
import numpy as np
import queue
import math
import MySQLdb
from copy import deepcopy
from sklearn.svm import SVC
from sklearn.cluster import KMeans
import time as tm
from time import time
serial


c
dbx
cap
ard
```

```
programSetup = True
programRunning = True

port = '/dev/ttyACM0'

ard = serial.Serial(port,9600,timeout=0.01)

def kmeans(x):
    img = cv2.cvtColor(x, cv2.COLOR_BGR2LAB)
    channel = cv2.split(img)
    channelIndices = 1
    image = img[:,:,channelIndices]
    if len(image.shape) == 2:
        image.reshape(image.shape[0], image.shape[1],1)
    reshaped = image.reshape(image.shape[0] * image.shape[1], 1)
    cluster = 2
    kmeans = KMeans(n_clusters=cluster, n_init=3,
max_iter=10).fit(reshaped)
    h,w = reshaped.shape[:2]

    width = np.array(kmeans.labels_, dtype=np.uint8)
    high = (h,w)

    clustering = np.reshape(np.array(kmeans.labels_,
dtype=np.uint8),
                                        (image.shape[0],
image.shape[1]))

    sortedLabels = sorted([n for n in range(cluster)],
                              key=lambda x: -np.sum(clustering ==
x))

    kmeansImage = np.zeros(image.shape[:2], dtype=np.uint8)

    for i, label in enumerate(sortedLabels):
        kmeansImage[clustering == label] = int((255) / (cluster -
1)) * i

    imContour, contours, hierarchy = cv2.findContours(kmeansImage,
cv2.RETR_TREE, cv2.CHAIN_APPROX_SIMPLE)
    mask = np.zeros(image.shape[:2], dtype=np.uint8)
    if (len(contours))>0:
        areaMax = 0
        i = contours[0]
        savedContours = 0
        for i in range (len(contours)):
            area = cv2.contourArea(contours[i])
            if area> areaMax:
                areaMax = area
                savedContours = i

        #cv2.drawContours(mask,  contours, savedContours,
,255),-1)
        (xi,yi),radius =
nclosingCircle(contours[savedContours])
        center = (int(xi),int(yi))
        radius = int(radius)
```

```
            cv2.circle(mask,center,radius,(255,255,255),-1)

        b,g,r,c = cv2.mean(x,mask)
        crop_lab = cv2.cvtColor(x, cv2.COLOR_BGR2LAB)
        L, a, q, d = cv2.mean(crop_lab,mask)
        #cv2.drawContours(x,  contours, savedContours, (100,255,50),1)
        cv2.circle(x,center,radius,(255,255,0),3)

        return x,b,g,r,a


class Ui_Form(QtWidgets.QWidget):
    def __init__(self):
        QtWidgets.QWidget.__init__(self)
        self.setupUi(self)
    def setupUi(self, Form):
        Form.setObjectName("Form")
        Form.resize(1065, 788)
        palette = QtGui.QPalette()
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.WindowText, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Button, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Light, brush)
        brush = QtGui.QBrush(QtGui.QColor(212, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Midlight, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Dark, brush)
        brush = QtGui.QBrush(QtGui.QColor(113, 170, 170))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Mid, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Text, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
        Palette.BrightText, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
        Palette.ButtonText, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
```

```
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Base, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Window, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.Shadow, brush)
        brush = QtGui.QBrush(QtGui.QColor(212, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.AlternateBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 220))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.ToolTipBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.ToolTipText, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.WindowText, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Button, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Light, brush)
        brush = QtGui.QBrush(QtGui.QColor(212, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Midlight, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Dark, brush)
        brush = QtGui.QBrush(QtGui.QColor(113, 170, 170))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Mid, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Text, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
Palette.BrightText, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
```

```
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.ButtonText, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Base, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Window, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.Shadow, brush)
        brush = QtGui.QBrush(QtGui.QColor(212, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.AlternateBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 220))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.ToolTipBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.ToolTipText, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.WindowText, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Button, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Light, brush)
        brush = QtGui.QBrush(QtGui.QColor(212, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Midlight, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Dark, brush)
        brush = QtGui.QBrush(QtGui.QColor(113, 170, 170))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Mid, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
Palette.Text, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
```

