ANALYSIS AND PREDICTION OF EARTHQUAKE IMPACT USING DIFFERENT ML ALGORITHMS

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Abstract: As far as herbal disasters go, earthquake is one of the most dangerous. Seismological prediction algorithms have been proposed that utilise specialist structures (ES). It is our goal to identify and evaluate earthquake prediction methods, models, frameworks, and equipment based on unique parameters. We have carried out a systematic mapping research based on 70 peer-reviewed articles published between January 2010 and January 2020 that used ES for earthquake prediction Earthquake damage was once graded from one to five in this work. A previously obtained information set was used to predict the injury grade of a given building, which is associated with a Unique Identification String. In order to make the prediction, we conducted a survey of existing laptop mastering classifier algorithms. Logistic Regression, Naive Bayes Classifier, Random Forest Classifier, and K-Nearest Neighbors are some of the algorithms used in this work. Before, algorithms were compared to see which one had the best set of attributes.

Key words: Earthquake, Logistic Regression, Naive Bayes Classifier, Random Forest Classifier, and K-Nearest Neighbors

Introduction

An earthquake is a calamitous incidence that is hazardous to human pastime and has an undesirable have an have an effect on the environment. Earthquakes have typically brought on incalculable harm to constructions and residences and added on the deaths of lots and lots of human beings all thru the world. In order to limit the have an impact on of such an event, pretty a few national, international and transnational companies take a vary of disaster detection and prevention measures. Time and extent of the organization's sources are limiting factors, and company managers face a range of difficulties when it comes to the distribution of the resources. Leveraging the electrical energy of computing device gaining expertise of is a attainable choice to predict the diploma of damage that is performed to buildings post an earthquake. It can aid find out covered and hazardous constructions which helps to predict damage prone areas and consequently fending off loss of lifestyles and accidents ensuing from the aftershock of an earthquake, while at the same time as making rescue efforts efficient.

Statement of the Problem

In recent years, damage prediction due to earthquakes and other natural calamities has gained a lot of traction. Numerous approaches to earthquake damage prediction have been developed and refined as a result of the research being conducted in this area.

Objectives of the study

In addition to being harmful to human interests, earthquakes also have a negative impact on the environment. Millions of people have died as a result of earthquakes around the world, which have caused incalculable damage to structures and property. Diverse measures are taken by national, international, and transnational organisations to minimise the impact of such a disaster. Organisational managers face a number of challenges when it comes to the distribution of resources due to time and resource limitations.

Review of Literature

[1] Long Wang, Xiaoqing Wang, Aixia Dou, Dongliang Wang "Study on construction seismic damage loss assessment using RS and GIS" International Symposium on Electromagnetic compatibility, 2014.

In this paper, a quick assessment method for earthquake emergency is introduced. The method contains two different modes to obtain damage information from remote sensing images, one of which is based on damage index and the other adopts image classification. The damage index mode relies on traditional visual interpretation. After the damage index is given by experts, the ground intensity data can be gained, and then loss estimate parameters will be acquired from the experiential vulnerability matrix. The image classification mode is an application of digital image processing technique. Those loss estimate parameters can be calculated from the classification result which is sorted by the type of buildings and ranged by the damage degree. While the assessment models are introduced, the action of multi-resourced estimate data is explained to show how to find parameters in various data.

[2] Ramli Adnan. AbdMananSamad, ZainazlanMdZain, FazlinaAhmatRuslan "5 hours flood prediction modeling using improved NNARX structure: case study Kuala Lumpur", IEEE 4th International Conference on System Engineering and Technology, 2014.

