

# Semantic cautious action for humans from natural environmental disaster

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## ABSTRACT

The natural environment contains all living creatures and non-living things that are occurring naturally on the earth. Climate weather and natural resources that affect human survival and economic activity such as Earthquake, Tsunami, land degradation and climatic change etc. GIS (Geographical Information System) is a spatial data infrastructure which collects, analyze, and manipulate the data. But this data is not in an open source. In the existing system, GIS data is maintained by supercomputer by any government or private organization in the country. The problem in existing system is, GIS information not accessed by public or normal people. In this proposal, based on the user location the data will be provided from GIS to user SMART phone. For instance a person who is willing to buy a land to build a house or to buy an apartment to live, he/she doesn't know about the history of disaster occurred in this place and the possibilities of the disaster will occur in this place are provided through our proposal. The main advantage of our proposal is to save the human's life from natural environmental disaster by using the field of information technology.

**KEY WORDS:** GPS-RS-GPS, Information technology, Natural environmental disaster.

## 1. INTRODUCTION

**Natural Disaster Instabilities:** Natural hazards like landslides, avalanches, floods and debris flows can result in enormous property damage and human casualties in mountainous regions. Natural disasters comprising avalanches, floods, debris flows and slope instabilities led to substantial loss of life and damage to property, infrastructure, cultural heritage and environment. In order to offer a solid technical infrastructure, a new concept and expert-tool based on an integrated web-based database/GIS structure is being developed Graciela (Metternichta, 2005). Satellite remote sensing is providing a systematic, synoptic framework for advancing scientific knowledge of the Earth as a complex system of geophysical phenomena that, directly and through interacting processes, often lead to natural hazards. Improved and integrated measurements along with numerical modeling are enabling a greater understanding of where and when a particular hazard event is most likely to occur and result in significant socioeconomic impact (David, 2005).

**Satellite imagery interpretation through name server:** Damage assessment is an important task within the framework of rapid mapping, and there are almost unlimited applications of change analysis. Fast and easy accessible global data sets such VMap are often not accurate enough for a high-resolution mapping. Hence, high-resolution data sets on infrastructure and settlement boundaries have to be derived by visual interpretation of satellite imagery. Global gazetteers such as the GEOnet Names Server can be used for labelling settlements and physiographical features like rivers and mountains. For a rough estimation of the population affected by a disaster, the Land Scan database Dobson, (2000) gives a good representation of rural and urban population densities. A combination of interferometrically derived DEMs from SRTM X- and C-band, ERS, and GLOBE 30-arcsecond data Roth, 2002 provides a global basis for the derivation of contour lines as an adequate representation of the topography. Generally, the map-generation process consists of different steps: integration of spatial data, data analysis, layout, quality control, map editing, and dissemination, as well as updating of the map and provide accession feature for providing the data for the users

**Earlier Methodologies:** In the existing system, Satellite remote sensing is providing a systematic, synoptic framework for advancing scientific knowledge of the Earth as a complex system of geophysical phenomena that, directly and through interacting processes, often lead to natural hazards. Improved and integrated measurements along with numerical modelling are enabling a greater understanding of where and when a particular hazard event is most likely to occur and result in significant socioeconomic impact (David, 2005). A random forest (RF) classifier is an ensemble classifier that produces multiple decision trees, using a randomly selected subset of training samples and variables. This classifier has become popular within the remote sensing community due to the accuracy of its classifications. The overall objective of this work was to review the utilization of RF classifier in remote sensing (Mariana Belgia, 2016).

**Easiest Accessibility of Datasets:** Typical image pre-processing for such rapid-mapping services includes atmospheric corrections (Richter, 1998) Orthorectification (Toutin, 2001), pan sharpening (Nichol, 2005), filtering, contrast enhancements, and visualization. Fast and easy accessible global data sets such VMap are often not accurate enough for a high-resolution mapping. Hence, high-resolution data sets on infrastructure and settlement boundaries have to be derived by visual interpretation of satellite imagery. Global gazetteers such as the GEOnet Names Server can be used for labelling settlements and physiographical features like rivers and mountains. For a rough estimation of the population affected by a disaster, the Land scan data base (Dobson, 2000) gives a good representation of rural and urban population densities. A combination of interferometrically derived DEMs from SRTM X- and C-band, ERS, and

