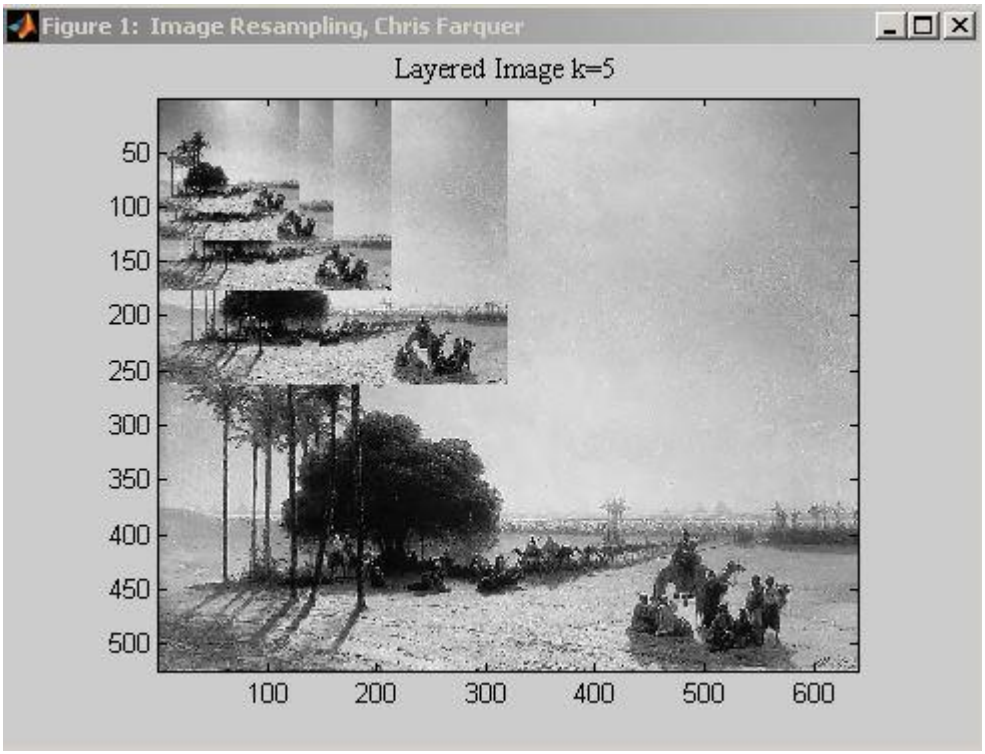
```
%read and display image

X=imread('aivazovsky78g.tif','tif');
info=imfinfo('aivazovsky78g.tif','tif');

% transposition

[N,M]=size(X);

h_fig=figure('Tag','Fig 1:',...
    'Name',' Image Resampling, Chris Farquer',...
    'Position',[10 384 488 350]);
set(h_fig,'MenuBar','none');


%gray scale
colormap(gray(255));
h_1=subplot(1,1,1);
image(X);
axis('image')
h_t1=title('original image');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)

%resample by k=2
k=2;
Y2=zeros(N/k,M/k);
for n=1:N/k
   for m=1:M/k
      Y2(n,m)=X(2*n-1,2*m-1);
   end
end

clear Y2;
Y2=zeros(N/k,M/k);
Y2=X(1:2:N,1:2:M);

%layers images
subplot(1,1,1);
image(X);
axis image;
X2=X;
X2(1:N/k,1:M/k)=Y2;
image(X2);
axis('image')
h_t1=title('Layered Image k=2');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)

%resample by k=3
k=3;
Y3=zeros((N+1)/k,(M-1)/k);
for n=1:(N+1)/k
```

```
   for m=1:(M-1)/k
      Y(n,m)=X(2*n-1,2*m-1);
   end
end

clear Y;
Y3=zeros((N+1)/k,(M-1)/k);
Y3=X(1:3:(N+1),1:3:(M-1));

%layer images
subplot(1,1,1);
image(X2);
axis ('image');
X3=X2;
X3(1:(N+1)/k,1:(M-1)/k)=Y3;
image(X3);
axis('image');
h_t1=title('Layered Image k=3');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)

%resample by k=4
k=4;
Y4=zeros(N/k,M/k);
for n=1:N/k
   for m=1:M/k
      Y4(n,m)=X(2*n-1,2*m-1);
