Department of Civil Engineering, National Taiwan University

Remote Sensing

(521 M7100) 2017
Due Date: 2017-6-21

Assignment #5

(1) Image Reading and Displaying:

(a) Code a program (using Matlab or C++) to read the image data to the PC memory. The image information is as follows:

Image File	MS.img	Pan.img
Image Width	1200	4800
Image Height	800	3600
Bands Number	4	1
Data Type	Unsigned Integer	Unsigned Integer
Interleave	BSQ	N/A

The images can be downloaded from:
https://ceiba.ntu.edu.tw/course/f924cc/hw/RS%20images.rar

(b) Enhance and display the images as gray or true color. Explain the enhancement method you use, and describe the image content from the images.

(2) Geometric Correction:

(a) Please complete the geometric correction of the Pan.img and MS.img respectively using the reference GIS data (1/1000 cartography). The GIS data can be downloaded from:
https://ceiba.ntu.edu.tw/course/f924cc/hw/GIS.rar

(b) Select a mathematical distortion model for the geometric correction and explain why the distortion model is selected by you.

(c) Find two sets of ground control points (GCPs) from the GIS data, one for geometric correction (control points) and the other for the assessment of RMS errors (test points).

(d) Calculate and list the coefficients of the transform models and print the corrected images. Also calculate the Root Mean Square Error (RMSE) of this transformation.

(e) Exchange the control points for test points and repeat the transformation calculation again. Describe the phenomenon you has observed?

(f) Finally, draw some conclusions for the procedure of this geometric correction.

(3) Pan Sharpening:

(a) Perform the pan-sharpening method (PCT-based, IHS-based or Wavelet-based) on the above panchromatic and multispectral images which have been corrected geometrically.