```
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.BrightText, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.ButtonText, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Base, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Window, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.Shadow, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 255, 255))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.AlternateBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(255, 255, 220))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.ToolTipBase, brush)
        brush = QtGui.QBrush(QtGui.QColor(0, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.ToolTipText, brush)
        Form.setPalette(palette)
        self.gvLiveCam = QtWidgets.QGraphicsView(Form)
        self.gvLiveCam.setGeometry(QtCore.QRect(20, 180, 501,
341))
        self.gvLiveCam.setObjectName("gvLiveCam")
        self.gvSisi1 = QtWidgets.QGraphicsView(Form)
        self.gvSisi1.setGeometry(QtCore.QRect(550, 90, 121, 101))
        self.gvSisi1.setObjectName("gvSisi1")
        self.label = QtWidgets.QLabel(Form)
        self.label.setGeometry(QtCore.QRect(540, 200, 47, 13))
        self.label.setObjectName("label")
        self.label_2 = QtWidgets.QLabel(Form)
        self.label_2.setGeometry(QtCore.QRect(540, 230, 47, 13))
        self.label_2.setObjectName("label_2")
        self.label_3 = QtWidgets.QLabel(Form)
        self.label_3.setGeometry(QtCore.QRect(540, 260, 47, 13))
        self.label_3.setObjectName("label_3")
        self.label_4 = QtWidgets.QLabel(Form)
        self.label_4.setGeometry(QtCore.QRect(540, 290, 47, 13))
        self.label_4.setObjectName("label_4")
        self.teR1 = QtWidgets.QTextEdit(Form)
        self.teR1.setGeometry(QtCore.QRect(560, 200, 104, 21))
        self.teR1.setObjectName("teR1")
        self.teG1 = QtWidgets.QTextEdit(Form)
        self.teG1.setGeometry(QtCore.QRect(560, 230, 104, 21))
        self.teG1.setObjectName("teG1")
        self.teB1 = QtWidgets.QTextEdit(Form)
```

```
self.teB1.setGeometry(QtCore.QRect(560, 260, 104, 21))
self.teB1.setObjectName("teB1")
self.teA1 = QtWidgets.QTextEdit(Form)
self.teA1.setGeometry(QtCore.QRect(560, 290, 104, 21))
self.teA1.setObjectName("teA1")
self.label_5 = QtWidgets.QLabel(Form)
self.label_5.setGeometry(QtCore.QRect(730, 260, 47, 13))
self.label_5.setObjectName("label_5")
self.teB2 = QtWidgets.QTextEdit(Form)
self.teB2.setGeometry(QtCore.QRect(750, 260, 104, 21))
self.teB2.setObjectName("teB2")
self.label_6 = QtWidgets.QLabel(Form)
self.label_6.setGeometry(QtCore.QRect(730, 290, 47, 13))
self.label_6.setObjectName("label_6")
self.gvSisi2 = QtWidgets.QGraphicsView(Form)
self.gvSisi2.setGeometry(QtCore.QRect(740, 90, 121, 101))
self.gvSisi2.setObjectName("gvSisi2")
self.label_7 = QtWidgets.QLabel(Form)
self.label_7.setGeometry(QtCore.QRect(730, 200, 47, 13))
self.label_7.setObjectName("label_7")
self.teG2 = QtWidgets.QTextEdit(Form)
self.teG2.setGeometry(QtCore.QRect(750, 230, 104, 21))
self.teG2.setObjectName("teG2")
self.teR2 = QtWidgets.QTextEdit(Form)
self.teR2.setGeometry(QtCore.QRect(750, 200, 104, 21))
self.teR2.setObjectName("teR2")
self.label_8 = QtWidgets.QLabel(Form)
self.label_8.setGeometry(QtCore.QRect(730, 230, 47, 13))
self.label_8.setObjectName("label_8")
self.teA2 = QtWidgets.QTextEdit(Form)
self.teA2.setGeometry(QtCore.QRect(750, 290, 104, 21))
self.teA2.setObjectName("teA2")
self.gvSisi3 = QtWidgets.QGraphicsView(Form)
self.gvSisi3.setGeometry(QtCore.QRect(920, 90, 121, 101))
self.gvSisi3.setObjectName("gvSisi3")
self.teR3 = QtWidgets.QTextEdit(Form)
self.teR3.setGeometry(QtCore.QRect(930, 200, 104, 21))
self.teR3.setObjectName("teR3")
self.teB3 = QtWidgets.QTextEdit(Form)
self.teB3.setGeometry(QtCore.QRect(930, 260, 104, 21))
self.teB3.setObjectName("teB3")
self.teA3 = QtWidgets.QTextEdit(Form)
self.teA3.setGeometry(QtCore.QRect(930, 290, 104, 21))
self.teA3.setObjectName("teA3")
self.label_9 = QtWidgets.QLabel(Form)
self.label_9.setGeometry(QtCore.QRect(910, 230, 47, 13))
self.label_9.setObjectName("label_9")
self.label_10 = QtWidgets.QLabel(Form)
self.label_10.setGeometry(QtCore.QRect(910, 290, 47, 13))
self.label_10.setObjectName("label_10")
self.label_11 = QtWidgets.QLabel(Form)
self.label_11.setGeometry(QtCore.QRect(910, 200, 47, 13))
self.label_11.setObjectName("label_11")
self.teG3 = QtWidgets.QTextEdit(Form)
self.teG3.setGeometry(QtCore.QRect(930, 230, 104, 21))
self.teG3.setObjectName("teG3")
self.label_12 = QtWidgets.QLabel(Form)
```

