**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

College code: 2108

College Name: **Kings Engineering College**

Project Domain: Artificial intelligence

Project Title: Earthquake Prediction Model using Python

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***Building an Earthquake prediction model involves several steps, including loading and preprocessing the dataset.***

***Here's a step-by-step guide***

**Import Necessary Libraries:**

First, you'll need to import the necessary Python libraries for data manipulation, visualization, and modeling. Common libraries include pandas, numpy, matplotlib, and scikit-learn.

**PYTHON CODE:**

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

%matplotlib inline

**1. Install Required Libraries:**

Ensure you have the necessary libraries installed by running these commands in your terminal or Jupyter Notebook:

```bash

pip install numpy pandas scikit-learn matplotlib kaggle

```

**2. Kaggle API Setup:**

You need to set up your Kaggle API credentials. Follow the Kaggle API setup guide to generate an API key file and place it in your user directory.

**3. Download the Dataset:**

Download the dataset using the Kaggle API. You can use the following code:

```python

import kaggle

# Define your Kaggle API credentials

kaggle.api.authenticate(api\_key="your\_api\_key\_here")

# Download the dataset

kaggle.api.dataset\_download\_files(

dataset="andrewmvd/earthquakes",

path="./",

unzip=True

)

```

**4. Load and Preprocess the Data:**

df = pd.read\_csv('../input/earthquakes-for-ml-prediction-new-version/silver.csv')

df[:5]

**Output:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| latitude | longitude | depth | mag | Id | hour | date |
| 34.189835 | -117.58800 | 6.000 | 1.70 | ci12317071 | 0 | 1973-01-01 |
| -9.214000 | 150.63400 | 41.000 | 5.30 | usp0000001 | 3 | 1973-01-01 |
| 48.308666 | -122.11733 | 13.680 | 2.20 | uw10840118 | 4 | 1973-01-01 |
| -15.012000 | -173.95800 | 33.000 | 5.00 | usp0000002 | 5 | 1973-01-01 |
| 19.443666 | -155.36084 | 7.302 | 1.85 | hv19723167 | 7 | 1973-01-01 |

**5. Building an Earthquake Prediction Model:**

**Covert Date:**

df['date'] = pd.to\_datetime(df['date'])

Magnitude analysis:

df['mag\_rounded\_down'] = df['mag'].astype(int)

df.groupby('mag\_rounded\_down').agg({'id': 'count'})

**Output:**

|  |
| --- |
| id |
| mag\_rounded\_down |  |
| -9 | 706 |
| -5 | 1 |
| -2 | 11 |
| -1 | 2389 |
| 0 | 994070 |
| 1 | 1550998 |
| 2 | 642669 |
| 3 | 211629 |
| 4 | 372804 |
| 5 | 73634 |
| 6 | 6135 |
| 7 | 634 |
| 8 | 37 |
| 9 | 2 |

**Calculate energy :**

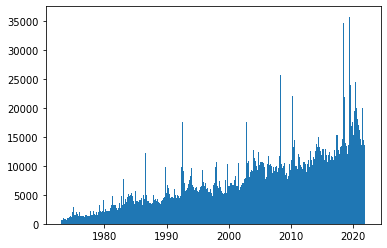
df['energy'] = 5.24

df['energy'] += 1.44 \* df['mag']

df['energy'] = np.power(10, df['energy'])

Count through years:

plt.hist(df['date'], bins = 500);



**6. Evaluate and Fine-Tune:**

Evaluate the model's performance and fine-tune it as needed. You may want to try different algorithms and hyperparameters to improve prediction accuracy.

**7. Deploy and Use the Model:**

Once your model is trained and evaluated, you can deploy it for earthquake prediction using new data.

Remember that predicting earthquakes is a complex and challenging task, and the above steps provide a basic framework. More sophisticated models and domain expertise may be necessary for accurate predictions.