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An Efficient Approach of Soil Classification

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Abstract- At Present Scenario Classifying of Soil is very difficult task. As we go from one place to other the Soil Features is different .Hence manual Classification of Soil is very time consuming and not accurate. In this paper Digital Image analysis approach has been developed to classify the Soil. The Gabor filter technique is applied to extract features of Image and create database of Images. Using the Database we classify the soil image easily with accuracy.

Index Terms-Gabor filter, Soil classify, Digital Soil Classification, Soil Texture

1. INTODUCTION

Agriculture or Ground Water identification purpose people are usually brought to use large collections of soil images .The content-based image retrieval (CBIR) system is used in many fields to browse and search huge image databases.. They need an automatic soil identification system to assist them in their work. This paper presents a soil retrieval system which takes input image as a Soil images taken from region and pictured by Camera. It gives the most similar images from the database. The problem involves identification of the matching soil, as well as retrieval of related varieties in a database. The scope of this research paper is to extend the approaches used in image processing to describe the texture of an image region are statistical, geometrical, structural, and model-based and signal processing features. Additionally, increasing work price, deficiency of gifted specialists and enhance creation forms have all add weight upon makers. Computerized arrangements are the response for the issues that are being confronted today by the horticulture world. In structural designing it is an essential to know the dirt classes up to a few profundities preceding any development. The immediate strategy to recognize the dirt classes by boring boreholes and testing soil tests is exceptionally costly.

Soils are recognized by its characteristics, such as physical appearance (e.g., color, texture, landscape position), and assist in vegetation. A vernacular distinction is used in classifying texture as heavy or light. Light Soils have better structure and easy for cultivation. Soil texture is an important soil characteristic that drives crop production and field management. The textural class of a Soil is determined by the percentage of Sand, Silt and Clay. Soils can be classified as one of four major textural classes: (1) Sands (2) Silts (3) Loam sand (4) Clays. A clay soil is referred to as a fine-textured soil whereas a sandy soil is a coarse textured soil. Soil texture determines the rate at which water drains through a saturated soil. water moves more freely through sandy soils than it does through clayey soils.

The evaluation of texture features is important for several image processing applications In this paper evaluate five different feature extraction methods. These are autocorrelation, edge frequency, primitive-length., Law's method, and co-occurrence matrices. All these methods are used for texture analysis of Meastex database [1].

Textures are one of the important features in computer vision for many applications .In this paper the features are constructed on preprocessed methods applied on the texture image by considering different types of windows. These features offer a better classification rate[2].

2. PROBLEM DEFINITION

The existing approach for classification of Soil has some Problems such as lot of time consuming, chances of creeping of human errors, manual involvement. This method proposes the development of digital image analysis approach for estimation of physical properties of soil that overcomes the problems of existing method.

3. PROPOSED METHODOLOGY

The soil type is classified using color, texture, boundary features.

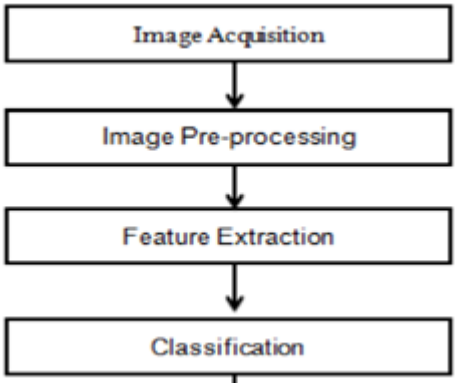

Fig 1. Block diagram

The Proposed fig 1 Block diagram is used to classify the soil. The work includes processing of images for dissimilar types of soil sample, extracting features of soil samples and then develop a database to store classified images.

4. IMPLEMENTATION

The Algorithm for image classification as follows
1. Read different types of soil images
2. Extract the features such as color and Texture.
3. Apply the Gabor filter to extracted images then classify
4. Develop a database of different types of soil images
5. Input a test image extract features compare with the database
6. Different Matching Soil Images are Encountered
7. Applying Statistical Measure on Each Images, The Image having highest matching ratio will be Matching Image.

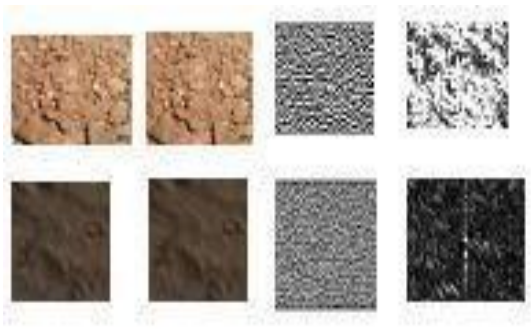

Fig 2 a) original image of clay soil b) color quantized c) S5S5 law mask filter d) Gabor filter e) original image law masks of alluvial soil f) color quantized alluvial soil g) S5S5 h) Gabor filter alluvial soil

The fig 2 shows the filtered image of clay and alluvial soil. The first row images are clay soil, color quantized clay soil, Law mask filtered image and Gabor filtered image. Second row shows the same of alluvial soil.As we have different types of Soil only 2 type shown above.The use of gabor filter show how image appears.


Fig 3Test image

The fig 3 shows the test image for finding the matching image.


Fig 4 Matching images from database

The fig 4 shows different matching images for a test image.


Fig 5 Matched Image

The different statistical measures have been applied on each images retrieved, the image having highest matching ratio is Matching image shown in fig 5.

5. CONCLUSION

A texture and color based soil retrieval system has been proposed to identify the needed soil from the Database . The proposed algorithm uses the efficient feature extraction methods like color quantization for color based feature extraction and Texture based feature extraction is done by applying Gabor filter.

Then the matching is achieved by applying statistical measurements like Mean, standard deviation, skew, and kurtosis. The performance of the proposed method using Gabor filter is proved to be more efficient. Combining different color and texture features extracted from the images enhance the accuracy of the system.

(A.1)

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