

Shonan Fujisawa Gakkai Report

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a Cause-based Methodology for Semantic Analysis of Deforestation using Multispectral Reflectance

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Abstract of Research

Nowadays, deforestation activity still occurs despite having huge impact for human being. The different causes of deforestation are relatively brings different effect on nature, while forest fire and illegal logging are two major deforestation activities. In this paper, we proposed a new method to represent semantic analysis of deforestation effect based on its cause. We proposed idea to interpret reflected “substances (material)” of deforestation area in spectrum domain into human language. The objectives of this paper are to (1) Detect deforestation area, (2) Detect the type activity that cause deforestation (whether it is logging or forest fire), (3) measuring the degree of deforestation effect for soil by considering the soil properties, (4) identify and present important nature changes occurring in soils that affect post deforestation management. Riau has been selected as the study area, where the data was acquired by using Landsat Satellite images between 2013 and 2014; where there is a big forest fire occurs. The experimental result produces new semantic analysis matrices to determining the soil condition after deforestation in different context

Details of Research Activity

The Fifth International Conference on Knowledge Creation and Intelligent Computing (KCIC) technically co-sponsored IEEE conference, which will be held in Manado, Indonesia, on November 15-17, 2016. Accepted full papers considered to be published in IEEE Xplore and indexed by Scopus. Deforestation activity is divides in two ways: illegal logging and forest fire. Although the effects of deforestation are numerous, it is highly dependent on what the causes activity. To present deep knowledge about deforestation based on its activity, we proposed a new approach to representing brief knowledge about deforestation impact in human interpretation. In order to identify the activity, we use Normalized Burn Ratio. After activity of deforestation has been detected, semantic computing is used to representing the natural condition and convert to human language. The experimental study has successfully produced the semantic matrices to interpret the nature condition by using three axes, consist of soil moisture, temperature, and soil salinity.

Our proposed idea consists of four processes: (A) Detecting deforestation area automatically, (B) Detect the activity types of deforestation causes (whether it is logging or forest fire) by using multispectral analysis, (C) measuring the degree of deforestation effect in soil by considering the soil properties. (D) Identify and present important nature changes occurring in soils that affect post deforestation management semantically.

Research Activity's Result and Discussion

We present and discussed our proposed idea in disaster risk management. There are five presenters in our categories, where all the representing the unique system design to handle the natural disaster. Our system are discussing about the usage of remote sensing in term to control and bring more knowledge of deforestation. By analyzing using semantic computing, we implement human language interpretation to give the benefit for users who want to study about the deforestation activity and impact in our society. The input data of our system are satellite images from Landsat and processes by clustering methods to identifying the deforested area, later in next step, the condition of deforestation effect had been analyzed by using mathematical band calculation. Knowledge gained from this process will be represented as semantic meaning.

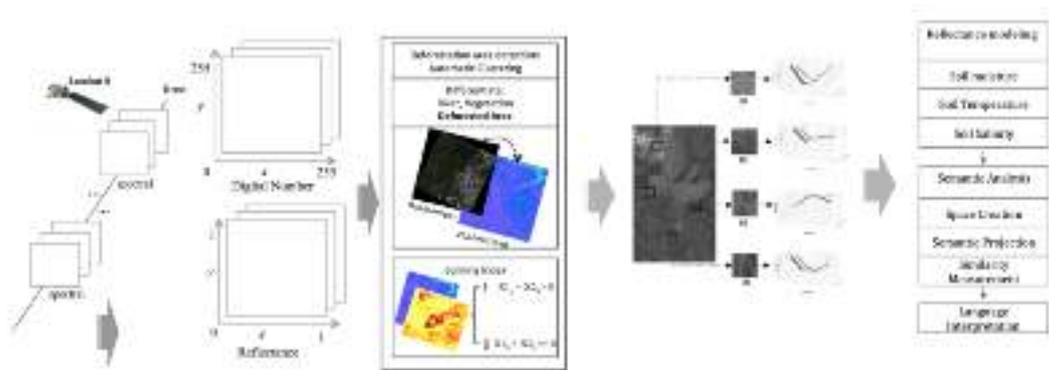


Figure 1. Proposed System Design

Many interesting question are coming, indicating that our topic has specific impact in tropical country society. Participant join in our presentation session was mainly a student and professional who are interested in environmental and disaster management.



Figure 2. Presentation session and Join Discussion

During the discussion we also discuss about several possibility to do more advanced research in term of disaster management, and future collaboration between international institutes are also being discussed and possible to realized in near future.