

Iphone Sales Analysis Project

Importing Libraries-

```
In [48]: pip install statsmodels
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: statsmodels in c:\programdata\anaconda3\lib\site-packages (0.14.0)
Requirement already satisfied: numpy>=1.18 in c:\programdata\anaconda3\lib\site-packages (from statsmodels) (1.24.3)
Requirement already satisfied: scipy!=1.9.2,>=1.4 in c:\programdata\anaconda3\lib\site-packages (from statsmodels) (1.11.1)
Requirement already satisfied: pandas>=1.0 in c:\programdata\anaconda3\lib\site-packages (from statsmodels) (2.0.3)
Requirement already satisfied: patsy>=0.5.2 in c:\programdata\anaconda3\lib\site-packages (from statsmodels) (0.5.3)
Requirement already satisfied: packaging>=21.3 in c:\programdata\anaconda3\lib\site-packages (from statsmodels) (23.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\programdata\anaconda3\lib\site-packages (from pandas>=1.0->statsmodels) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\programdata\anaconda3\lib\site-packages (from pandas>=1.0->statsmodels) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\programdata\anaconda3\lib\site-packages (from pandas>=1.0->statsmodels) (2023.3)
Requirement already satisfied: six in c:\programdata\anaconda3\lib\site-packages (from patsy>=0.5.2->statsmodels) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

```
In [31]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import plotly.graph_objects as go
import plotly.express as px
```

Loading Dataset-

```
In [6]: data = pd.read_csv("Iphone_sales.csv")
data.head()
```

Out[6]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Upc	Star Rating	Ram
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOBEXRGV7EHHTGUH	4.6	2 GB
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVAC6TJT4F	4.6	2 GB
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVGETABXWZ	4.6	2 GB
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBEXRGVMZWUHCBA	4.5	2 GB
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	MOBEXRGVPK7PFEJZ	4.5	2 GB

In [8]: `data.columns`

```
Out[8]: Index(['Product Name', 'Product URL', 'Brand', 'Sale Price', 'Mrp',
       'Discount Percentage', 'Number Of Ratings', 'Number Of Reviews', 'Upc',
       'Star Rating', 'Ram'],
      dtype='object')
```

Checking Null Values-

In [9]: `data.isnull().sum()`

```
Out[9]: Product Name      0  
Product URL       0  
Brand             0  
Sale Price        0  
Mrp              0  
Discount Percentage 0  
Number Of Ratings 0  
Number Of Reviews 0  
Upc              0  
Star Rating       0  
Ram               0  
dtype: int64
```

Disciptive Analysis-

```
In [10]: data.describe()
```

	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Star Rating
count	62.000000	62.000000	62.000000	62.000000	62.000000	62.000000
mean	80073.887097	88058.064516	9.951613	22420.403226	1861.677419	4.575806
std	34310.446132	34728.825597	7.608079	33768.589550	2855.883830	0.059190
min	29999.000000	39900.000000	0.000000	542.000000	42.000000	4.500000
25%	49900.000000	54900.000000	6.000000	740.000000	64.000000	4.500000
50%	75900.000000	79900.000000	10.000000	2101.000000	180.000000	4.600000
75%	117100.000000	120950.000000	14.000000	43470.000000	3331.000000	4.600000
max	140900.000000	149900.000000	29.000000	95909.000000	8161.000000	4.700000

Checking Datatypes-

```
In [11]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62 entries, 0 to 61
Data columns (total 11 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Product Name    62 non-null      object  
 1   Product URL     62 non-null      object  
 2   Brand            62 non-null      object  
 3   Sale Price      62 non-null      int64  
 4   Mrp              62 non-null      int64  
 5   Discount Percentage 62 non-null  int64  
 6   Number Of Ratings 62 non-null  int64  
 7   Number Of Reviews 62 non-null  int64  
 8   Upc              62 non-null      object  
 9   Star Rating      62 non-null      float64 
 10  Ram              62 non-null      object  
dtypes: float64(1), int64(5), object(5)
memory usage: 5.5+ KB
```

Iphone sales analysis in India-

In [12]: `data.head()`

Out[12]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Upc	Star Rating	Ram
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOBEXRGV7EHHTGUH	4.6	2 GB
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVAC6TJT4F	4.6	2 GB
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVGETABXWZ	4.6	2 GB
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBEXRGVMZWUHCBA	4.5	2 GB
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	MOBEXRGVPK7PFEJZ	4.5	2 GB

Creating new dataframe by storing all the data about the top 10 highest rated Iphone in India on flipkart. It will help in understanding what kind of Iphones are mostly liked by Indians-

In [25]:

