Extraction of Brightness Values of Different Object from Irs & Landsat Satellite Image: Comparative Study

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Abstract:
The main aim of this research is to find optimum segmentation parameters for extracting different spectral values of a different object of Land sat and IRS image. A relatively new segmentation approach, multiresolution segmentation, is being examined using two data sets (Land sat and IRS).

Introduction:
Indian Remote Sensing Satellite (IRS) Less III has been widely used for integrated land and water, vegetation, settlement, resources management. To complement and substitute data measured from other similar satellites and obtain constant measurements of the Earth's surface features, we evaluated the spectral characteristics between IRS LISS-III, a sensor of IRS P6, and LANDSAT Image by comparing their water body, vegetation, settlement, sand beach, Road network, river, and open space. In particular, due to the difference in layer 1, 2, 3 and band Red, Green and Blue design between LISS-III and Land sat the spectral characteristics of RGB band of LISS-III were compared with the RGB bands of Land sat satellite image.

Objective: To show the different spectral values of different object of IRS & LANDSAT satellite image.

LITERATURE REVIEW
According to Meyer, 1999 every parcel of land on the Earth's surface is unique in the cover it possesses. Land use and land cover are distinct yet closely linked characteristics of the Earth's surface. The use to which we put land could be grazing, agriculture, urban development, logging, and mining among many others. While land cover categories could be cropland, forest, wetland, pasture, roads, urban areas among others. The term land cover originally referred to the kind and state of vegetation, such as forest or grass cover but it has broadened in subsequent usage to include other things such as human structures, soil type, biodiversity, surface and ground water (Meyer, 1995).
Land use affects land cover and changes in land cover affect land use. A change in either however is not necessarily the product of the other. Changes in land cover by land use do not necessarily imply degradation of the land. However, many shifting land use patterns driven by a variety of social causes, result in land cover changes that affects biodiversity, water and radiation budgets, trace gas emissions and other processes that come together to affect climate and biosphere (Riebsame Meyer, and Turner, 1994).

Land cover can be altered by forces other than anthropogenic. Natural events such as weather, flooding, fire, climate fluctuations, and ecosystem dynamics may also initiate modifications upon land cover. Globally, land cover today is altered principally by direct human use: by agriculture and livestock raising, forest harvesting and management and urban and suburban construction and development There are also incidental impacts on land cover from other human activities such as forest and lakes damaged by acid rain from fossil fuel combustion and crops near cities damaged by troposphere ozone resulting from automobile exhaust (Meyer 1995).

A remote sensing device records response which is based on many characteristics of the land surface, including natural and artificial cover. An interpreter uses the element of tone, texture, pattern, shape, size, shadow, site and association to derive information about land cover. (Olorunfemi 1983).

Change detection is the process of identifying differences in the state of an object or phenomenon by observing it at different times (Singh, 1989).

Investigated the advantages of Remote sensing techniques in relation to field surveys in providing a regional description of vegetation cover. The results of their research were used to produce four vegetation cover maps that provided new information on spatial and temporal distributions of vegetation in this area and allowed regional quantitative assessment of the vegetation cover (Shosheng and Kutiel 1994)

METHODOLOGY: My whole work done by the Erdas imagine 9.2. I have collected spectral values from IRS & LANDSATE Satellite image. Then I have compared spectral values of both images and at last interpreted of these values.

DATASOURCES

IRS image collected from Resourcesat-1 and Less III image from toposheet no-G45Q04 which were caught by ISRO on 24 Feb 2012 and from LANDSAT 7 image which sensor is ETM and path 139, row 43 on 2005.

ANALYSIS PART:

IRS SATELITE IMAGE INFORMATION
Fig1. IRS Image and their information.

Analysis: So this figure we can easily found that various information that means file information. Layer Information, statistical information map & projection information.

