zomato-rating

September 18, 2024

[100]:
```
import pandas as pd
```

DATA LOADING

[101]:
```
df = pd.read_csv(r"C:\Users\Windows 10\Downloads\zomato.csv")
```

DATA INFO AND DESCRIPTION

[102]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51717 entries, 0 to 51716
Data columns (total 17 columns):
 #   Column                       Non-Null Count  Dtype 
---  ------                       --------------  ----- 
 0   url                          51717 non-null  object
 1   address                      51717 non-null  object
 2   name                         51717 non-null  object
 3   online_order                 51717 non-null  object
 4   book_table                   51717 non-null  object
 5   rate                         43942 non-null  object
 6   votes                        51717 non-null  int64 
 7   phone                        50509 non-null  object
 8   location                     51696 non-null  object
 9   rest_type                    51490 non-null  object
 10  dish_liked                   23639 non-null  object
 11  cuisines                     51672 non-null  object
 12  approx_cost(for two people)  51371 non-null  object
 13  reviews_list                 51717 non-null  object
 14  menu_item                    51717 non-null  object
 15  listed_in(type)              51717 non-null  object
 16  listed_in(city)              51717 non-null  object
dtypes: int64(1), object(16)
memory usage: 6.7+ MB
```

[103]:
```
df.shape
```

[103]: (51717, 17)

[104]:
```
df.count()
```

[104]:
```
url                             51717
address                         51717
name                            51717
online_order                    51717
book_table                      51717
rate                            43942
votes                           51717
phone                           50509
location                        51696
rest_type                       51490
dish_liked                      23639
cuisines                        51672
approx_cost(for two people)     51371
reviews_list                    51717
menu_item                       51717
listed_in(type)                 51717
listed_in(city)                 51717
dtype: int64
```

[105]:
```
df.rename(columns={'approx_cost(for two people)':'average_cost'}, inplace=True)
```

[106]:
```
df.columns
```

[106]:
```
Index(['url', 'address', 'name', 'online_order', 'book_table', 'rate', 'votes',
       'phone', 'location', 'rest_type', 'dish_liked', 'cuisines',
