TECHNIQUES USED FOR THE DETECTION OF SOIL FERTILITY USING REMOTELY SENSED IMAGE

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Abstract—

The earth's surface is ever increasing so the propensity towards up to date information are needed. The information generated through the satellites is used in wide range of applications such as land monitoring, weather forecasting, resource monitoring and environment monitoring. By utilizing the applications of distance routing we can detect soil fertility with various techniques and also there is still research for new techniques. In this paper we proposed a technique that is used to detect fertility of soil images. This technique improves the error through the use of segmented approach and enhances entropy. The result shows the comparison with existing approach.

Keywords- **distance routing, pixel based, satellites, object oriented, data mining**

Introduction

The soil fertility are inevitable as surface component alter with varying rate in distance routing application. Land cover and land use vary information is critical because of its practical uses in critically vast applications, including deforestation, assessment of damage, monitoring of disaster, land expansion and land management. Soil detection is the process of identifying differences in the state of an object or phenomena by observing it at different times[1]. Soil detection framework utilizes multi time varying datasets to analyze time dependent event and determine soil detection which are required in current system[2]. The distance routing data becomes major source for soil detection studies because of its accuracy in determining stabilized point in given time series. Digital format which suits for computation, synoptic view and vast selection of space dependent and spectral resolution is great application supported by distance routing application. The general objectives of soil detection in distance routing includes determine location over wide area along with distinct soil detection and then determining amount of soil detection in particular location. Also accuracy of result is analyzed produced through soil detection using distance routing.
The soil detection methods researched within distance routing is ongoing agenda. The principal behind utilizing distance routing data in soil detection is to detect other factors which are causing soil detection so that those factors could be separable from distance routing with change detection. Rest of the paper is organized as follows: Section II describes general considerations used in change detection. Section III describes pixel oriented methods for change detection, section IV describes object oriented methods for change detection, section V describes data mining approach whereas section VI provides comparison of relative merit and demerit of various approaches and last section provides conclusion and future scope.

GENERAL CONSIDERATION IN CHANGE DETECTION

Soil detection has legion of assumptions and general facts associated with it. Most general factors involves

- Feature Extraction: it is expressed in terms of ratio or difference.
- List of functions for Decision making: it is used to form decision regarding change in current environment or not.

These are general assumptions but may not be always followed. The soil detection is divided into following categories.

- Pre-processing
- Selection
- Checking Accuracy or assessing Accuracy of prediction

Pre-processing is the process by which radiometric, atmospheric and image registration process is tackled. Data from same sensor is required to handle such parameters. There are legion of factors which distort the collected data. These factors include sunlight, noise from the medium of transmission, phonological difference, angle deviation etc. corrections are required to tackle such issues. Corrective measures are applied by the use of error correction metrics such as root mean square error, absolute error and relative error. The amount of discrepancy is predicted through the corrective measure metrics[3].
Legion of techniques after corrective metrics application are utilized for soil detection in distance routing areas. These methods include pixel, object and Data mining based approaches for change detection. These methods are discussed in proceeding sections.

PIXEL DRIVEN APPROACH FOR CHANGE DETECTION

Pixel is picture element and is basic unit of image analysis. Pixel is a atomic analytical technique in which spatial characteristics are not considered. Most commonly statistical methods are used to evaluate individual pixel. Different pixel based approach for soil detection are described in this section. The relative merits and demerits are described in tabular structure as follows
The classification based approach is most cited and most commonly used for change detection. GIS based approach is used to support decisions regarding soil detection based on distance routing. Most of the techniques fetch binary information indicating change vs no change approach. Next section describes object oriented approach for change detection.

OBJECT ORIENTED APPROCH FOR CHANGE DETECTION

Object oriented approach provides higher levels of security while fetching of information. Multi spectral images and higher computational capabilities challenge pixel driven approaches. Distance routing using this approach is capable of determining damage occurring through earthquakes. It is determined that pixel is not a geographical object. Hence pixel based approach is not recommended for GIS systems[4]. This section provides summary of object oriented techniques used to detect soil detection .
Object based approach is commonly utilized in geographical object based image analysis. Object based approach helps fetch more richer information in terms of texture, shape and spatial resolution[5].