   end
end

clear Y4;
Y4=zeros(N/k,M/k);
Y4=X(1:4:N,1:4:M);

%layers images
subplot(1,1,1);
image(X3);
axis image;
X4=X3;
X4(1:N/k,1:M/k)=Y4;
image(X4);
axis('image')
h_t1=title('Layered Image k=4');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)

%resample by k=5
k=5;
Y5=zeros((N+1)/k,M/k);
for n=1:(N+1)/k
   for m=1:M/k
      Y5(n,m)=X(2*n-1,2*m-1);
   end
end
```

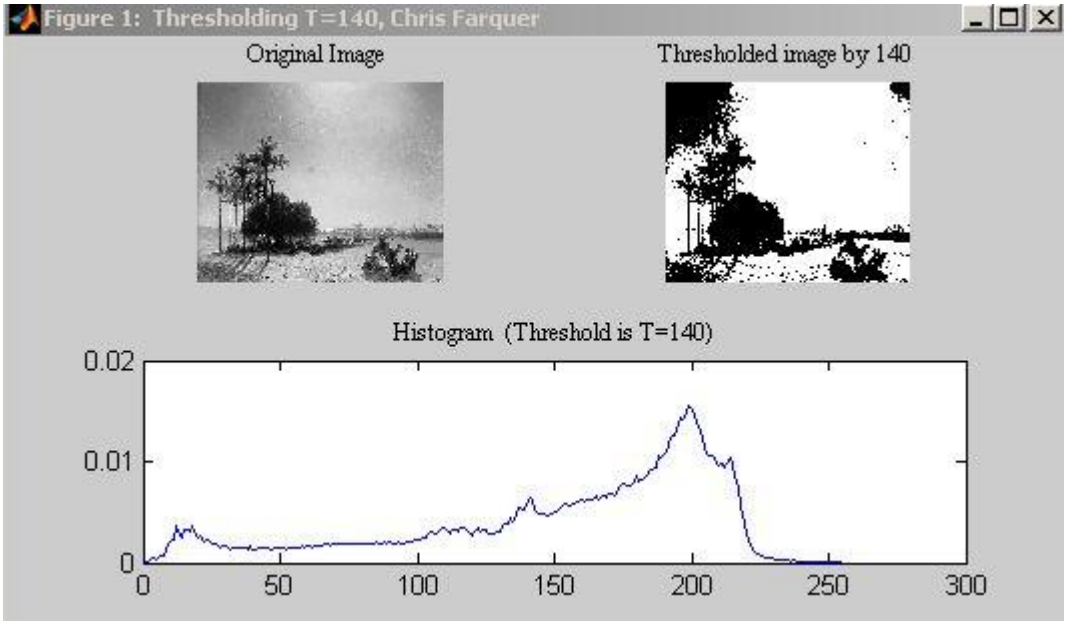
```
clear Y5;
Y5=zeros((N+1)/k,M/k);
Y5=X(1:5:(N+1),1:5:M);

subplot(1,1,1);
image(X4);
axis ('image');
X5=X4;
X5(1:(N+1)/k,1:M/k)=Y5;
image(X5);
axis('image');
h_t1=title('Layered Image k=5');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)
```




```
Y=imread('aivazovsky78g.tif','tif');
info=imfinfo('aivazovsky78g.tif','tif');



h_fig=figure('Tag','Fig 1:',...
    'Name',' Thresholding T=140, Chris Farquer',...
    'Position',[9 385 530 294]);
set(h_fig,'MenuBar','none');

colormap(gray(255));
h_1=subplot(1,1,1);
```

```
image(X);
axis('square')
h_t1=title('Original Image');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)


X=double(Y);
[N,M]=size(X);

h_s1=subplot(2,2,1)
colormap(gray(255));
image(X);
axis('image');  % axis image
axis off;       % axis on

mx_image=max(max(X));
mn_image=min(min(X));
colormap(gray(mx_image));

h_title1=title('Original Image');
set(h_title1,'FontName','Times', ...
