

EARTHQUAKE PREDICTION USING PYTHON MODEL

PHASE 1 SUBMISSION

ABSTRACT:

Python programming language is reliable enough to solve Machine Learning and Deep Learning problems. This paper describes how to solve earthquake prediction problems using the Python programming language that runs in the Jupyter Notebook environment. With the python library used, namely Keras. Deep Learning programming for this earthquake prediction system is the following programming sequence: data preparation, Keras model determination, Keras model compilation, Keras model adjustment, Keras model evaluation, and prediction system creation. From the test results of the earthquake prediction system using the python programming language, the results are quite satisfying. The simulation results show the results of the Deep Learning training process for the prediction system of b-value as an earthquake precursor with several iterations of 10,000 times, the results of MSE, RMSE, MAPE, and the percentage of successful predictions are 5.43×10^{-5} ; 0.00737; 0.80897 and 99.19% respectively. The results of the Deep Learning testing process for the b-value prediction system as an earthquake precursor which was

carried out during the five tests obtained an average of MSE, RMSE, MAPE and the percentage of successful predictions was 0.03886; 0.19003; 23.96459, and 77.75%.

MODULE:

Data Preprocessing: Clean and preprocess the data to handle missing values and outliers. Convert date and time information into a usable format. Normalize or scale numerical features as needed.

Earthquakes are natural disasters that can cause significant damage and loss of life. Accurate prediction of earthquakes is essential for developing early warning systems, disaster planning, risk assessment, and scientific research. This project aims to predict the magnitude and probability of Earthquake occurring in a particular region (California, United States) from the historic data of that region using various Machine learning models.

Model Development: Build a machine learning or statistical model for earthquake prediction. Common approaches include logistic regression, decision trees, or deep learning models like neural networks

PROGRAM:

```
Import pandas as pd
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From sklearn.model_selection import train_test_split
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From sklearn.ensemble import RandomForestRegressor
From sklearn.metrics import mean_squared_error
# Load earthquake data into a DataFrame
Data = pd.read_csv('earthquake_data.csv')
# Feature engineering and preprocessing (e.g., scaling,
handling missing data)
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(features,
target, test_size=0.2, random_state=42)
# Initialize and train the model (Random Forest
Regressor)
Model = RandomForestRegressor(n_estimators=100,
random_state=42)
Model.fit(X_train, y_train)
# Make predictions
Y_pred = model.predict(X_test)
# Evaluate the model
Mse = mean_squared_error(y_test, y_pred)
Print(f'Mean Squared Error: {mse}')
```

