Simulation and Modelling Lab

<u>Assignment – 5</u>

This assignment is to be completed using MATLAB.

The assignment and its steps described below provide the technique of Median filtering for image denoising – a very standard image processing/cleaning technique. There are other sophisticated denoising techniques for images too.

In this assignment, we shall learn how to handle an image using MATLAB. In this example we shall take up the task of denoising an image.

1. Take a photograph of yours as input.
2. Convert your image to grayscale using rgb2gray() MATLAB inbuilt function.
3. Read the grayscale image into an array A using imread() MATLAB function.
4. Notice how the image pixels are stored in MATLAB. Each pixel is an 8-bit integer, with 0 indicating black and 255 indicating white and rest all gray levels ranging between 0-255.
5. Print the size of the image. Use function size().
6. Now, divide A sequentially into 3×3 non-overlapping pixel blocks.
7. For each block compute the central pixel value (C) as the median of the surrounding eight pixels (S1-S8). Replace the old value of C with this median.

S1	S2	S3
S4	C	S5
S6	S7	S8

8. Now display the resultant matrix as an image using imshow() MATLAB function and save it as an image using imwrite() / imsave() function. [Save it as a .tiff or .png image since these are lossless image formats.]
9. Now repeat step 6-8 using sequential non-overlapping blocks of size 5×5 and 7×7.
10. Compare all three images generated.

[Check the following: If you do not convert the colored photograph of yours into a grayscale image at step 2 above, what does imread() function return you in this case? Check what is the size of the returned matrix using size().]