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Satellite Image Classification Based on RGB to IHS Transform using Fusion Based Approached: A Review

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Abstract*—Classification of satellite images is necessary to recognize the pattern of satellite data. Today, there may exist many types of classification algorithms, such as parallelepiped and minimum distance classifiers and classification by using the cellular automata, but it is still necessary to improve their performance in terms of accuracy rate. So the proposed system first use image fusion on multispectral and its respective panchromatic Image and merge these images to get the high resolved image using the RGB to IHS transform. Then feature extraction, classification and pattern recognition is done on that image. It can give the percentages to regions. This fusion based classification technique is the simpler one which maintains the quality of output.

***Keywords*—Image classification, panchromatic image, multispectral image, image fusion, feature extraction.**

I. INTRODUCTION

The previously proposed classification algorithms are not much capable for well classification of satellite images. It doesn't use highly resolved images for the classification. So by using the fusion technique it can maintain the quality of classification of Satellite images. The previous techniques are much complicated now proposed is simpler one.

The methodology used for classification of satellite images first fused that both images such as multispectral and its respected panchromatic image taken by the satellite so by merging these to images by using RGB to IHS fusion technique, certainly a highly resolved image is obtained[6]. Extract the features of that highly resolved image by using extended histogram technique. So features get extracted. As features get extracted then use KNN (K nearest neighbours) classifier for classification and pattern recognition of the image [4]. The classification is done and patterns are get recognised allocate particular colour codes to that respected regions. Then according to colours Image get classified.

II. RELATED WORK

In the recently previous research they used the different classification algorithms to classify the satellite images which are known as parallelepiped and minimum distance classifiers, but it is still necessary to improve their performance in terms of accuracy rate because they got failed to provide good output.

Also, there is little previous research of cellular automata which related to satellite image classification; they offer many advantages that can improve the results of classical classification in some extent. And also the new classification algorithm based on cellular automata is developed again to improve the classification accuracy rate in satellite images by using contextual techniques which offers a hierarchical classification of pixels. According to all above researches our research is simpler one with great classification of satellite image.

III. PROPOSED RESEARCH

In the proposed method first collect the data sets in terms of Satellite Images. The satellite Images such as the multispectral and its respected panchromatic image so that the both images belongs to the same region. The IHS transform image fusion technique is used for merging both the images.

A. Image Fusion

There are numerous image fusion techniques such as averaging, IHS (Intensity Hue Saturation) based, PCA(Principle Component Analysis) and the Spatial Image fusion method. But here we are using IHS technique for image fusion.

1) Necessity of Image fusion: Multisensory data fusion image fusion has become a discipline which demands more general formal solutions to number of sensing application cases. Several situations in image processing require both high spatial and high spectral in formation in a single image. This is important in remote sensing area. However, the instruments are not capable of providing such information either by observing design or because of observational constraints. One possible solution for this is image fusion.