       'average_cost', 'reviews_list', 'menu_item', 'listed_in(type)',
       'listed_in(city)'],
      dtype='object')
```

[107]:
```
df.describe()
```

[107]:
```
              votes
count  51717.000000
mean     283.697527
std      803.838853
min        0.000000
25%        7.000000
50%       41.000000
75%      198.000000
max    16832.000000
```

NULL VALUES

[108]:
```
df.isnull().sum()
```

[108]:
```
url                   0
address               0
name                  0
online_order          0
book_table            0
rate                7775
votes                 0
phone              1208
location             21
rest_type           227
dish_liked        28078
cuisines             45
average_cost        346
reviews_list          0
menu_item             0
listed_in(type)       0
listed_in(city)       0
dtype: int64
```

[109]:
```
df = df[df.cuisines.isnull()==False]
```

[110]:
```
df.isnull().sum()
```

[110]:
```
url                   0
address               0
name                  0
online_order          0
book_table            0
rate                7741
votes                 0
phone              1179
location              0
rest_type           206
dish_liked        28033
cuisines              0
average_cost        320
reviews_list          0
menu_item             0
listed_in(type)       0
listed_in(city)       0
dtype: int64
```

[111]:
```
df.drop(columns=["url", 'address','phone','listed_in(city)'], inplace  =True)
```

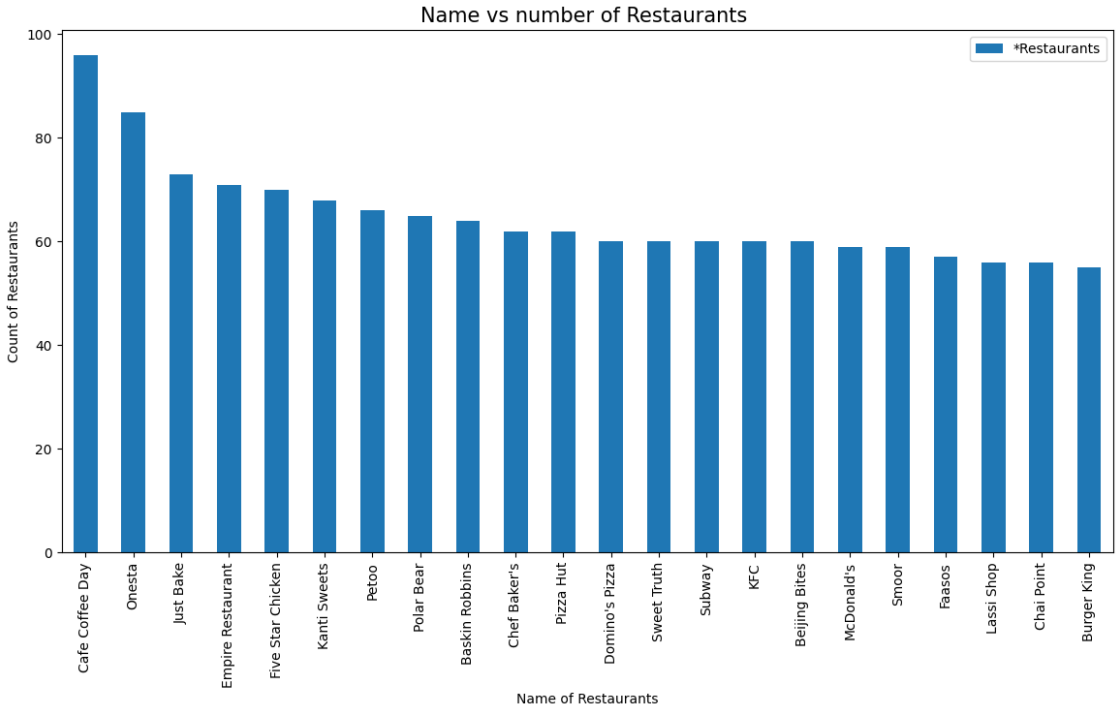
PREPROCESSING AND VISUALIZATION

[112]:
```
df.name.value_counts().head()
```

[112]:
```
name
Cafe Coffee Day      96
Onesta               85
Just Bake            73
Empire Restaurant    71
Five Star Chicken    70
Name: count, dtype: int64
```

[113]:
```
plt.figure(figsize=((14,7)))
a = df.name.value_counts()[:22].plot(kind='bar')
a.legend(['*Restaurants'])
plt.xlabel("Name of Restaurants")
plt.ylabel("Count of Restaurants")
plt.title("Name vs number of Restaurants ",fontsize = 15)
```

[113]:
```
Text(0.5, 1.0, 'Name vs number of Restaurants ')
```



ONLINE ORDER

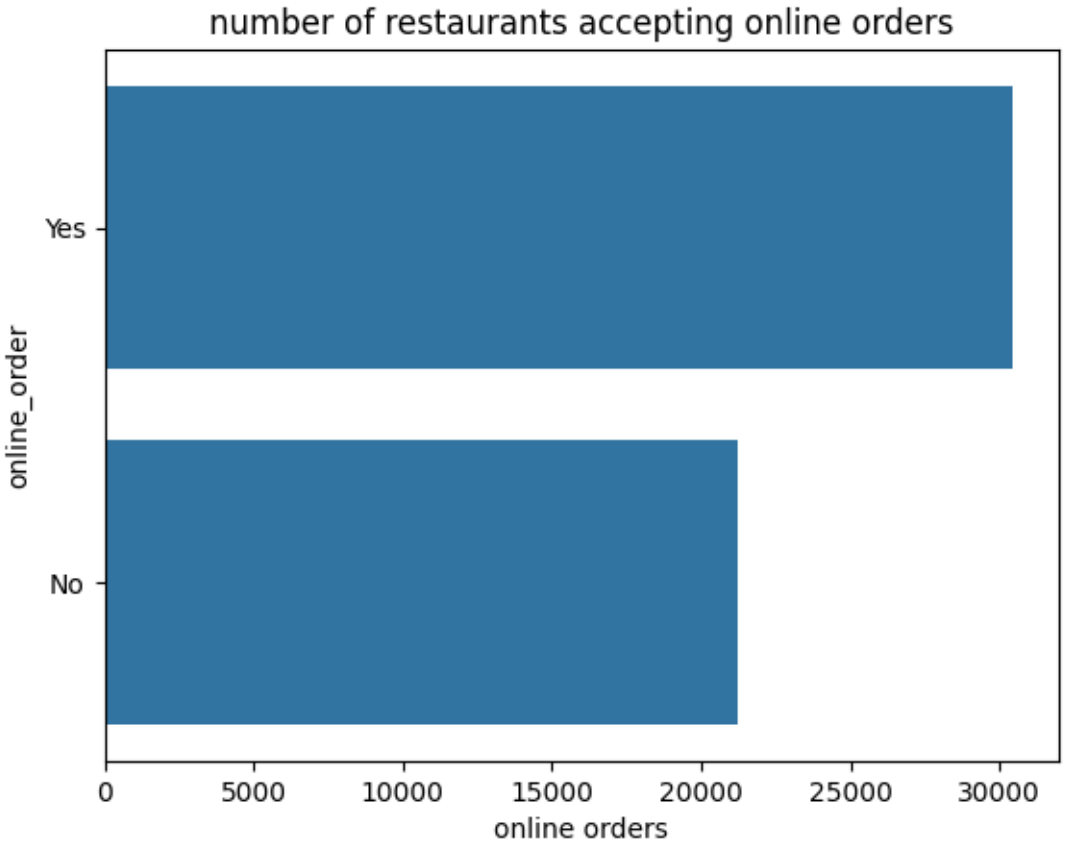
[114]:
```
df.online_order.value_counts()
```

[114]:
```
online_order
Yes    30428
No     21244
Name: count, dtype: int64
```

what's most common in Bangalore Restaurants? Do they offer online ordering and table booking?

[115]:
```
x=sns.countplot(df['online_order'])
