INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

A REVIEW ON "STUDY AND ANALYSIS OF HYPERSPECTRAL IMAGES"

S. S. MONDHE, DR. S. V. RODE

Department of Electronics and Telecommunication, Sipna College of Engineering & Technology, Amravati, India

Abstract: The project titled as "Study and Analysis of Hyperspectral Images" describes the acquisition of information from the far object without coming it physical contact it is called Remote Sensing. With help of remote sensing it possible to detect the object which made up of different material having different chemical composition according to that they reflect, absorb & emit electromagnetic radiation .we can obtain spectral signature if we use the energy of radiation as function of wavelength it used to identify any material .The measurement & analysis of spectra it which obtained under the subject of spectroscopy. The imaging technology & spectroscopy this two technique are combine to cover large area to acquire detail information it known as imaging spectroscopy it also called as hyperspectral remote sensing. This is the new technique to detect vegetation, minerals.

Keywords–Hyperspecral image Remote sensing, spectroscopy, spectra

PAPER-QR CODE

Corresponding Author: S. S. MONDHE

Access Online On:

www.ijpret.com

How to Cite This Article:

S. S. Mondhe, IJPRET, 2016; Volume 4 (9): 391-396

INTRODUCTION

In hyperspectral remote sensing hyper mean too many wavelength band .This image provide the spectral information due to this identify the unique material is possible In the hyperspectral images there is high correlation between band .The image provide more accurate information.

The aim of remote sensing is to extract the information from the object & present it in way that we easily analyzed it. The hyperspectral imagery& multispectral imagery are both powerful tool in the remote sensing sector .within the electromagnetic spectrum .all spectral band is not available for purpose of remote sensing. Hyperspectral data set will be compare of 100 to 200 spectral band have narrow bandwidth & multispectral data set which possess 5-10 band of larger bandwidth .The analysis of multispectral image depend upon shape,texture &spectral property in few wavelength band in which image is acquired so it is not possible to identify the unique material or any element in soil

For this purpose hyperspectral remote sensing is used which provide the spectral characteristic of the object .hyperspectral image are spectrally over determine due to that it is easy to identify & distinguish the object which is spatially similar looking but having spectral changes The hyperspectral remote sensing era began in 1970 .where AVIRIS was propose to NASA in 1983 .which on aircraft platform, where the first space born Hyperion sensor have 10 nm bandwidth & give the range of 400-2500 m

LITERATURE REVIEW

[1]B. Krishna Mohan proposed a hyper spectral image analysis, where atmospheric correction & imaging spectroscopy this issue are explained. For dimensionality reduction & brief description of super resolution, MGA & Hopfield neural network is provided. In field of spatial & spectral hyperspectral imagery is described which having rapid development by using sensor mounted on aircraft. [2] Edward M. Barnes proposed Nowdays farmer are aware of spatial variability in crop production. The variability can be related with different soil property. To determine soil property by using high spatial resolution .The spectral response gives nitrogen, organic matter, & salinity status. The no of ground based sensor used to determine soil property. The tractor mounted sensor & data from it compliment image based data. it give electrical conductivity, nitrate content & organic matter content. To maximize the info from source we integrate model &statistical method. [3] Heng Dong proposed **S**oil spectral reflection is affected due to soil chemical and physical nature and physical basis of remote sensing. The impact factor of soil spectrum feature are water, organic, iron oxide & physical composition. In this paper study ASD FieldSpec Pro FR was used to collect the spectra of soil samples. Sensitive band which

select for analyzed the relation between nutrient & soil spectral feature. The inversion model of nitrogen & organic matter established by linear regression. The result show that nitrogen & organic matter retrieve from remote sensing. [4] Lin Qiu proposed Soil macropore are important migration passage for water &air in soil. The proper amount of soil macropore in soil increase soil permeability, improve rhizosphere environment & increase water tension capacity, but excess of macropore waste in rainfall, irrigation & pollution of ground water. To understand the monitoring of water quality & mechanism of solution solute transportation. We need to know about spatial distribution of soil macropore. Measurement of soil pore is very difficult. So in this paper we study measurement of macropore by using dye tracing & image analysis (DTIA) with paddy soil from the Tai Lake region as case study. Brilliant blue solution is used as dye solution was poured into soil study area .after one days dyeing vertical solution were dug & photograph. The photograph is taken by digital camera process software ERDAS IMAGINES 9.0 is used for analysis. [5] Peng Lu proposed Soil characteristic are analyzed by using conventional method are very time consuming, expensive. Hence objective of paper to estimate soil organic carbon by using VIS-NIR spectroscopy & map SOC in bare soil hyperion reflectance data. [6] Qinhong Liao proposed the estimation of soil organic matter is very important in agriculture production but determination of soil organic matter is very costly & time consuming .recently hyperspectral diagnosis technique is used to measured soil organic matter. Because it's rapid, non destructive characteristics. Four method are used to determined the fluvo-aquic soil organic matter in soil but R2 was only 0.09. As Nonel method the Discrete Cosine Transform as prefer on each of soil reflectance spectra .the estimation model had been effectively built by using spectra indices .this method is also used for estimation of soil nutrient such as nitrogen, phosphorus, potassium and other.