Analysis of different spectral values of different object of IRS image:

Table 1: Objects of IRS image and their layer, bands and pixel values.

| Objects	Layer	Band	Pixel values	
			Lowest pixel values	Highest pixel values
Water body	1	Red	76	80
	2	Green	50	54
	3	Blue	53	68
Vegetation	1	Red	93	127
	2	Green	72	121
	3	Blue	107	157
Settlement	1	Red	76	103
	2	Green	54	93
	3	Blue	106	128
Sand beach	1	Red	82	97
	2	Green	55	80
	3	Blue	157	155
Road Network	1	Red	90	115
	2	Green	76	107
	3	Blue	130	139
River	1	Red	77	89
	2	Green	48	63
	3	Blue	48	94
Open space	1	Red	111	127
	2	Green	108	126
	3	Blue	169	182

From the above table the threshold limit of different bands and different layers of different objectives are been shown below.

1. **WATER BODY :** The pixel values of the red band of layer 1 are ranging in between 76 to 80 where in case of green band the values are ranging in between 50to54 in layer 2 and in layer 2 , blue band the range is in between 53to 68 . So the range is highest in case of red band.

2. **VEGETATION:** The pixel values of the red band of layer 1 are ranging in between 93 Tto127 where in case of green band the values are ranging in between 72 to 121 in layer 2 and in layer 2, blue band the range is in between 107 to 157. Here the range is highest in case of blue band.

3. **SETTLEMENT:** The pixel values of the red band of layer 1 are ranging in between 76 to 103 where in case of green band the values are ranging in between 54 to 93 in layer 2 and in layer 2, blue band the range is in between 106 to 128. Here the range is highest in case of green band.

4. **SAND BEACH:** The pixel values of the red band of layer 1 are ranging in between 82to 97 where in case of green band the values are ranging in between 55 to 80 in layer 2 and in layer 2 , blue band the range is in between 155 to 157 . Here the range is highest in case of green band.

5. **ROAD NETWORK**: The pixel values of the red band of layer 1 are ranging in between 90 to 115 where in case of green band the values are ranging in between 76 to 107 in layer 2 and in layer 2 , blue band the range is in between 130 to 139 . Here the range is highest in case of green band.

6. **RIVER:** The pixel values of the red band of layer 1 are ranging in between 77 to 89 where in case of green band the values are ranging in between 48 to 63 in layer 2 and in layer 2 , blue band the range is in between 48 to 94 . Here the range is highest in case of blue band.

7. **OPEN SPACE**: The pixel values of the red band of layer 1 are ranging in between 111 to 127 where in case of green band the values are ranging in between 108 to 126 in layer 2 and in layer 2, blue band the range is in between 169 to 182. Here the range is highest in case of green band.