Flood is one of natural disaster that has becomes major threat around the world. Flood disaster may damages people's life and property. Therefore, an accurate flood water level prediction is very important in flood modelling because it can give ample time to residents nearby flood location for evacuation purposes. However, due to the dynamics of flood water level itself is highly nonlinear, Artificial Neural Network (ANN) technique is a good modelling option because ANN was widely used to solve nonlinear problems. NNARX is one type of ANN model. Therefore, this paper proposed flood prediction modelling to overcome the nonlinearity problem and come out with advanced neural network technique for the prediction of flood water level 5 hours in advance. The input and output parameters used in this model are based on real-time data obtained from Department of Irrigation and Drainage Malaysia upon special request. Results showed that the Improved NARX model successfully predicted the flood water level 5 hours ahead of time and significant improvement can be observed from the original NNARX model.

[3] H Takata, H. Nakamura, T Hachino "On prediction of electric power damage by typhoons in each district in Kagoshima Prefecture via LRM and NN", SICE Annual Conference, 2004.

Kagoshima Prefecture has suffered from natural disasters by typhoons repeatedly. They hit power systems very badly and sometimes cut off electricity. To ensure the rapid restoration of electricity supply, one needs to predict the accurate amount of damage by typhoon in every region. This paper considers the damage prediction in each district in Kagoshima Prefecture by using a two-stages predictor. It consists of LRM (linear regression model) at the first stage and NN (neural networks) at the second stage. This predictor enables us to predict the number of damaged distribution poles and lines from weather forecasts of typhoon. Effectiveness of the approach is assured by applying it to the actual data.

Proposed Work

In addition to being harmful to human interests, earthquakes also have an unfavourable impact on the environment. Millions of people have died as a result of earthquakes around the world, which have caused incalculable damage to structures and property. Several national, international, and transnational organisations take a variety of disaster detection and prevention measures in order to minimise the impact of such an event. The organization's time and resources are limited, and managers face a number of challenges when it comes to allocating resources..

To predict the extent of damage caused by an earthquake, machine learning can be used. In addition to identifying safe and unsafe buildings, it can also help predict damage-prone areas, reducing the risk of fatalities and injuries from earthquake aftershocks, and facilitating rescue efforts.

Implementation

1. Data Collection: Collect sufficient data samples and legitimate software samples.

2. Data Pre-processing: Perform effective data processing on the sample and extract the features.

3. Train and Test Modelling: Split the data into train and test data Train will be used for trainging the model and Test data to check the performance

4. Modelling: Logistic, Naviebayes, Random Forest ,KNN and xgboost . Combine the training using machine learning algorithms and establish a classification model.

