RS Tango V1.0

Software for Digital Image Processing

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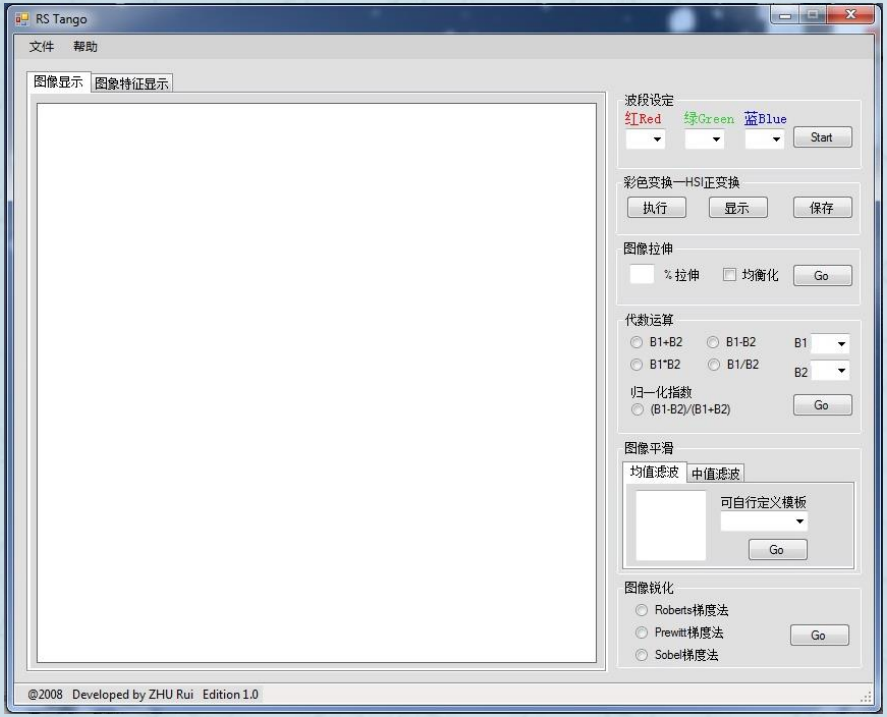
Outline

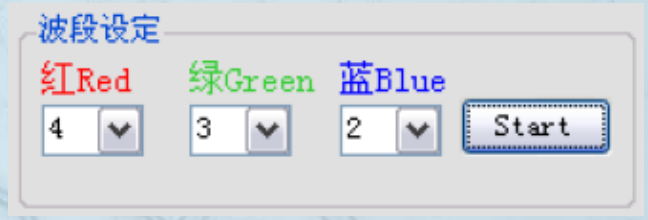
1. Introduction

- Software for Digital Image Processing
- Study the Theory of Remote Sensing
- Single Window Development



2.1 Set Multi-brand Data

1. Seven brand data are read in seven two-dimensional array
2. At the same time, software will read .hdr head file
3. Three index out of seven arrays can be chosen to fill in RGB function
4. The data is provided by range of 360*360 for every lay



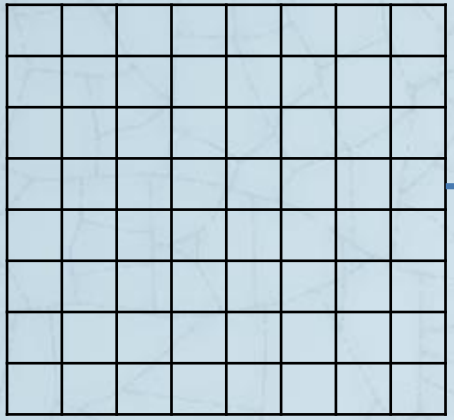
2.2 Characteristic Statistics

intVal = value in the middle index of a array, which holds different values of the original data