DATA MINING APPROACH FOR CHANGE DETECTION

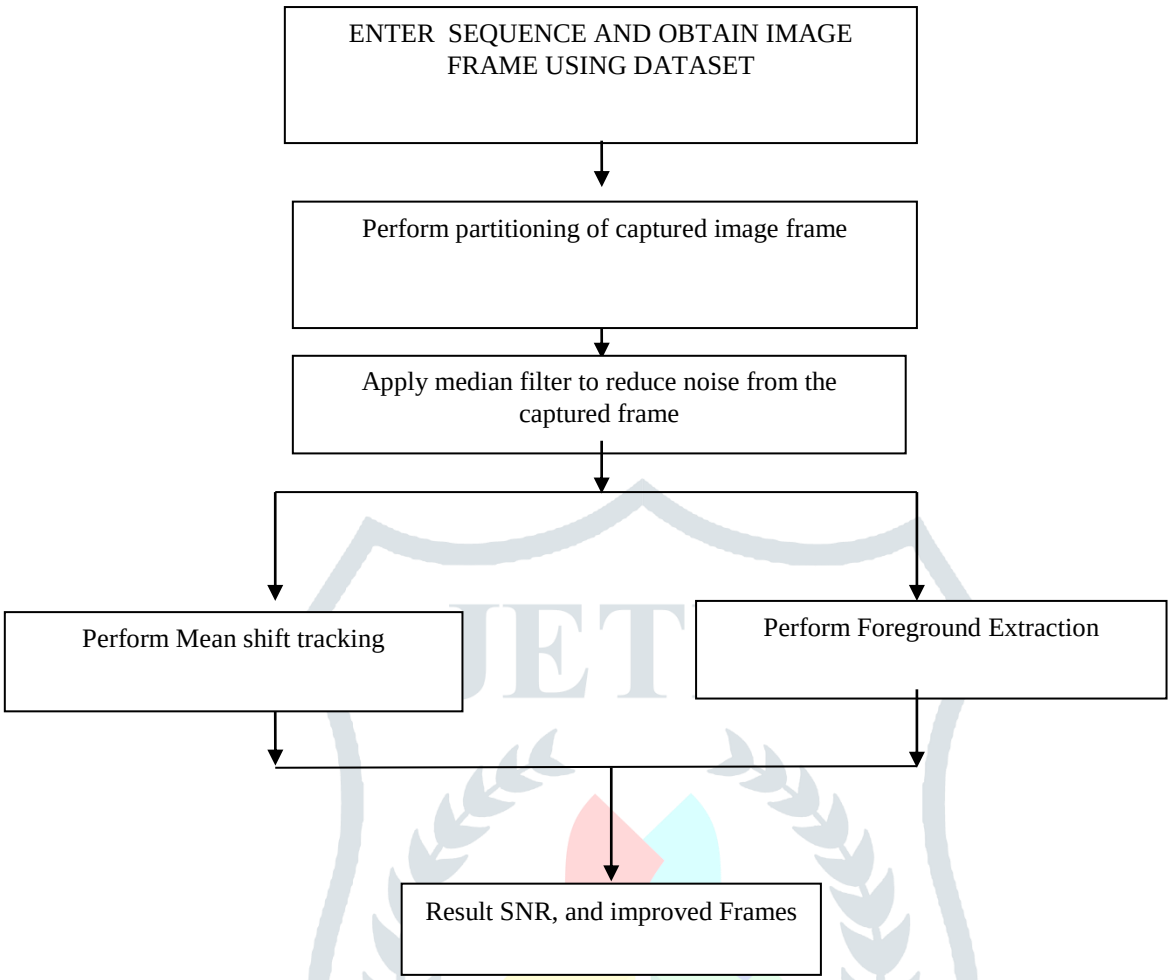
Repository of datasets relating to distance routing is available which can be used to detect soil detection . Images available through the datasets are at very high resolution. This causes criticality of data mining approach to promote data based approach for soil detection in distance routing. Data rich and information poor is promoted through this approach[6]. Data mining approach is used in this section and described in comparative manner as follows
Distance routing can be greatly improved by the use of data mining approach. Clustering of information can be generated using K-Means, C means, and fuzzy approaches [7] of neural network. Hybrid approaches are generally preferred in the area of soil detection in distance routing images. Since optimal features can be extracted using the hybrid approach[3].

