Project 4: Measure Energy Consumption

PHASE-3 PROJECT SUBMISSION

Team Member: Hariharaa Sudan S
Reg No: 311121205301

Objective:

The objective of this project is to create an automated system that measures energy consumption, analyzes the data, and provides visualizations for informed decision-making. This solution aims to enhance efficiency, accuracy, and ease of understanding in managing energy consumption across various sectors.

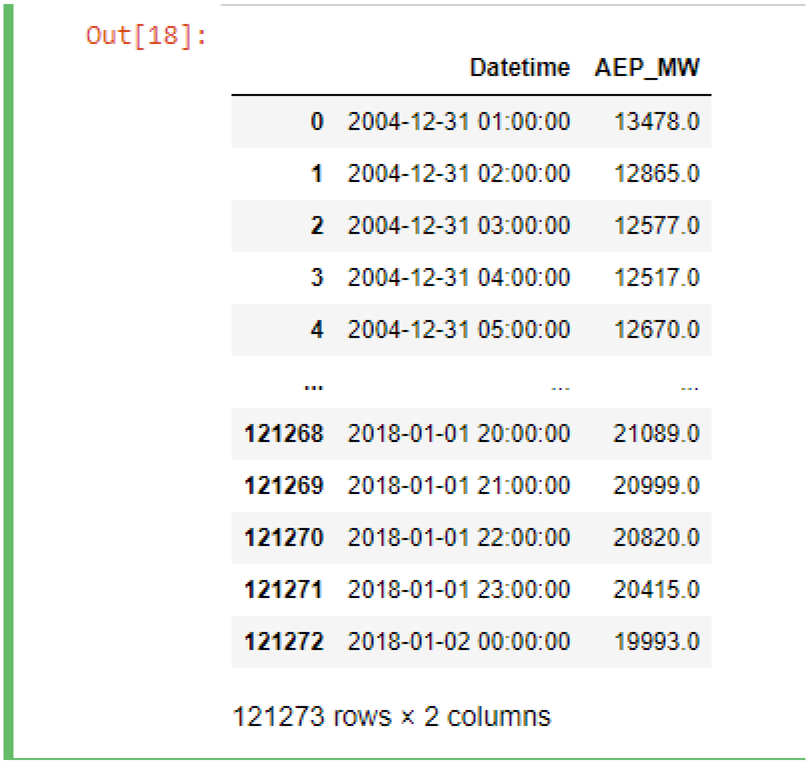
In this phase we concentrate on loading our dataset and removing duplicate values.Finally preprocessing the data generated.

Loading data:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler

# Load the AEP Hourly Energy Consumption dataset
data = pd.read_csv('AEP_hourly.csv')
data
```

Output:



Out[18]:

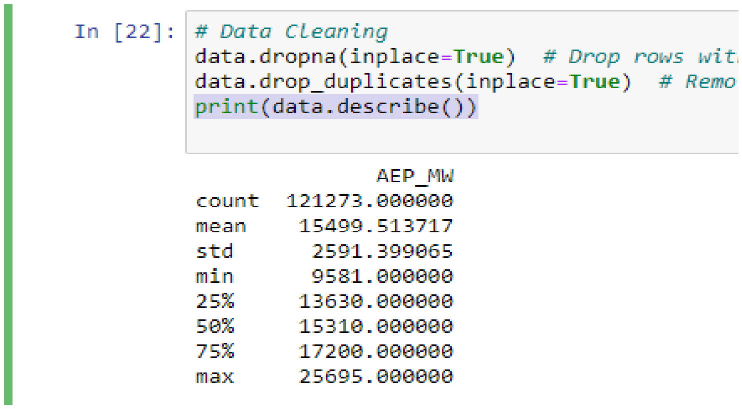
	Datetime	AEP_MW
0	2004-12-31 01:00:00	13478.0
1	2004-12-31 02:00:00	12865.0
2	2004-12-31 03:00:00	12577.0
3	2004-12-31 04:00:00	12517.0
4	2004-12-31 05:00:00	12670.0
...	...	...
121268	2018-01-01 20:00:00	21089.0
121269	2018-01-01 21:00:00	20999.0
121270	2018-01-01 22:00:00	20820.0
121271	2018-01-01 23:00:00	20415.0
121272	2018-01-02 00:00:00	19993.0

121273 rows × 2 columns

Removing Duplicates and Description:

```
# Data Cleaning
data.dropna(inplace=True)  # Drop rows with missing values
data.drop_duplicates(inplace=True)  # Remove duplicate rows, if any
print(data.describe())
```

Output:



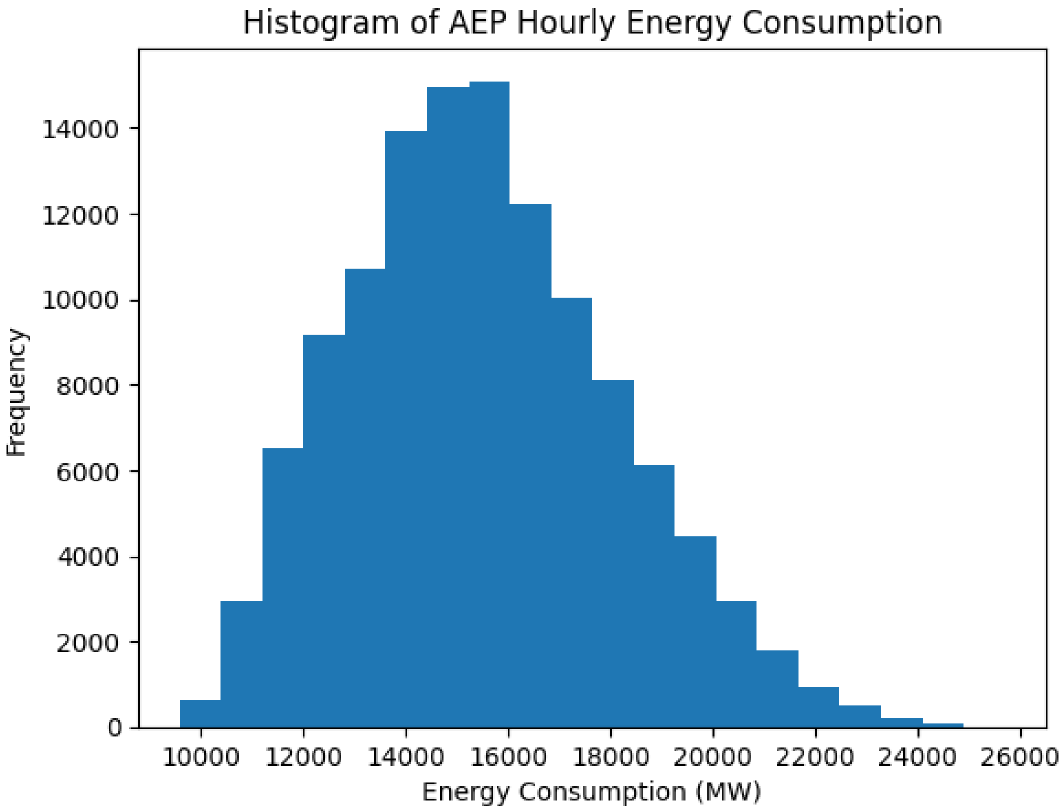
```
In [22]: # Data Cleaning
         data.dropna(inplace=True)  # Drop rows wit
         data.drop_duplicates(inplace=True)  # Remo
         print(data.describe())
```

```
                AEP_MW
count  121273.000000
mean    15499.513717
std      2591.399065
min      9581.000000
25%     13630.000000
50%     15310.000000
75%     17200.000000
max     25695.000000
```

Plotting:

```
plt.hist(data['AEP_MW'], bins=20)
plt.xlabel('Energy Consumption (MW)')
plt.ylabel('Frequency')
plt.title('Histogram of AEP Hourly Energy Consumption')
plt.show()
```

Output:



Data Preprocessing:

```
# Data Splitting (if for machine learning)
X = data.drop('AEP_MW', axis=1)  # Assuming 'AEP_MW' is the target variable
y = data['AEP_MW']
```

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

# Drop non-numeric columns before scaling
non_numeric_columns = ['Datetime']  # Add the names of non-numeric columns here
X_train = X_train.drop(columns=non_numeric_columns)
X_test = X_test.drop(columns=non_numeric_columns)

# Convert DataFrames to NumPy arrays
X_train = X_train.to_numpy()
X_test = X_test.to_numpy()

# Normalization/Scaling (if needed)
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# Save Preprocessed Data
data.to_csv('preprocessed_AEP_hourly.csv', index=False)
```

Conclusion:

Finally,We are saving all the preprocessed data into a new csv file preprocessed_AEP_hourly.csv. This is the file that we are going to use for the future analysis as we have removed all the duplicate values.