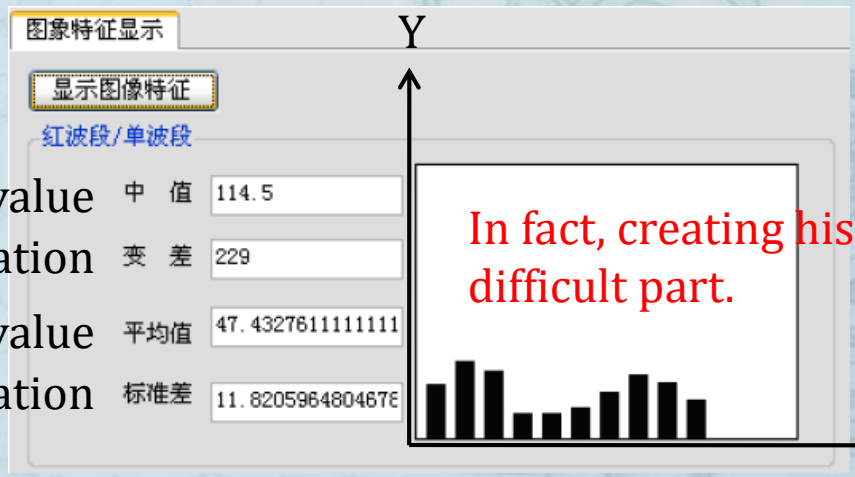
var = max – min;

mean = sum/num;

stdDev = sqrt(sum((xij - xmean)^2))/(n-1);



Array A = [1, 3, 22, 45, 99, 111, 146, 234, 225];
Odd / Even



Intermediate value

Variation

Mean value

Standard deviation

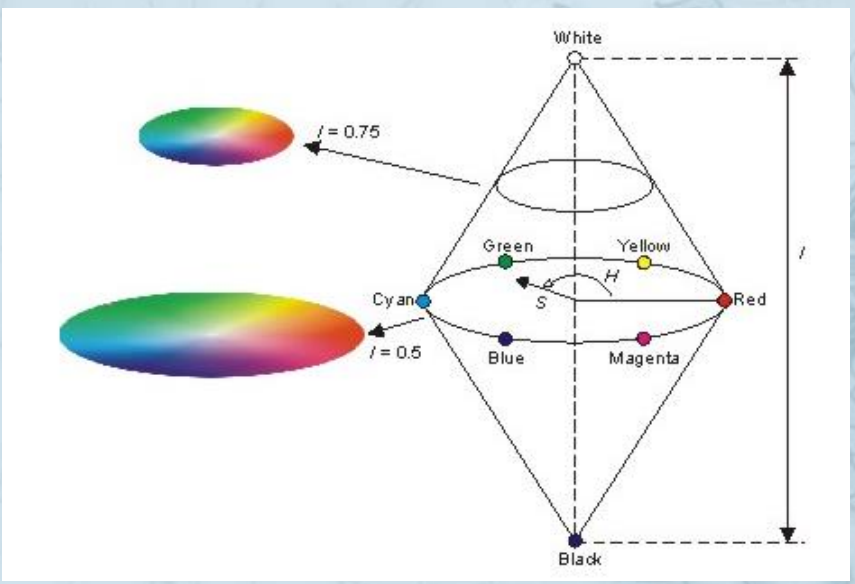
2.3 Color Transformation

The HSI color space is very important and attractive color model for image processing applications because it represents colors similarly how the human eye senses colors. The HSI color model represents every color with three components: hue (H), saturation (S), intensity (I).

The Hue component describes the color itself in the form of an angle between [0,360] degrees. 0 degree mean red, 120 means green 240 means blue. 60 degrees is yellow, 300 degrees is magenta.

The Saturation component signals how much the color is polluted with white color. The range of the S component is [0,1].

The Intensity range is between [0,1] and 0 means black, 1 means white.



