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Soil Nutrients Analysis using Colour Image Processing

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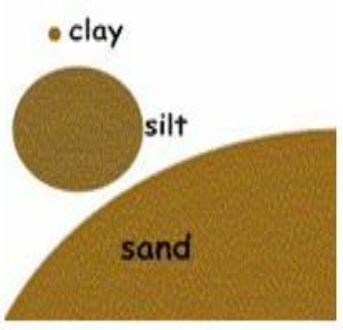
***Abstract*:** *Soil is a key element of agriculture, without soil we can be able to grow plant. Because of this reason we can determine the nutrient of soil like PH, Nitrogen, Potassium etc by using color & texture Image processing. The availability of nutrient in the soil is the most common reason for soil testing. In color image processing color is used for identification of object. There are various color models in image processing that are based on color components & color recognition. The property of Soil color is visual perceptual property which helps to separate soil. Soil can be separated on the basis of color and texture .The both the color and texture are mainly used to determine the soil nutrients in the mat lab using image processing.*

Index terms: *Samples of soil, Digital camera or android phone with large pixels, Image processing, colour models RGB.*

I.INTRODUCTION:

Soil is one of the most important natural resource. Systematic study of soil gives information on nature and types of soil.PH of soil is important part of soil health. PH is determine the degree of acidity and basicity of soil directly affects plant growth. Nutrient of soil are based on acidity and basicity of soil. That nutrients like NPK. If PH is in range of below 7 then soil is acidic ,If PH is 7 then soil is nutral, If PH is above 7 then soil is basic. Yellow and red color of soil indicates the presence of iron oxide. Dark black or brown color of soil indicate the soil has high organic matter. Minrals present in the soil can also affect Hence we can determine the nutrient of soil by using color image processing. If digital camera receives the light in terms of RGB bands. RGB are the basic colors which is arranged in bands 321(RGB).It denote the wavelength of electromagnetic radiations in spectrum band. By using this RGB values determine the nutrient of soil .

Soil types:



II. METHODOLOGY:

Samples of soil are collected and after processing soil pH are determined by using pH meter and NK values are also determined by using chemical analysis**.** Soil samples were analyzed for the present study and digital camera or android phone having high resolution was used for capturing images (JPEG format).This JPEG format of images was converted into image file for the purpose of digital value extraction and determine the digital values of digital image.

The equation for PH index value for each sample is: PH index=R*(G\B).

From above equation value and measured soil PH value (by using PH meater) are correlated. Hence at this type soil PH was determine by using digital image processing.

In this method of soil nutrient detection first of we collect the soil samples.

Than determine the soil nutrient that is Nitrogen, potassium and pH by using laboratory method we determine nutrient of soil. Than by using colour image processing we determine R,G,B value of soil sample.

After that collect the both value and result will be find.

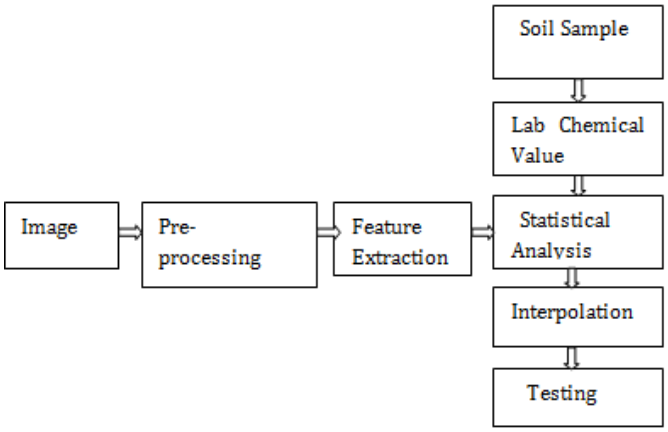


Figure 1.block diagram

1. Image:

The soil samples are collected from the different fields from the various locations. The image of the soil is captured with the help of android phone which is having highest pixels.