Proposed Methodology

The methodology is as described below

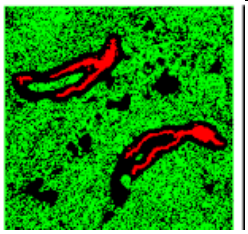
1. Input the image X.
2. Create copy of original image X_i=X
3. Construct Subtraction image S and Construct ratio image R.
4. Construct wavelet Kernels of both the images
5. Obtain RMS and correlation
6. Apply PCA and DWT to obtain initial soil fertility detection result.
7. Classification results based on KNN approach.
8. Obtain Soil fertility detection result.

Proposed Flowchart



RESULT AND PERFORMANCE ANALYSIS

The performance of proposed system is analyzed by comparing it with the existing system without fuzzy system. The dataset used for this approach is derived from the internet as the source. The dataset along with size of the image is listed as under

IMAGE	SIZE	TYPE/FORMAT
	127X114	JPEG
	127X126	JPEG
	125X115	JPEG

	127X114	JPEG

Table 1:Image set used for evaluation with proposed system

As the size of image set varies hence to overcome this problem pre-processing in terms of resizing operation is needed.

RESULTS

As compared with existing technique without fuzzy system, result improves considerably. The tabular representation and plots describe the same. The following table gives affected area detected through existing and proposed approach

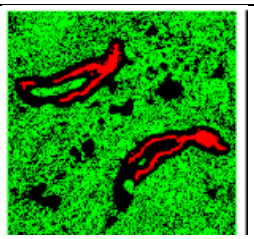
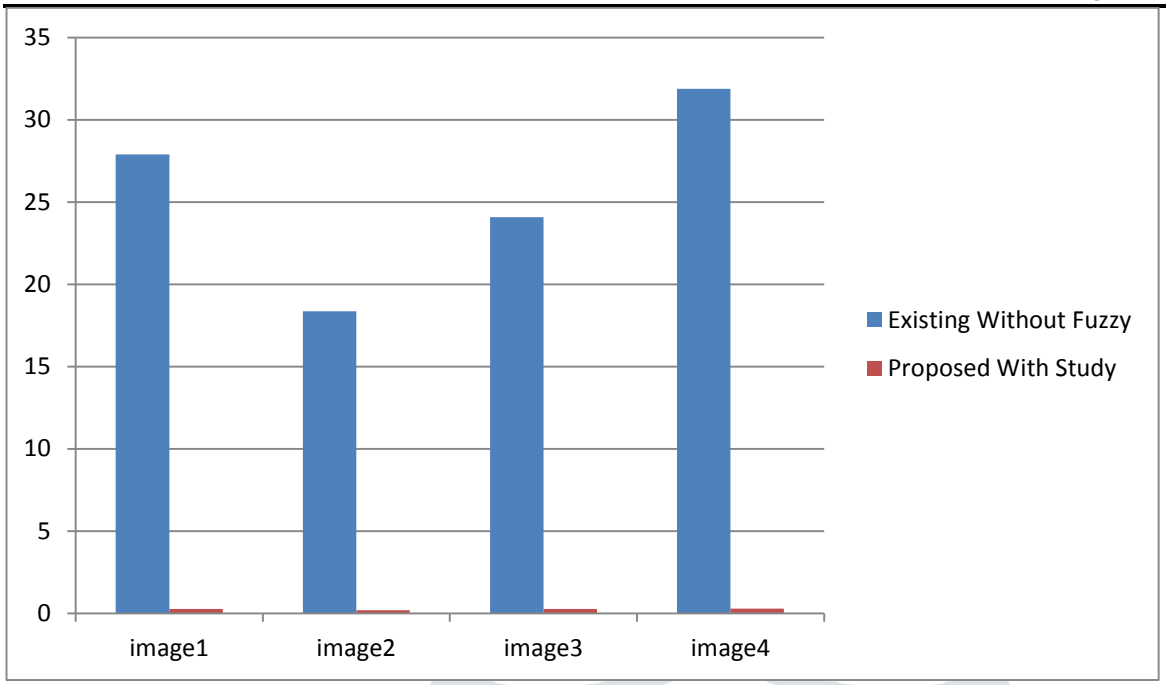
Image	Existing Without Fuzzy	Proposed With Study
	27.8971	0.26789
	18.3638	0.183638
	24.0837	0.271981
	31.8792	0.28761

