

AIM : To implement linear regression on a time series data .

IMPLEMENTATION :

```
import pandas as pd

from sklearn.model_selection import train_test_split

from sklearn.linear_model import LinearRegression

import matplotlib.pyplot as plt
```

Load the dataset

```
file_path = "Electric_Production.csv"

df = pd.read_csv(file_path)
```

Convert DATE to a numerical format

```
df["DATE"] = pd.to_datetime(df["DATE"])

df["DATE_ORDINAL"] = df["DATE"].map(pd.Timestamp.toordinal)
```

Define features (X) and target variable (Y)

```
X = df[["DATE_ORDINAL"]]

y = df["IPG2211A2N"]
```

Split data into training and testing sets

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

Train the linear regression model

```
model = LinearRegression()
```

```
model.fit(X_train, y_train)
```

Model coefficients

```
print(f'Slope: {model.coef_[0]}')
```

```
print(f'Intercept: {model.intercept_}')
```

Make predictions

```
y_pred = model.predict(X_test)
```

Plot the regression line

```
plt.scatter(X_test, y_test, color='blue', label='Actual Data')
```

```
plt.plot(X_test, y_pred, color='red', linewidth=2, label='Regression Line')
```

```
plt.xlabel("Date (Ordinal)")
```

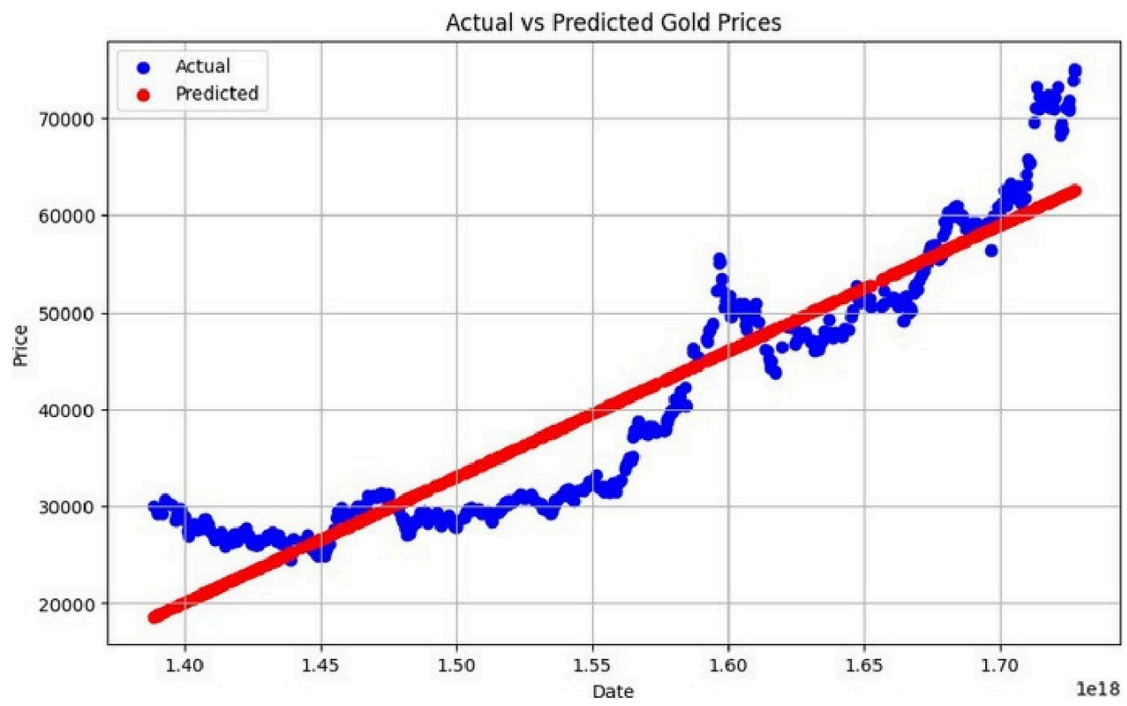
```
plt.ylabel("Electric Production")
```

```
plt.title("Simple Linear Regression on Electric Production Data")
```

```
plt.legend()
```

```
plt.show()
```

OUTPUT:



RESULT : Thus linear regression has been implemented on a time series data.