Active Product Sales Analysis using Matplotlib in Python

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Every modern company that engages in online sales or maintains a specialized e-commerce website now aims to maximize its throughput in order to determine what precisely their clients need in order to increase their chances of sales. The huge datasets handed to us can be properly analyzed to find out what time of day has the highest user activity in terms of transactions.

In this post, We will use Python Pandas and Matplotlib to analyze the insight of the dataset. We can use the column **Transaction Date,** in this case, to glean useful insights on the busiest time (hour) of the day. You can access the entire dataset here.

Stepwise Implementation

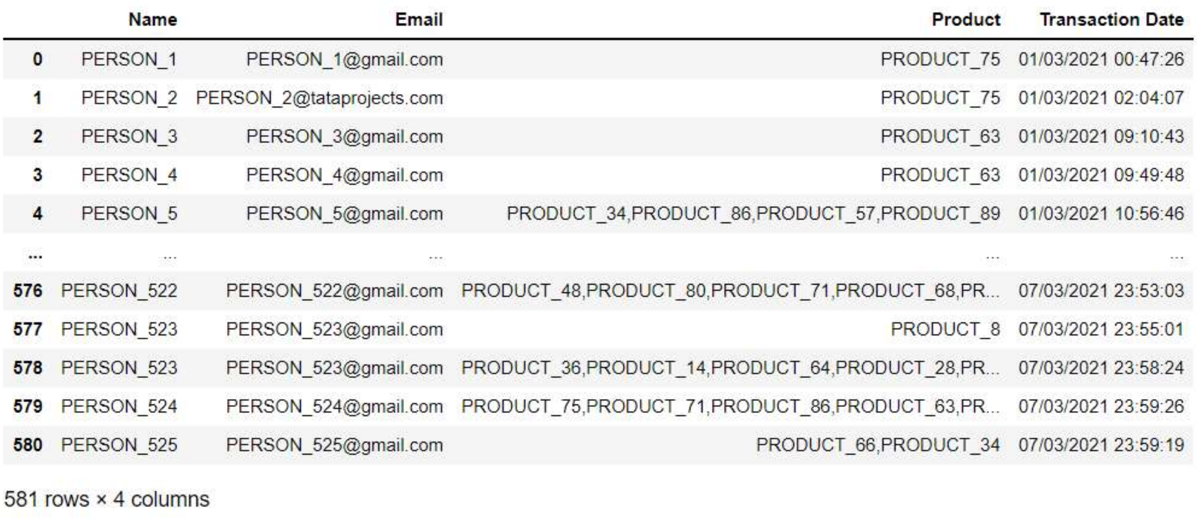
Step 1:

First, We need to create a Dataframe of the dataset, and even before that certain libraries have to be imported.

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

Order_Details = pd.read_csv('Order_details(masked).csv')
```

Output:



	Name	Email	Product	Transaction Date
0	PERSON_1	PERSON_1@gmail.com	PRODUCT_75	01/03/2021 00:47:26
1	PERSON_2	PERSON_2@tataprojects.com	PRODUCT_75	01/03/2021 02:04:07
2	PERSON_3	PERSON_3@gmail.com	PRODUCT_63	01/03/2021 09:10:43
3	PERSON_4	PERSON_4@gmail.com	PRODUCT_63	01/03/2021 09:49:48
4	PERSON_5	PERSON_5@gmail.com	PRODUCT_34,PRODUCT_86,PRODUCT_57,PRODUCT_89	01/03/2021 10:56:46
...	...	...	...	...
576	PERSON_522	PERSON_522@gmail.com	PRODUCT_48,PRODUCT_80,PRODUCT_71,PRODUCT_68,PR...	07/03/2021 23:53:03
577	PERSON_523	PERSON_523@gmail.com	PRODUCT_8	07/03/2021 23:55:01
578	PERSON_523	PERSON_523@gmail.com	PRODUCT_36,PRODUCT_14,PRODUCT_64,PRODUCT_28,PR...	07/03/2021 23:58:24
579	PERSON_524	PERSON_524@gmail.com	PRODUCT_75,PRODUCT_71,PRODUCT_86,PRODUCT_63,PR...	07/03/2021 23:59:26
580	PERSON_525	PERSON_525@gmail.com	PRODUCT_66,PRODUCT_34	07/03/2021 23:59:19

581 rows × 4 columns

Step 2:

Create a new column called Time that has the DateTime format after converting the Transaction Date column into it. The DateTime format, which has the pattern **YYYY-MM-DD HH:MM:SS**, can be customized however you choose. Here we're more interested in obtaining hours, so we can have an Hour column by using an in-built function for the same:

```
# here we have taken Transaction
# date column
Order_Details['Time'] = pd.to_datetime(Order_Details['Transaction Date'])

