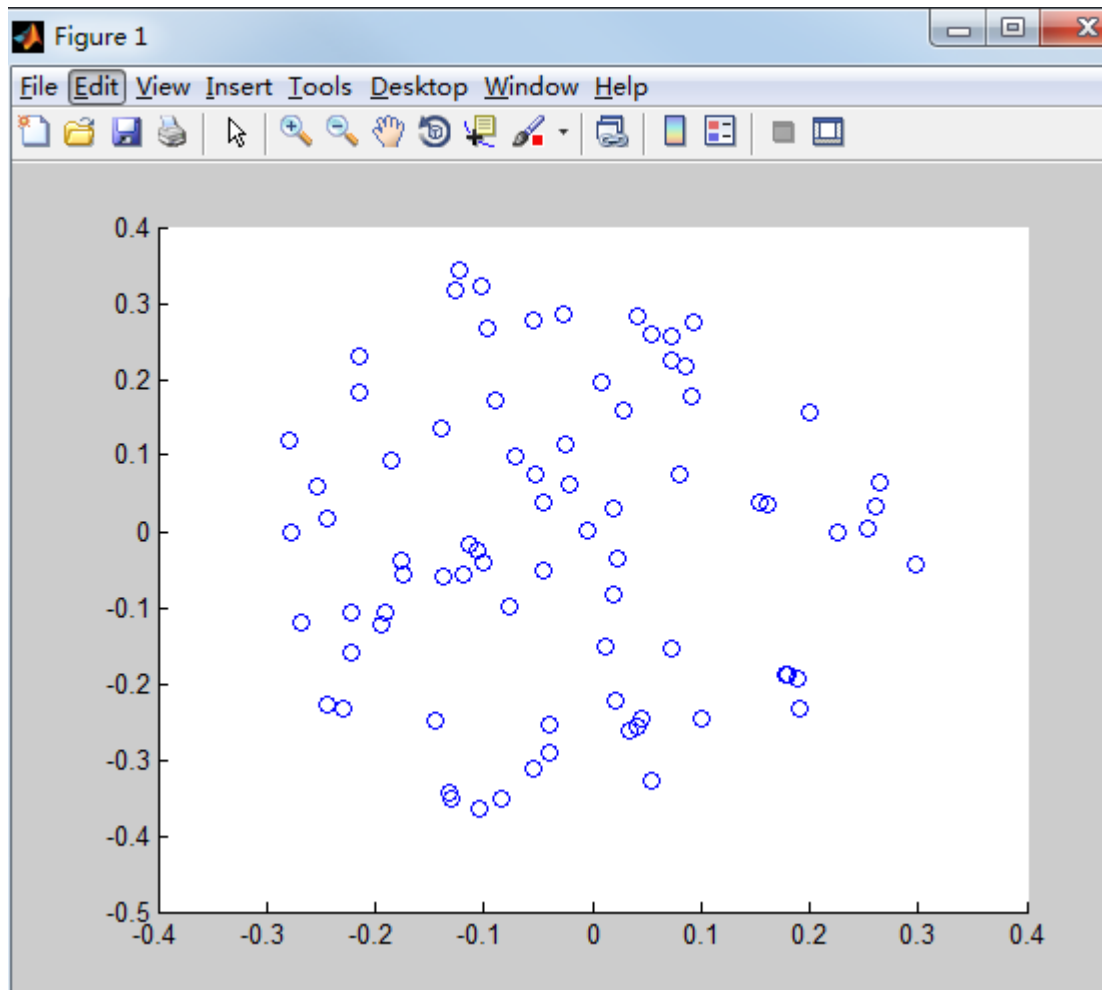


1. To see the magnitude of every point, and find out those points with big magnitude. It will be the contour.
2. Scan from the most left, to find the first point (the point with the smallest x value) with a big magnitude. Then scan from the most right and most top and most bottom. These four can be candidate feature points.
3. The fewer feature points, the fewer of calculation cost and fewer memory to store the data.

4 . The matlab code:

```
stars = load('stars');
Mag = stars.Mag;
Dec = stars.Dec;
Dec = Dec /180 *pi;
RA = stars.RA;
RA = RA /180*pi;
cra= 293/180* pi;
c_dec = -2.8/180 *pi;

for i =1 : length (RA)
[x(i),y(i)]= project (RA(i), Dec(i), cra,c_dec);
end
scatter (x,y);
axis([-0.4,0.4,-0.5,0.4])
```



5.

$N = 79$. If k is large, it will take a lot time to calculate. If k is too small, it can't tell the feature of the image.

6 Using clustering approach can find 1 to n fits, n is the number of clusters. We can pick the number we want instead of choosing k ahead of time.

7. The transform is:

$t =$

$$\begin{pmatrix} 0.5000 & 0.8660 \\ -0.8660 & 0.5000 \end{pmatrix}$$

The matlab code is:

```
function T = Procrustes (F,S)
```

```
[U,s,V] = svd(S*F');
```

```
T = U*V';
```

```
End
```

```
a = load('procrustes');
```

```
A =a.A;  
B = a.B;  
  
t = Procrustes (A,B);
```

Lab

```
1.  
clear all;  
close all;  
  
img = imread('diamond.png');  
imshow(img);  
  
grey = rgb2gray(img);  
  
[m,n] = size(grey);  
ind = 0;  
coe = zeros(1,2);  
  
for i = 1:m  
    for j = 1:n  
        if grey(i,j) < 10  
            ind = ind+1  
            coe(ind,:) =[i,j];  
        end  
    end  
end  
  
coe =  
  
    120    287  
    127    278  
    131    273  
    135    268  
    146    254  
    150    249  
    154    244  
    161    235  
    165    230  
    169    225  
    176    216  
    180    211  
    184    206  
    195    192
```

199	187
210	390
214	385
218	380
225	371
229	366
233	361
244	347
248	342
252	337
259	328
263	323
267	318
274	309
278	304
282	299

This are the feature points.

2.

To find the point with the smallest and the biggest x value and the y value.

120	287
282	299
210	390
199	187