```
self.label_12.setGeometry(QtCore.QRect(910, 260, 47, 13))
self.label_12.setObjectName("label_12")
self.teG4 = QtWidgets.QTextEdit(Form)
self.teG4.setGeometry(QtCore.QRect(560, 480, 104, 21))
self.teG4.setObjectName("teG4")
self.teR5 = QtWidgets.QTextEdit(Form)
self.teR5.setGeometry(QtCore.QRect(750, 450, 104, 21))
self.teR5.setObjectName("teR5")
self.teB4 = QtWidgets.QTextEdit(Form)
self.teB4.setGeometry(QtCore.QRect(560, 510, 104, 21))
self.teB4.setObjectName("teB4")
self.label_13 = QtWidgets.QLabel(Form)
self.label_13.setGeometry(QtCore.QRect(540, 450, 47, 13))
self.label_13.setObjectName("label_13")
self.gvSisi4 = QtWidgets.QGraphicsView(Form)
self.gvSisi4.setGeometry(QtCore.QRect(550, 340, 121, 101))
self.gvSisi4.setObjectName("gvSisi4")
self.teG6 = QtWidgets.QTextEdit(Form)
self.teG6.setGeometry(QtCore.QRect(930, 480, 104, 21))
self.teG6.setObjectName("teG6")
self.teR4 = QtWidgets.QTextEdit(Form)
self.teR4.setGeometry(QtCore.QRect(560, 450, 104, 21))
self.teR4.setObjectName("teR4")
self.label_14 = QtWidgets.QLabel(Form)
self.label_14.setGeometry(QtCore.QRect(910, 450, 47, 13))
self.label_14.setObjectName("label_14")
self.teB5 = QtWidgets.QTextEdit(Form)
self.teB5.setGeometry(QtCore.QRect(750, 510, 104, 21))
self.teB5.setObjectName("teB5")
self.label_15 = QtWidgets.QLabel(Form)
self.label_15.setGeometry(QtCore.QRect(540, 510, 47, 13))
self.label_15.setObjectName("label_15")
self.gvSisi5 = QtWidgets.QGraphicsView(Form)
self.gvSisi5.setGeometry(QtCore.QRect(740, 340, 121, 101))
self.gvSisi5.setObjectName("gvSisi5")
self.gvSisi6 = QtWidgets.QGraphicsView(Form)
self.gvSisi6.setGeometry(QtCore.QRect(920, 340, 121, 101))
self.gvSisi6.setObjectName("gvSisi6")
self.label_16 = QtWidgets.QLabel(Form)
self.label_16.setGeometry(QtCore.QRect(910, 510, 47, 13))
self.label_16.setObjectName("label_16")
self.label_17 = QtWidgets.QLabel(Form)
self.label_17.setGeometry(QtCore.QRect(730, 450, 47, 13))
self.label_17.setObjectName("label_17")
self.teA5 = QtWidgets.QTextEdit(Form)
self.teA5.setGeometry(QtCore.QRect(750, 540, 104, 21))
self.teA5.setObjectName("teA5")
self.label_18 = QtWidgets.QLabel(Form)
self.label_18.setGeometry(QtCore.QRect(910, 480, 47, 13))
self.label_18.setObjectName("label_18")
self.label_19 = QtWidgets.QLabel(Form)
self.label_19.setGeometry(QtCore.QRect(910, 540, 47, 13))
self.label_19.setObjectName("label_19")
self.label_20 = QtWidgets.QLabel(Form)
self.label_20.setGeometry(QtCore.QRect(730, 480, 47, 13))
self.label_20.setObjectName("label_20")
self.label_21 = QtWidgets.QLabel(Form)
```