plt.title('number of restaurants accepting online orders')
plt.xlabel('online orders')
```

[115]:
```
Text(0.5, 0, 'online orders')
```



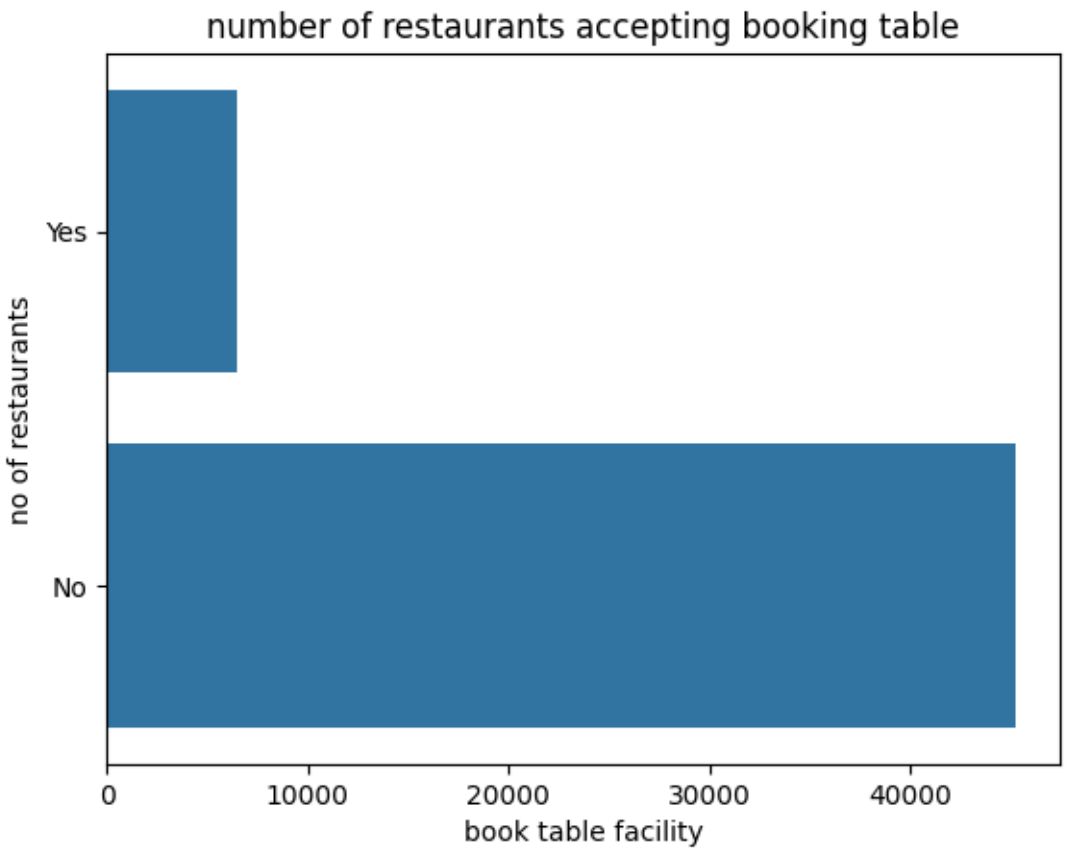
BOOKING TABLE

[116]:
```
df.book_table.value_counts()
```

[116]:
```
book_table
No     45223
Yes     6449
Name: count, dtype: int64
```

[117]:
```
x=sns.countplot(df['book_table'])
plt.title('number of restaurants accepting booking table')
plt.xlabel('book table facility')
plt.ylabel('no of restaurants')
```

[117]: Text(0, 0.5, 'no of restaurants')



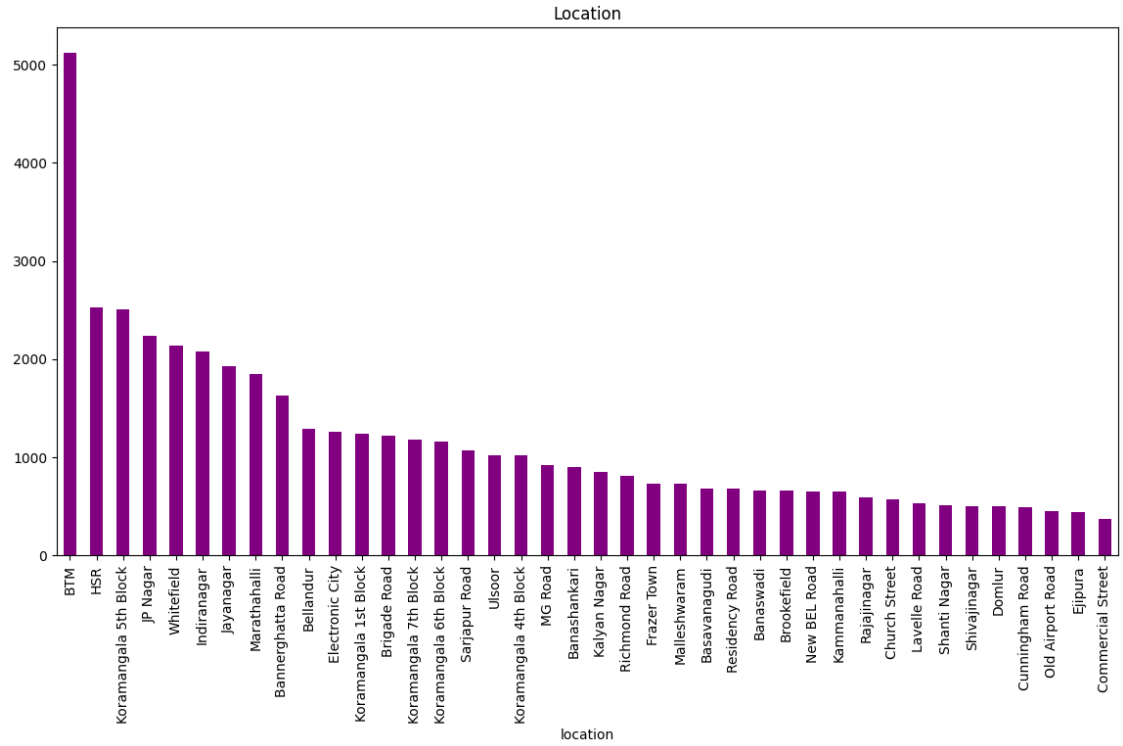
LOCATION

[118]:
```
df.location.value_counts()[:10]
```

[118]:
```
location
BTM                    5124
HSR                    2523
Koramangala 5th Block  2504
JP Nagar               2233
Whitefield             2136
Indiranagar            2081
Jayanagar              1926
Marathahalli           1843
Bannerghatta Road      1630
Bellandur              1286
Name: count, dtype: int64
```

[119]:
```
plt.figure(figsize=(14, 7))
df.location.value_counts()[:40].plot(kind='bar', color='purple')
plt.title('Location')
```

[119]:
```
Text(0.5, 1.0, 'Location')
```



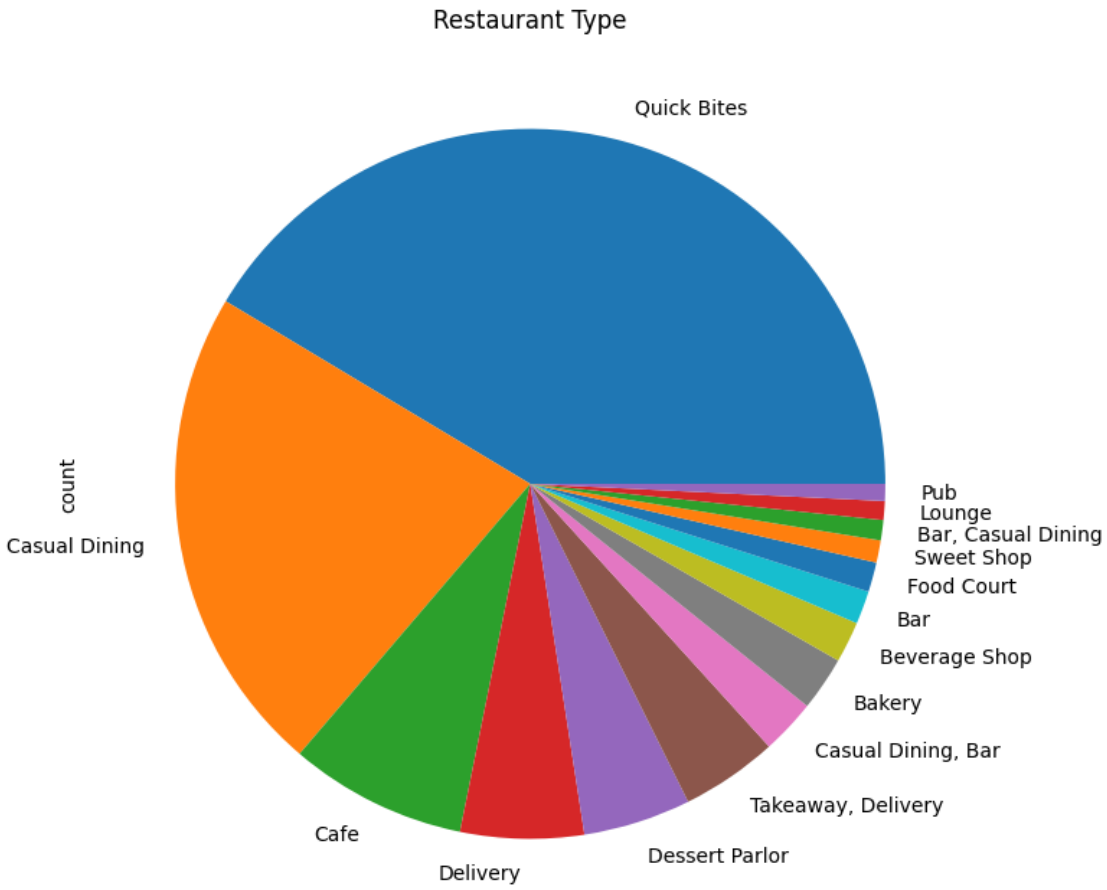
RESTAURANT TYPE

[120]:
```
df.rest_type.value_counts()[:15]
