IIIT Vadodara
Autumn 2018-19
TE3 Computer Vision
Lab-4: Geometric transformations

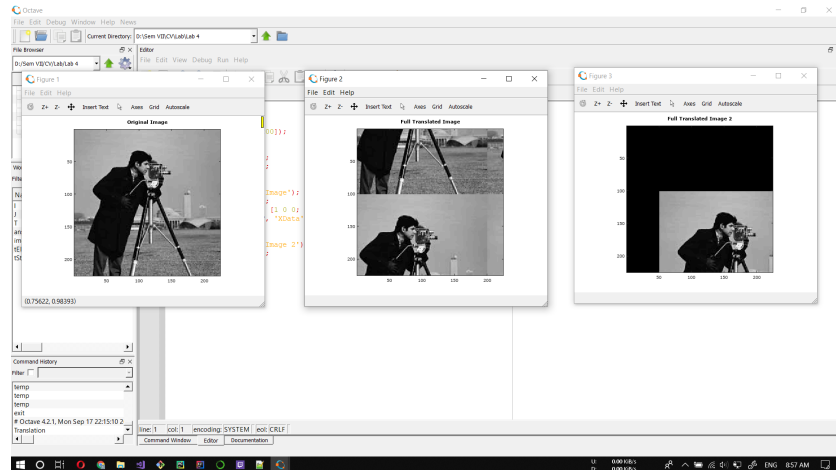### Shivvrat Arya (201551059)

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Problem 1. Translation

Solution Code :-

```
tStart=tic;
pkg load image;
I = imread("cam.jpg");
J = circshift(I, [100 200]);
figure
imshow(I);
title('Original Image');
set(gca,'Visible','on');
figure
imshow(J);
title('Full Translated Image');
set(gca,'Visible','on');
T = maketform('affine', [1 0 0; 0 1 0; 50 100 1]);
img2 = imtransform(I, T, 'XData',[1 size(I,2)], 'YData',[1 size(I,1)]);
figure
imshow(img2);
title('Full Translated Image 2');
set(gca,'Visible','on');
tElapsed=toc(tStart)
```

tElapsed $= 28.786$

In this problem we have translated the given image in the coordinates, i.e. we have changed the position of the given image w.r.t. the coordinate systems.

Question 2. Rotation

Solution Code :-

```
tStart=tic;
pkg load image;
im = imread("cam.jpg");
figure(1)
imshow(im);
xform = [ 1, -30, 0;
         30 , 1 , 0;
         0, 0, 1 ]
tform_translate = maketform('affine',xform);
[cb_trans xdata ydata]= imtransform(im, tform_translate);
figure(2)
imshow(cb_trans)

tElapsed=toc(tStart)
```
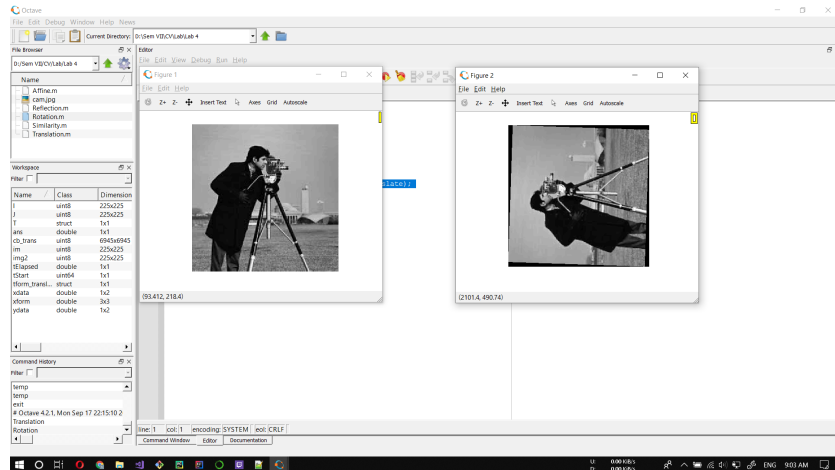
tElapsed = 12.042

In this solution we have tried to rotate the image.

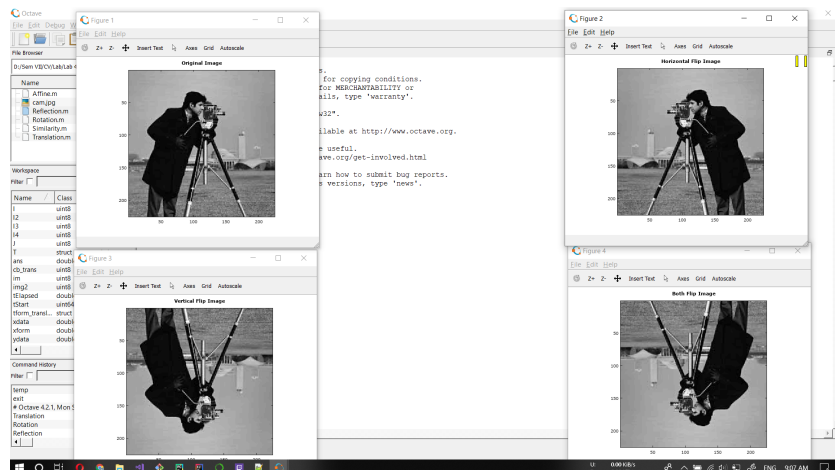**Question 3.** Reflections

Solution ode :-

```
tStart=tic;
I = imread('cam.jpg');
figure
imshow(I);
title('Original Image');
set(gca,'Visible','on');
I2 = flipdim(I ,2);
figure
```

```
imshow(I2);
title('Horizontal Flip Image');
set(gca,'Visible','on');
I3 = flipdim(I ,1);
figure
imshow(I3);
title('Vertical Flip Image');
set(gca,'Visible','on');
I4 = flipdim(I3,2);
figure
imshow(I4);
title('Both Flip Image');
set(gca,'Visible','on');
tElapsed=toc(tStart)
```

In this question we have done different kind of reflections in the image.

tElapsed = 1.0254

Question 4. Similarity

Solution Code :-

```
tStart=tic;
pkg load image;
im = imread("cam.jpg");
figure(1)
imshow(im);
xform = [ 1, -30, 0;
          30 , 1 , 0;
         0, 0,  1 ]
tform_translate = maketform('affine',xform);
[cb_trans xdata ydata]= imtransform(im, tform_translate);
T = maketform('affine', [1 0 0; 0 1 0; 500 100 1]);
I = cb_trans;
img2 = imtransform(I, T, 'XData',[1 size(I,2)], 'YData',[1 size(I,1)]);
figure
imshow(img2);
title('Full Translated Image');
set(gca,'Visible','on');
tElapsed=toc(tStart)
```

In this question we are doing similarity transform on the image
tElapsed = 24.374

Problem 5. Affine Transformation

Solution ode :-

```
tStart=tic;
pkg load image;
im = imread("cam.jpg");
figure(1)
imshow(im);
xform = [ 1, 0, 0;
```

```
        0.5 , 1 , 0;
        0, 0, 1 ]
tform_translate = maketform('affine',xform);
[cb_trans xdata ydata]= imtransform(im, tform_translate);
figure(2)
imshow(cb_trans)
tElapsed=toc(tStart)
```

tElapsed $= 0.43135$