    'FontSize',9,'Color','k');
h_x=xlabel('(a)'); % axis on
h_txt1=text(128,280,'(a)');  % delete(h_txt1)

H=hist_my(Y,2,1,2,'b');

for T=0:140;
    x=[T T]; y=[0,H(T+1)];
    h_s3=subplot(2,1,2);
    hold on;
    h_line=line(x,y);
    set(h_line,'Color','r');
    sT=sprintf('Histogram  (Threshold is T=%3g)',T);
    h_txt=text(T-2,y(2)+0.001,'T'); % delete(h_txt);
    h_title=title(sT);
    set(h_title,'FontName','Times','FontSize',9);
    pause(0.1)

    XT=zeros(N,M);
    %XT=(X>T).*X;
    XT=(X>T)*mx_image;
    h_s2=subplot(2,2,2)
    image(XT); axis off
    axis image
    %title('Thresholded image')
    s_title=sprintf('Thresholded image by %3g',T);
    h_title=title(s_title);
    set(h_title,'FontName','Times','FontSize',9);

    pause(.1);
    delete(h_txt);
    delete(h_line);
```

```
end
```




```
Y=imread('aivazovsky78g.tif','tif');
info=imfinfo('aivazovsky78g.tif','tif');



h_fig=figure('Tag','Fig 1:',...
    'Name',' Thresholding T=140, Chris Farquer',...
    'Position',[9 385 530 294]);
set(h_fig,'MenuBar','none');

colormap(gray(255));
h_1=subplot(1,1,1);
image(X);
axis('square')
h_t1=title('Original Image');
set(h_t1,'FontName','Times','FontSize',10,'Color','k');
pause(2)

X=double(Y);
[N,M]=size(X);

h_s1=subplot(2,2,1)
colormap(gray(255));
image(X);
axis('image');  % axis image
axis off;       % axis on

mx_image=max(max(X));
mn_image=min(min(X));
colormap(gray(mx_image));

h_title1=title('Original Image');
set(h_title1,'FontName','Times', ...
```

```
    'FontSize',9,'Color','k');
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    hold on;
    h_line=line(x,y);
    set(h_line,'Color','r');
    sT=sprintf('Histogram  (Threshold is T=%3g)',T);
    h_txt=text(T-2,y(2)+0.001,'T'); % delete(h_txt);
    h_title=title(sT);
    set(h_title,'FontName','Times','FontSize',9);
    pause(0.1)


    pause(.1);
    delete(h_txt);
    delete(h_line);
end

H=hist_my(Y,2,2,3,'b');

for T=0:170;
    x=[T T]; y=[0,H(T+1)];
    h_s3=subplot(2,2,3);
    hold on;
    h_line=line(x,y);
    set(h_line,'Color','r');
    sT=sprintf('Histogram  (Threshold is T=%3g)',T);
    h_txt=text(T-2,y(2)+0.001,'T'); % delete(h_txt);
    h_title=title(sT);
    set(h_title,'FontName','Times','FontSize',9);
    pause(0.1)


    pause(.1);
    delete(h_txt);
    delete(h_line);
end
H=hist_my(Y,2,2,3,'b');

for T=0:170;
    x=[T T]; y=[0,H(T+1)];
    h_s3=subplot(2,2,3);
    hold on;
    h_line=line(x,y);
    set(h_line,'Color','r');
    sT=sprintf('Histogram  (Threshold is T=%3g)',T);
    h_txt=text(T-2,y(2)+0.001,'T'); % delete(h_txt);
    h_title=title(sT);
```

```
    set(h_title,'FontName','Times','FontSize',9);
    pause(0.1)


    pause(.1);
    delete(h_txt);
    delete(h_line);
end
H=hist_my(Y,2,2,4,'b');

for T=0:170-140;
    x=[T T]; y=[0,H(T+1)];
    h_s3=subplot(2,2,4);
    hold on;
    h_line=line(x,y);
    set(h_line,'Color','r');
    sT=sprintf('Histogram  (Difference of Thresholding)',T);
    h_txt=text(T-2,y(2)+0.001,'T'); % delete(h_txt);
    h_title=title(sT);
    set(h_title,'FontName','Times','FontSize',9);
    pause(0.1)


    pause(.1);
    delete(h_txt);
    delete(h_line);
end
```