```
        self.label_21.setGeometry(QtCore.QRect(730, 540, 47, 13))
        self.label_21.setObjectName("label_21")
        self.teA6 = QtWidgets.QTextEdit(Form)
        self.teA6.setGeometry(QtCore.QRect(930, 540, 104, 21))
        self.teA6.setObjectName("teA6")
        self.label_22 = QtWidgets.QLabel(Form)
        self.label_22.setGeometry(QtCore.QRect(540, 540, 47, 13))
        self.label_22.setObjectName("label_22")
        self.teG5 = QtWidgets.QTextEdit(Form)
        self.teG5.setGeometry(QtCore.QRect(750, 480, 104, 21))
        self.teG5.setObjectName("teG5")
        self.label_23 = QtWidgets.QLabel(Form)
        self.label_23.setGeometry(QtCore.QRect(730, 510, 47, 13))
        self.label_23.setObjectName("label_23")
        self.teR6 = QtWidgets.QTextEdit(Form)
        self.teR6.setGeometry(QtCore.QRect(930, 450, 104, 21))
        self.teR6.setObjectName("teR6")
        self.teA4 = QtWidgets.QTextEdit(Form)
        self.teA4.setGeometry(QtCore.QRect(560, 540, 104, 21))
        self.teA4.setObjectName("teA4")
        self.teB6 = QtWidgets.QTextEdit(Form)
        self.teB6.setGeometry(QtCore.QRect(930, 510, 104, 21))
        self.teB6.setObjectName("teB6")
        self.label_24 = QtWidgets.QLabel(Form)
        self.label_24.setGeometry(QtCore.QRect(540, 480, 47, 13))
        self.label_24.setObjectName("label_24")
        self.pbStart = QtWidgets.QPushButton(Form)
        self.pbStart.setGeometry(QtCore.QRect(80, 80, 121, 21))
        self.pbStart.setObjectName("pbStart")
        self.pbStop = QtWidgets.QPushButton(Form)
        self.pbStop.setGeometry(QtCore.QRect(210, 80, 121, 21))
        self.pbStop.setObjectName("pbStop")
        self.label_25 = QtWidgets.QLabel(Form)
        self.label_25.setGeometry(QtCore.QRect(0, 20, 1061, 31))
        font = QtGui.QFont()
        font.setPointSize(20)
        font.setBold(True)
        font.setWeight(75)
        self.label_25.setFont(font)
        self.label_25.setAlignment(QtCore.Qt.AlignCenter)
        self.label_25.setObjectName("label_25")
        self.pbKalibrasi = QtWidgets.QPushButton(Form)
        self.pbKalibrasi.setGeometry(QtCore.QRect(340, 80, 121,
21))
        self.pbKalibrasi.setObjectName("pbKalibrasi")
        self.label_32 = QtWidgets.QLabel(Form)
        self.label_32.setGeometry(QtCore.QRect(20, 140, 491, 31))
        font = QtGui.QFont()
        font.setPointSize(20)
        font.setBold(True)
        font.setWeight(75)
        self.label_32.setFont(font)
        self.label_32.setAlignment(QtCore.Qt.AlignCenter)
        self.label_32.setObjectName("label_32")
        self.label_33 = QtWidgets.QLabel(Form)
        self.label_33.setGeometry(QtCore.QRect(550, 70, 111, 16))
        self.label_33.setAlignment(QtCore.Qt.AlignCenter)
```

```
        self.label_33.setObjectName("label_33")
        self.label_34 = QtWidgets.QLabel(Form)
        self.label_34.setGeometry(QtCore.QRect(740, 70, 111, 16))
        self.label_34.setAlignment(QtCore.Qt.AlignCenter)
        self.label_34.setObjectName("label_34")
        self.label_35 = QtWidgets.QLabel(Form)
        self.label_35.setGeometry(QtCore.QRect(920, 70, 111, 16))
        self.label_35.setAlignment(QtCore.Qt.AlignCenter)
        self.label_35.setObjectName("label_35")
        self.label_36 = QtWidgets.QLabel(Form)
        self.label_36.setGeometry(QtCore.QRect(550, 320, 111, 16))
        self.label_36.setAlignment(QtCore.Qt.AlignCenter)
        self.label_36.setObjectName("label_36")
        self.label_37 = QtWidgets.QLabel(Form)
        self.label_37.setGeometry(QtCore.QRect(750, 320, 111, 16))
        self.label_37.setAlignment(QtCore.Qt.AlignCenter)
        self.label_37.setObjectName("label_37")
        self.label_38 = QtWidgets.QLabel(Form)
        self.label_38.setGeometry(QtCore.QRect(920, 320, 111, 16))
        self.label_38.setAlignment(QtCore.Qt.AlignCenter)
        self.label_38.setObjectName("label_38")
        self.label_39 = QtWidgets.QLabel(Form)
        self.label_39.setGeometry(QtCore.QRect(30, 530, 491, 31))
        font = QtGui.QFont()
        font.setPointSize(20)
        font.setBold(True)
        font.setWeight(75)
        self.label_39.setFont(font)
        self.label_39.setAlignment(QtCore.Qt.AlignCenter)
        self.label_39.setObjectName("label_39")
        self.lbPredict = QtWidgets.QLabel(Form)
        self.lbPredict.setGeometry(QtCore.QRect(30, 580, 491, 61))
        palette = QtGui.QPalette()
        brush = QtGui.QBrush(QtGui.QColor(170, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Active,
QtGui.QPalette.WindowText, brush)
        brush = QtGui.QBrush(QtGui.QColor(170, 0, 0))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Inactive,
QtGui.QPalette.WindowText, brush)
        brush = QtGui.QBrush(QtGui.QColor(85, 127, 127))
        brush.setStyle(QtCore.Qt.SolidPattern)
        palette.setBrush(QtGui.QPalette.Disabled,
QtGui.QPalette.WindowText, brush)
        self.lbPredict.setPalette(palette)
        font = QtGui.QFont()
        font.setFamily("OpineHeavy")
        font.setPointSize(37)
        font.setBold(True)
        font.setItalic(False)
        font.setWeight(75)
        self.lbPredict.setFont(font)
        self.lbPredict.setText("")
        self.lbPredict.setAlignment(QtCore.Qt.AlignCenter)
        self.lbPredict.setObjectName("lbPredict")
        self.teB4_2 = QtWidgets.QTextEdit(Form)
```