LANDSAT SATELITE IMAGE INFORMATION

Fig2. LANDSAT Image and their information.
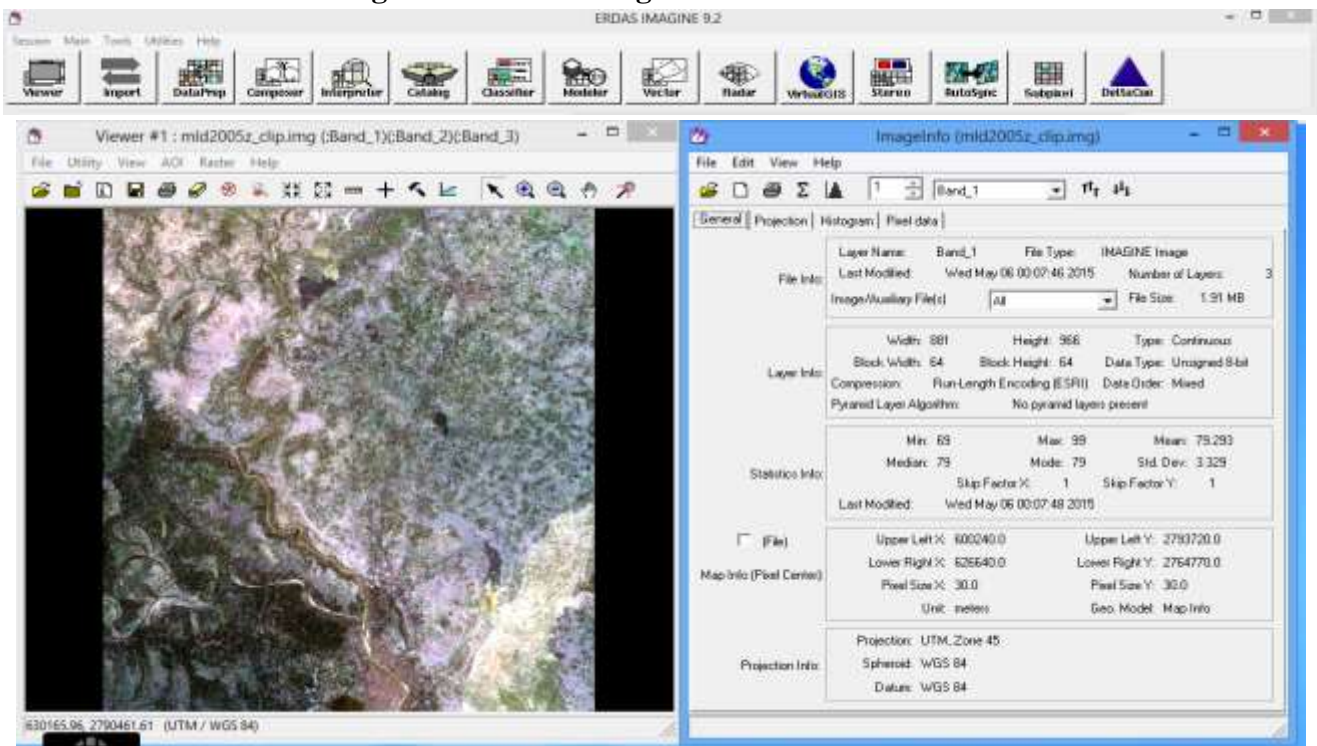
Analysis: So this figure we can easily found that various information that means file information. Layer Information, statistical information map & projection information.

Analysis of different spectral values of different object of Land sat image:

Table 2: Objects of LANDSAT image and their layer, bands and pixel values.

Objects	Layer	Band	Pixel values	
			Lowest pixel values	Highest pixel values
Water body	1	Red	73	79

	2	Green	31	33
	3	Blue	30	34
Vegetation	1	Red	74	78
	2	Green	33	34
	3	Blue	30	30
Settlement	1	Red	72	77
	2	Green	31	32
	3	Blue	27	29
Sand beach	1	Red	81	89
	2	Green	38	40
	3	Blue	42	45
Road Network	1	Red	78	87
	2	Green	35	40
	3	Blue	36	45
River	1	Red	77	83
	2	Green	34	37
	3	Blue	34	36
Open space	1	Red	82	87
	2	Green	37	39
	3	Blue	40	43

From the above table the threshold limit of different bands and different layers of different objectives of Land sat image are been analysis in below.

1. **WATER BODY:** The pixel values of the red band of layer 1 are ranging in between 73 to 79 where in case of green band the values are ranging in between 31 to 33 in layer 2 and in layer 2, blue band the range is in between 30 to 34. So the range is highest in case of red band.

2. **VEGETATION:** The pixel values of the red band of layer 1 are ranging in between 74 to 78 where in case of green band the values are ranging in between 33 to 34 in layer 2 and in layer 2, blue band the range is in between 30 to 30. Here the range is highest in case of red band.

3. **SETTLEMENT:** The pixel values of the red band of layer 1 are ranging in between 72 to 77 where in case of green band the values are ranging in between 31 to 32 in layer 2 and in layer 2, blue band the range is in between 27 to 29. Here the range is highest in case of red band.

4. **SAND BEACH:** The pixel values of the red band of layer 1 are ranging in between 81 to 89 where in case of green band the values are ranging in between 38 to 40 in layer 2 and in layer 2, blue band the range is in between 42 to 45. Here the range is highest in case of red band

5. **ROAD NETWORK:** The pixel values of the red band of layer 1 are ranging in between 78 to87 where in case of green band the values are ranging in between 35to 40 in layers 2 and in layer 2, blue band the range is in between 36 to 45. Here the range is highest in case of red band.

