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Article *in* Journal of Critical Reviews · May 2020

DOI: 10.31838/jcr.07.07.131

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Journal of Critical Reviews

ISSN-2394-5125 Vol 7, Issue 7, 2020

AN APPROACH TOWARDS SOIL EROSION MONITORING SYSTEM USING SATELLITE IMAGES THROUGH DATA MINING AND PATTERN MINING TECHNIQUES

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Received: 10.02.2020 ***Revised: 13.03.2020*** ***Accepted: 24.04.2020***

Abstract
In this paper, we determine a data mining techniques on agricultural land for soil erosion monitoring. We used the spatial data and pattern mining tool used herein the time series of satellite images. The first thing we use in time series of satellite images is to get the input images and it is processed and spatial mining is used. Pattern mining we use consists of a lot of processes the data are taken and some pre-processing happen, we use image segmentation on the satellite images, we used pattern theory and last;y the resulted are collected in order for forming visualization to get the better data results considering the soil erosion on agricultural land.

Keywords: monitoring, satellite, Pattern.

DOI: http://dx.doi.org/10.31838/jcr.07.07.131

INTRODUCTION

One major factor that affects the Indian economy is agriculture. Most of the country's populace is either straightforwardly utilized or is reliant on agribusiness for their occupation. Along these lines, different research organizations and Government associations put forth a consistent attempt to improve the efficiency and maintainability of Indian Agriculture.

The agriculture pattern recognition for soil erosions on the respective agriculture field is done by the spatial data mining data and the images taken from the satellite are used for the most part. The images that are taken from the satellite images are allotted in time order and pattern recognition mining is used to get the results. The time-series data mining is used on the respected satellite images and spatial data mining to get the big pattern visualization on the agricultural land to get the how major impact is happening and to take precaution methods for the soil erosions on the agricultural land.

In landforms lot of causes happen; the most thing normally happens the soil erosion. The soil erosion mostly happens on the topsoil because of the erosion of water and some times like air and it might be caused by the culture too.

Soil erosion, whether it is mostly caused by the physical powers of water or some other caused by air or it caused by the culturing the greater loss in soil erosion, is the richness in the topsoil or in the soil because of erosion the richness might be migrated for the soil to elsewhere.

The soil erosion if happen near the drainage with a poor conditional system it might affect the terrain because of the migration of soil during the soil erosion and it affects the surrounding, which causes to pollution. This kind of thing might affect the nearby water system sometimes and nearby lands. The soil erosion might happen slowly sometimes without anyone noticing, or it happens at an alarming rate, so we proposed this system to monitor and taking pattern mining in the agricultural land for soil erosion.

The recognition of patterns and some regularities can be studied in AI artificial intelligence field of view and it is known as pattern recognition. It is firmly related to AI. Example acknowledgment systems broadly utilized. For example it mostly in data mining and somewhere in machine learning etc. example the pattern recognition is used in various field like in medical field it is used in brain research, cancer, etc. examples it is used in traffic monitoring and a lot of data are allotted and analyzed in software fields. The pattern recognition can be divided into two types. One type is a physical one and another one is on the data in software areas.

Geographic information systems data also are known as GSI from spatial data mining; having full scale and ongoing attributes have been a significant method for land spread location. The geographic data of the earth surface, if we consider taking sometimes vary during the time because a lot of variation happens to like because of construction etc. so spatial data cannot be considered based solely on the geographic data. Some additionally, things are ought to take a suitable technique to break down their temporal qualities to separate the applicable data and information.

The paper represents using time series data mining, spatial data mining and pattern mining on agricultural land for soil erosion monitoring using satellite images. And the sections 1 of the paper is illustrated as follows the first section is about introduction about the methods we use in this paper like time series data mining, spatial data mining, pattern recognition etc. and section 2 about the related works followed by section 3 proposed method

and section 4 about the conclusion and last section 5 about references.