2. Preprocessing:

The preprocessing is nothing but the process of filteration. In the filteration process the noises ,blured images or the resolution,hue,intencity is checked.This helps to add the remaining contents to form the desired output.

3.Featute Extraction:

Feature extraction handles the most important role in the fild of image processing. There are various techniques for analysing the soil nutrients like. Binarization, thresholding, normalization, resizing are applied on the sampled image . applying the input data into the features is nothing but the feature extraction.

4.Soil Samples:

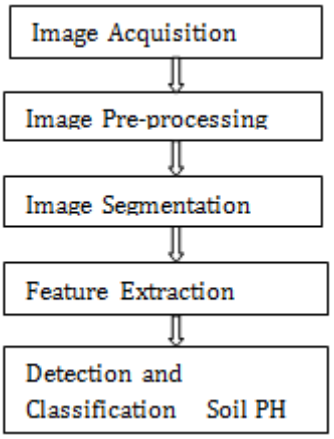
Collected the soil samples from the field by digging the 1meter down. Then arranged the soil in the square in fixed size. To capture the image use digital camera also in the fixed range. The original soil image and resized soil are shown in the below images. Remove the background portion and resize the image into the 480*480 form.

5.Interpolation:

Interpolation is simply defined as the zooming and zooms out of the image. By using this u can get the pixels in the correct forms. Interpolation is used to rearrange the image contents if there is any missing information you can easily found it by using the interpolation.

6. Testing:

Testing is the final step. In this step compare the values which are taken in the lab that is chemical values of the nutrients nitrogen, potassium, PH calculated on the image processing with the help of mat lab.



Flow chart

III. Results:

Fig2. original soil image

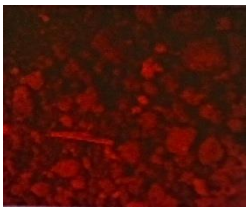


Fig2. (a) Red image

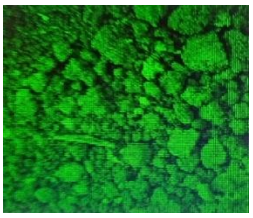


Fig2. (b) Green image

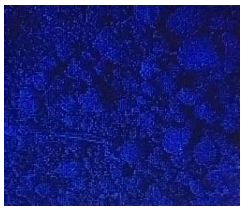


Fig2. (c) Blue image

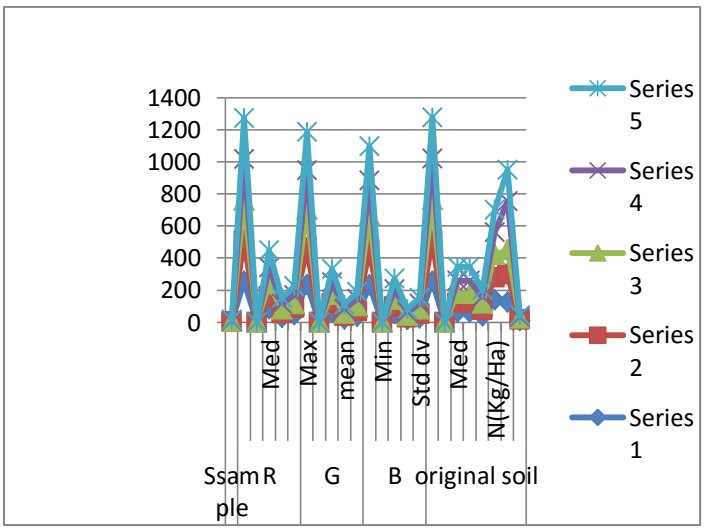


Fig 3. Graph of RGB value

IV. CONCLUSION:

This mode is based on color image processing technique where digital photograph of the sample were used for soil Nitrogen, Potassium & PH determination.

We can conclude that by using this technique we can easily detect the NK nutrients are very usefull for growth of plants.

On the basis of the above applications and methods,it is proposed to characterize soil using imaging techniques.

Than by using colour image processing we determine R,G,B value of soil sample. After that collect the both value and result will be find.

V.REFERENCES:

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