

Prediction of Rapid Floods from Big Data using Map Reduce Technique

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Abstract

Rapid floods is one of the irremediable calamities. They are always dangerous causing heavy damage at the surroundings due to heavy rainfall which cannot be figured out. In some cases the behaviour of the streams and their link with other strems are examined and the GIS tool is used to predict the floods. Safety measures are not taken into consideration for rapid flood. The data must be collected and analyzed for particular area and various attributes are taken for analysis purpose. Here analysis of risk is based on certain attributes to check whether the flood may cross the limit or not. It has been a challenge in predicting the floods that cause damage i.e mostly in the crowded areas. There are some difficulties in physics based models in demonstrationg the information about the absolute rainfall prediction. In this paper, we analyze the rainfall datasets based upon the threshold value. Big data is used to examine large datasets of rainfall and to predict the occurrence of floods. If the rainfall crosses the threshold value then the flood is predicted and an alert message is sent to the nearby locations. Map Reduce technique is used to give the exact reduced data from the large amount of input datasets.

Keywords: rapid floods; rainfall datasets; threshold value; map reduce

Introduction

Floods is one of the calamities that cannot be figured out. Heavy rains is the primary source of floods destroying the lives and the lands of the people around. Due to floods in certain areas the drainage system around becomes bad. Heavy rainfall causing floods in the local areas results a heavy loss that is responsible of the day to day life of people. Remote sensing and Geographical Information System methodologies guides us to provide a clear image of the areas where the floods are about to occur due to rainfall. These floods mainly occurs in the congested areas which further reduces the lifespan of the people situated around. Floods are also identified by observing the soil texture and the use of the land that causes floods. The satellite radar images and other additional information is also used to predict the occurrence of floods

Safety is an important factor during floods. Data must be collected and analyzed for the particular area and the various parameters are taken for the analysis purpose. Weighted Standardised Risk Factor that is retrieved is used to portray about the flood crossing the limit. Controlling the occurrence of the rapid floods must be taken into consideration. [1]

The analysis of drainage system is performed. The behaviour of the stream and their relationship with other streams are also analyzed. Remotely sensed data is used to portray about the stream that is buried underneath which is in connection with other drainage networks. Geographical Information System tool is additionally used to provide analyzing the data that helps us to find the areas where floods are likely to occur. [2]

The integration of remote sensing and GIS methods for sudden floods and to get rid of floods and additionally the analysis on rainfall is done to predict rapid floods. A database is constructed which contains Digital Elevation Model, geological maps to represent the occurrence of floods. The data at the input and the parameters are processed efficiently to obtain the exact information about the region. [3]

The floods that occur mainly in crowded areas causes heavy damage. There are problems in the physics based models in presenting the information about the floods without the absolute rainfall prediction. So therefore the prediction of floods are made possible by machine learning methods by demonstrating the flood results from the previous attempts. The selection method is practiced into the neural networking models to provide the occurrence of floods. [4]The sudden floods that occur rapidly which cause huge destruction to the surroundings. The risk map is generated for the rainfall based on certain parameters. Digital Elevation Model(DEM) is applied to Geographical Information System(GIS) to describe about the rainfall and the various parameters are calculated which helps to get rid of the floods that are about to occur in that particular region. [5]

Heavy watersheds that affects the day to day life of the people around due to the low pressure system. The WRF model with grid resolution of 9 km is used for investigation purpose. Heavy rainfall that occurs due to the breeze causing floods with heavy damage to the people and the lands around. [6]

Satellite radar images and additional information to predict about the areas that the floods are likely to occur at the tip level and the capability of calculating through

maps. The area that is flooded is integrated from SAR imagery with the topographical information in digital form from the GIS methodology. [7]

The status of the soil moisture the happening of the floods is determined. Remotely sensed surface soil moisture detection delivers the information about the floods. C- and X-brightness temperature facts from Advanced Microwave Scanning Radiometer (AMSR-E) is used to give the data about the floods with the help of remotely sensed surface soil moisture during floods. [8]

The sudden floods that occur regularly. GIS based technique is used for evaluating and geographically mapping the floods. This technique integrates the information about the topographic, geological and the datasets about the use of the land in GIS surroundings which makes use of the Curve Number method for designing the floods. [9]The wet spa model which is the mixture of altitude, soil and the data about the use of land that predicts floods with the parameters of the rainfall. The data of the soil is represented in GIS format and the use of the land is received from the remote sensed images. The obtained data is processed to determine the floods. [10]

