Using Spectral Angle Mapper Technique (SAM) on Hyperspectral Images to Determine the Area and Location of Some Objects[*]

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Abstract

This research depends on the relationship between the spectral reflectance and the nature of target in order to track it and draw boundaries and area of its spread, and even the proportion of its presence with other objects in the area to be measured. The greater the number of spectral channels used the greater the amount of extracted information from the studied target. The use of hyperspectral images requires complex processing techniques which differ in the means and methodology from those using multispectral images. Hyperspectral image of Hyperion on the satellite EO- was 1 used to determine the area of the spread of some of the most important targets in the image (northeast area of Damascus) and using the spectral values for field targets recorded by Spectroradiometer instrument to increase the accuracy of target discrimination and the percentage of their presence and thus the accuracy of the boundaries of its area. The completeness of using a specialized programs (GIS, ENVI, RS3, Viewspec-pro) on satellite image data and field data using spectral angle mapper technique (SAM) showed the superiority of this technology to identify actual areas and boundaries of the spread of the studied targets whether topographical, architectural, geological, agricultural and others. In addition, other targets could be discovered and their its areas could be calcuated which where as multispectral images could not discover them .

Keywords: Hyperspectral image, SAM(spectral angle mapper), Field hyperspectral data .

References:

1. د. ناصر ابراهيم, 2010 . تكامل الصور الفضائية فائقة الدقة الطيفية مع البيانات الطيفيــة الحقليــة لتحديد التكشفات الصخرية والسمات الأرضــية . الهيئة العامة للاستشعار عن بعد, دمشق .

2. Marcus Borengasser, William S.Hungate, and Russell Watkins, 2008 , Hyperspectral Remote Sensing : Principles and Applications, CRC press, Taylor and Fancic Gruop .

3. Jay Pearlman, Carol Segal, Lushalan Liao, Steve Carman, Mark Folkman Bill Browne (GSFC), Lawrence Ong (GSFC), Stephen Ungar, 2000, Development and Operations of the EO-1 Hyperion Imaging Spectrometer .

4. Prashant Kawishar, 2007, Atmospheric Correction Models for Retrievals of Calibrated Spectral Profiles from Hyperion EO-1 Data,Thesis Master of science .

5. Rajat Satpathy, Vivek Kumar Singh, Reshma Parveen, Ayyem Thillai Jeyaseelan ,2010, Spectral Analysis of Hyperion Data for Mapping the Spatial Variation of AL+OH Minerals in a Part of Latehar & Gumla District, Jharkhand, India .

6. EO-1 User Guide, Version 2.3 , July 15, 2003 .

7. Kropff. M. J, 2006, Sampling scheme optimization from hyperspectral data,Thesis of Doctor, ITC, Enschede, Netherlands .