```
        self.teB4_2.setGeometry(QtCore.QRect(930, 630, 104, 21))
        self.teB4_2.setObjectName("teB4_2")
        self.teR4_2 = QtWidgets.QTextEdit(Form)
        self.teR4_2.setGeometry(QtCore.QRect(560, 630, 104, 21))
        self.teR4_2.setObjectName("teR4_2")
        self.teG4_2 = QtWidgets.QTextEdit(Form)
        self.teG4_2.setGeometry(QtCore.QRect(750, 630, 104, 21))
        self.teG4_2.setObjectName("teG4_2")
        self.label_40 = QtWidgets.QLabel(Form)
        self.label_40.setGeometry(QtCore.QRect(930, 610, 101, 20))
        self.label_40.setAlignment(QtCore.Qt.AlignCenter)
        self.label_40.setObjectName("label_40")
        self.label_41 = QtWidgets.QLabel(Form)
        self.label_41.setGeometry(QtCore.QRect(560, 610, 101, 20))
        self.label_41.setAlignment(QtCore.Qt.AlignCenter)
        self.label_41.setObjectName("label_41")
        self.label_42 = QtWidgets.QLabel(Form)
        self.label_42.setGeometry(QtCore.QRect(750, 610, 101, 20))
        self.label_42.setAlignment(QtCore.Qt.AlignCenter)
        self.label_42.setObjectName("label_42")
        self.label_43 = QtWidgets.QLabel(Form)
        self.label_43.setGeometry(QtCore.QRect(550, 580, 491, 31))
        font = QtGui.QFont()
        font.setPointSize(15)
        font.setBold(True)
        font.setWeight(75)
        self.label_43.setFont(font)
        self.label_43.setAlignment(QtCore.Qt.AlignCenter)
        self.label_43.setObjectName("label_43")
        self.label_44 = QtWidgets.QLabel(Form)
        self.label_44.setGeometry(QtCore.QRect(0, 680, 1061, 31))
        font = QtGui.QFont()
        font.setPointSize(14)
        font.setBold(True)
        font.setWeight(75)
        self.label_44.setFont(font)
        self.label_44.setAlignment(QtCore.Qt.AlignCenter)
        self.label_44.setOpenExternalLinks(True)

self.label_44.setTextInteractionFlags(QtCore.Qt.LinksAccessibleByM
ouse)
        self.label_44.setObjectName("label_44")
        self.label_45 = QtWidgets.QLabel(Form)
        self.label_45.setGeometry(QtCore.QRect(310, 660, 261, 31))
        font = QtGui.QFont()
        font.setPointSize(11)
        font.setBold(True)
        font.setWeight(75)
        self.label_45.setFont(font)
        self.label_45.setAlignment(QtCore.Qt.AlignCenter)
        self.label_45.setObjectName("label_45")
        self.comboBox = QtWidgets.QComboBox(Form)
        self.comboBox.setGeometry(QtCore.QRect(210, 110, 211, 22))
        self.comboBox.setObjectName("comboBox")
        self.comboBox.addItem("")
        self.comboBox.addItem("")
        self.comboBox.addItem("")
```

```
        self.label_26 = QtWidgets.QLabel(Form)
        self.label_26.setGeometry(QtCore.QRect(140, 110, 47, 13))
        self.label_26.setObjectName("label_26")

        self.retranslateUi(Form)
        QtCore.QMetaObject.connectSlotsByName(Form)


    def retranslateUi(self, Form):
        _translate = QtCore.QCoreApplication.translate
        Form.setWindowTitle(_translate("Form", "Form"))
        self.label.setText(_translate("Form", "R"))
        self.label_2.setText(_translate("Form", "G"))
        self.label_3.setText(_translate("Form", "B"))
        self.label_4.setText(_translate("Form", "A"))
        self.label_5.setText(_translate("Form", "B"))
        self.label_6.setText(_translate("Form", "A"))
        self.label_7.setText(_translate("Form", "R"))
        self.label_8.setText(_translate("Form", "G"))
        self.label_9.setText(_translate("Form", "G"))
        self.label_10.setText(_translate("Form", "A"))
        self.label_11.setText(_translate("Form", "R"))
        self.label_12.setText(_translate("Form", "B"))
        self.label_13.setText(_translate("Form", "R"))
        self.label_14.setText(_translate("Form", "R"))
        self.label_15.setText(_translate("Form", "B"))
        self.label_16.setText(_translate("Form", "B"))
        self.label_17.setText(_translate("Form", "R"))
        self.label_18.setText(_translate("Form", "G"))
        self.label_19.setText(_translate("Form", "A"))
        self.label_20.setText(_translate("Form", "G"))
        self.label_21.setText(_translate("Form", "A"))
        self.label_22.setText(_translate("Form", "A"))
        self.label_23.setText(_translate("Form", "B"))
        self.label_24.setText(_translate("Form", "G"))
        self.pbStart.setText(_translate("Form", "Start Program"))
        self.pbStop.setText(_translate("Form", "Stop Program"))
        self.label_25.setText(_translate("Form", "Passion Fruit
Auto Shorting Machine"))
        self.pbKalibrasi.setText(_translate("Form",
"Callibration"))
        self.label_32.setText(_translate("Form", "Live Camera"))
        self.label_33.setText(_translate("Form", "Side 1"))
        self.label_34.setText(_translate("Form", "Side 2"))
        self.label_35.setText(_translate("Form", "Side 3"))
        self.label_36.setText(_translate("Form", "Side 4"))
        self.label_37.setText(_translate("Form", "Side 5"))
        self.label_38.setText(_translate("Form", "Side 6"))
        self.label_39.setText(_translate("Form", "PREDICT"))
        self.label_40.setText(_translate("Form", "UNRIPE"))
        self.label_41.setText(_translate("Form", "RIPE"))
        self.label_42.setText(_translate("Form", "NEARLY RIPE"))
        self.label_43.setText(_translate("Form", "Fruit
s"))
        self.label_44.setText(_translate("Form",
<head/><body><p><a
https://www.facebook.com/tenri.sidehabi\"><span style=\"
```

