**Experiment 1**: **Basic Image Operation & Image Transformation**

1. **Objective**

(1) To know how to manipulate images

(2) To be able to implement basic image transformations in Matlab

(3) To be able to use intensity transformations to enhance an image.

1. **Experiment Content**
   1. **Basic Image Operation**
2. Read the images ***tire.tif****,* ***rice.png*** given in the folder, and show them in one and two figures respectively. (referenced function: imread, imshow, figure, subplot)
3. In matlab, observe the images information from the workspace Panel
4. Use size, imfinfo, whos, etc functions to obtain image information respectively.
5. Add title to the images. (referenced function: title)
6. Implement the following codes in the M-file Editor

f=imread(‘tire.tif’) ;

imshow(f);

set(figure(1),'NumberTitle','off','Name','my first image’)

observe the result, and determine the function of set()

1. Save ***tire.tif*** to the directory “d:\imagetest”. If the folder does not exist, please create this new folder first. (referenced function: imwrite)
   1. **Zooming and Shrinking Images**
2. Write a program capable of shrinking(缩放) the image ***kids.tif*** by nearest, bilinear, and bicubic interpolation respectively. (referenced function: imresize)
3. Use your program to zoom the images in step 1 back to original size. Explain the reasons for their differences. (referenced function: imresize)
4. Crop the image ***kids.tif*** to the size specified by you.
5. Rotate the image ***kids.tif*** by the degree specified by you.
   1. **Simple Intensity Transformations**

(a) Use the log transformation of Eq. (1) to enhance the image ***spine.tif***:

*s* = *c* log(1+*r*) (1)

(reference function: log)

(b) Use a power-law transformation of the form shown in Eq. (2) to enhance the image ***spine.tif***. (reference algorithm operator: ^)



(2)

The only free parameter is *c* in equation (1), but in equation (2) there are two parameters, *c* and *γ* for which values have to be selected. As in most enhancement tasks, experimentation is a must. The objective of this experiment is to obtain the best visual enhancement possible with the methods in (a) and (b). Once (according to your judgment) you have the best visual result for each transformation, explain the reasons for the major differences between them.

1. **Some Possible Matlab functions**

The functions that might been used in the experiment include **imresize**, **imrotate**, **imcrop**, **imshow**, **imread**, **imwrite**, **figure**, **subplot**, **log** and so on. See the MATLAB HELP for more information.

1. **Requirement of Experiment Report**

In your experiment report, you should

1. Describe the experiment procedure

2. Give the original image and resulted image in your experiment.

3. Discuss the effect resulted from various parameter value when you do intensity transformation.