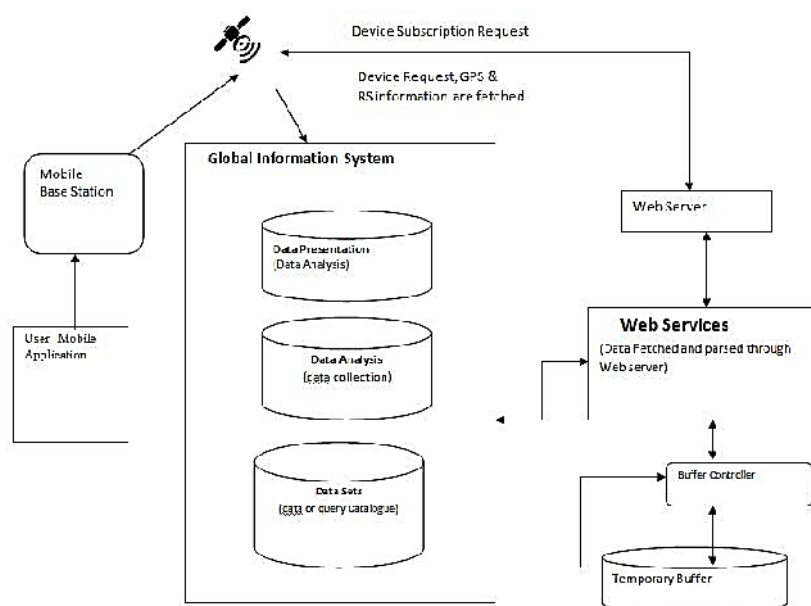
GLOBE 30-arcsecond data Roth, 2002 provides a global basis for the derivation of contour lines as an adequate representation of the topography

### Architecture:

**User Mobile Application Request & Response:** GIS is a computer system for capturing, Managing, integrating, manipulating, analyzing and displaying data are spatially referenced to the earth geographical system. GPS (Global Positioning System) is a system of earth-orbiting satellites which can provide precise (100 meter) of location on the earth's surface. Remote sensing (RS) use of satellite or aircraft is to capture information about the earth's surface. Here GPS and RS are input to the GIS. In this proposed architecture, this GIS input is stored and processed based on the users request.

**Global Information System Ever:** User Mobile `application make a request and subscribes the GIS server. In GIS server, Device Subscription request are identified via Datasets in the bottom layer of the GIS server and fetch the queried data from the Data Analysis Database in the GIS Server. After the Data Analysis the user queried data is analyzed from the Data collection and fetched via Datasets in the bottom layer and then processed and stored temporarily in the temporary buffer.

Most of the time, even though there are methodology to predict the natural disaster, we are unable to predict little fast. And also, we are unable make the people to get more awareness about the natural disaster in time. So, finally we are losing our community in very big level with its belongs. Even we are unable to measure the level of destroy. Our proposed system will help to understand the seriousness of environmental disturbance and also guide the people to relocate the people as early as possible.



**Figure.1.Global Information System**

In this proposal, the user enter his/her requirement information in the Application in their mobile device, then application subscribe the GIS Data server and check the user preferred data based on the use of Recommendation system and the data representation system. This fetch the user required data and parse it to the Classified GIS file Database, then snapshot the GIS file in the database and this image file will sent towards the response for the subscribed device through Internet via GPS.

Moreover, our proposed system trained to help the people to understand their problem in terms of location identification, nature of soil, Land Irrigation, Rock Type and Slope Coverage GIS File. With this knowledge, the will be able to identify the proper place to live safely. This proposed system is fully based on rule base. So, each and every process will be done by rule. The decision will be taken with help of rule manager and rule base. Because of that, the quality of the decision will be improved to the satisfied level.

### Tier architecture:

TIER:1.....Spatial Analytics

In this tier, user location can be identified and compute the further process based on the user request.

TIER:2.....Query fetch and Information Display

In this tier, user requests are processed through different sets of query in the GIS coverage database file in the server and display the user required information as a response for the subscribed device.

TIER:3.....Data Archive Or web based search on data warehouse.

In this tier, requested data are indexed by using Metadata index search and move to the temporary buffer

storage and send as a response towards the subscribed device.

## 2. MATERIALS AND METHODS

**Algorithm:** Generally GIS uses Supercomputers for maintaining and processing very huge amount of data. Before generating a process, first phase to find the user location using GPS and fetch it into the RS and input to the GIS. Then process is generated and the following algorithms are initiated to process as follows

**Input:** user input queries

**Output:** Processed data extracted from GIS server

Step 1: User access the Application and Establish a Query about his/her Location

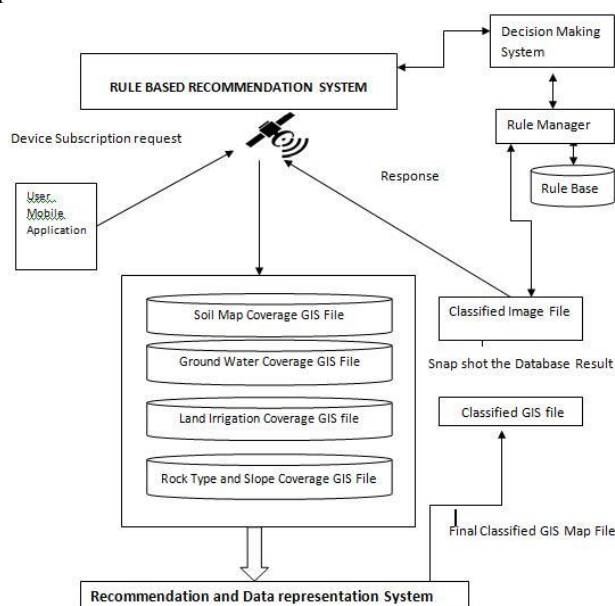
Step 2: User Application from device subscribes the GIS server

Step 3: Make a request to access the GIS server and process the user request. Step 4: The response towards the Subscribed device from the GIS server.