RELATED WORKS

Z. G. WANG et al. [1] represents a method to monitor soil erosion by using data fusion. The monitoring is taken place in the Upper Yangtze River Basin in China to conduct soil erosion monitoring. This method is based on the USLE based model is known as the Universal Soil Loss Equation. Soil misfortunes or some affected topsoil stores in the Upper Yangtze River watershed have been expanding for a considerable length of time, with substantial negative impacts in the field agribusiness it happens in along Three Gorges Dam and Yangtze River. In the 1990s the Chinese government had taken some projects for the soil erosion it named Return Farmland into Trees (Grass). The main purpose in this method is to picture the pixel unbending system is used on the information combination. The pixel is counted on the information from satellite sensor information on soil disintegration and the USLE model. Right now improves the precision for each parameter computation. Prior to making the last estimation, we completed an overview in July 2000 on the waterway valley. We extracted the result it shows 15% soil disintegration contrast from the information we computation values in 2000 from satellite form ETM data, and also from the outcome in 1999 situ measurable. The strategy is conducted on Valley. The data from Minjiang River is utilized for instance, for soil misfortune figuring for different waterways in the Upper Yangtze River watershed.

Parul Mahawar et al. [2] conducted there method in India in the Rajasthan region for ARIMA and rule mining in those regions. The method is applied to get the Time series data for the yield in cultivation on the Rajasthan regions, the regions contain twenty-nine states and we conduct the experiment from the data accumulated from 1997-2010. The results are taken and we considered based on the time series result between 1997-2010 are taken and we used to predict another ten years from 2010 the yield in cultivation.

Manasa Manjunatha et al. [3] explains Farming is the broadly rehearsed activity on a country based on agricultural business like India. Agricultural is the most needed and profitable one, which increases the GDP of a nation. In India, the Agribusiness drilled in customary employment as a result of which farming isn't being rehearsed as the technology-driven or innovation situated occupation. Accordingly, cultivating practice in India isn't creating acceptable financial results. Information mining in agribusiness is one such rising pattern which targets the yield information on harvest and we can improve the cultivating practices in India. This yield harvest information is exposed based climate information furthermore, airfield information so as examine the joined impact in climate variation and some crop yield based on soil type. They illustrated and confirmed the harvest yield result improved by using the data mining.

A.A. Khodaskar et al. [4] illustrates some advanced pattern recognition methods. To edify design acknowledgment strategies in straightforward language, including the essential, part, philosophy alongside late methods and use of example acknowledgment. Research on design acknowledgment is expanding quickly, the related fields and the uses of example acknowledgment have gotten more extensive and more extensive as notice prior. It assumes an important job in different fields like PC vision, horticulture, mechanical autonomy, biometrics, programmed location of illnesses in the contaminated plants. Right now, examine some propelled design acknowledgment applications, incorporates precise malignant growth conclusion and evaluating framework, improved capacity reclamation framework for people with spinal injury, Gear solidness corruption framework, rice infection recognition framework and so forth. Propelled design acknowledgment methods improve exactness, review and precision of picture recovery framework.

Yao Zhao et al. [5] illustrates some useful time-series data. An auspicious time arrangement grouping structure arrangements are taken from the clusterLandsat8 for the proposed method. The CD- Dynamic Time Warping separation is taken in this method for the time arrangements. We analyze the EUCDynamic Time Warping and compact disc Dynamic Time Warping are taken inland and spread characterization of satellite time arrangement, compact disc Dynamic Time Warping calculation are significantly performed. In the future, compact disc Dynamic Time Warping tried in additional information can be tried in various areas, furthermore, contrasted with more variations of DTW.

PROPOSED METHOD

The agriculture pattern recognition for soil erosions on the respective agriculture field is done by the spatial data mining data and the images taken from the satellite are used for the most part. The images that are taken from the satellite images are allotted in time order and pattern recognition mining is used to get the results. The time-series data mining is used on the respected satellite images and spatial data mining to get the big pattern visualization on the agricultural land to get the how major impact is happening and to take precaution methods for the soil erosions on the agricultural land. The explanation of the methods is going to illustrate down below.

