

Lab4: Understanding Linear Stretching and Color Representations

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1 Objective

To understand color composites, color representation LUT's by studying-How colors are represented in an image. Role of DN's in different bands and color composites Linear stretching. Understanding of the Look Up Table (LUT).

2 Results and discussion

2.1 False Colour Composite (FCC 4-3-2):

The Imagery L-4 which was used in last laboratory is read in matlab, this image has four bands. A colour composite is made assigning 4th, 3rd and 2nd band of this image to 1st, 2nd and 3rd band of colour composite. This type of colour composite is standard colour composite in matlab.



Figure 1: False colour composite(4-3-2)

FCC created contains three bands, linear stretching is applied to each band by following formula-

$$I_N : ((I - Min) * (newMax - newMin) / (Max - Min) + newMin) \quad (1)$$

- Where, I_N is the new value of the pixel,
- I is the pixel value to be stretched
- newMax and newMin are the new ranges of pixel value (0-255),
- Max and Min are the ranges of DN numbers the current band of image has most of pixels.

Firstly histogram for each band of FCC is plotted in matlab, from histogram maximum and minimum values of DN numbers which most of the pixel have are observed and assigned in formula for each band.

2.2 Histogram and stretched image of each band of FCC:

- Band1:

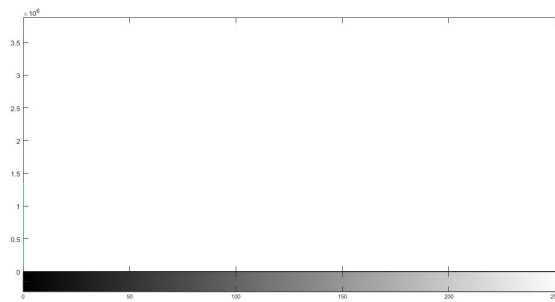


Figure 2: Histogram of band 1 of FCC

As 1st band of FCC is made of 4th band of Imagery file which was not having any DN values hence we get entire display of 1st band before and after stretching as all white coloured pixels.

original image-band1

stretched image band 1



Figure 3: Band 1 of FCC before and after stretching

- Band2:

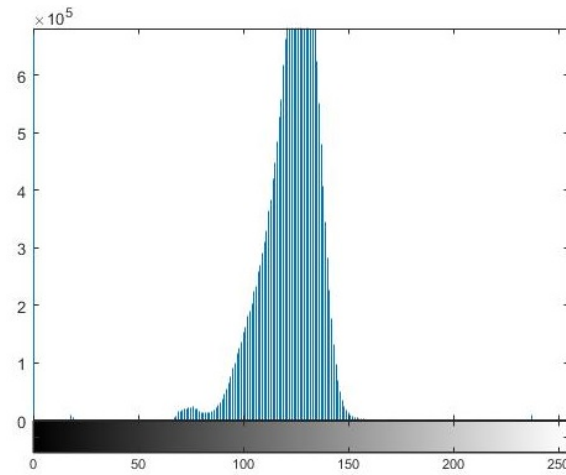


Figure 4: Histogram of band 2 of FCC

Most of the pixels of 2 of FCC have DN value in between 65 to 160 hence these values are Incorporated as current max and min values in linear stretching formula and we get stretched image as output.

