Zomato Restaurants

Loading the Dataset

In [1]:

```
#Importing Libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LogisticRegression
from sklearn.linear_model import LinearRegression #Linear Regression is a Machine Learning
from sklearn.model_selection import train_test_split #Splitting of Dataset
from sklearn.metrics import classification_report
from sklearn.metrics import confusion_matrix
from sklearn.metrics import r2_score
```

Reading the dataset

In [2]:

```
#reading the dataset
zomato_orgnl=pd.read_csv("D:/class/M.Tech 2nd/DL/lab/projects/business/zomato.csv")
zomato_orgnl.head() #This function returns the first n rows for the object based on positio
```

Out[2]:

	url	address	name	online_order	book_table
0	https://www.zomato.com/bangalore/jalsa-banasha...	942, 21st Main Road, 2nd Stage, Banashankari, ...	Jalsa	Yes	Yes
1	https://www.zomato.com/bangalore/spice-elephan...	2nd Floor, 80 Feet Road, Near Big Bazaar, 6th ...	Spice Elephant	Yes	No
2	https://www.zomato.com/SanchurroBangalore?cont...	1112, Next to KIMS Medical College, 17th Cross...	San Churro Cafe	Yes	No
3	https://www.zomato.com/bangalore/addhuri-udupi...	1st Floor, Annakuteera, 3rd Stage, Banashankar...	Addhuri Udupi Bhojana	No	No
4	https://www.zomato.com/bangalore/grand-village...	10, 3rd Floor, Lakshmi Associates, Gandhi Baza...	Grand Village	No	No

Deleting Unnnecessary Columns

In [3]:

```
#Deleting Unnnecessary Columns
zomato=zomato_orgnl.drop(['url','dish_liked','phone'],axis=1)
```

Removing the Duplicates

In [4]:

```
#Removing the Duplicates
zomato.duplicated().sum()
zomato.drop_duplicates(inplace=True)
```

Remove the NaN values from the dataset

In [5]:

```
#Remove the NaN values from the dataset
zomato.isnull().sum()
zomato.dropna(how='any',inplace=True)
zomato.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 43499 entries, 0 to 51716
Data columns (total 14 columns):
address                      43499 non-null object
name                         43499 non-null object
online_order                 43499 non-null object
book_table                   43499 non-null object
rate                         43499 non-null object
votes                        43499 non-null int64
location                     43499 non-null object
rest_type                    43499 non-null object
cuisines                     43499 non-null object
approx_cost(for two people)  43499 non-null object
reviews_list                 43499 non-null object
menu_item                    43499 non-null object
listed_in(type)              43499 non-null object
listed_in(city)              43499 non-null object
dtypes: int64(1), object(13)
memory usage: 2.8+ MB
```

Changing the Columns Names

In [6]:

```
#Changing the Columns Names
zomato.columns
zomato = zomato.rename(columns={'approx_cost(for two people)':'cost','listed_in(type)':'typ
                                'listed_in(city)':'city'})
zomato.columns
```

Out[6]:

```
Index(['address', 'name', 'online_order', 'book_table', 'rate', 'votes',
       'location', 'rest_type', 'cuisines', 'cost', 'reviews_list',
       'menu_item', 'type', 'city'],
      dtype='object')
```

Some Transformations

In [7]:

```
#Some Transformations
zomato['cost'] = zomato['cost'].astype(str)
zomato['cost'] = zomato['cost'].apply(lambda x: x.replace(',','.'))
zomato['cost'] = zomato['cost'].astype(float)
zomato.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 43499 entries, 0 to 51716
Data columns (total 14 columns):
address         43499 non-null object
name            43499 non-null object
online_order    43499 non-null object
book_table      43499 non-null object
rate            43499 non-null object
votes           43499 non-null int64
location        43499 non-null object
rest_type       43499 non-null object
cuisines        43499 non-null object
cost            43499 non-null float64
reviews_list    43499 non-null object
menu_item       43499 non-null object
type            43499 non-null object
city            43499 non-null object
dtypes: float64(1), int64(1), object(12)
memory usage: 3.0+ MB
```

Removing '/5' from Rates

In [8]:

```
#Removing '/5' from Rates
zomato['rate'].unique()
zomato = zomato.loc[zomato.rate !='NEW']
zomato = zomato.loc[zomato.rate !='-'].reset_index(drop=True)
remove_slash = lambda x: x.replace('/5', '') if type(x) == np.str else x
zomato.rate = zomato.rate.apply(remove_slash).str.strip().astype('float')
zomato['rate'].head()
```

Out[8]:

```
0    4.1
1    4.1
2    3.8
3    3.7
4    3.8
Name: rate, dtype: float64
```

Adjust the column names

In [9]:

```
# Adjust the column names
zomato.name = zomato.name.apply(lambda x:x.title())
zomato.online_order.replace(('Yes','No'),(True, False),inplace=True)
zomato.book_table.replace(('Yes','No'),(True, False),inplace=True)
zomato.cost.unique()
```

