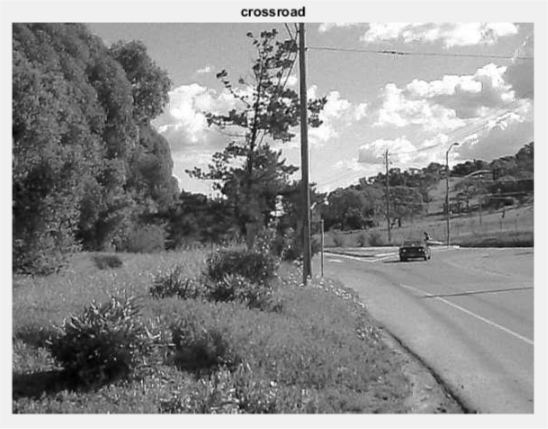
**Digital Image Processing Sessional Assignment 1**

**Exercise 1**

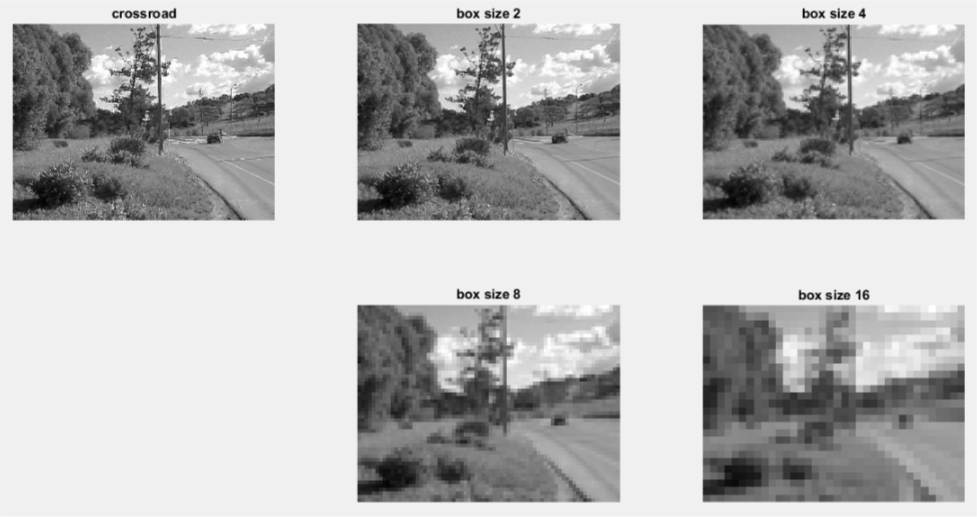
This problem was to understand image resolution.

1. For this problem it was told to Download the provided “crossroad.dat” file. After that import it with fopen() and then read it with fread() then assigned data of unsigned 8 bits while having width of 580 pixels and height of 435 pixels. Finally the image was shown with imshow().



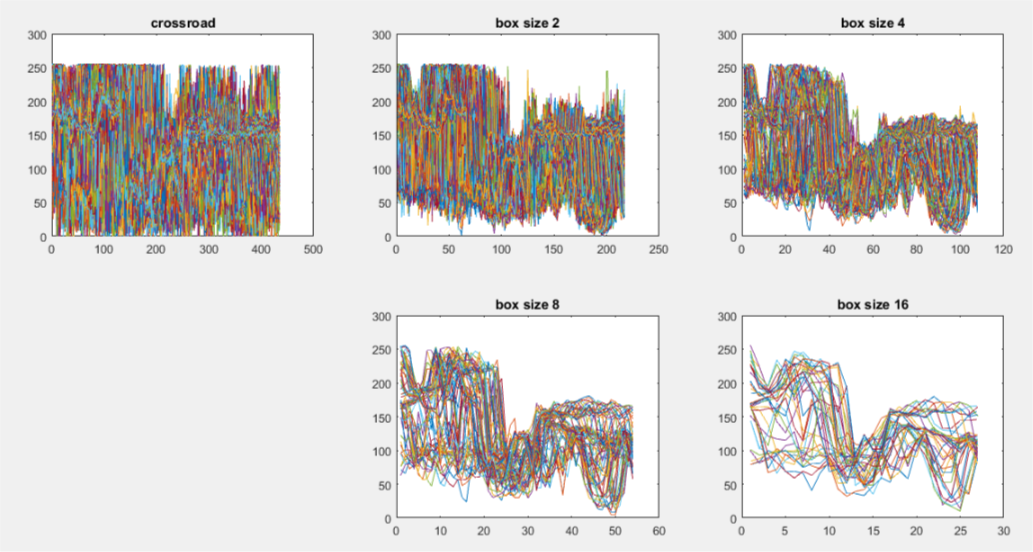
As the image was not suitably oriented so it was rotate using imrotate(). Thus, the observation for this problem was done.

1. For this part of the problem it was told to take the image used in the previous part and change the image resolution with boxes 2,4,8 1nd 16 pixels meaning decreasing the pixel numbers by .5,.25,.125,0.0625 of the original image. For that purpose the main image was resize by using imresize().



By seeing the resulted images, it is clear that by reducing pixel numbers the image loses its resolution. By applying box with 2x2 pixels only the sharpness is reduced without it no major difference is seen. For 4x4 the image gets blurry and the pixel boxes are seen at some parts. For 8x8 all over the image is the pixel boxes are seen and the image is more blur and the sharp edges of the pixel boxes giving the image a box effect. For 16x16 the pixel boxes are more bigger and the edges of the boxes are seen more and the image is holding the lowest resolution and details. So, in the conclusion it can be said that the more pixels are used to form box the more the image loses its resolution.

1. This part told to examine minimum obvious structure size in each case. For that the images were plot and graph showed their obvious structure.



The observation from the plots are that the main image holds more information as it has more pixels by decreasing of pixels the images lost their information and so that their obvious structure is getting shrinked.

**Code:**

% importing the .dat file

I = fopen('crossroad.dat');

% converting the .dat file to matlab readable image format

I = fread(I,[580,435]);

% rotating the image to get a nice view

I = imrotate(I,270);

%converting the image into uint8 format

I = uint8(I);

% displaying the image

subplot(2,3,1),imshow(I),title('crossroad');

% Changing the image resolution sizes with 2,4,8,16 boxes

w = floor(580/2);

h = floor(435/2);

I2 = imresize(I,[h w]);

subplot(2,3,2),imshow(I2),title('box size 2');

w = floor(580/4);

h = floor(435/4);

I4 = imresize(I,[h w]);

subplot(2,3,3),imshow(I4),title('box size 4');

w = floor(580/8);

h = floor(435/8);

I8 = imresize(I,[h w]);

subplot(2,3,5),imshow(I8),title('box size 8');

w = floor(580/16);

h = floor(435/16);

I16 = imresize(I,[h w]);

subplot(2,3,6),imshow(I16),title('box size 16');

% Displaying the obvious structure

figure;

subplot(2,3,1), plot(I), title('crossroad');

subplot(2,3,2), plot(I2), title('box size 2');

subplot(2,3,3), plot(I4), title('box size 4');

subplot(2,3,5), plot(I8), title('box size 8');

subplot(2,3,6), plot(I16), title('box size 16');