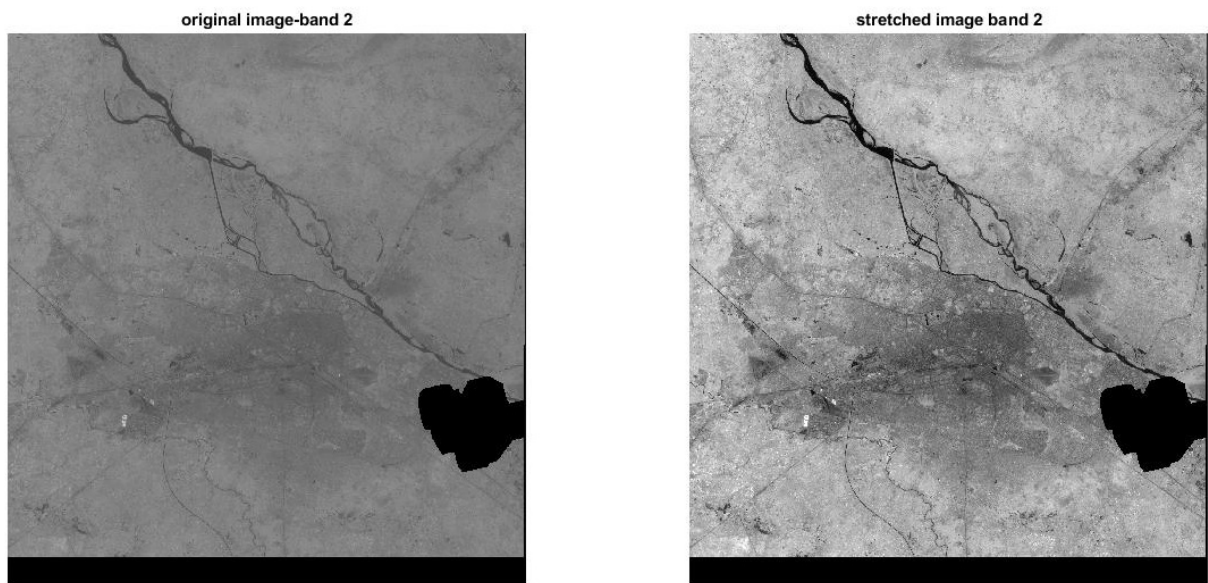


Figure 5: Band 2 of FCC before and after stretching

- Band3:

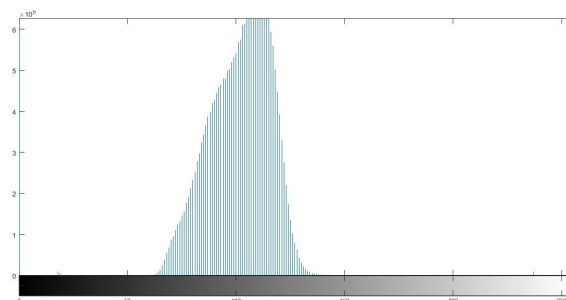


Figure 6: Histogram of band 3 of FCC

Most of the pixels of 2 of FCC have DN value in between 65 to 135 hence these values are Incorporated as current max and min values in linear stretching formula and we get stretched image as output.

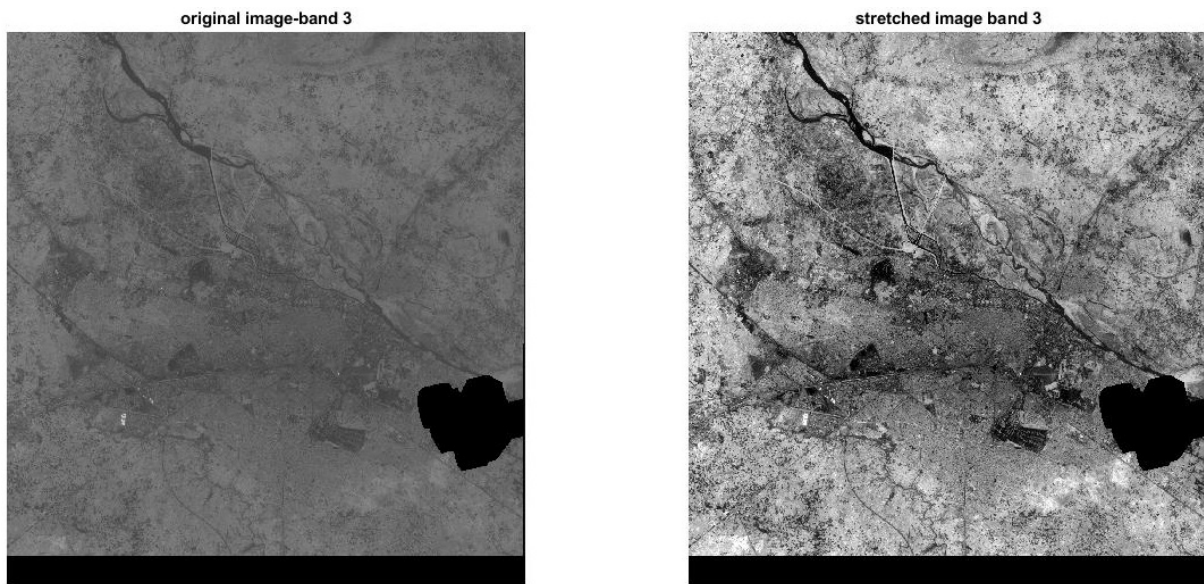


Figure 7: Band 3 of FCC before and after stretching

3 Conclusion

False colour composites can be created in matlab by using multispectral images and these false colour composites can be utilized to analyze image by viewing it in the bands in which features in image have high spectral reflectance.

Linear stretching can be applied to various bands of image by iterating each pixel of image over for loop in MATLAB and assigning new DN value to that pixel according to stretching formula.