6. **RIVER:** The pixel values of the red band of layer 1 are ranging in between 77 to 83 where in case of green band the values are ranging in between 34 to 37 in layer 2 and in layer 2, blue band the range is in between 34 to 36. Here the range is highest in case of red band.

7. **OPEN SPACE**: The pixel values of the red band of layer 1 are ranging in between 82 to 87 where in case of green band the values are ranging in between 37 to 39 in layer 2 and in layer 2, blue band the range is in between 40 to 43. Here the range is highest in case of red band.

Comparative study in between Land sat and IRS satellite image for different objectives:

WATER BODY: In case of IRS image the range is highest in case of red band similar to the land sat image which is also the red band ranges maximum. The red band is ranges from 76-80 in case of IRS image where the range is 73-79 in case of land sat image. The range in IRS image ranges in between 50-54 for green band where the range 31-33 in land sat image. In case of IRS image the blue band ranges from 53-68 and it is ranges 30-34 in case of land sat image.

VEGETATION: The pixel value are ranges in between 53-60 in case of red band in IRS image it is quite higher in case of land sat image is 74-78. It is ranges 93-127 in case of IRS image of green band where in case of land sat image it is 33-34.In IRS image the range is varies from 72-121 where the range is 0 in case of land sat image ranges 30-30 in case of blue band.

SETTLEMENT: The pixel value are ranges in between 76-103 in case of red band in IRS image it is quite higher in case of land sat image is 72-77. It is ranges 54-93 in case of IRS image of green band where in case of land sat image it is 31-32.In IRS image the range is varies from 106-128 where the range is 27-29 in case of land sat in case of blue band. The pixel values are higher in IRS image comparison to land sat image.

SAND BEACH: The pixel values are ranges in between 82-97 in case of red band in IRS image it is quite higher in case of land sat image is 81-89. It is ranges155 -180 in case of IRS image of green band where in case of land sat image it is 38-40.In IRS image the range is varies from155 -157 where the range is 42-45 in case of land sat in case of blue band. The pixel values are higher in IRS image comparison to land sat image.

ROAD NETWORK: In case of IRS image the range is highest in case of green band the range is highest in red band in the land sat image. The red band is ranges from 90-115 in case of IRS image where the range is 78-87 in case of land sat image. The range in IRS image ranges in between 76-107 for green band where the range 35-40 in land sat image. In case of IRS image the blue band ranges from 130-139 and it is ranges   36-45 in case of land sat image.

RIVER: The pixel value are ranges in between 77-89 in case of red band in IRS image it is quite higher in case of land sat image is 77-83. It is ranges 48-63 in case of IRS image of green band where in case of land sat image it is 34-37.In IRS image the range is varies from 48-94 where the range is 34-36 in case of land sat in case of blue band. The pixel values are higher in IRS image comparison to land sat image.

OPEN SPACE: In case of IRS image the range is highest in case of green band the range is highest in red band in the land sat image. The red band is ranges from 111-127 in case of IRS image where the range is 82-87in case of land sat image. The range in IRS image ranges in between 108-126 for green band where the range 37-39 in land sat image. In case of IRS image the blue band ranges from 169-182 and it is ranges   40-43 in case of land sat image.

Major finding:

1. In case of water body the spectral values of IRS Image at red band are greater than landsat image.
2. In case of vegetation the spectral values of land sat image at red band are higher than IRS image.
3. In case of settlement the spectral values of IRS image at red band are quite higher than land sat image.
4. In case of Sand Beach the spectral values of IRS image at red band are quite higher than land sat image.
5. In case of green band of road network the spectral values of IRS image are higher than land sat image and in case of red band the spectral values of land sat image are higher than IRS image.
6. In case of River the spectral values of all the band of IRS image are higher than land sat image.
7. In case of Open Space the spectral values of all the band of IRS image are higher than land sat image.

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