a=imread('C:\Users\Anushree Basu\Desktop\positiveimages\image 001.bmp');

figure;imshow(a);

sum1=sum(a,3);

skin\_mask = roipoly;

pause(0.1);

%skin\_inds = find(skin\_mask>0);

% skin\_R = (a(:,:,1));

% skin\_G = (a(:,:,2));

% skin\_B = (a(:,:,3));

skin\_inds = find(skin\_mask>0);

k = a(:,:,1);

skin(:,1) = k(skin\_inds);

k = a(:,:,2);

skin(:,2) = k(skin\_inds);

k = a(:,:,3);

skin(:,3) = k(skin\_inds);

bg\_inds = find(skin\_mask==0);

k = a(:,:,1);

bg(:,1) = k(bg\_inds);

k = a(:,:,2);

bg(:,2) = k(bg\_inds);

k = a(:,:,3);

bg(:,3) = k(bg\_inds);

disp('processing...');

s = imread('uint8(b).jpg');

num\_iter = 5;

delta\_t = 0.1;

kappa =20;

option = 2;

voxel\_spacing = ones(9,1);

ad = anisodiff3D(s,num\_iter,delta\_t,kappa,option,voxel\_spacing);

l=uint8(ad);

%figure, subplot 121, imshow(s,[]), subplot 122, imshow(uint8(ad),[])

figure,imshow(s,[]);title('segmentated face image from background');

figure;imshow(l,[]);title('removal of noise from face image using anisotropic diffusion');

%se=strel('line',15,45);

%m=figure;imshow(im2bw(l));

se=strel('disk',6);

BW = imerode(l,se);

figure;imshow(uint8(BW));

BW2=imdilate(BW,se);

figure;imshow(BW2);

IM2 = imtophat(l,se);

figure;imshow(uint8(IM2));

d = rgb2gray(IM2);

figure;imshow(d);

d1 = d>15;

figure;imshow(d1);

se1=strel('disk',2);

d2 = imerode(d1,se1);

figure;imshow(d2);title('thickening of blood vessels of face image using tophat segmentation');

thin\_image = bwmorph(d2,'skel',Inf);

figure, imshow(thin\_image);

title('skeletanisation of blood vessels of face image using thinning');

%Minutiae extraction

s=size(thin\_image);

N=3;%window size

n=(N-1)/2;

r=s(1)+2\*n; %radius

c=s(2)+2\*n; %centroid

double temp(r,c);

temp=zeros(r,c);bifurcation=zeros(r,c);ridge=zeros(r,c);

temp((n+1):(end-n),(n+1):(end-n))=thin\_image(:,:);

outImg=zeros(r,c,3);%For Display

outImg(:,:,1) = temp .\* 255;

outImg(:,:,2) = temp .\* 255;

outImg(:,:,3) = temp .\* 255;

for x=(n+1+10):(s(1)+n-10)

for y=(n+1+10):(s(2)+n-10)

e=1;

for k=x-n:x+n

f=1;

for l=y-n:y+n

mat(e,f)=temp(k,l);

f=f+1;

end

e=e+1;

end;

if(mat(2,2)==0)

ridge(x,y)=sum(sum(~mat));

bifurcation(x,y)=sum(sum(~mat));

end

end;

end;

% RIDGE END FINDING

[ridge\_x ridge\_y]=find(ridge==2);

len=length(ridge\_x);

%For Display

for i=1:len

outImg((ridge\_x(i)-3):(ridge\_x(i)+3),(ridge\_y(i)-3),2:3)=0;

outImg((ridge\_x(i)-3):(ridge\_x(i)+3),(ridge\_y(i)+3),2:3)=0;

outImg((ridge\_x(i)-3),(ridge\_y(i)-3):(ridge\_y(i)+3),2:3)=0;

outImg((ridge\_x(i)+3),(ridge\_y(i)-3):(ridge\_y(i)+3),2:3)=0;

outImg((ridge\_x(i)-3):(ridge\_x(i)+3),(ridge\_y(i)-3),1)=255;

outImg((ridge\_x(i)-3):(ridge\_x(i)+3),(ridge\_y(i)+3),1)=255;

outImg((ridge\_x(i)-3),(ridge\_y(i)-3):(ridge\_y(i)+3),1)=255;

outImg((ridge\_x(i)+3),(ridge\_y(i)-3):(ridge\_y(i)+3),1)=255;

end

%BIFURCATION FINDING

[bifurcation\_x, bifurcation\_y]=find(bifurcation==4);

len=length(bifurcation\_x);

%For Display

for i=1:len

outImg((bifurcation\_x(i)-3):(bifurcation\_x(i)+3),(bifurcation\_y(i)-3),1:2)=0;

outImg((bifurcation\_x(i)-3):(bifurcation\_x(i)+3),(bifurcation\_y(i)+3),1:2)=0;

outImg((bifurcation\_x(i)-3),(bifurcation\_y(i)-3):(bifurcation\_y(i)+3),1:2)=0;

outImg((bifurcation\_x(i)+3),(bifurcation\_y(i)-3):(bifurcation\_y(i)+3),1:2)=0;

outImg((bifurcation\_x(i)-3):(bifurcation\_x(i)+3),(bifurcation\_y(i)-3),3)=255;

outImg((bifurcation\_x(i)-3):(bifurcation\_x(i)+3),(bifurcation\_y(i)+3),3)=255;

outImg((bifurcation\_x(i)-3),(bifurcation\_y(i)-3):(bifurcation\_y(i)+3),3)=255;

outImg((bifurcation\_x(i)+3),(bifurcation\_y(i)-3):(bifurcation\_y(i)+3),3)=255;

end

figure;imshow(outImg);title('Minutiae point extraction from face image');

data = double([skin; bg]);

group = [ones(size(skin,1),1); 2\*ones(size(bg,1),1)];

svmStruct = svmtrain(data,group,'kernel\_function','rbf');

k = a(:,:,1);

im(:,1) = k(:);

k = a(:,:,2);

im(:,2) = k(:);

k = a(:,:,3);

im(:,3) = k(:);

im=double(im);

class = svmclassify(svmStruct,im(1,:));