```
%Inverse Transformation Example with Bilinear Interpolation
Inp = imread('cameraman.tif');
imshow(Inp)
```

```
[M2]=size(Inp,1)*2;
[N2]=round(size(Inp,2)*1.6);
[M,N]=size(Inp);
T1=[2,0,0;0,1.6,0;0,0,1]
```

```
T1 = 3×3
    2.0000         0         0
         0    1.6000         0
         0         0    1.0000
```

```
T_inv=inv(T1)
```

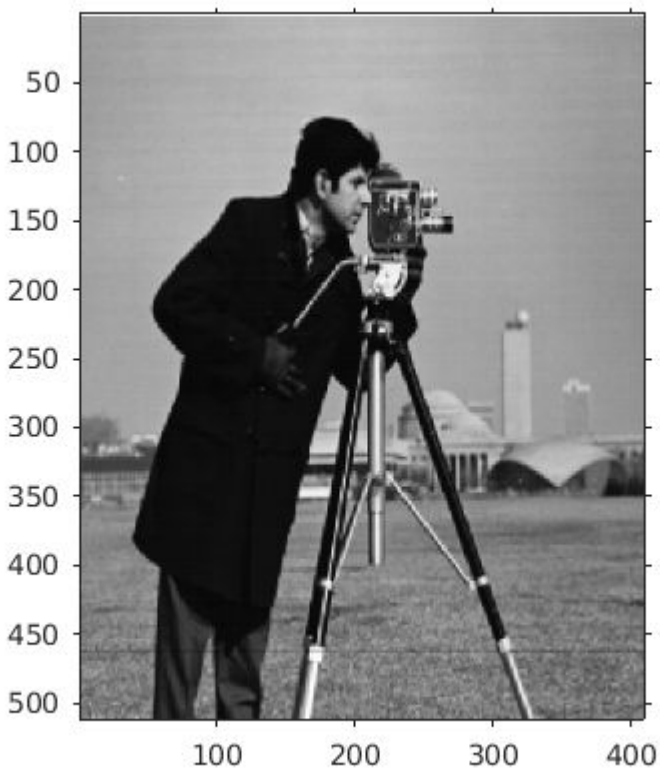
```
T_inv = 3×3
    0.5000         0         0
         0    0.6250         0
         0         0    1.0000
```

```
for row=1:M2;
    for col=1:N2;
        Ori_Coor=T_inv*[row, col,1]';
        if mod(Ori_Coor(1),1) == 0 & mod(Ori_Coor(2),1) == 0
            Outp(row, col)=Inp(Ori_Coor(1),Ori_Coor(2));
        elseif mod(Ori_Coor(1),1) == 0 & Ori_Coor(2)>1 & Ori_Coor(2)<= N
            a=Inp(Ori_Coor(1),ceil(Ori_Coor(2)));
```

```
            b=Inp(Ori_Coor(1),floor(Ori_Coor(2)));
            dif_y=Ori_Coor(2)-floor(Ori_Coor(2));
            dif_yplus1=ceil(Ori_Coor(2))-Ori_Coor(2);
            Outp(row, col)=a*dif_y+b*dif_yplus1;
        elseif mod(Ori_Coor(2),1) == 0 & Ori_Coor(1)>1 & Ori_Coor(1)<=M
            a=Inp(ceil(Ori_Coor(1)),Ori_Coor(2));
            b=Inp(floor(Ori_Coor(1)),Ori_Coor(2));
            dif_x=Ori_Coor(1)-floor(Ori_Coor(1));
            dif_xplus1=ceil(Ori_Coor(1))-Ori_Coor(1);
            Outp(row, col)=a*dif_x+b*dif_xplus1;

        elseif  Ori_Coor(1)>1 & Ori_Coor(2)>1 & Ori_Coor(1)<=M & Ori_Coor(2)<= N
            a=Inp(ceil(Ori_Coor(1)),ceil(Ori_Coor(2)));
            b=Inp(floor(Ori_Coor(1)),ceil(Ori_Coor(2)));
            c=Inp(ceil(Ori_Coor(1)),floor(Ori_Coor(2)));
            d=Inp(floor(Ori_Coor(1)),floor(Ori_Coor(2)));
            dif_x=Ori_Coor(1)-floor(Ori_Coor(1));
            dif_xplus1=ceil(Ori_Coor(1))-Ori_Coor(1);
            dif_y=Ori_Coor(2)-floor(Ori_Coor(2));
            dif_yplus1=ceil(Ori_Coor(2))-Ori_Coor(2);
            Outp(row, col)=(d*dif_xplus1*dif_yplus1+c*dif_x*dif_yplus1+b*dif_xplus1*dif

        else
            Outp(row, col)=255;
        end


    end
end
Outp=uint8(Outp)
```

```
Outp = 512×410 uint8 matrix
   255   255   255   255   255   255   255   255   255   255   255   255   255 ···
   255   157   159   159   157   156   156   158   157   157   159   159   158
   255   159   158   159   158   159   158   158   159   159   159   160   158
   255   159   155   156   157   158   158   157   158   159   158   158   158
   255   158   157   159   158   157   158   158   159   159   159   160   158
   255   157   159   159   157   156   156   158   157   157   159   159   158
   255   159   158   159   158   159   158   158   159   159   159   160   158
   255   159   155   156   157   158   158   157   158   159   158   158   158
   255   157   154   157   157   159   159   159   159   159   158   158   157
   255   155   154   155   156   158   159   159   157   155   156   156   155
    ⋮
```

```
figure;  imshow(Outp);axis on
```


50
100
150
200
250
300
350
400
450
500
100
200
300
400