```
text-decoration: underline; color:#0000ff;\">SITTI WATENRIAJENG
SIDEHABI</span></a></p></body></html>"))
        self.label_45.setText(_translate("Form", "design copyright
: "))
        self.comboBox.setItemText(0, _translate("Form", "Matang"))
        self.comboBox.setItemText(1, _translate("Form",
"Mengkal"))
        self.comboBox.setItemText(2, _translate("Form", "Muda"))
        self.label_26.setText(_translate("Form", "Klasifikasi"))
        self.pbStart.clicked.connect(self.Start)
        self.pbStop.clicked.connect(self.Stop)
        self.pbKalibrasi.clicked.connect(self.Kalibrasi)

    def Start(self):
        print("Program Started")
        global cap
        global programSetup
        global programRunning
        global ard
        currentFrame = 0

        while(programSetup):
            #setupdatabase dan SVM Model

            self.file = open("testfile.txt","w")

            dbJenis = []
            dbData = []

            print("Try to Fetching data form Database")
            try:
                c.execute("SELECT jenis, r1, g1, b1, a1, r2, g2,
b2, a2, r3, g3, b3, a3, r4, g4, b4, a4, r5, g5, b5, a5, r6, g6,
b6, a6 FROM data_markisa_backup")
                result = c.fetchall()
                if result is None:
                    print("Data Base Loaded...")
            except:
                print("can't read data form database")

            for dt in result:

dbData.append([dt[1],dt[2],dt[3],dt[4],dt[5],dt[6],dt[7],dt[8],dt[
9],dt[10],dt[11],dt[12],dt[13],dt[14],dt[15],dt[16],dt[17],dt[18],
dt[19],dt[20],dt[21],dt[22],dt[23],dt[24]])
                dbJenis.append(dt[0])

            y_jenis = (np.array(dbJenis).astype(np.float))
            x_data = (np.array(dbData).astype(np.float))

            y_jenis.reshape(-1,1)
            x_data.reshape(-1,1)
            clf = SVC(C=25, gamma = 1e-5, degree = 3, coef0=0.001,
'rbf')
            clf.fit(x_data, y_jenis)
            print("Database Trained Successfully")
```

```
            #setup camera
            cap = cv2.VideoCapture(0)
            if not cap.isOpened():
                print("No Camera Attached")
            #set resolusi dan fps kamera
            cap.set(cv2.CAP_PROP_FRAME_WIDTH, 640)
            cap.set(cv2.CAP_PROP_FRAME_HEIGHT, 360)
            cap.set(cv2.CAP_PROP_FPS, 24)
            currentFrame = 0

            programSetup = False
            ard.flush()
            kirim = True
            t1 = time()
            putar = True
            detek = True
        while (programRunning):

            #live cam started
            ret,frames = cap.read()
            #resize frame agar muat pada graphics view
            frames = cv2.resize(frames,None,fx=0.7, fy=0.7,
interpolation = cv2.INTER_CUBIC)
            #print(frames.shape)
            #resize frame untuk mereduksi jumlah piksel yang akan
di proses
            frame = cv2.resize(frames,None,fx=0.5, fy=0.5,
interpolation = cv2.INTER_CUBIC)
            print(frame.shape)
            #'''
            print(kirim)

            print(putar)

            if(kirim):
                ard.write(str.encode("s"))
                kirim=False

            if(detek):
                msg = ard.readline()

            print(msg)

            if msg == b'r' :
                t0 = time()

                if(putar):
                    ard.write(str.encode("a"))
                    putar = False

                    detek = False
                    #ard.flush()
                    #msg = ""
                if(currentFrame == 7):
                    frame1 = frame[20:250,40:160]
                    #cv2.imshow('frame 1',frame1)
                if(currentFrame == 9):
```