Step 5: Response from GIS server are extracted based on the Mining techniques

Step 6: User Queried data are provided from GIS Server, then wait for another user queries

The above said algorithm describe that how the users queries are processed and relevant data are retrieved. To process the user queries, the user needs to subscribe the GIS server through user application and the he can make the request. The request will be processed if the user have been subscribed the GIS server already. Based on the user's request, the response will be extracted through some specific data mining techniques. Collected data can be undergoing to the data mining process for different process like preprocess, classification and association rule. Finally, from the mined data, the knowledge can be represented in the user's requested format to gain proper knowledge to take precaution steps. Through this proposed work, the natural disaster problem was analysed technically and the same way the solution will be identified. Another importance of this proposed work is to help the end user to create the awareness and to find the alternated solution for the same problem.



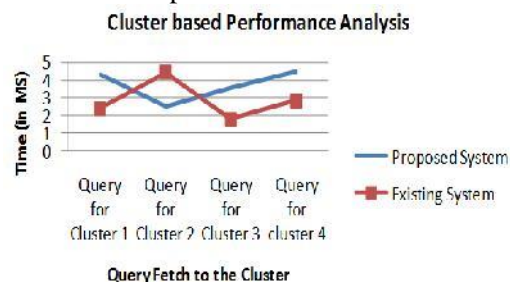
**Figure.2. Proposed system Architecture**

## 3. RESULTS AND DISCUSSION

At a time, the server may be able to receive more number of queries. According to the different user's queries, the queries must be organized by means of clustering and classification. Most of the time, the users queries will be incomplete or partial. Either it should be completed or removed by data mining preprocess technique. The same way, the data extracted from the server according to the user queries also must be organized and identified the association among the data. Then it will be co related according to the user queries. The performance was analyzed based on the clustering data and queries with respect to time. It was given below in the form of graph analysis.

In the figure 3, the response time was analyzed and compared with the existing system. The response time was improved 17% widely and focused on improving response time fully. The response in time was analyzed based on the clustered query. In figure 3 and figure 4, user query analysis and location accuracy analysis was done with respect to time in seconds. We will be able to receive many quires from many users.

All the user's queries must be collected and organized and clustered based on the similarity and frequency of the queries. Frequently all the collected and clustered queries will be analyzed in parallel to solve their immediate problem as early as possible. According to the user's queries, the location was identified with more accuracy and same collected data will be processed at once.



**Figure.3.Cluster based Performance Analysis**

In the table 1, our proposal application finds many parameters based on the User location Using GIS and analyse the above factors in certain time limits. Our proposal's time limits are very efficient compared to the existing system. Variation in m- seconds with different factor like altitude, slope, degree etc. are sincerely compared and analyzed.



**Figure.4.Location accuracy**

**Table.1.Performance Analysis of proposed system with different factors**

Module	Factors	Existing System (in ms)	Proposed system (in ms)
Topography	Altitude	0.14	0.12
	Slope	0.024	0.01
Climate	Degree	2	1.132
	Precipitation	11	5.9
Hydrology	Ground Water Accessibility	13	10.9
	Surface Water Accessibility	0.98	0.89
Land use	Land Types	0.06	0.07
	Elevation	12.5	7.9
	Orientation	90	98
	Soil Rock Exposure	0.0667	0.897
	Soil Types	8	7

In this proposal, we find solution for user queries based on several parameters such as Topography, climatic change, Hydrology, and land use modules contains several information such as land types, elevation, orientation, Rock exposure, Soil types. This information is processed with in a fraction of milli-seconds and provides data based on the user queries. Collecting user information and the change in environment, we took care in efficiency as well as accuracy. We reduced the complexity and cost of the proposed system while perform and deliver the system. Very simple and flexible and re liable installation procedures derived for our proposed system

#### 4. CONCLUSION

In this proposal, we save the human's life from natural environmental disaster by using the field of information technology. In the implementation phase, it need enormous amount of resources, cost are needed. Even though, the work was analyzed in the olden style, the response time was improved lot and also customized according to the individual. The cost of the proposed system was very low when compared with the existing system. Almost, the cost of proposed system is varied from 10 to 25% to lower when compared with the existing system. At the same time, we would have been concentrating the efficiency and accurate results produced by the system. So, there is no need of waiting for anything when they have this application. So, we proved in presenting this paper work which play in main role to save the human life and properties.

**Conflict of interest:** The author declares having no competing interests.

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