# After that we extracted hour
# from Transaction date column
Order_Details['Hour'] = (Order_Details['Time']).dt.hour
```

Step 3:

We then require the "n" busiest hours. For that, we get the first "n" entries in a list containing the occurrence rates of the hours when the transaction took place. To further simplify the manipulation of the provided data in Python, we may utilize value counts for frequencies and tolist() to convert to list format. We are also compiling a list of the associated index values.

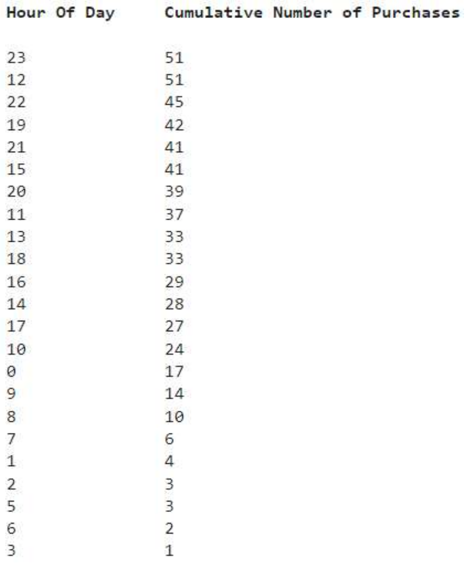
```
# n =24 in this case, can be modified
# as per need to see top 'n' busiest hours
timemost1 = Order_Details['Hour'].value_counts().index.tolist()[:24]
```

Step 4:

Finally, we stack the indices (hour) and frequencies together to yield the final result.

```
tmost = np.column_stack((timemost1,timemost2))

print(" Hour Of Day" + "\t" + "Cumulative Number of Purchases \n")
print('\n'.join('\t\t'.join(map(str, row)) for row in tmost))
```



```
Hour Of Day     Cumulative Number of Purchases

23              51
12              51
22              45
19              42
21              41
15              41
20              39
11              37
13              33
18              33
16              29
14              28
17              27
10              24
0               17
9               14
8               10
7               6
1               4
2               3
5               3
6               2
3               1
```

Step 5:

Before we can create an appropriate data visualization, we must make the list slightly more customizable. To do so, we gather the hourly frequencies and perform the following tasks:

```
timemost = Order_Details['Hour'].value_counts()
timemost1 = []

for i in range(0,23):
    timemost1.append(i)
    
timemost2 = timemost.sort_index()
timemost2.tolist()
timemost2 = pd.DataFrame(timemost2)
```

Step 6:

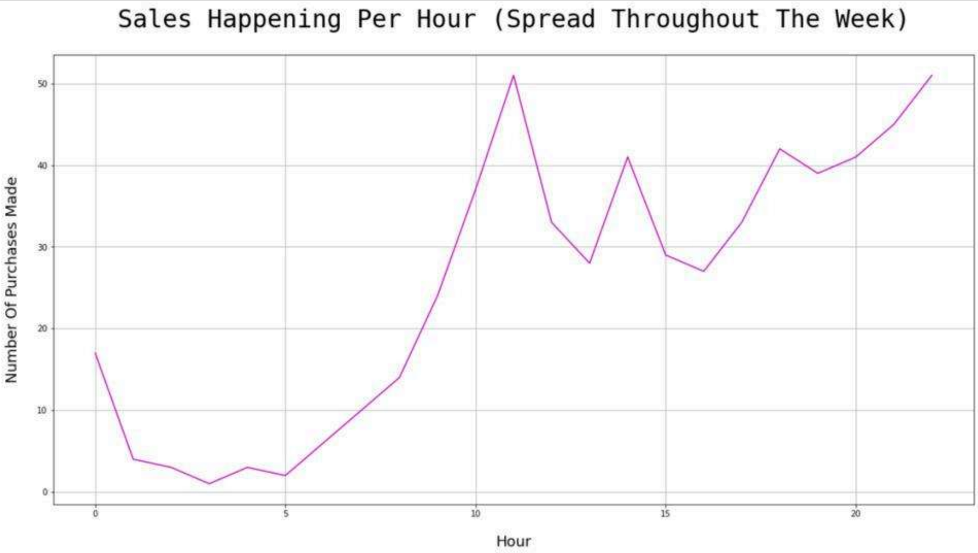
For data visualization, we will proceed with Matplotlib for better libraries. But, It is up to you to choose any of the pre-existing libraries like Matplotlib, Ggplot, Seaborn, etc., to plot the data graphically.

The commands written below are mainly to ensure that X-axis takes up the values of hours and Y-axis takes up the importance of the number of transactions affected, and also various other aspects of a line chart, including color, font, etc., to name a few.

```
plt.figure(figsize=(20, 10))

plt.title('Sales Happening Per Hour (Spread Throughout The Week)',
          fontdict={'fontname': 'monospace', 'fontsize': 30}, y=1.05)

plt.ylabel("Number Of Purchases Made", fontsize=18, labelpad=20)
plt.xlabel("Hour", fontsize=18, labelpad=20)
plt.plot(timemost1, timemost2, color='m')
plt.grid()
plt.show()
```



The results are indicative of how sales typically peak in late evening hours prominently, and this data can be incorporated into business decisions to promote a product during that time specifically.

Get the complete notebook link here

Colab Link : click here.

Dataset Link : click here.

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