```
                    frame2 = frame[20:250,40:160]
                    #cv2.imshow('frame 2',frame2)
                if(currentFrame == 10):
                    frame3 = frame[20:250,40:160]
                    #cv2.imshow('frame 3',frame3)
                if(currentFrame == 11):
                    frame4 = frame[20:250,40:160]
                    #cv2.imshow('frame 4',frame4)
                if(currentFrame == 12):
                    frame5 = frame[20:250,40:160]
                    #cv2.imshow('frame 5',frame5)
                if(currentFrame == 13):
                    frame6 = frame[20:250,40:160]
                    #cv2.imshow('frame 6',frame6)


                    x1, b1, g1, r1, a1 = kmeans(frame1)
                    self.teR1.setText(str(r1))
                    self.teG1.setText(str(g1))
                    self.teB1.setText(str(b1))
                    self.teA1.setText(str(a1))
                    img = cv2.cvtColor(x1, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi1.setScene(self.scene)

                    print(b1, g1, r1, a1 )
                    x2, b2, g2, r2, a2 = kmeans(frame2)
                    self.teR2.setText(str(r2))
                    self.teG2.setText(str(g2))
                    self.teB2.setText(str(b2))
                    self.teA2.setText(str(a2))
                    img = cv2.cvtColor(x2, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi2.setScene(self.scene)

                    print(b2, g2, r2, a2 )
                    x3, b3, g3, r3, a3 = kmeans(frame3)
                    self.teR3.setText(str(r3))
                    self.teG3.setText(str(g3))
                    self.teB3.setText(str(b3))
                    self.teA3.setText(str(a3))
                    img = cv2.cvtColor(x3, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
```

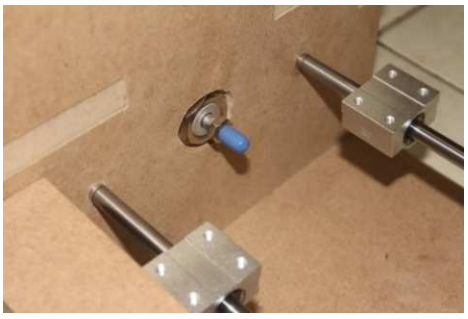
```
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi3.setScene(self.scene)

                    print(b3, g3, r3, a3)
                    x4, b4, g4, r4, a4 = kmeans(frame4)
                    self.teR4.setText(str(r4))
                    self.teG4.setText(str(g4))
                    self.teB4.setText(str(b4))
                    self.teA4.setText(str(a4))
                    img = cv2.cvtColor(x4, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi4.setScene(self.scene)

                    print(b4, g4, r4, a4)
                    x5, b5, g5, r5, a5 = kmeans(frame5)
                    self.teR5.setText(str(r5))
                    self.teG5.setText(str(g5))
                    self.teB5.setText(str(b5))
                    self.teA5.setText(str(a5))
                    img = cv2.cvtColor(x5, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi5.setScene(self.scene)

                    print(b5, g5, r5, a5)
                    x6, b6, g6, r6, a6 = kmeans(frame6)
                    self.teR6.setText(str(r6))
                    self.teG6.setText(str(g6))
                    self.teB6.setText(str(b6))
                    self.teA6.setText(str(a6))
                    img = cv2.cvtColor(x6, cv2.COLOR_BGR2RGB)
                    height, width, channel = img.shape
                    pbl = channel * width
                    imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                    self.scene = QGraphicsScene()
                    self.scene.addPixmap(QPixmap.fromImage(imgF))
                    self.gvSisi6.setScene(self.scene)

                    print(b6, g6, r6, a6)
```

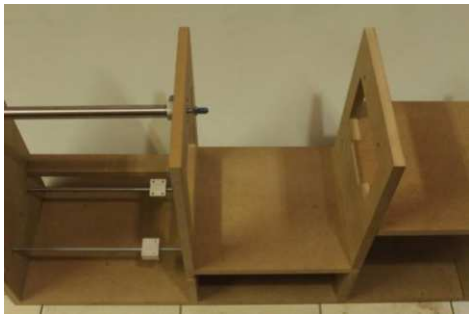
```
                    tkmeans=time()


                    if (self.comboBox.currentText() == "Matang"):
                        dbJenis = 1
                    elif (self.comboBox.currentText() ==
"Mengkal"):
                        dbJenis = 2
                    else:
                        dbJenis = 3
                    dbr1 = r1; dbg1 = g1; dbb1 = b1; dba1 = a1
                    dbr2 = r2; dbg2 = g2; dbb2 = b2; dba2 = a2
                    dbr3 = r3; dbg3 = g3; dbb3 = b3; dba3 = a3
                    dbr4 = r4; dbg4 = g4; dbb4 = b4; dba4 = a4
                    dbr5 = r5; dbg5 = g5; dbb5 = b5; dba5 = a5
                    dbr6 = r6; dbg6 = g6; dbb6 = b6; dba6 = a6
                    #print(dbJenis)