Results and Discussions

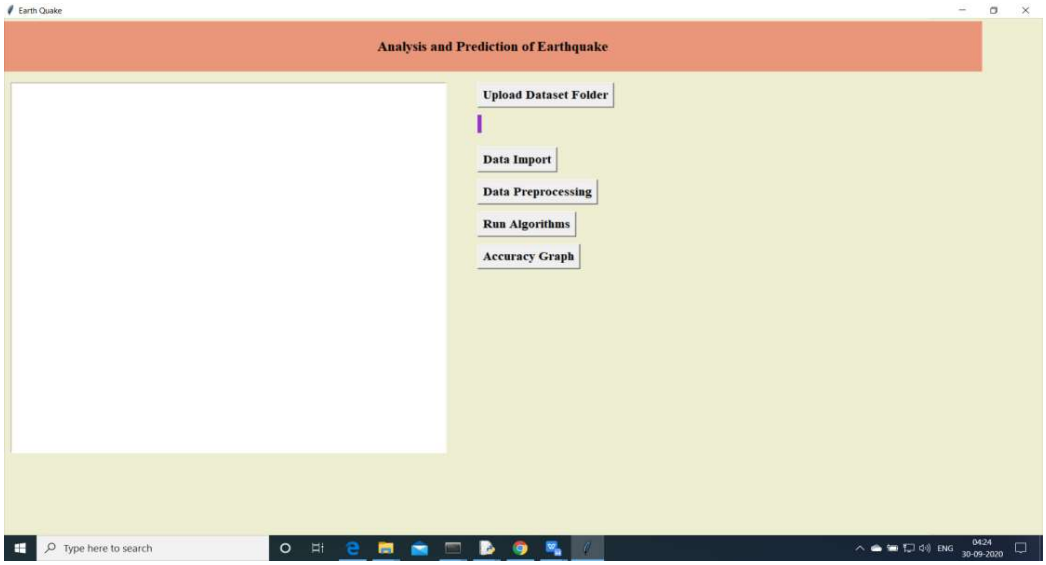
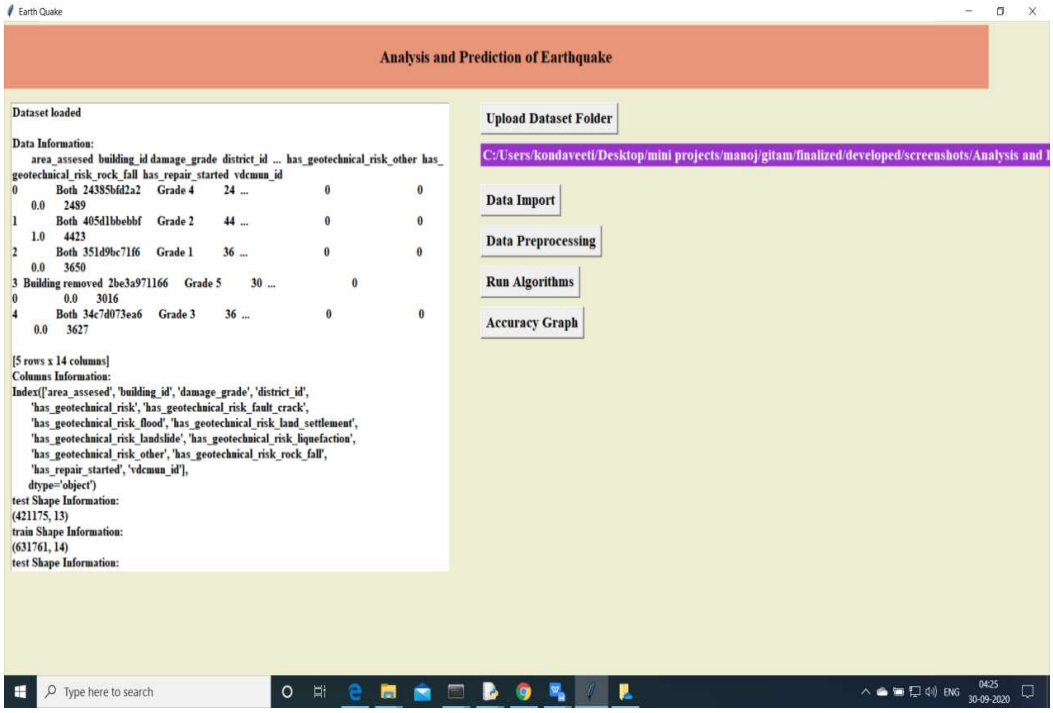


