Classification of Satellite Image using Minimum Distance Classification Algorithm

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Abstract

Remote sensing is discussed about the information based on values using land of area. The most relevant process using classification technique based on satellite image. As per algorithm based on satellite image is classified into two types. They are spectral classification and contextual classification. The spectral classification is work in non-noisy image then the property are pixels determine the classes sufficient that is the outcome of result is misclassified occur. The overcome of this misclassified introducing contextual classification. The contextual information in addition to spectral data is depends on information then use mean values, variances or texture description from a pixel neighborhood to improve that pixel spectral classification. At-last, classification is again classified into two algorithm, one is supervised classification algorithm when identify the pixel in the image using different elements in particular samples and it determines the quality of the training set and another one is un-supervised classification algorithm is not discuss about the training set. So, the main concept of supervised algorithm is used because of training set but the outcome of result is misclassified. Therefore, reducing this misclassified introducing algorithm of minimum distance algorithm.

Keywords - *Remote Sensing, Satellite Image, Minimum Distance Classification Algorithm.*

I. INTRODUCTION

Remote sensing is a collection the information about land of area and environmental information values without contact. The classification of algorithms is one of the most techniques using remote sensing. So, here need of satellite image for read the information. Satellite and remote sensing images give the quantitative and efficient information that minimized the complexity of the work and study timing. Satellite Image classification to introduce a extracting data and to produce of grouping pixels into relevant classes from satellite image. Its analyst the information such as forest, building, grass, water etc…. using spectrum variations in satellite image it is show in figure 1.

The requirement of satellite image classification is needed for (1) Extract the data for an application (2) Field study (3) Impressive decision making (4) Spatial info mining (5) Disaster management (6) Thematic map organization (7) Visual and digital satellite image analysis

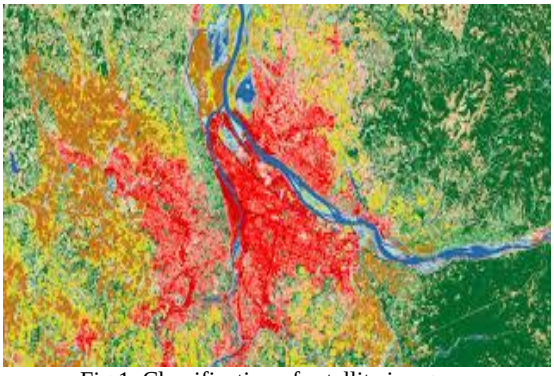

Fig.1. Classification of satellite image

The main aim of remote sensing is solving and improving all the problems of soil quality survey, water resources survey, meteorology simulations, environmental preservation etc. To solving those problems collect the large amount of satellite data using satellite image classification. These classification algorithms the procedure on grouped pixels into an related classes using spectral bands. It is divided into three types of image classifications. They are (1) unsupervised classification is the analyst only species the number of classes, and the algorithm groups the satellite image pixels based solely on the numerical information of the data and analyst has not to know the zone to study (2) supervised classification is the analyst selects samples of the different elements to identify the pixels in the image and the analyst knowledge of the study area determines the quality of the training set and (3) object based image analysis is based on information from a set of similar pixels called objects or image objects. More precisely, the image size and shape of the pixels are the same as those of the other pixels.

The issue of classification algorithms of satellite image is categorized into two main methods one is supervised algorithm and another one is unsupervised algorithm. The procedure of both algorithms depends on the analyst expert's information on the satellite image study area. The main drawback is related to the terms of classification correctness rate.

II. RELATED WORK

Remote Sensing [1] is a technique introduced in early 1960's for data analysis and interpretation. Remote sensing is a collection the information about land of area and environmental information values without contact. Remote sensing [1] collects huge amount of satellite data. Satellite image classification can also be introduced as extracting data from satellite images is referred by Amritpal kaur, Kumud sachdeva and Vanita rani [2]. Classification algorithms of satellite images [3] can be divided into two main categories: supervised and unsupervised algorithms. In a supervised classification, [4] the analyst selects samples of the different elements to identify in the image. In this method the analyst knowledge of the study area determines the quality of the training set. In an unsupervised classification, [4] the analyst only specifies the number of classes, and the algorithm groups the classes, based solely on the numerical information in the data. In these algorithms, the analyst has not to know the study area.

The analysis of this work is based on the supervised algorithm because of the different elements to identify in the image and also have training set. In this method classified many algorithms using supervised algorithm. Finally, this paper tells about the main concept of this algorithm using minimum distance algorithm.

III. BASIC CONCEPT OF CLASSIFICATION

Initially, the classification of satellite image is divided into two types. They are one is spectral classification and another one is contextual specification. In an spectral classification is work in non-noisy image and the property is discussed about the pixels determine the classes sufficient. So, the outcome of result is misclassified. To overcome this misclassified introducing contextual classification. In an contextual classification is discussed about contextual information in addition to spectral data is depends on information and use mean values variance or texture description from a pixel neighborhood to improve that pixel spectral classification.

The outcome of result is misclassified using both spectral and contextual classification. Therefore, the procedure of algorithm again classified of satellite image. They are divided into two types are supervised algorithm and another one is unsupervised algorithm.

In a supervised classification, the analyst selects samples of the different elements to identify in the image. In this method the analyst knowledge of the study area determines the quality of the training set. In an unsupervised classification, the analyst only specifies the number of classes, and the algorithm groups the classes, based solely on the numerical information in the data. In these algorithms, the analyst has not to know the study area. The following

fig.2 shows about the basic concept of supervised algorithm.