Picture comes from: http://www.blackice.com/colorspaceHSI.htm

2.3 Color Transformation

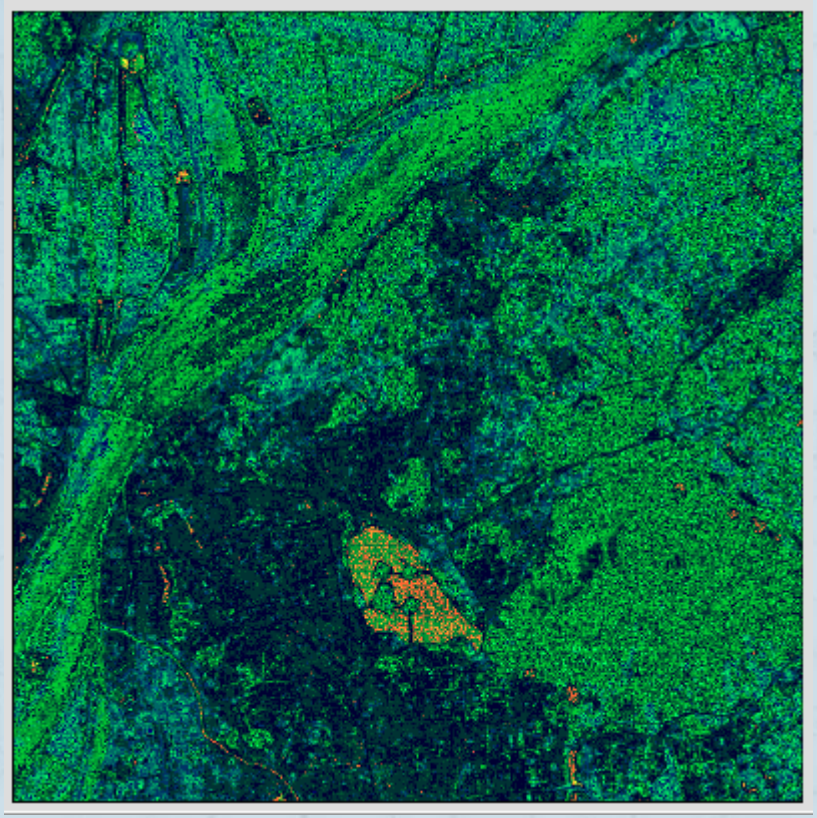
Converts from RGB to HSI.

void imColorRGB2HSI (float *r*, float *g*, float *b*, float * *h*, float * *s*, float * *i*)

“h" is the angle starting from the red vector, given in degrees.

“s" is the normal distance from the diagonal of the RGB cube. It ranges from 0 to 1.

“i" is defined along the cube diagonal. It ranges from 0 (black) to 1 (white).

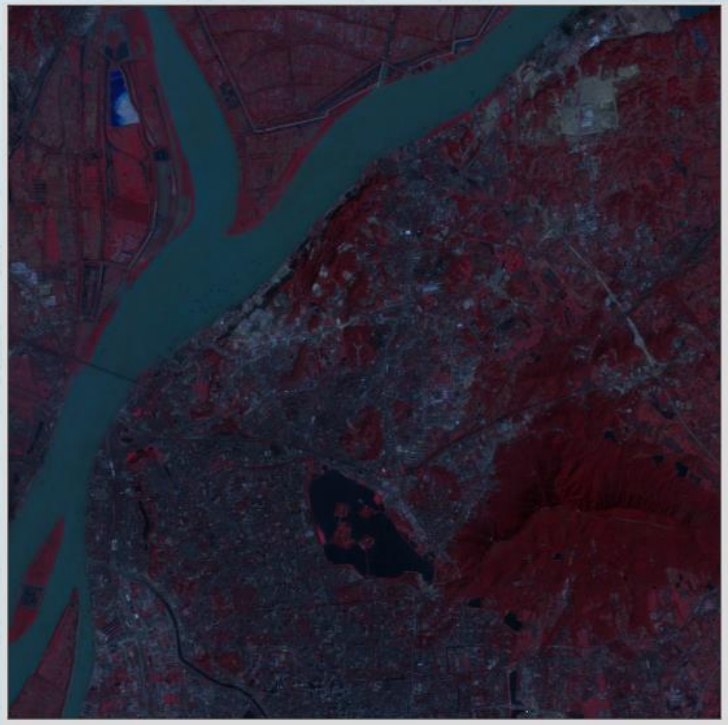


2.4 Image Stretching and Equalization

We cannot distinguish the variations of remote sensing image clearly when the data values are consternated in a small range.

For example, values can be converted from 0-50 to 0-255 in linear equation by stretching. In this case, gray level is enlarged.