Fig 2:Now click on Upload data



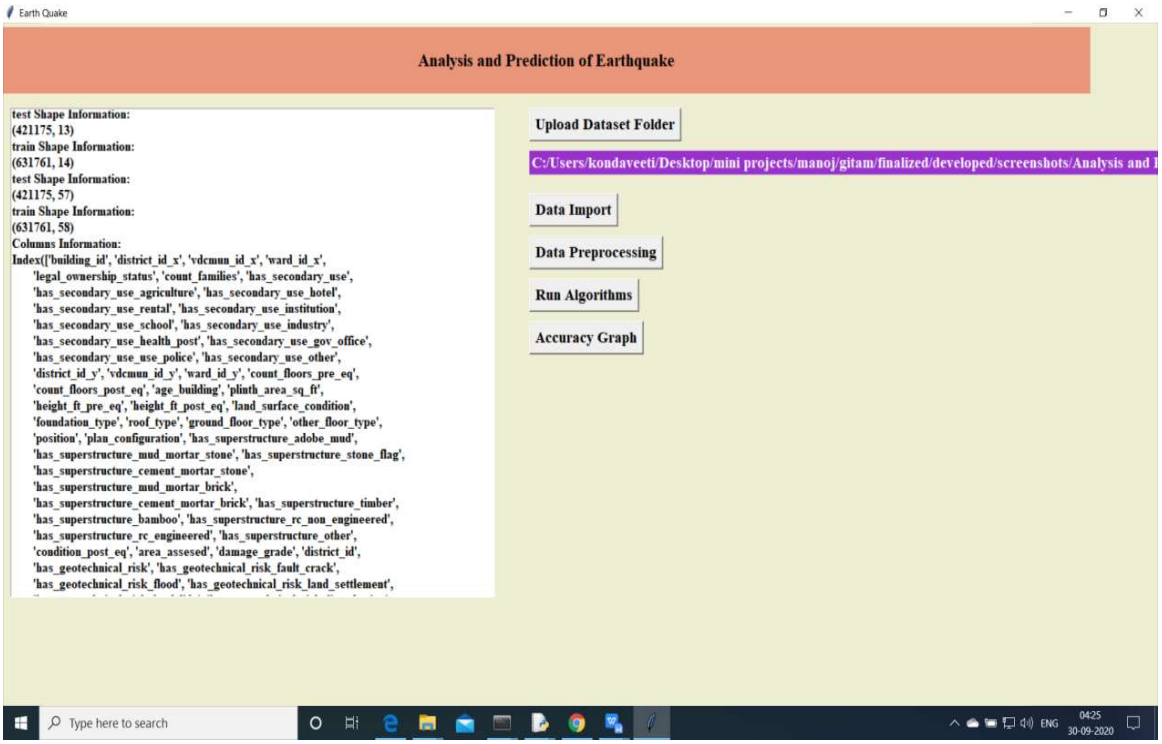


Fig 3: Upload the data and read the basic data information will be shown on the screen

