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PHASE 3: DEVELOPMENT PART 1

Earthquake prediction model using python

INTRODUCTION:

Creating an earthquake prediction model using AI is a complex and on-going challenge. Earthquakes are the result of tectonic plate movements, and predicting them accurately is difficult due to their chaotic and unpredictable nature.

Project introduction:

It is well known that if a disaster has happened in a region, it is likely to happen there again. Some regions really have frequent earthquakes, but this is

just a comparative quantity compared to other regions. So, predicting the earthquake with Date and Time, Latitude and Longitude from previous data is not a trend which follows like other things, it is natural occurring.

Seismic Sensor Data:

AI models can analyse data from seismic sensors to detect patterns and anomalies that might indicate seismic activity.

Machine Learning Algorithms:

Algorithms like neural networks and support vector machines can be used to process seismic data and make predictions.

Historical Data Analysis:

Studying historical earthquake data can help identify trends and potential risk areas.

Geospatial Data:

AI can analyse geospatial data, such as fault lines and geological features, to predict earthquake-prone regions.

Early Warning Systems:

AI can be used to develop early warning systems that provide a few seconds to minutes of advance notice before an earthquake strikes.

Input 1:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

import os
print(os.listdir("../input"))
['database.csv']
```

Input 2:

```
data = pd.read_csv("../input/database.csv")
data.head()
```

Input 3:

```
data.columns
```

Output 3:

```
Index(['Date', 'Time', 'Latitude', 'Longitude', 'Type', 'Depth', 'Depth
Error',
       'Depth Seismic Stations', 'Magnitude', 'Magnitude Type',
       'Magnitude Error', 'Magnitude Seismic Stations', 'Azimuthal Gap',
       'Horizontal Distance', 'Horizontal Error', 'Root Mean Square',
'ID',
       'Source', 'Location Source', 'Magnitude Source', 'Status'],
      dtype='object')
```

Input 4:

```
data = data[['Date', 'Time', 'Latitude', 'Longitude', 'Depth',
'Magnitude']]
data.head()
```

Output 4:

	Date	Time	Latitude	Longitude	Depth	Magnitude
0	01/02/1965	13:44:18	19.246	145.616	131.6	6.0
1	01/04/1965	11:29:49	1.863	127.352	80.0	5.8
2	01/05/1965	18:05:58	-20.579	-173.972	20.0	6.2
3	01/08/1965	18:49:43	-59.076	-23.557	15.0	5.8
4	01/09/1965	13:32:50	11.938	126.427	15.0	5.8

Input 5:

```
import datetime
import time

timestamp = []
for d, t in zip(data['Date'], data['Time']):
    try:
        ts = datetime.datetime.strptime(d+' '+t, '%m/%d/%Y %H:%M:%S')
        timestamp.append(time.mktime(ts.timetuple()))
    except ValueError:
        # print('ValueError')
        timestamp.append('ValueError')
```

Input 6:

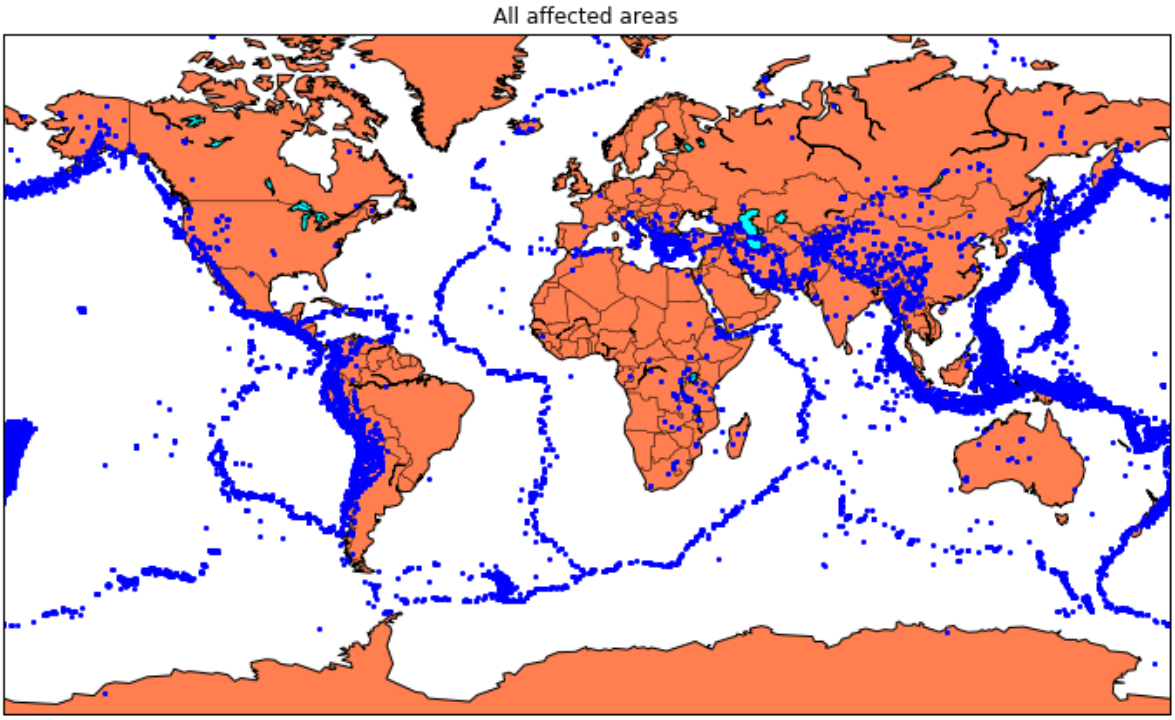
```
timeStamp = pd.Series(timestamp)
data['Timestamp'] = timeStamp.values
```

Input 7:

```
final_data = data.drop(['Date', 'Time'], axis=1)
final_data = final_data[final_data.Timestamp != 'ValueError']
final_data.head()
```

Output 7:

	Latitude	Longitude	Depth	Magnitude	Timestamp
0	19.246	145.616	131.6	6.0	-1.57631e+08
1	1.863	127.352	80.0	5.8	-1.57466e+08
2	-20.579	-173.972	20.0	6.2	-1.57356e+08
3	-59.076	-23.557	15.0	5.8	-1.57094e+08
4	11.938	126.427	15.0	5.8	-1.57026e+08



CONCLUSION:

It's important to note that while progress has been made in earthquake prediction, it's still an evolving field, and accurate long-term prediction remains a challenge. Public safety agencies and seismologists continue to work on improving these models to mitigate earthquake risks.