

Earthquake Prediction Model Using Python

Phase 4:

Development Part 2

Aim:

Feature engineering, model training and evaluation of the given dataset.

Dataset:

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

Program:

Feature Engineering:

```
grid = GridSearchCV(estimator=model, param_grid=param_grid,  
n_jobs=-1)
```

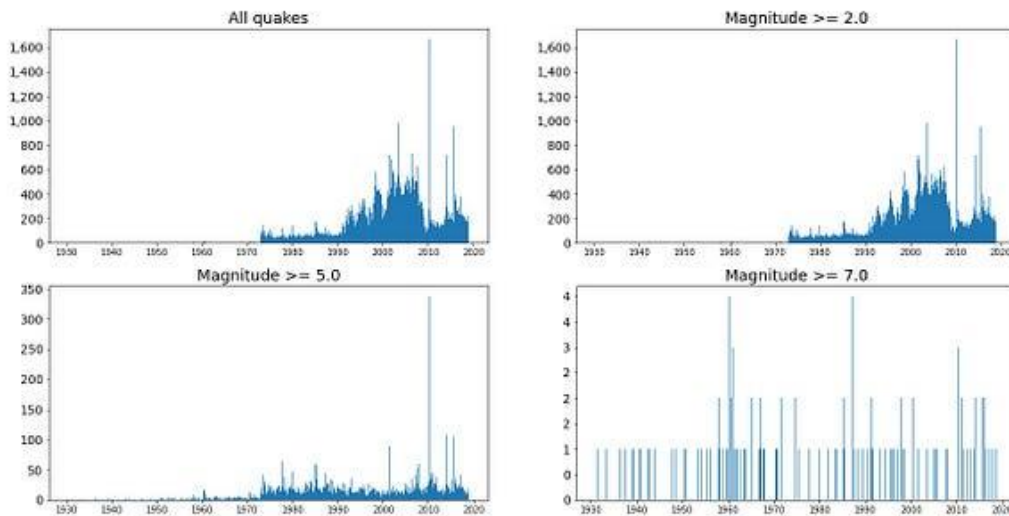
```
grid_result = grid.fit(X_train, y_train)
```

```
print("Best: %f using %s" %  
(grid_result.best_score_,  
grid_result.best_params_))
```

```
means = grid_result.cv_results_[&#39;mean_test_score&#39;]
```

```
stds = grid_result.cv_results_[&#39;std_test_score&#39;]
params = grid_result.cv_results_[&#39;params&#39;]
for mean, stdev, param in zip(means, stds, params):
    print(&quot;%f (%f) with: %r&quot; % (mean, stdev, param))
```

output:

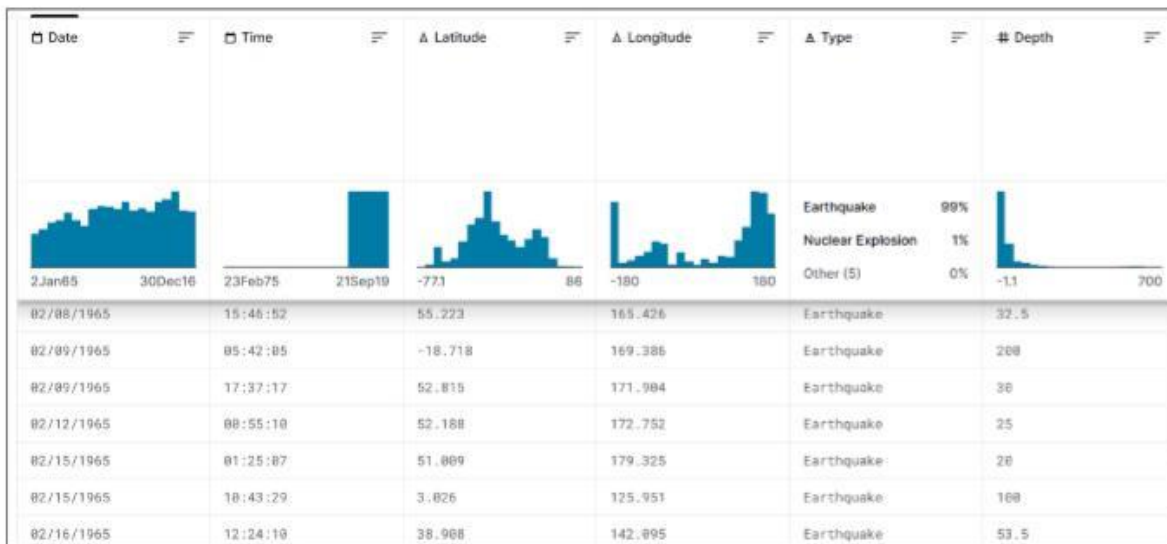


Program:

```
X = final_data[['Timestamp', 'Latitude', 'Longitude']]
y = final_data[['Magnitude', 'Depth']]
X_train,X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)
```

Output:

```
Index(['Date', 'Time', 'Latitude', 'Longitude', 'Type', 'Depth', 'Depth
Error',
'Deepth 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')
```

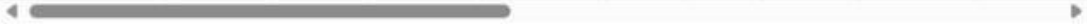


program:

```
reg = RandomForestRegressor(random_state=42)
reg.fit(X_train, y_train)
reg.predict(X_test)
```

output:

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



Magnitude Error	Magnitude Seismic Stations	Azimuthal Gap	Horizontal Distance	Horizontal Error	Root Mean Square	ID	Source	Location Source	Magnitude Source
NaN	NaN	NaN	NaN	NaN	NaN	ISCGEM860706	ISCGEM	ISCGEM	ISCGEM
NaN	NaN	NaN	NaN	NaN	NaN	ISCGEM860737	ISCGEM	ISCGEM	ISCGEM
NaN	NaN	NaN	NaN	NaN	NaN	ISCGEM860762	ISCGEM	ISCGEM	ISCGEM
NaN	NaN	NaN	NaN	NaN	NaN	ISCGEM860856	ISCGEM	ISCGEM	ISCGEM
NaN	NaN	NaN	NaN	NaN	NaN	ISCGEM860890	ISCGEM	ISCGEM	ISCGEM