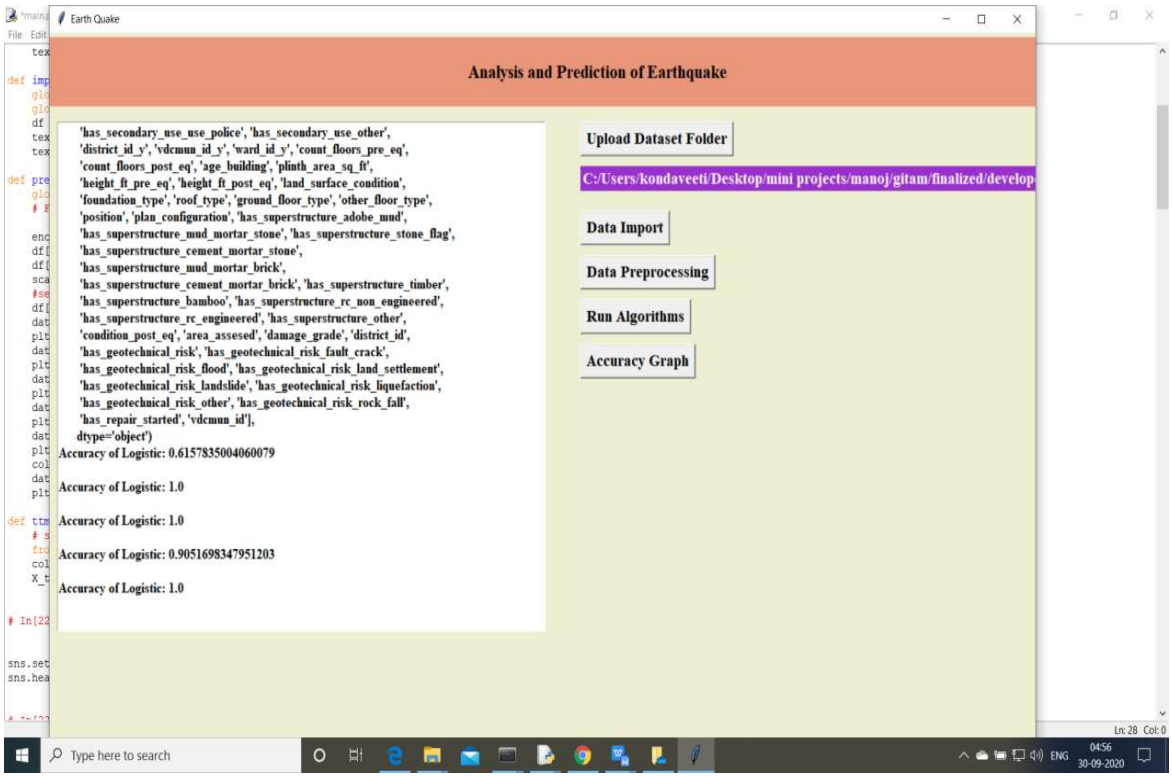


Fig 4: Now click on "Run Algorithms". Mentioned algorithms will be run on the data

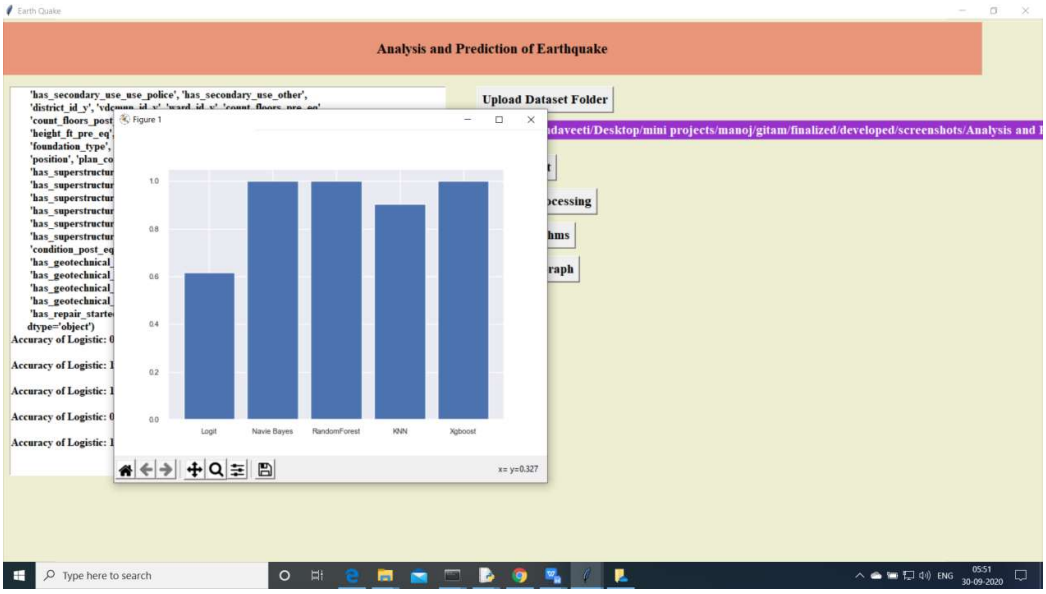


Fig 5: Accuracy Comparison for all the models

Conclusion

F1 ratings have been calculated for each of the four algorithms considered in this work, and the Random Forest Classifier algorithm is found to be the most accurate. earthquake damage prediction, K-Nearest Neighbors has been ranked as the second most popular algorithm for earthquake damage prediction. Reinforced concrete is found to be the most effective material for preventing damage to buildings during an earthquake, according to the study. In addition to earthquakes, electromagnetic pulses are also known to cause tremors beneath the Earth's crust.Reinforced concrete effectively shields electromagnetic pulses. Its tensile strength is low, so steel bars are embedded in the concrete. Earthquakes are no match for Reinforced Concrete's enormous strength. As a result, reinforced concrete is used extensively in structures with Earthquake Damage Grade 1 and minimally in structures with Earthquake Damage Grade 5. Additionally, this work can be used in areas where a comparable and applicable dataset is unavailable to predict damage caused by earthquakes.

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