(n_ij-min)/(max-min) = (n_ij_newValue - min)/(max*(1+x%)-min)

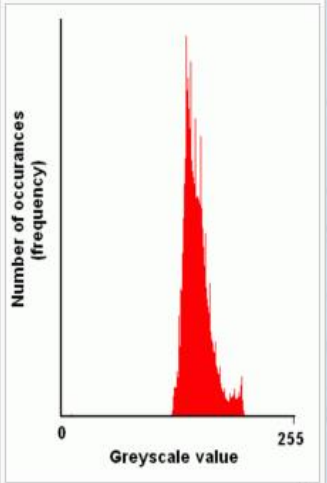


2.4 Image Stretching and Equalization

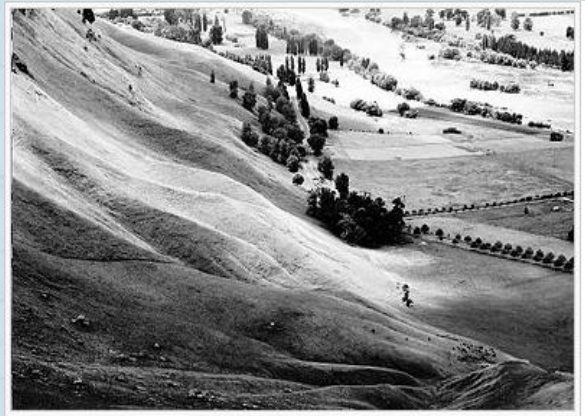
This method is usually used to increase the overall number of image contrast, especially when the contrast of the image of the useful data is very close to the time.

In this way, the brightness can be better distributed in the histogram. This can be used to enhance the local contrast without affecting overall contrast, histogram equalization used by effectively expanding the brightness to achieve this functionality.

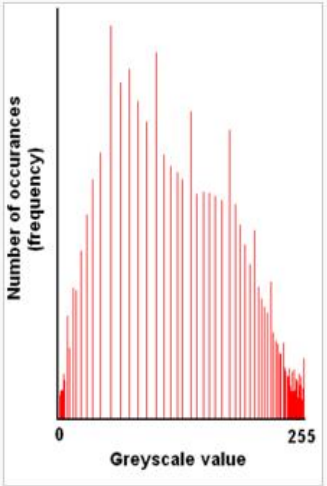
Images without equalization



Corresponding histogram



After equalization of the same image



Corresponding histogram

2.5 Map Algebra Calculation

代数运算

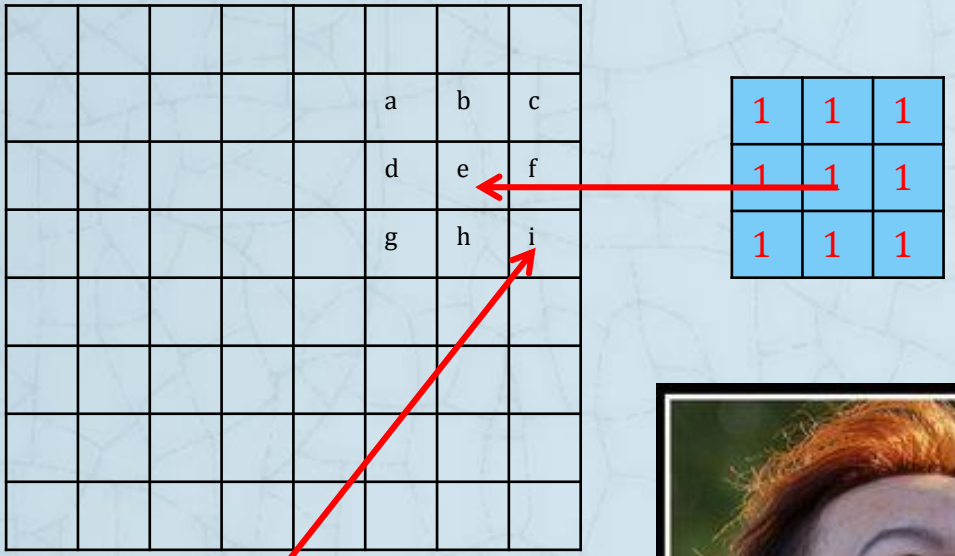
B1+B2　B1-B2　B1 4

B1*B2　B1/B2　B2 5

归一化指数

(B1-B2)/(B1+B2)　Go

2.6 Image Smoothing



1	1	1
1	1	1
1	1	1

new e = (a*1+b*1+…+i*1)/9

Problem for the values locates along the boundary

3. Result and Discussion

Let’s do it!

4. Conclusion

1. Read file problems
2. More works can be done further
3. Bugs in this software
4. Meet the demand of the target on theory of remote sensing digital processing

Tack så mycket
och
har du några frågor?