AI_LAB_24-Sept-2024

October 25, 2024

#Provide an example of a simple Python program that uses both NumPy and Pandas to generate a dataset, create a DataFrame, perform basic operations like adding a new column, sorting, filtering, and calculating statistics?

[1]:
```
import numpy as np
import pandas as pd
```

[2]:
```
np.random.seed(0)
data = {
    'ID': np.arange(1, 11),
    'Age': np.random.randint(18, 60, size=10),
    'Score': np.random.randint(50, 101, size=10)
}
```

[3]:
```
df = pd.DataFrame(data)
```

[4]:
```
df
```

[4]:

	ID	Age	Score
0	1	18	74
1	2	21	74
2	3	21	62
3	4	57	51
4	5	27	88
5	6	37	89
6	7	39	73
7	8	54	96
8	9	41	74
9	10	24	67

[5]:
```
df['Category'] = np.where(df['Score'] >= 75, 'High', 'Low')
```

[6]:
```
df
```

[6]:

	ID	Age	Score	Category
0	1	18	74	Low
1	2	21	74	Low
2	3	21	62	Low

```
3   4   57      51       Low
4   5   27      88      High
5   6   37      89      High
6   7   39      73       Low
7   8   54      96      High
8   9   41      74       Low
9  10   24      67       Low
```

[7]:
```
df_sorted = df.sort_values(by='Age')
```

[8]:
```
df_sorted
```

[8]:
```
    ID  Age  Score Category
0    1   18     74      Low
1    2   21     74      Low
2    3   21     62      Low
9   10   24     67      Low
4    5   27     88     High
5    6   37     89     High
6    7   39     73      Low
8    9   41     74      Low
7    8   54     96     High
3    4   57     51      Low
```

[9]:
```
df_high_category = df[df['Category'] == 'High']
```

[10]:
```
df_high_category
```

[10]:
```
    ID  Age  Score Category
4    5   27     88     High
5    6   37     89     High
7    8   54     96     High
```

[11]:
```
age_mean = df['Age'].mean()
score_mean = df['Score'].mean()
age_max = df['Age'].max()
score_min = df['Score'].min()
```

[12]:
```
print("\nStatistics:")
print(f"Mean Age: {age_mean:.2f}")
print(f"Mean Score: {score_mean:.2f}")
print(f"Max Age: {age_max}")
print(f"Min Score: {score_min}")
```

```
Statistics:
Mean Age: 33.90
Mean Score: 74.80
```

```
Max Age: 57
Min Score: 51
```

[ ]: