



Google Ads Hourly Analysis

Date : 09/06/2023

Project Start Date - End Date	<ul style="list-style-type: none">● Start Date – 07 -06 -2023● End Date – 09 -06 2023
Objectives	<ul style="list-style-type: none">● To analyses how many people who clicked on the advertisement enrolled in our course● General exploratory analyses● General descriptive analyses
Milestones accomplished the week of Start Date - End Date:	<ul style="list-style-type: none">● Descriptive analyses● Exploratory analyses● Prediction of data with respect to term

Contact Information

This project is performed for educational purpose of under the guidance of Siddhivinayak Sir .

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Project Abstract

The given dataset analyses marketing activities on google ad for EdTech company. This dataset provides valuable insights into the company's advertising campaigns, focusing on impressions, clicks, and sales units.

- Impressions refer to the visibility of advertisements served through Google Ads. Through this we can understand our reach to the potential customer.
- Clicks, on the other hand, indicate the number of interested candidates who clicked on the ads and potentially visited our website
- sales units represent the number of students enrolled in a course.

The dataset consists of 4 columns followed by 48 rows. In the first column i.e., named Sr. No. indicates the time slot which is of period of each 30 minutes throughout the day.

Descriptive analysis-

As we have analyzed the data, the average values of impressions, clicks, sales unit are as follows:

- Average Impressions: 45,971.18
Impressions represent the visibility of advertisements served through Google Ads. With an average of 45,971.18 impressions, it suggests that our ads have a significant reach and are being viewed by a substantial number of users.
- Average Clicks: 1,756.47
Clicks refer to the number of interested candidates who clicked on the ads and potentially visited the company's website. The average of 1,756.47 clicks indicates a moderate level of user engagement with the advertisements.
- Average Sales Units: 12.29

Sales units represent the number of students enrolled in a course as a result of the marketing campaigns. With an average of 12.29 sales units, it implies that the marketing efforts are resulting in a moderate number of enrolments. It's important to note that sales units depend on various factors beyond clicks and impressions, such as the effectiveness of the website, pricing, and overall conversion strategies.

To analyze the further data, we utilized the linear regression method to examine the relationship between clicks and impressions in our advertisement data. Our analysis revealed a distinct pattern in sales based on the time of day. Specifically, sales were found to be at their peak between 10:30 PM and 12:00 AM, gradually decreasing as it approached the early morning hours of 1-4 AM. Following this decline, sales began to rise again during the day, but not as effectively as during the early midnight period. One possible explanation for the high sales during the late evening and midnight hours is that individuals may be more relaxed and have more leisure time during these periods. This relaxation could lead to increased online browsing and purchasing behavior.

Insights

As we can see that the impressions, clicks reaches its peak at around 10pm to 12pm followed by the decline between 1am to 5am. The impressions again starts to increase gradually at a constant rate. In the afternoon the rate slightly increases for a period of time. Again right before it strikes the midnight the impressions and clicks takes a height resulting in increased number of sales unit.

The average impressions made throughout the day- 45981.187500

The average Clicks- 1756.474554

The average Sales Unit- 12.295322

- The behavior of impressions with respect to time shows a similar trend to sales unit and clicks. Impressions, which represent the number of times an advertisement is displayed, tend to be at their peak between 10:30 PM and 12:00 AM. They gradually decline during the early morning hours of 3-4 AM and then start to rise again throughout the day, One possible reason for the peak in impressions during the late evening and midnight hours is the increased online activity during that time. Many individuals may be actively browsing websites or social media platforms, leading to more exposure to advertisements. Moreover, during this period, people may have more leisure time and be more likely to engage with online content, resulting in a higher number of impressions.
- Similar to sales unit and impressions, clicks also exhibit a comparable behavior with respect to time One possible reason for the peak in clicks during the late evening and midnight hours is that individuals may have more free time and are more likely to engage with online content after coming home from work.

During this period, people may be in a relaxed state of mind, actively browsing the internet, and therefore more inclined to click on advertisements. The reduced engagement during work hours could contribute to a decline in clicks

- The peak in sales unit during the late evening and midnight hours can be attributed to several factors. Firstly, individuals may have more time available after coming home from work, whereas during work hours, individuals may be more focused on their professional tasks, leading to a decline in engagement and fewer sales.

Google Ads Hourly Analysis

Importing libraries,

```
: import pandas as pd
import matplotlib.pyplot as plt
```

```
: file=pd.read_excel("C:/Users/vaish/OneDrive/Desktop/Marketing Data Google Ads 6th june.xlsx")
```

```
: file.head()
```

```
:
```

	Sr no	Impressions	Clicks	Sales Unit
0	00:00:00	258647	7759.41	54.31587
1	00:30:00	219974	8798.96	61.59272
2	01:00:00	1096	10.96	0.07672
3	01:30:00	1481	14.81	0.10367
4	02:00:00	1794	17.94	0.12558

```
: # DATA PREPROCESSING
```

```
dataset=file.drop("Sr no",axis=1)
```

```
dataset
```

	Impressions	Clicks	Sales Unit
0	258647	7759.4100	54.315870
1	219974	8798.9600	61.592720
2	1096	10.9600	0.076720
3	1481	14.8100	0.103670
4	1794	17.9400	0.125580
5	2156	21.5600	0.150920

```
# DESCRIPTIVE ANALYSIS
```

```
dataset.sum()
```

```
Impressions    2.207097e+06
Clicks         8.431078e+04
Sales Unit     5.901755e+02
dtype: float64
```

```
#calculating the average value
```

```
dataset.mean()
```

```
Impressions    45981.187500
Clicks         1756.474554
Sales Unit     12.295322
dtype: float64
```

```
: # finding null values
```

```
: dataset.isnull().sum()
```

```
: Impressions      0  
Clicks            0  
Sales Unit        0  
dtype: int64
```

```
: x=dataset.iloc[:,1:-1].values  
y=dataset.iloc[:, -1].values
```

```
: x
```

```
: array([[7.7594100e+03],  
        [8.7989600e+03],  
        [1.0960000e+01],  
        [1.4810000e+01],  
        [1.7940000e+01],  
        [2.1560000e+01],
```

```
: y
```

```
: array([5.43158700e+01, 6.15927200e+01, 7.67200000e-02, 1.03670000e-01,  
        1.25580000e-01, 1.50920000e-01, 2.89100000e-02, 1.00800000e-02,  
        9.73000000e-03, 1.33700000e-02, 2.77200000e-02, 1.91800000e-02,  
        2.20640000e-01, 2.16230000e-01, 1.49450000e-01, 2.58972000e+00,  
        3.74703000e+00, 3.12154500e+00, 4.78119600e+00, 3.28888000e+00,  
        1.53538000e+00, 2.93731200e+00, 3.40956000e-01, 2.87910000e+00,
```

```
: #LINEAR REGRESSION
```

```
: # Splitting the dataset into training set and test set
```

```
: from sklearn.model_selection import train_test_split  
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size = 0.25, random_state = 0)
```

```

: from sklearn.linear_model import LinearRegression

: lr=LinearRegression()

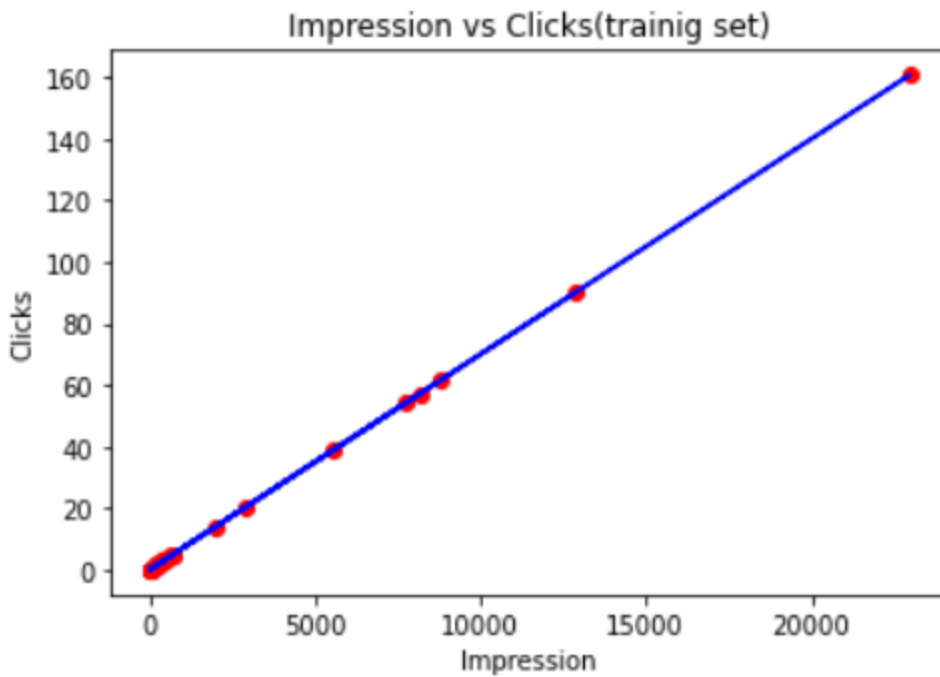
: lr.fit(x_train,y_train) #fit function is used to train dataset
: LinearRegression()

: y_pred=lr.predict(x_test)

: y_pred
array([3.7506000e+00, 1.2558000e-01, 8.6796192e+00, 3.7506000e-01,
       4.1313300e+00, 1.3864550e+01, 4.0404210e+00, 7.9058000e-01,
       1.0080000e-02, 2.7720000e-02, 1.9180000e-02, 3.0956100e+00])

: plt.scatter(x_train, y_train, color='red')
: plt.plot(x_train, lr.predict(x_train), color='blue')
: plt.title('Impression vs Clicks(trainig set)')
: plt.xlabel('Impression')
: plt.ylabel('Clicks')
: plt.show()

```

```
print(x_train)
```

```
[4.2282400e+02]
[2.0247200e+03]
[2.2969752e+04]
[1.0960000e+01]
[1.2871560e+04]
```

```
print(y_train)
```

```
[2.95976800e+00 1.41730400e+01 1.60788264e+02 7.67200000e-02
9.01009200e+01 4.78119600e+00 2.58972000e+00 2.04352400e+01
3.40956000e-01 3.74703000e+00 1.11839000e+00 1.53538000e+00
1.37648000e+00 9.73000000e-03 2.16230000e-01 4.73342100e+00
1.50920000e-01 3.12154500e+00 2.59618800e+00 1.49450000e-01]
```

```
: print(x_test)
```

```
[[5.3580000e+02]  
 [1.7940000e+01]  
 [1.2399456e+03]  
 [5.3580000e+01]  
 [5.9019000e+02]  
 ]
```

```
: print(y_test)
```

```
[3.7506000e+00 1.2558000e-01 8.6796192e+00 3.7506000e-01 4.1313300e+00  
 1.3864550e+01 4.0404210e+00 7.9058000e-01 1.0080000e-02 2.7720000e-02  
 1.9180000e-02 3.0956100e+00]
```

```
: #conclusion
```

```
: # from the graph we can conclude that the linear regression is giving perfect accuracy for advertisement data
```

Data Visualisation

Sheet 1

