Pattern Recognition for Region Identification and Labeling for Remotely Sensed Images

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Abstract

In today's world, rapid urbanization is leading to increasing the availability of remotely sensed images which gives occasion of identifying urban objects. Lot of work has already done in this regard but it is limited for the images of some specific areas like urban images, airports etc. Also the techniques used were limited to those areas and not applicable to other images from different areas. This paper gives a new method of recognizing the objects of remotely sensed images and labeling them by using classification techniques on the base of knowledge of known images. This system gives identification of the objects in the image and gives labels to the specific area.

Keywords: Remote sensing, Recognition, Pattern recognition, Knowledge-base, Gaussian algorithm

Introduction:

In machine learning, pattern recognition is the assignment of a label to a given input value. In1936, the discriminate analysis was introduced for this purpose. Examples of pattern recognition include classification that gives challenges for assigning each input value to one of the given set of classes. Here, pattern recognition is a more general problem that encompasses other types of outputs as well.

Pattern recognition algorithms are usually intended to provide a reasonable answer for all possible inputs and to perform "most likely" matching of the inputs after checking their statistical variation. But pattern matching algorithms are used to look for exact matches in the input with patterns which already exist.

In recent years, many different methods of object recognition have applied. But these were limited to some specific area of the certain images for example building, water, bridge, aircraft etc. [1] [4] . The technique is unable to give the preferred output due to change in specific area.

This paper gives advantage of using knowledge of known images as base so that it can work on any type of images like rural and urban. Also, classification technique with edge detection applied for identifying the region under specific category. By labeling them, it gives added advantage of finding specific region percentage to other regions of the remotely sensed images.

Literature Review:

The result of gradient calculation with the edge extracted from the gradient value is still quite unclear and distorted. This suppression of non-maxima can help to suppress all the gradient values to 0 excluding the local

maximal that is indicating the location with the sharpest change of intensity value. The following algorithm is applied for the calculation of each pixel in the gradient image:

1. Compare to the current pixel's edge strength with the edge strength of the pixel in the positive and negative gradient directions.
2. If the edge strength of the current pixel is the largest compared to the other pixels in the mask with the same direction, then the value will be saved. For example the pixel pointing in the y direction will be compared to the pixel above and below it in the vertical axis and preserved. Otherwise, the value will be suppressed.

The Proposed Work-

Image pre-processing includes correction of deformation that is bending in the image, degradation means filth effects, and noise introduced during the imaging process. This noise may be any unwanted information that pollute an image

This process gives output as a corrected image which is close by both geometrically and radio-metrically near the radiant energy characteristics of the original scene. The errors include radiometric and geometric errors encountered in remotely sensed imagery.

As the study on result of filter algorithms gives Gaussian algorithm is best suited, the following technique is used for the image pre-processing. The equation of a Gaussian function in one dimension is $G\ x\ =1\ 2\pi\sigma 2e-\ x22\sigma 2$ The product of two such Gaussian functions is considered for two dimensions. $G\ x\ =1\ 2\pi\sigma 2e-\ x2+y22\sigma 2$

The proposed method associates each region of an image to our database. When user selects his required region of interest, the clicked pixel and its neighboring 10 by 10 pixels are selected. As per the classification of classes, the selected region will be identified and according the names will be given.

Here, database has created on the study of images of those areas which are already known and it gives maximum correct results. By matching these values with the database values the result is calculated.

Conclusion:

This paper gives a new method to identify and label the regions of the remotely sensed images using classification. The results are more efficient and applicable on any images. By applying this technique, the analysis is done on 20 images and results show around 92% accuracy. This method has been used for the machine learning so any input image can give proper result. This method is used to find the percentage area under civilization, water, and greenery.

In the future, the analysis will be done on more complicated objects. As this system works mainly on color part of the image, other classes like texture, shape can also be used for detecting the objects.

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