In a growing research field, the spatial data mining is still can be considered at a very early stage. During the most recent decade, due to the broad uses of global positioning system devices innovation, there is a lot of usages happened, in the user fields like mapping, spatial data are sent through the internet to the other or the positions are pointed for the various uses, and a lot of fields are using this spatial data mining for carious used like in military, etc.

For example, social examination and business applications. Other than the examination area, private businesses and the overall population additionally have gigantic enthusiasm for both contributing geographic information and utilizing the huge information assets for different application needs.

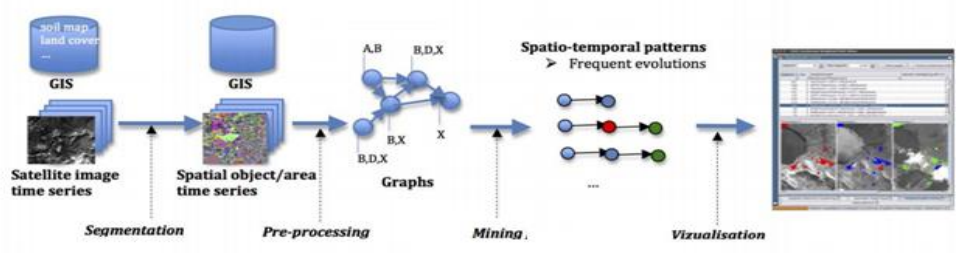

Figure1. The full process of the proposed system

We use geographic information system known as GIS in this method. It incorporates different assignments and, for each task, various strategies are frequently accessible, regardless of whether computational, factual, visual, or a mix of them. Here we just quickly present a chosen set of errands and related strategies, including order (directed arrangement), affiliation rule mining, bunching (unaided characterization), and multivariate geo-visualization.

In the process, the time series data are taken. The process based on the input taken in the time series data mining from the satellite images into time series of satellite images and it will include the data from the geographic information systems data it will extract and represent the finalized spatiotemporal data. And from the data's we can conclude that the process taken into that are merging of images with the geographic information system data the segmentation are taken in that place.

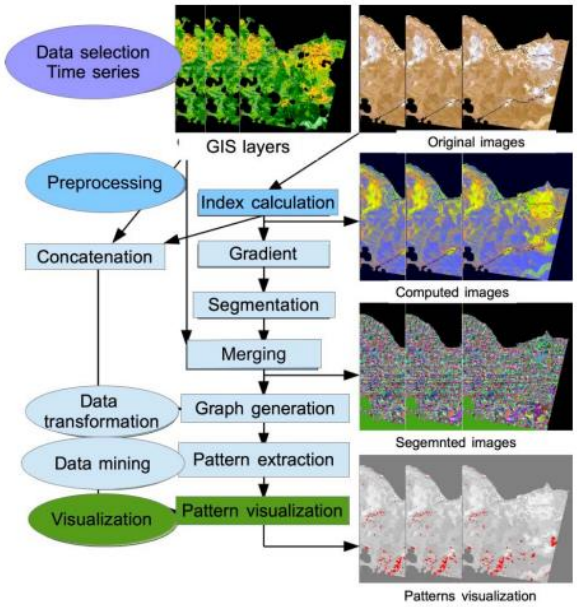

Figure2. The detailed version of the proposed method

The initial steps manage the segment in the picture taken from the resulted of satellite data pictures. Watershed is used on the pixels to gather the radiometric values and we acquire the homogenous locales. The picked traditional technique on the grounds that it creates various little profoundly homogenous areas (over-segmentation). Be that as it may, our satellite pictures are multispectral.

The result are gotten for solitary division in every picture, every band autonomously, consolidate on crossing locales. The progression, are additionally incorporate accessible global positioning system information identified with the contemplated zone. The resulted radiometric values, absolute qualities are gotten from vector information at the end from each image that related to top qualities for every picture.