```
Highest_Rated = data.sort_values(by = "Star Rating", ascending=False)
print(Highest_Rated.head(10))
print()
print(Highest_Rated["Product Name"])
```

	Product Name	\
20	APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)	
17	APPLE iPhone 11 Pro Max (Space Grey, 64 GB)	
16	APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)	
15	APPLE iPhone 11 Pro Max (Gold, 64 GB)	
14	APPLE iPhone 11 Pro Max (Gold, 256 GB)	
0	APPLE iPhone 8 Plus (Gold, 64 GB)	
29	APPLE iPhone 12 (White, 128 GB)	
32	APPLE iPhone 12 Pro Max (Graphite, 128 GB)	
35	APPLE iPhone 12 (Black, 128 GB)	
36	APPLE iPhone 12 (Blue, 128 GB)	

	Product URL	Brand	Sale Price	\
20	https://www.flipkart.com/apple-iphone-11-pro-m... pnqnytjwvzg	Apple	117100	
17	https://www.flipkart.com/apple-iphone-11-pro-m... pnqnytjwvzg	Apple	117100	
16	https://www.flipkart.com/apple-iphone-11-pro-m... pnqnytjwvzg	Apple	131900	
15	https://www.flipkart.com/apple-iphone-11-pro-m... pnqnytjwvzg	Apple	117100	
14	https://www.flipkart.com/apple-iphone-11-pro-m... pnqnytjwvzg	Apple	131900	
0	https://www.flipkart.com/apple-iphone-8-plus-g... pnqnytjwvzg	Apple	49900	
29	https://www.flipkart.com/apple-iphone-12-white... pnqnytjwvzg	Apple	75900	
32	https://www.flipkart.com/apple-iphone-12-pro-m... pnqnytjwvzg	Apple	120900	
35	https://www.flipkart.com/apple-iphone-12-black... pnqnytjwvzg	Apple	75900	
36	https://www.flipkart.com/apple-iphone-12-blue-... pnqnytjwvzg	Apple	75900	

	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	\
20	117100	0	1078	101	
17	117100	0	1078	101	
16	131900	0	1078	101	
15	117100	0	1078	101	
14	131900	0	1078	101	
0	49900	0	3431	356	
29	84900	10	2101	180	
32	129900	6	580	45	
35	84900	10	2101	180	
36	84900	10	2101	180	

	Upc	Star Rating	Ram
20	MOBFKCTSRYPAQNYT	4.7	4 GB
17	MOBFKCTSNDMKCGQS	4.7	4 GB
16	MOBFKCTSAAKGQV7	4.7	4 GB
15	MOBFKCTSAPAYNSGG	4.7	4 GB
14	MOBFKCTS7HCHSPFH	4.7	4 GB
0	MOBEXRGV7EHHTGUH	4.6	2 GB
29	MOBFWBYZBTZFGJF9	4.6	6 GB

```
32 MOBFWBYZFDGQSDWS      4.6  6 GB
35 MOBFWBYZK3HACR72      4.6  6 GB
36 MOBFWBYZKPTZF9VG      4.6  6 GB

20     APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)
17         APPLE iPhone 11 Pro Max (Space Grey, 64 GB)
16     APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)
15         APPLE iPhone 11 Pro Max (Gold, 64 GB)
14         APPLE iPhone 11 Pro Max (Gold, 256 GB)

        ...
45         APPLE iPhone 12 Mini (Black, 64 GB)
28         APPLE iPhone 12 Mini (White, 64 GB)
23     Apple iPhone SE (White, 256 GB) (Includes EarP...
41         APPLE iPhone 12 Pro (Pacific Blue, 512 GB)
27         APPLE iPhone 12 Pro (Graphite, 256 GB)
Name: Product Name, Length: 62, dtype: object
```

Let's have a look on the no. of rating of highest rated Iphone on flipkart-

```
In [20]: Iphone = Highest_Rated["Product Name"].value_counts()
Iphone
```

```
Out[20]: Product Name
APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)      1
APPLE iPhone 11 Pro Max (Space Grey, 64 GB)           1
APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)       1
APPLE iPhone 11 Pro Max (Gold, 64 GB)                 1
APPLE iPhone 11 Pro Max (Gold, 256 GB)                1
APPLE iPhone 8 Plus (Gold, 64 GB)                      1
APPLE iPhone 12 (White, 128 GB)                        1
APPLE iPhone 12 Pro Max (Graphite, 128 GB)            1
APPLE iPhone 12 (Black, 128 GB)                        1
APPLE iPhone 12 (Blue, 128 GB)                         1
Name: count, dtype: int64
```

```
In [44]: Iphone = Highest_Rated["Product Name"].value_counts()
label = Iphone.index
counts = Highest_Rated["Number Of Ratings"]

figure = px.bar(Highest_Rated, x=label, y=counts, title="No. of Ratings of Highest Rated Iphones")

figure.update_layout(width=1000, height=1000)
figure.show()
```


let's have a look at the number of reviews of the highest rated iphones on flipkart-

```
In [42]: Iphone = Highest_Rated["Product Name"].value_counts()
label = Iphone.index
counts = Highest_Rated["Number Of Reviews"]

figure = px.bar(Highest_Rated, x=label, y=counts, title="No. of Reviews of Highest Rated Iphones")
figure.update_layout(width=1000, height=1000)
figure.show()
```


Let's have a look at the relationship between sale price of Iphones and their ratings on flipkart-

In [52]: `data.head()`

Out[52]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Upc	Star Rating	Ram
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOBEXRGV7EHHTGUH	4.6	2 GB
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVAC6TJT4F	4.6	2 GB
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVGETABXWZ	4.6	2 GB
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBEXRGVMZWUHCBA	4.5	2 GB
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	MOBEXRGVPK7PFEJZ	4.5	2 GB

In [53]:

```
figure = px.scatter(data_frame=data,
                     x="Number Of Ratings",
                     y="Sale Price",
                     size="Discount Percentage",
                     trendline="ols",
                     title="Relationship between Sale Price of iPhones and Their Ratings")
figure.show()
```

Let's have a look on the relationship between Discount Percentage & Number of ratings of Iphone-

```
In [55]: figure = px.scatter(data_frame= data,
                         x="Number Of Ratings",
                         y="Discount Percentage",
                         size="Sale Price",
                         trendline="ols",
```

```
title="Relationship between Discount Percentage & Number of Ratings of Iphone")  
figure.show()
```