Table 2: Comparison in terms of affected Area Detected



The affected area in terms of existing technique detected is more hence including those areas which may not be affected. Proposed approach on the other hand introduces precision and gives accurate area of infection. Comparison in terms of accuracy is given as under

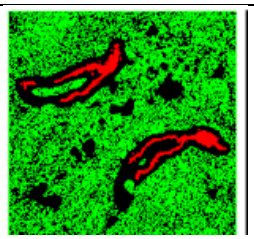
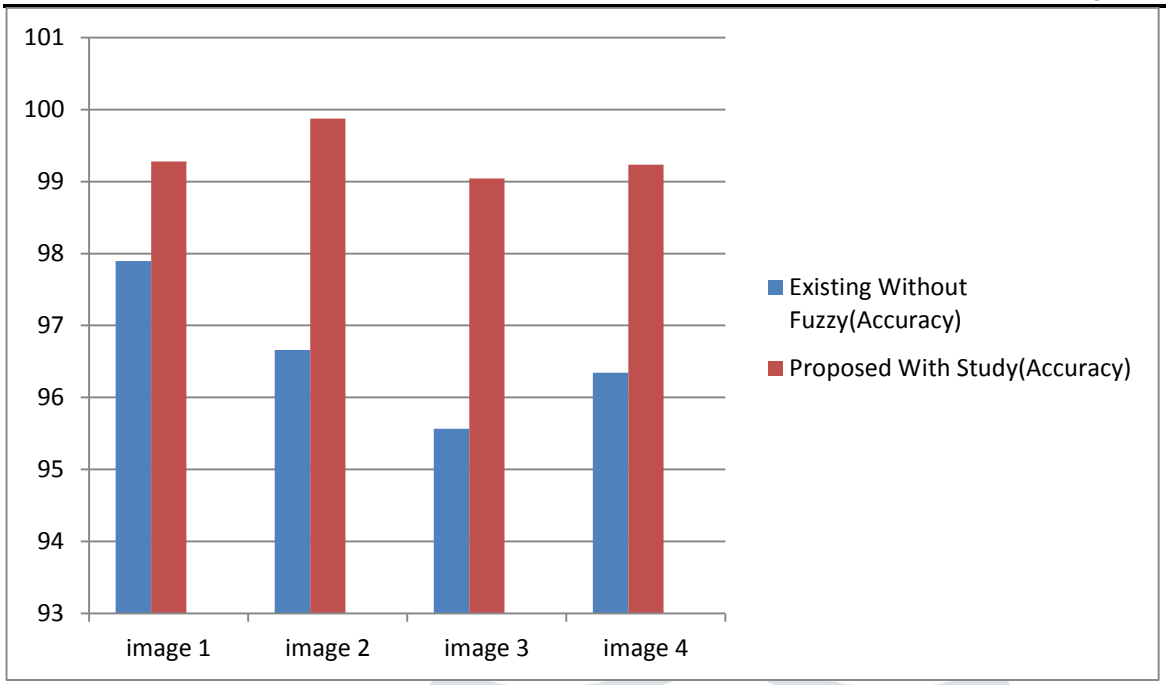
Image	Existing Without Fuzzy(Accuracy)	Proposed With Study(Accuracy)
	97.8971	99.2789
	96.6578	99.8762
	95.567	99.04523
	96.345	99.2345

Table 3: Comparison in terms of Accuracy



The observed entropy is in the range of 7 to 8 for the proposed system. The entropy describes degree of relationship between pixels. Overall proposed system with Fuzzy SVM produces better result as compared to existing system without fuzzy.

