CE-671A INTRODUCTION TO REMOTE SENSING

LAB - 4

(2022-23 1st SEMESTER)

OBJECTIVES

- To understand linear stretching, color composites, color representation and LUT's.

You will learn:

a. How colors are represented in an image.
b. Role of DNs in different bands and color composites.
c. Linear stretching.
d. Understanding of the Look Up Table (LUT).

METHODOLOGY:

WORKING WITH MATLAB

1. Use the three images in **L4_tiff** folder as provided.
2. Read about the specification of LISS 3 sensor and available bands. We have the images of band 2, 3 and 4. By default, MATLAB considers R, G and B color guns as band 1, 2 and 3 respectively for displaying images.
3. Display the FCC image with RGB channels with appropriate bands in MATLAB.
   (NIR band will be shown in red color)

4. As the image is shown in a new window, check the values of pixels in different bands. Can you comment on the spread of pixel values in different bands?
5. Try showing the different combination of bands in RGB. How many different combinations are possible?

6. Apply linear stretching with clip on each band with the help of following function:

$$I_N = (I - Min)\frac{newMax - newMin}{Max - Min} + NewMin$$

   where, I_N is the new value of the pixel, I is the value to be stretched, *newMax* and *newMin* are the new ranges (0-255), Max and Min are the ranges of the current values/image.

   (Select appropriate range of values Min – Max, to apply linear stretching with clip. This can be done with the help of histograms)

7. Display the stretched image as FCC.

8. Now, select any five pixels of normal FCC image in different areas (say top of workshop roof, water body, vegetation, road, concrete floor). Go to these pixels by zooming in till the image gets pixelated.

9. Make a table for these pixels as described. Fill the values in table for each of the pixels. "RGB values from the Image" is the RGB value given by clicking on the pixel; use these values in the blender which you can find at – "http://www.rapidtables.com/web/color/RGB_Color.htm".

10. Further, calculate the values for RGB using the formula for stretching and note the new RGB values. Compare these values with the stretched image. Also, find the new color in the blender. The generated table can be used as a "Look Up Table".

Pixel Number (1)	Pixel Address(2)	Type of Land use/Land cover (3)	RGB values from the Image (4)	Color from the Blender (5)	Values from the Stretched Image (6)	Color from the new Image in Blender (7)

QUESTIONS:

1. Give any three applications where different FCC combinations can be used for solving a real-life problem.
2. What is the difference between RGB and CMYK model? Why they so called additive and subtractive mixing? Give any two areas where these models used.
3. Explain the significance of LUT's.

DELIVERABLES:

- Report with images and explanations.
- MATLAB code (.m file)

SUBMISSION DUE DATE: 07:00 PM, 2nd September (Friday)

NOTE:

The lab report must be prepared in LaTeX and submitted by 07:00 PM on the same day.