Out[9]:

```
array([800.  , 300.  , 600.  , 700.  , 550.  , 500.  , 450.  , 650.  ,
       400.  , 900.  , 200.  , 750.  , 150.  , 850.  , 100.  ,   1.2 ,
       350.  , 250.  , 950.  ,   1.  ,   1.5 ,   1.3 , 199.  ,   1.1 ,
         1.6 , 230.  , 130.  ,   1.7 ,   1.35,   2.2 ,   1.4 ,   2.  ,
         1.8 ,   1.9 , 180.  , 330.  ,   2.5 ,   2.1 ,   3.  ,   2.8 ,
         3.4 ,  50.  ,  40.  ,   1.25,   3.5 ,   4.  ,   2.4 ,   2.6 ,
         1.45,  70.  ,   3.2 , 240.  ,   6.  ,   1.05,   2.3 ,   4.1 ,
       120.  ,   5.  ,   3.7 ,   1.65,   2.7 ,   4.5 ,  80.  ])
```

Encode the input Variables

In [10]:

```
#Encode the input Variables
def Encode(zomato):
    for column in zomato.columns[~zomato.columns.isin(['rate', 'cost', 'votes'])]:
        zomato[column] = zomato[column].factorize()[0]
    return zomato

zomato_en = Encode(zomato.copy())
```

In [12]:

```
#Defining the independent variables and dependent variables
x = zomato_en.iloc[:,[2,3,5,6,7,8,9,11]]
y = zomato_en['rate']
#Getting Test and Training Set
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=.1,random_state=353)
x_train.head()
y_train.head()
```

Out[12]:

```
16950    3.9
767      3.7
6750     4.0
9471     3.8
25162    3.7
Name: rate, dtype: float64
```

Regression Analysis

Linear Regression

In [13]:

```
#Prepare a Linear REgression Model
reg=LinearRegression()
reg.fit(x_train,y_train)
y_pred=reg.predict(x_test)
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

Out[13]:

```
0.2736233722103867
```

Decision Tree Regression

In [14]:

```
#Prepairng a Decision Tree Regression
from sklearn.tree import DecisionTreeRegressor
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=.1,random_state=105)
DTree=DecisionTreeRegressor(min_samples_leaf=.0001)
DTree.fit(x_train,y_train)
y_predict=DTree.predict(x_test)
from sklearn.metrics import r2_score
r2_score(y_test,y_predict)
```

Out[14]:

```
0.8534364353683124
```

Random Forest Regression

In [15]:

```
#Preparing Random Forest REgression
from sklearn.ensemble import RandomForestRegressor
RForest=RandomForestRegressor(n_estimators=500,random_state=329,min_samples_leaf=.0001)
RForest.fit(x_train,y_train)
y_predict=RForest.predict(x_test)
from sklearn.metrics import r2_score
r2_score(y_test,y_predict)
```

Out[15]:

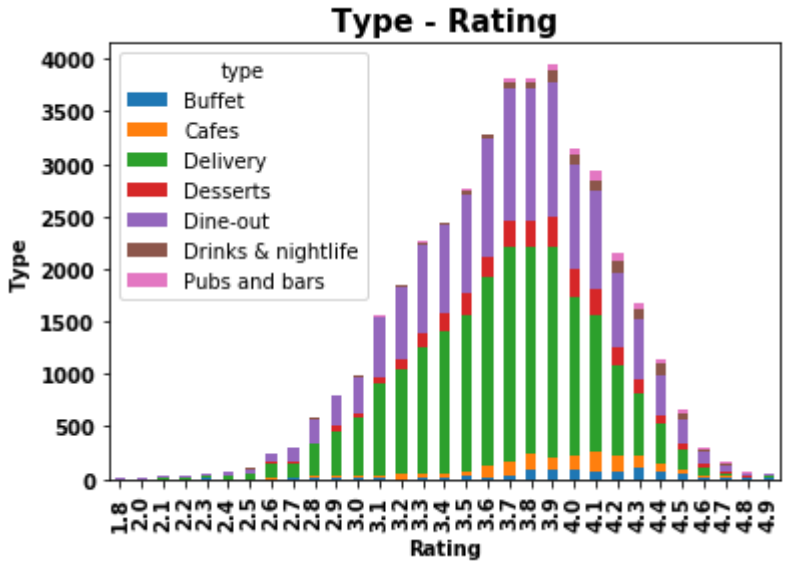
```
0.877381398846147
```

Results

Type and Rating

In [18]:

```
#Type and Rating
type_plt=pd.crosstab(zomato['rate'],zomato['type'])
type_plt.plot(kind='bar',stacked=True);
plt.title('Type - Rating',fontsize=15,fontweight='bold')
plt.ylabel('Type',fontsize=10,fontweight='bold')
plt.xlabel('Rating',fontsize=10,fontweight='bold')
plt.xticks(fontsize=10,fontweight='bold')
plt.yticks(fontsize=10,fontweight='bold');
```



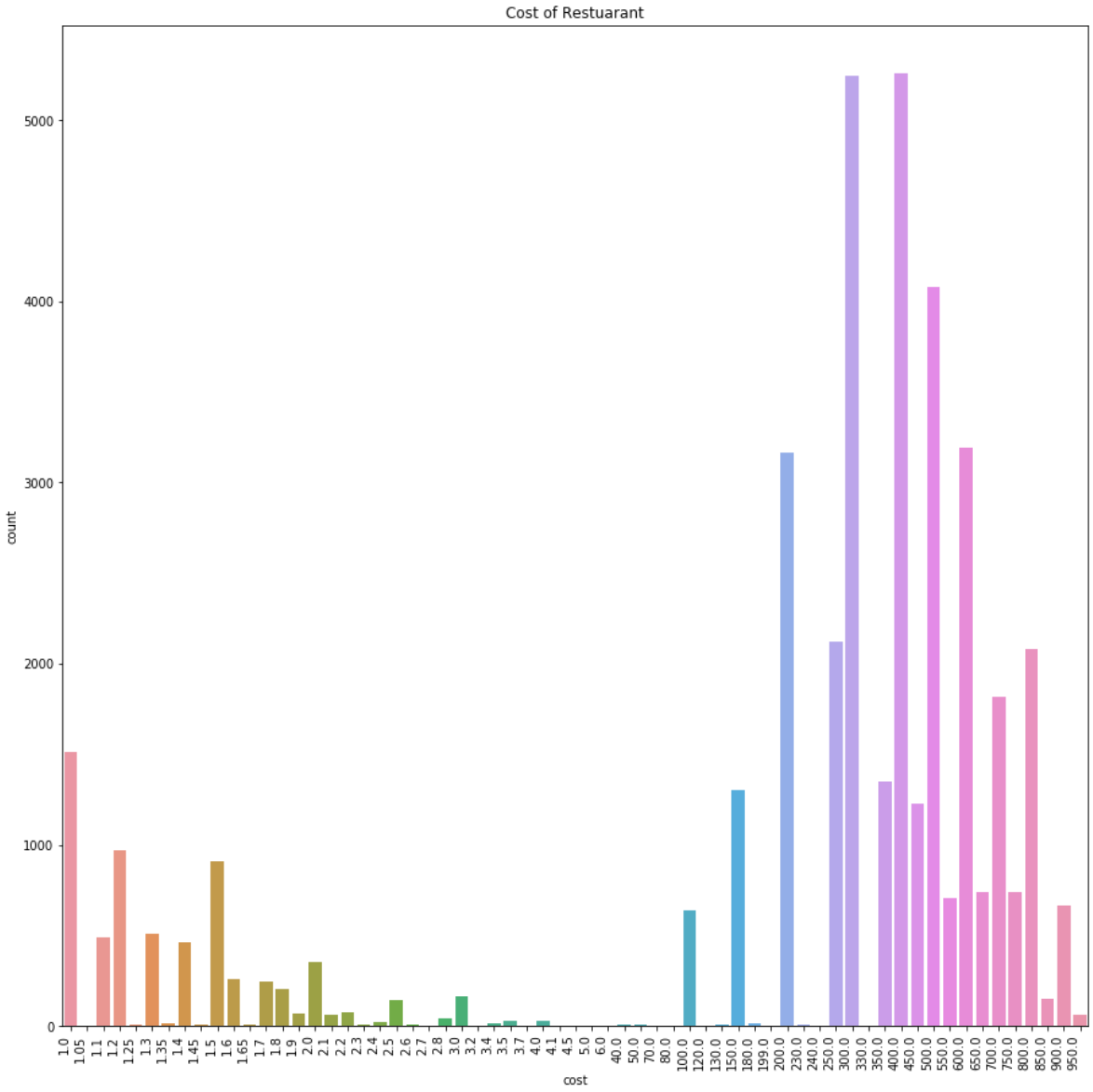
Cost of Restuarant

In [19]:

```
#Cost of Restuarant
sns.countplot(zomato['cost'])
sns.countplot(zomato['cost']).set_xticklabels(sns.countplot(zomato['cost']).get_xticklabels
fig = plt.gcf()
fig.set_size_inches(15,15)
plt.title('Cost of Restuarant')
```

Out[19]:

```
Text(0.5,1,'Cost of Restuarant')
```



Most famous restaurant chains in Bengaluru

In [17]:

```
#Most famous restaurant chains in Bengaluru
plt.figure(figsize=(15,7))
chains=zomato_orgnl['name'].value_counts()[:20]
sns.barplot(x=chains,y=chains.index,palette='Set1')
plt.title("Most famous restaurant chains in Bangaluru",size=20)
plt.xlabel("Number of outlets",size=15)
```

Out[17]:

```
Text(0.5,0,'Number of outlets')
```