The amount of area that is unclassified is very less using the proposed methodology. The peak signals obtained indicating amount of area which is classified is given through the figure 4

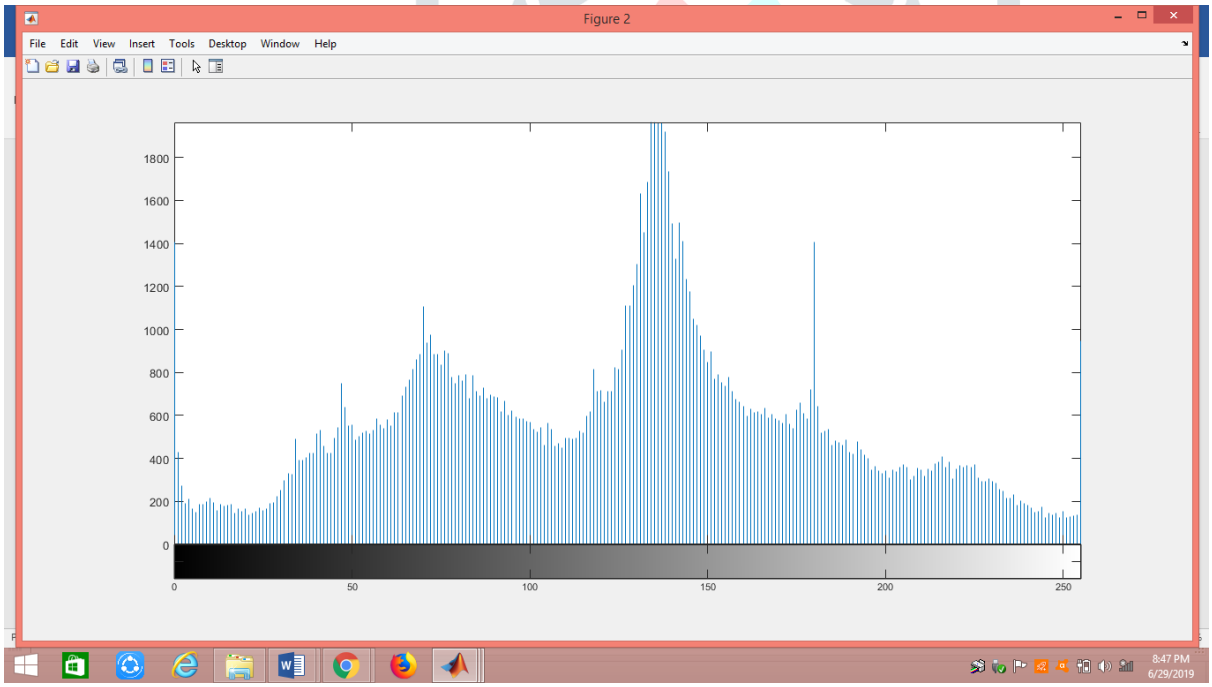


Figure 4: Classification area distinguishment

VI. CONCLUSION AND FUTURE SCOPE

Fuzzy SVM with Revisiting is utilized as a part of request to upgrade the precision and execution of the SVM division to recognize change in land. Early recognition of such ailment is basic for aversion and analysis which generally is unrealistic. To accomplish exactness in the error inalienable in formal names related with MRI picture of Remote satellite, approximate ideas can be utilized for characterization of tests for recuperation, the SVM is a capable technique for information arrangement. The commitment of this writing is as far as better exactness, affected area, accuracy and review. Aggregate of thirteen parameters are used in the

proposed system. These parameters are gotten accordingly of highlight extraction and choice. These ascribes adds to exactness, affected area, Precision and review.

The rate at which result is gotten in the event of complex picture is moderate. Later on covering pixel disposal component can be utilized alongside fuzzy SVM to enhance execution facilitate.

VII.REFERENCES

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