

Earthquake Prediction Model using Python

1.1 Understanding the problem :

The problem is to develop an earthquake prediction model using a Kaggle dataset. The objective is to explore and understand the key features of earthquake data, visualize the data on a world map for a global overview, split the data for training and testing, and build a neural network model to predict earthquake magnitudes based on the given features.

2.1 Problem Definition :

2.2 Scope of the problem :

The primary aim is to conduct an in depth analysis in Earthquake dataset on the following factors.

2.2.1 Earthquake Occurs :

Natural calamities like earthquakes may also be brought on by human interaction with the environment. Earthquakes can be brought by building dams and storing large amounts of water. An earthquake can also be caused by bombings , nuclear tests as well as naturally due to Tectonic plates.

2.2.2 Earthquake Locations:

For our model to predict the earthquake it requires location of the occurrence of earthquake. This Location is given to our model in terms of longitude and latitude. The dataset, which we use contains the lat and long coordinates of existing earthquakes.

2.2.3 Earthquake Intensity :

The Intensity of the earthquake is determined based on amount of shaking on a particular location. If it's magnitude is more than 6.3 then it is considered as a heavy earthquake and if it's magnitude is 5.3 then it's an average one.

2.2.4 Earthquake Model :

In this project, we use a regression neural network that takes earthquake locations as input and provides output in the form of a map. It plots the earthquake intensity of the given location on the map.

3.1 Design Thinking :

Our approach to solve this problem involves a structured design thinking process, ensuring systematic and effective analysis of Earthquake prediction.

3.1.1 Data Collection:

For this project, we use a dataset from kaggle which is recommended for our problem statement. The link of the dataset is given below .

Dataset Link: <https://www.kaggle.com/datasets/usgs/earthquake-database>

3.1.2 Data Preprocessing :

As mentioned before, our model requires latitude and longitude as input and intensity , lat and long of earthquake for processing. The dataset given for us already contains latitude and longitude, so we are not modifying any fields of the dataset.

3.1.2 Exploratory Data Analysis (EDA):

Following data preprocessing, we will conduct an exploratory data analysis in order to gain more sense from the dataset's fields or characteristics. EDA helps us to identify patterns, outliers within the data, providing the base for further analysis.

3.1.2 Code Implementation :

Python will be used to code this problem. We will be using python libraries like folium, keras, numpy and pandas. Folium is used to deal with map related problems , numpy and pandas for processing the dataset and keras for developing our neural network.

3.1.3 Visualizations :

To effectively display our findings we will be displaying the output of our model in a map. For visualization we will be using folium library from python in order to display our output in map.

4.1 System Representation :

The process flow chart is displayed as a flow chart for better understanding of our model.

