**Matlab code**

**8 point algorithm**

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| % Homework 2  % Created by Nguyen Van Chuong, ID: 20161199  % 8\_point algorithm  Corr\_1\_data=load('fig1.txt');  Corr\_2\_data=load('fig2.txt');    Corr\_1=Corr\_1\_data(1:7:500,:);  Corr\_2=Corr\_2\_data(1:7:500,:);  [rows columns] = size(Corr\_1);    img1=imread('img1.PNG');  img2=imread('img2.PNG');    A(1:rows,1:9)=0;  for i=1:rows  A(i,1)=Corr\_1(i,1)\*Corr\_2(i,1);  A(i,2)=Corr\_1(i,1)\*Corr\_2(i,2);  A(i,3)=Corr\_1(i,1);  A(i,4)=Corr\_1(i,2)\*Corr\_2(i,1);  A(i,5)=Corr\_1(i,2)\*Corr\_2(i,2);  A(i,6)=Corr\_1(i,2);  A(i,7)=Corr\_2(i,1);  A(i,8)=Corr\_2(i,2);  A(i,9)=1;  end  [U1,S1,V1]=svd(A);  f=V1(:,9);  F1=[f(1) f(2) f(3); f(4) f(5) f(6); f(7) f(8) f(9)];    [U,S,V]=svd(F1);  I=[1 0 0; 0 1 0; 0 0 0];    F=U\*S\*V';  F=F./F(3,3);  % Draw epipolar lines and correspondence    Corr\_1\_data(:,3)=1;  Corr\_2\_data(:,3)=1;  figure;  subplot(121);  imshow(img1);  hold on;    for i=1:11:660  e\_line=F\*Corr\_2\_data(i,:)';  e\_line=e\_line/e\_line(3);  x=[1 size(img1,2)];  y=-(e\_line(1)/e\_line(2))\*x-(1/e\_line(2))\*[1 1];  plot(Corr\_1\_data(i,1),Corr\_1\_data(i,2),'r-o','MarkerSize',5)  plot(x,y)  end    subplot (122)  imshow(img2);  hold on;  for i=1:11:660  e\_line=F'\*Corr\_1\_data(i,:)';  e\_line=e\_line/e\_line(3);  a=-e\_line(1)/e\_line(2);b=-1/e\_line(2);  x=[1 size(img2,2)];  y=a\*x+b\*[1 1];  plot(Corr\_2\_data(i,1),Corr\_2\_data(i,2),'r-o','MarkerSize',5)  plot(x,y)  end |

Normalized 8 point algorithm

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| % Homework 2  % Created by Nguyen Van Chuong, ID: 20161199  % Normalized\_8 point algorithm    Corr\_1\_data=load('fig1.txt');  Corr\_2\_data=load('fig2.txt');    Corr\_1=Corr\_1\_data(1:7:500,:);  Corr\_2=Corr\_2\_data(1:7:500,:);  [rows columns] = size(Corr\_1);    mu\_u=ones(rows,1)'\*Corr\_1(:,1)\*ones(rows,1)/rows;  mu\_v=ones(rows,1)'\*Corr\_1(:,2)\*ones(72,1)/rows;  mu\_uprime=ones(rows,1)'\*Corr\_2(:,1)/rows\*ones(rows,1);  mu\_vprime=ones(rows,1)'\*Corr\_2(:,2)/rows\*ones(rows,1);    sigma\_u=sqrt((Corr\_1(:,1)-mu\_u)'\*(Corr\_1(:,1)-mu\_u)/rows);  sigma\_v=sqrt((Corr\_1(:,2)-mu\_v)'\*(Corr\_1(:,2)-mu\_v)/rows);  sigma\_uprime=sqrt((Corr\_2(:,1)-mu\_uprime)'\*(Corr\_2(:,1)-mu\_uprime)/rows);  sigma\_vprime=sqrt((Corr\_2(:,2)-mu\_vprime)'\*(Corr\_2(:,2)-mu\_vprime)/rows);    % Normalized data point    Q\_Corr\_1=[(Corr\_1(:,1)-mu\_u)/sigma\_u (Corr\_1(:,2)-mu\_v)/sigma\_v];  Q\_Corr\_2=[(Corr\_2(:,1)-mu\_uprime)/sigma\_uprime (Corr\_2(:,2)-mu\_vprime)/sigma\_vprime];    % Matrix Transform  T=[1/sigma\_u(1) 0 -mu\_u(1)/sigma\_u(1);  0 1/sigma\_v(1) -mu\_v(1)/sigma\_v(1);  0 0 1];  T\_prime=[1/sigma\_uprime(1) 0 -mu\_uprime(1)/sigma\_uprime(1);  0 1/sigma\_vprime(1) -mu\_vprime(1)/sigma\_vprime(1);  0 0 1];    A(1:rows,1:9)=0;  for i=1:rows  A(i,1)=Q\_Corr\_1(i,1)\*Q\_Corr\_2(i,1);  A(i,2)=Q\_Corr\_1(i,1)\*Q\_Corr\_2(i,2);  A(i,3)=Q\_Corr\_1(i,1);  A(i,4)=Q\_Corr\_1(i,2)\*Q\_Corr\_2(i,1);  A(i,5)=Q\_Corr\_1(i,2)\*Q\_Corr\_2(i,2);  A(i,6)=Q\_Corr\_1(i,2);  A(i,7)=Q\_Corr\_2(i,1);  A(i,8)=Q\_Corr\_2(i,2);  A(i,9)=1;  end    [U1,S1,V1]=svd(A);  f=V1(1:9,9);  F1=[f(1) f(2) f(3); f(4) f(5) f(6); f(7) f(8) f(9)];  I=[1 0 0; 0 1 0; 0 0 0];  [U,S,V]=svd(F1);  S=S\*I;  F=U\*S\*transpose(V);  F=T'\*F\*T\_prime;  F=F./F(3,3);  Corr\_1\_data(:,3)=1;  Corr\_2\_data(:,3)=1;  % Draw epipolar lines and correspondence  figure;  subplot(121);  imshow(img1);  hold on;    for i=1:11:660  e\_line=F\*Corr\_2\_data(i,:)';  e\_line=e\_line/e\_line(3);  x=[1 size(img1,2)];  y=-(e\_line(1)/e\_line(2))\*x-(1/e\_line(2))\*[1 1];  plot(Corr\_1\_data(i,1),Corr\_1\_data(i,2),'r-o','MarkerSize',5)  plot(x,y)  end  subplot (122)  imshow(img2);  hold on;  for i=1:11:660  e\_line=F'\*Corr\_1\_data(i,:)';  e\_line=e\_line/e\_line(3);  a=-e\_line(1)/e\_line(2);b=-1/e\_line(2);  x=[1 size(img2,2)];  y=a\*x+b\*[1 1];  plot(Corr\_2\_data(i,1),Corr\_2\_data(i,2),'r-o','MarkerSize',5)  plot(x,y)  end |