#print(dbJenis,dbr1,dbb1,dbg1,dba1,dbr2,dbb2,dbg2,dba2,dbr3,dbb3,d
bg3,dba3,dbr4,dbb4,dbg4,dba4,dbg5,dbb5,dbg5,dba5,dbr6,dbb6,dbg6,db
a6)

                    sql =  "INSERT INTO data_markisa_backup2
(jenis, r1, g1, b1, a1, r2, g2, b2, a2, r3, g3, b3, a3, r4, g4,
b4, a4, r5, g5, b5, a5, r6, g6, b6, a6 ) VALUES (%s, %s, %s, %s,
%s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s,
%s, %s, %s, %s, %s)"

                    try:
                        #c.execute(sql,( dbJenis, r1, g1, b1, a1,
r2, g2, b2, a2, r3, g3, b3, a3, r4, g4, b4, a4, r5, g5, b5, a5,
r6, g6, b6, a6))
                        c.execute(sql,( str(dbJenis), str(dbr1),
str(dbg1), str(dbb1), str(dba1), str(dbr2), str(dbg2), str(dbb2),
str(dba2), str(dbr3), str(dbg3), str(dbb3), str(dba3), str(dbr4),
str(dbg4), str(dbb4), str(dba4), str(dbr5), str(dbg5), str(dbb5),
str(dba5), str(dbr6), str(dbg6), str(dbb6), str(dba6)))
                        db.commit()
                        print("Data Berhasil di Upload")
                    except ValueError:
                        print(ValueError)

                    except:
                        db.rollback()
                        print("Failed to Insert data to Database")
                    #db.close()


                    test = []
                    test.append([str(r1),str(g1),str(b1),str(a1),
                                 str(r2),str(g2),str(b2),str(a2),
                                 str(r3),str(g3),str(b3),str(a3),
                                 str(r4),str(g4),str(b4),str(a4),
                                 str(r5),str(g5),str(b5),str(a5),
str(g6),str(b6),str(a6),])
                    test_data = (np.array(test).astype(np.float))
```

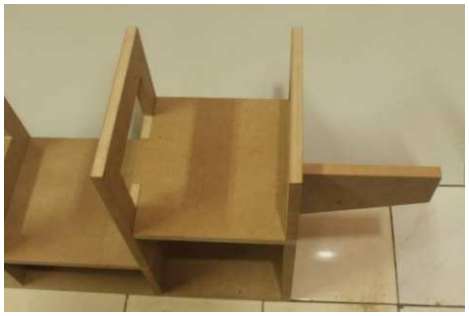
```
                        predict = clf.predict(test_data)
                        if (predict == [1.]):
                            hasil = "RIPE"
                            ard.write(str.encode("1"))
                        elif (predict == [2.]):
                            hasil = "NEARLY RIPE"
                            ard.write(str.encode("2"))
                        elif (predict == [3.]):
                            hasil = "UNRIPE"
                            ard.write(str.encode("3"))
                        self.lbPredict.setText(str(hasil))
                        self.file.write("%s \t"%hasil)
                        self.file.write("waktu eksekusi kmeans %f
\t"%(tkmeans-t0))
                        tfull = time()
                        self.file.write("waktu eksekusi per buah %f
\n"%(tfull-t1))
                        #tm.sleep(3.5)
                        kirim = True
                        putar = True
                        detek = True
                        ard.flush()
                        t1 = time()
                        currentFrame=0

                    currentFrame += 1

                else:
                    currentFrame = 0


                if cv2.waitKey(1) & 0xFF == ord('q'):
                    programRunning = False
                    break


                img = cv2.cvtColor(frames, cv2.COLOR_BGR2RGB)
                height, width, channel = img.shape
                pbl = channel * width
                imgF = QImage(img.data, width, height, pbl,
QtGui.QImage.Format_RGB888)

                self.scene = QGraphicsScene()
                self.scene.addPixmap(QPixmap.fromImage(imgF))
                self.gvLiveCam.setScene(self.scene)



    def Stop(self):
        print("Program Stopped")
        global cap
        cap.release()
        #cv2.destroyAllWindows()
        self.live = False
        programRunning = False
        print("Cleaning...")
```

```
            #GPIO.cleanup()
            print("Byee")
            #sys.exit()
            self.file.close()

        def Kalibrasi(self):
            print("Calibration Machine")
            ard.write(str.encode("s"))

            msg= ard.readline()
            print(msg)

            if msg == b'':
                ard.write(str.encode("a"))
                tm.sleep(3)
                ard.write(str.encode("1"))
            kirim = True

            putar = True
            detek = True

if __name__ == '__main__':

    try:
        db =
MySQLdb.connect("localhost","root","50er412di","db_markisa")
        c = db.cursor()
        print ("Server Connected....")
    except:
        print ("Server Offline....")

    app = QtWidgets.QApplication(sys.argv)
    ex = Ui_Form()
    ex.show()
    sys.exit(app.exec_())
```

E. PROSES PERAKITAN MESIN PEMILAH BUAH MARKISA







F. SURVEI KE INDUSTRI SIRUP MARKISA AURORA

G. SURVEI KE PETANI PENGHASIL BUAH MARKISA DI JENEPONTO