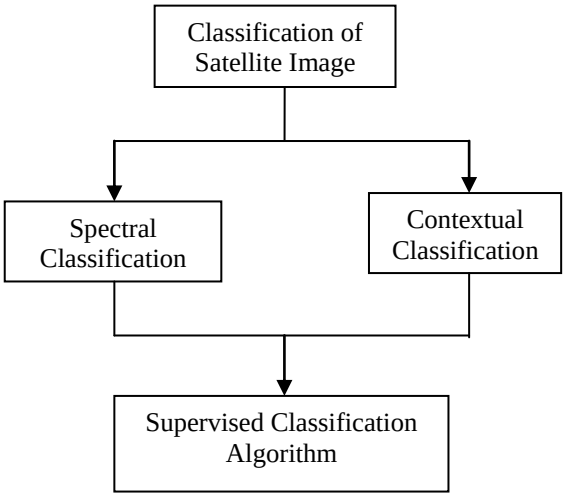

Fig.2. Basic concept of classification

In this paper work in supervised classification algorithm because of the training set. The procedure of supervised algorithm having training set and testing set. Training set is analyst as a input images are separate of water image, building image, grass image etc…..and testing set is analyst input image as a satellite image. When compared to the training set, the satellite image is extract the image, find out the pixel value and grouping the class. It is used to reducing for misclassification and improve more accuracy when compare to other result of spectral classification, contextual classification and unsupervised classification algorithm.

IV. MINIMUM DISTANCE CLASSIFICATION ALGORITHM

In supervised algorithm is classified many algorithms but initially the paper consider as a minimum distance classification algorithm.

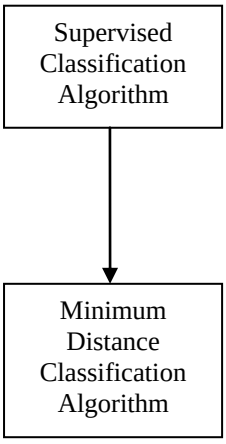

Fig.3. Supervised classification algorithm

In minimum distance algorithm, to find a mean value of pixels of training sets in n-dimensional space.

All pixels in image classified according to the class mean to which they are closest.

It is one of a simple algorithm the use of a training set of a class is represent as a center point based on the information about the average of all pixels of sample class. This method calculate the mean vector for each class, calculate the statistical (Eulidean) distance from each pixel to class mean vector and assign each pixel to the class it is closed.

The minimum distance classification is based on the minimum distance from the mean value Mt of each class of the training data to the digital value Dv of each pixel in the imagery. The minimum distance is calculated by using the Euclidean distance measurement.

$$Sqrt(\text{Dv-Mt})^2 \qquad (1)$$

The class mean with the minimum distance with the pixel will be assigned as the class of the pixel. The following fig.4 is show the group of pixel will be assign in a class,

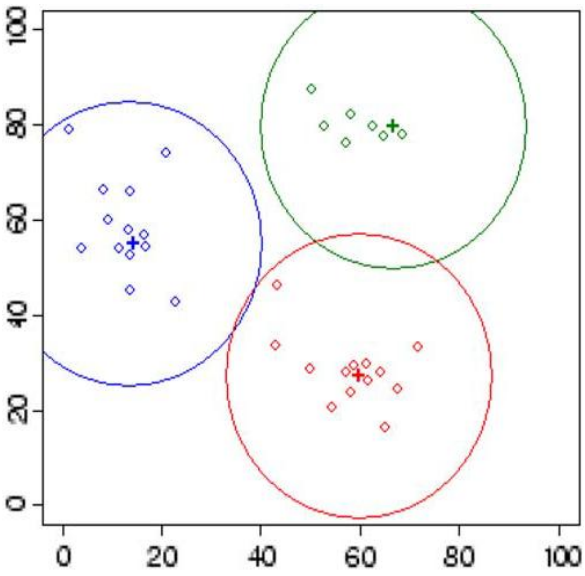

Fig.3. Minimum distance classification algorithm

The advantage of minimum distance algorithm is when executing this classifier it will be fast, saving time depends on training set and all pixels will be classified. The disadvantage of minimum distance classifier algorithm is the outcome of the result is misclassification of pixels because of prone to errors when all pixel is classified even if the shortest distance it will be far away. Calculated mean value for all classes using classification of spectral distance and the outcome of the result is all pixel will be classified but assign as a class of unclassified pixel with the lowest distance. Finally, to solve the problem of minimum distance classification algorithm is introducing another classification algorithm is produced upcoming part.

V. CONCLUSIONS

This paper tells about many classification of satellite image and basic concept of supervised classification algorithm detailed discussed. To overcome misclassification introducing new technique process will be done to improve the performance of high accuracy under the concept of remote sensing. Finally the classification of minimum distance algorithm under the concept of supervised classification. The survey of minimum distance classification algorithm will be fast, saving time and all pixels will be classified. The issue of minimum distance classifier algorithm is the outcome of the result is misclassification when all pixels will be classified even if the shortest distance it will be far away. Calculated mean value for all classes using classification of spectral distance and the outcome of the result is all pixel will be classified but assign as a class of unclassified pixel with the lowest distance. Finally, to solve the problem of minimum distance classification algorithm is introducing another classification is discussed in detailed next paper.

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