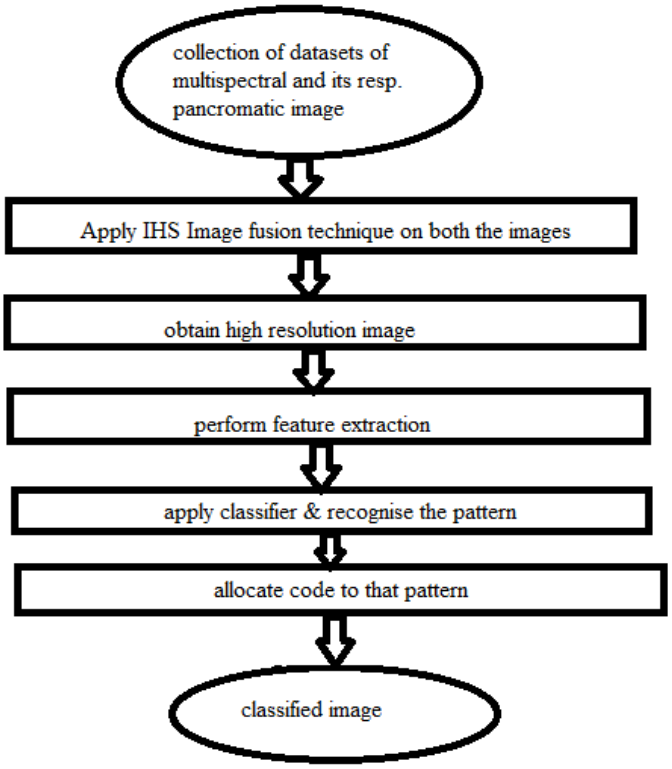

Fig. 1 Flow of proposed research

2) IHS technique: Image fusion in remote sensing has several applications. An important domain is multi-resolution image fusion (commonly referred to pan-sharpening) in satellite. In satellite imagery we can have two types of images.
Panchromatic images – The image which collected in the broad visual wavelength range but the image is black and white.
Multispectral images – The images which are optically acquired in more than one spectral or wavelength interval. Each image is usually of the same physical area and scale but of different spectral band.

Now consider an example i.e SPOT PAN Satellite provides high resolution (10m pixel) panchromatic image. While the LANDSAT TM Satellite provides low resolution (30m pixel) multispectral images. Then the image fusion is attempt to merge these images and produce a single high resolution multispectral image.

Fusion of Panchromatic satellite image (From Spot Pan Satellite) and Multispectral Satellite image (From Landsat TM Satellite) is done by using following steps:

1]Step1: Resize the given multi spectral image to the same size of Panchromatic Image
2]Step2: Transform the Red Green Blue bands of spectral image into Intensity Hue Saturation Components respectively.
3]Step3: Modification of the panchromatic image with respect to multispectral image is done by using histogram matching of the panchromatic image with intensity component of the multispectral image.
4]Step4: Replace the intensity Component by Panchromatic image and perform inverse transform to obtain high resolution multispectral image.

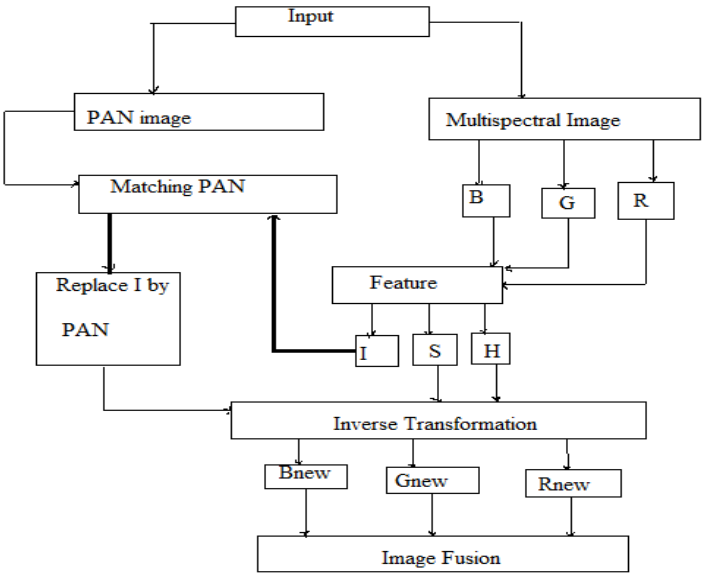

Fig. 2 Image fusion process

Then after Image fusion apply the feature extraction on the highly resolved image. Feature extraction is done by using colour feature based on extended histogram technique. As features get extracted then use the KNN classifier for classification and pattern recognition of the image. Once the classification is done and patterns are get recognized, the separated regions are observed.

IV. PROPOSED METHODS AND ALGORITHMS

A. *Image Fusion:* It is used to acquire the high resolution quality Image. Fusion of multispectral and panchromatic image is done by using RGB to IHS transform.
B. *Feature extraction:* Feature extraction is done by using colour feature based on extended histogram technique. Pixels are directly distinguished by just observing the histogram representation.
C. *Classification and Pattern recognition:* The regions are classified and patterns are recognised by using KNN (k nearest neighbors).

V. EXPECTED OUTCOME

By using the proposed method of fusion a highly resolved image is obtained. And by using feature extraction and pattern recognition separate regions are observed. Also the percentage of agriculture and non agriculture land is shown by the proposed research.

VI. CONCLUSION

The proposed research gives a detailed classified image showing the particular regions. And it will show the percentage of agricultural and non agricultural region. This system is used to detect the same type of landmarks spread all over the world within the small time span. Image fusion is applied on the given images and classifies the region to maintain the quality of output.

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