The pattern extraction can be said with an example. It can portray a fleeting succession of occasions or a fleeting advancement of items. It gives a portrayal of worldly causal connections that are effectively deciphered based on specialists. Each edge on the weight paths is taken to get the weighted way.

For pattern mining, we use the directed acyclic graph. The directed acyclic graph is described by the formalized as a partial order. It is lesser than or equal to vertices V of the directed acyclic graph.

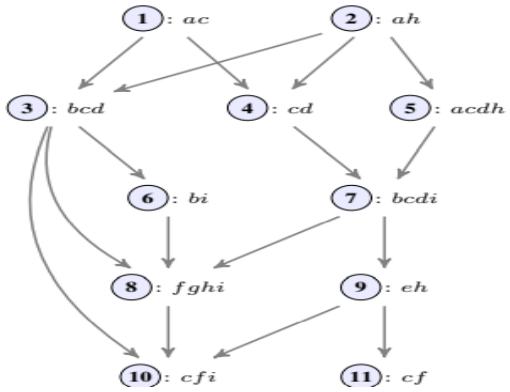

Figure3. Example of the directed acyclic graph

The directed acyclic graph figure mentioned above is used on the pattern mining to get the results.
Directed acyclic graph G = (vertices V, edges E, Labelled function L)
In the path pattern P=I1 →I2→ ⋯ . → Ip in this where I represent the item set.

From figure 3 we can say that P= ah→ CD → i. From this, we can see that ah→ cd = 4 and we can say cd→ i = 6.
The final step consists of the visualization of the constructed of the directed acyclic graph. Even for the geologist or some people in geographers, it is difficult in the pattern.

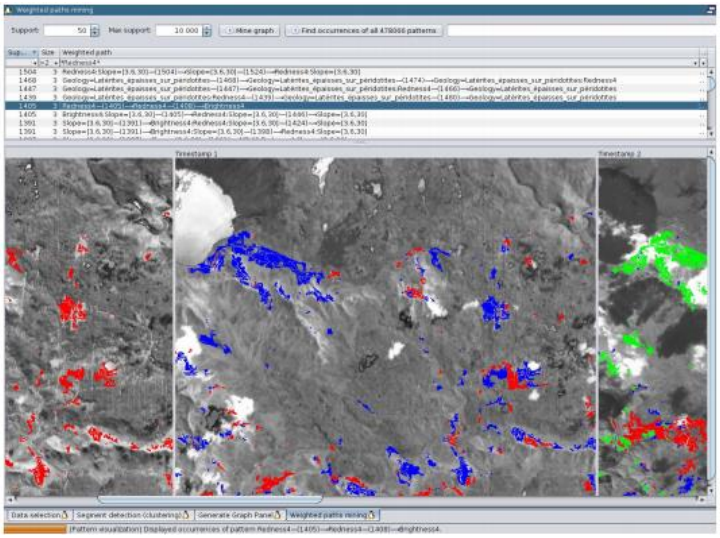

Figure4. Pattern visualization

The help of thematic read maps accustoms the pattern visualization. We can say that the display of each pattern is taken from the initial results from the time series data mining method and geographic information system data.
From figure 4 we can say that we used pattern P= Rednessarea4→Rednessarea4→Brightnessarea4
The areas are categorized as described from figure 4. As displayed in that picture. regions related and categorized into three parts as follows

1. In the first part, the RED is marked for the Rednessarea4.
2. In the second part, the BLUE is marked for the Rednessarea4.
3. In the third part, the GREEN are marked for the Brightnessarea4.

CONCLUSION

In this method, we used the time series data mining from the satellite images on the agricultural land and we used the geographic information systems data on the specific areas. And we used the segmentation in the images and we used the pattern mining on the images and we concluded that by the resulted pattern data, we could process which area in the agricultural field needs additional care to prevent the soil erosions.

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