PROPOSED METHODOLOGY

The proposed system architecture gives the idea about hyper spectral image analysis .The data contain in the hyperspectral images is more than the multispectral images due to this reason there are some challenges in the image analysis .the challenges are data volume, redundancy & dimensionality problem. In proposed methodology, we discussed some pre processing technique which need for image analysis firstly minimization of atmospheric effect is necessary so, ATREM, ACORN, FLAASH model are generally used. Minimum Noise Fraction is used for dimentiality reduction where the principal component analysis is technique assist to dimensionality reduction issue, Endmember extraction is done to select endmember spectra for used in classification & advance spectral analysis technique. Feature reduction is necessary to

identify smallest of band. There are two method feature selection & feature reduction by using data transformation.
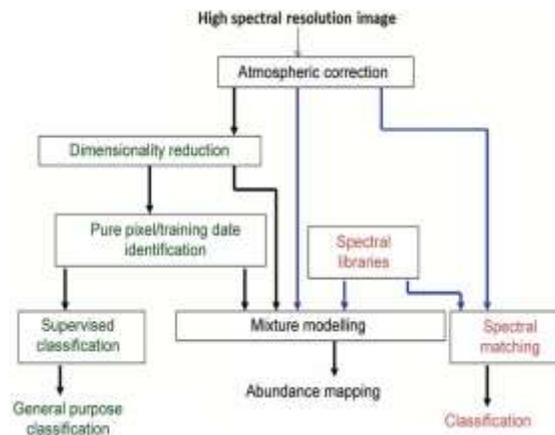

Figure 1:- Basic diagram of the proposed system for hyperspectral image analysis.

For the use of data which taken from the satellite & other platform .some extraction technique are needed .so classifier which transform continuous data into categorical class. The maximum likehood is classifier is generally used .The classification technology such as neural network, spectral mapper, support vector machine, linear &non linear spectral unimixing.

CONCLUSION

Hyperspectral imagery give opportunity to extract the information which is more detail than multispectral imagery. The availability of hyperspectral analysis tool is good & these tool are become easier to use .This paper give various method of hyper spectral image analysis .and different model for the atmospheric correction & various method for classification, feature selection, reduction. This project is found very advantages & convenient for hyper spectral image analysis

References

1. B. Krishna Mohan And Alok Porwal "Hyperspectral Image Processing And Analysis*" Hyperspectral Remote Sensing Current Science, Vol. 108, No. 5, 10 March 2015.*

2. Edward M. Barnes, Kenneth A. Sudduth "Remote- and Ground-Based Sensor Techniques to Map Soil Properties" *Photogrammetric Engineering & Remote SensingVol. 69, No. 6, June 2003.*

3. XUE Lianqinq LI Dan HUANG Shuo WU Chunlin "Spatial variability Analysis on Soil Nitrogen and Phosphorus Experiment Based on Geostatisics" *2008 International Workshop on Education Technology and Training & 2008 International Workshop on Geoscience and Remote Sensing* .

4. Lin Qiu ,Xiaomin Chen "In situ measurement of soil macropores by dye tracing and image analysis".

5. Peng Lu, Zheng Niu, Linghao Li "Prediction of soil organic carbon by hyperspectral remote sensing imagery" *2012 Third Global Congress on Intelligent Systems*.

6. Qinhong Liao, Jihua Wang "Estimation of Fluvo-aquic Soil Organic Matter from Hyperspectral Reflectance by Using Discrete Wavelet Transformation".

7. J. B.Adams, M. O. Smith, and A. R. Gillespie. Remote geochemical analysis: Elemental and mineralogical composition. In C. M. Pieters and P. A. J. Englert, editors, *Imaging spectroscopy: Interpretationbased on spectral mixture analysis,* pages 145-166, Cambridge, 1993. Cambridge University Press.

8. R. J. Adler, R. E. Feldman, and M. S. Taqqu. *A Practical Guide to Heavy Tails: Statistical Techniques and Applications.* Birkhauser, Boston, 1998.

9. C. Chang, X. Zhao, M. Althouse, and J. Pan. Least squares subspace projection approach to mixed pixel classification for hyperspectral images. *IEEE Trans, on Geoscience and Remote Sensing,*36(3):898-912, May 1998.

10. W. H. Farrand and J. C. Harsanyi. Discrimination of poorly exposed lithologies in imaging spectrometerdata. *Journal of Geophysical Research,* 100(E1):1565-1578, January 1995.

11. K. T. Fang, S. Kotz, and K. W. Ng. *Symmetric Multivariate and Related Distributions.* Chapman and Hall, New York, 1990.

12. E. Conte, M. Lops, and G. Ricci. Asymptotically optimum radar detection in compound-Gaussian clutter. *IEEE Trans, on Aerospace and ElectronicSystems,* 31(2):617-625, 1995.

13. W. Chen and I. S. Reed. Anew CFAR detection test for radar. *Digital Signal Processing,* 1(4):198-214,1991.

14. O. P. Cheremisin. Efficiency of an adaptive algorithm with regularization of the sample covariance matrix. *Radio Engineering and Electronic Physics,* (10):69-77, 1982.

Available Online at www.ijpret.com

15. Y Bresler. Maximum likelihood estimation of a linearly structured covariance with application to antenna array processing, pages 172-175. Fourth Annual ASSP Workshop on Spectral Estimation and Modeling , 1988.