The intensity of the rainfall that leads to floods at the urban areas. Here the data that is required for the structure quantity of storm sewer is extracted. The methods used to calculate the floods includes calculation based on the criteria in capacity of sewage and the estimation depending on the percent of the members who are ensembled. [11] Heavy rainfall that causes floods in rivers and the nearby areas that is in charge of regular day to day life. An approach is used to automatically view the floods in the particular area by using cyber surveillance systems and image process methods to receive the immediate flooding results[12]

Proposed Work

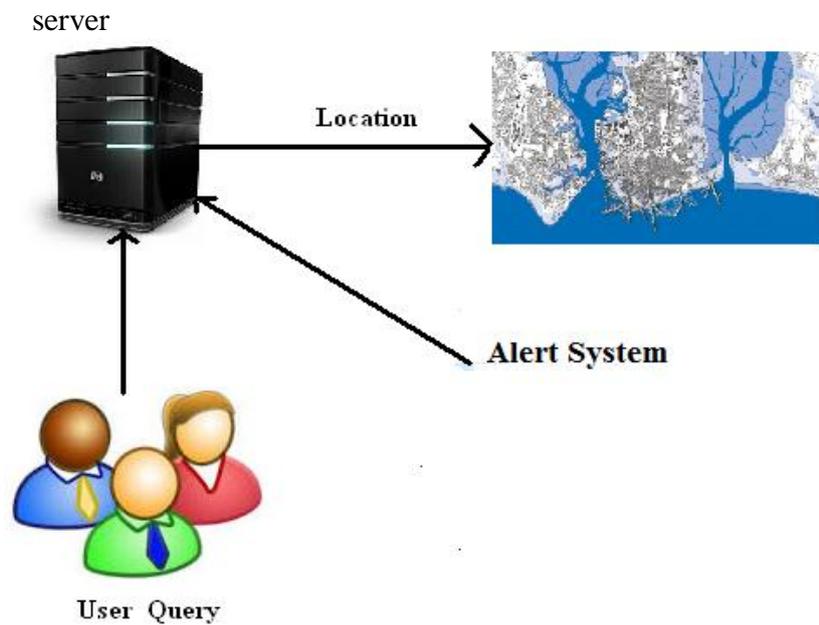
In the existing work there is no automatic system to predict the rapid floods in advance and no proper alert system is maintained. In the proposed work, the data must be collected and analyzed for particular area and various attributes such as the rainfall data that has occurred previous years, texture of the soil etc are taken for analysis purpose. Here analysis of risk is based on these attributes to check whether the flood may cross the limit or not. It has been a challenge in predicting the floods that cause damage i. e., mostly in the crowded areas. In this paper, we analyze the rainfall datasets based upon the threshold value. The strength of flood is measured and alert message is sent to nearby locations which helps us to get can get pre intimation of flood attack and is a full automated system.

Data and Methodology

The rainfall dataset is collected for the particular area where the analysis process must be performed to figure out whether there are possibilities of flood occurrence in that region. Analysis of risk is based on various attributes to determine whether the floods may cross the limit or not. Map Reduce technique is used to present the exact reduced data from the huge quantity of input datasets. This algorithm divides the input datasets into separate pieces of data which are further processed simultaneously to produce the desired reduced data.

Architecture

The user application is created by which the user is permitted to approach the data from the server. Initially, the user must be created and only then they are permitted to access the network. Once the user account is created they are permitted to enter their account to access the application. Depending on the request of the user, the server will give the response to the user. All the user detail are stored in server database. The User Interface Frame (UIF) is designed to communicate with the server through the network coding. The server will test the entire user information in their own database and verify them when they are required. Also the Server will store the complete information of the users in their database and establish the connection to interact with the Users. The Server will update the each User's activities in its database. The Server will verify each user before they access the Application which helps to prevent the Unauthorized User from accessing the Application. As the air level rises it becomes cool and will not be able to have the moisture content as it could when it was warmer. Eventually the air that rises to a certain point where it is completely saturated (i. e) it cannot hold any more water. Based on the user query it goes and fetch with database and bring information about the user query which is useful for detection and analyzing the rainfall. Once the flood is detected it gives an alert to the user so that they can easily rescue from the rain flood detection.



Conclusion

Rapid floods which are one of the irremediable calamities destroy the duration of life for many people who are situated around. The certain measures for safety must be considered for floods that mostly occurs in the heavily congested areas. The Map Reduce technique is well suited for yielding the accurate reduced data from the huge quantity of rainfall datasets which are given as input.

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