```

[120]:
```
rest_type
Quick Bites           19129
Casual Dining         10326
Cafe                   3732
Delivery               2595
Dessert Parlor         2262
Takeaway, Delivery     2035
Casual Dining, Bar     1154
Bakery                 1141
Beverage Shop           865
Bar                     697
Food Court              623
Sweet Shop              468
Bar, Casual Dining      425
```

```
Lounge                  396
Pub                     357
Name: count, dtype: int64
```

[121]:
```
plt.figure(figsize = (14, 8))
df.rest_type.value_counts()[:15].plot(kind = "pie")
plt.title("Restaurant Type")
plt.show()
```



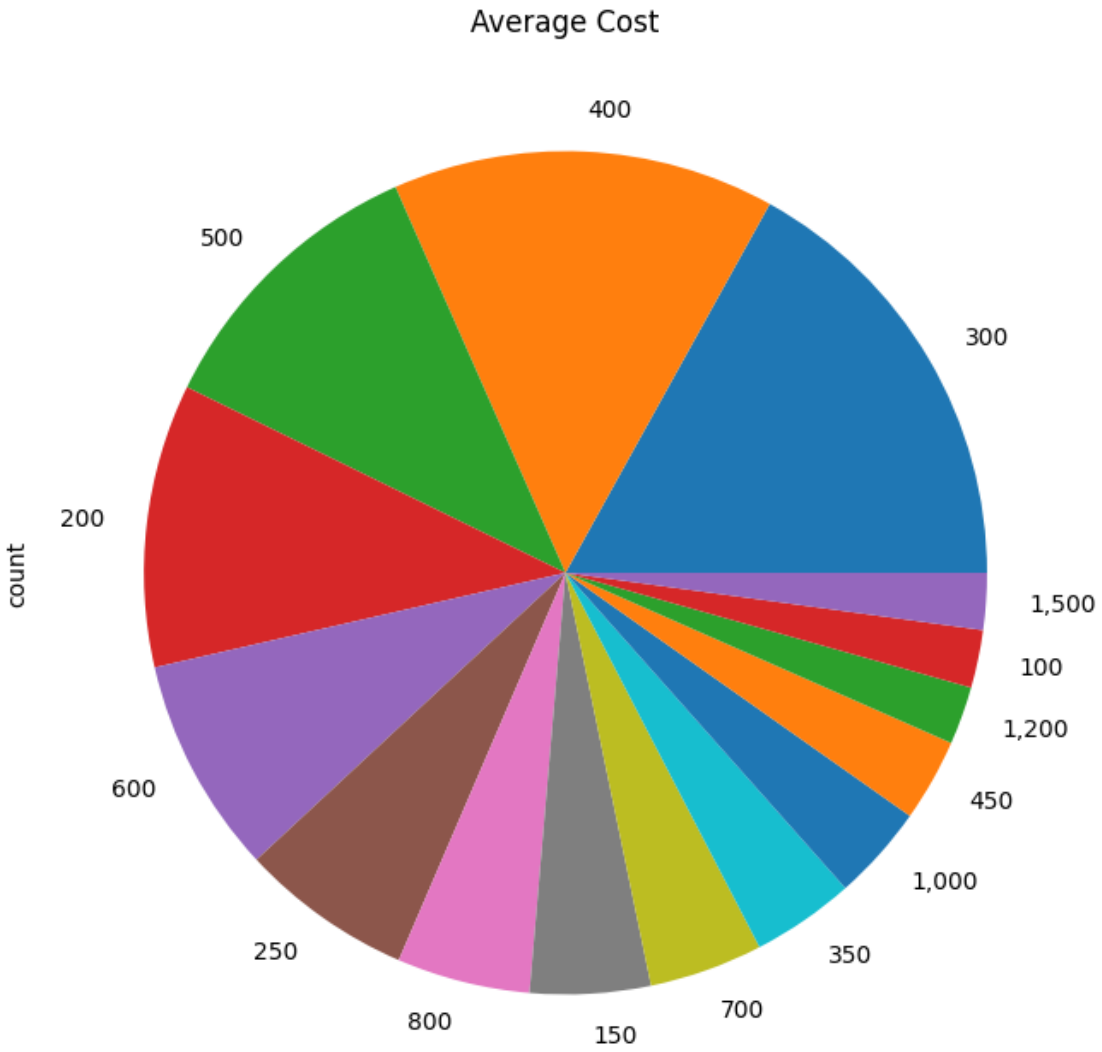
AVERAGE COST

[122]:
```
df.average_cost.value_counts()[:20]
```

[122]:
```
average_cost
300       7576
400       6554
500       4977
200       4855
```

```
600      3712
250      2959
800      2285
150      2064
700      1948
350      1763
1,000    1637
450      1417
1,200     993
100       991
1,500     971
650       776
550       761
750       758
900       700
1,300     516
Name: count, dtype: int64
```

[123]:
```
plt.figure(figsize = (14, 8))
df.average_cost.value_counts()[:15].plot(kind = "pie")
plt.title("Average Cost")
plt.show()
```



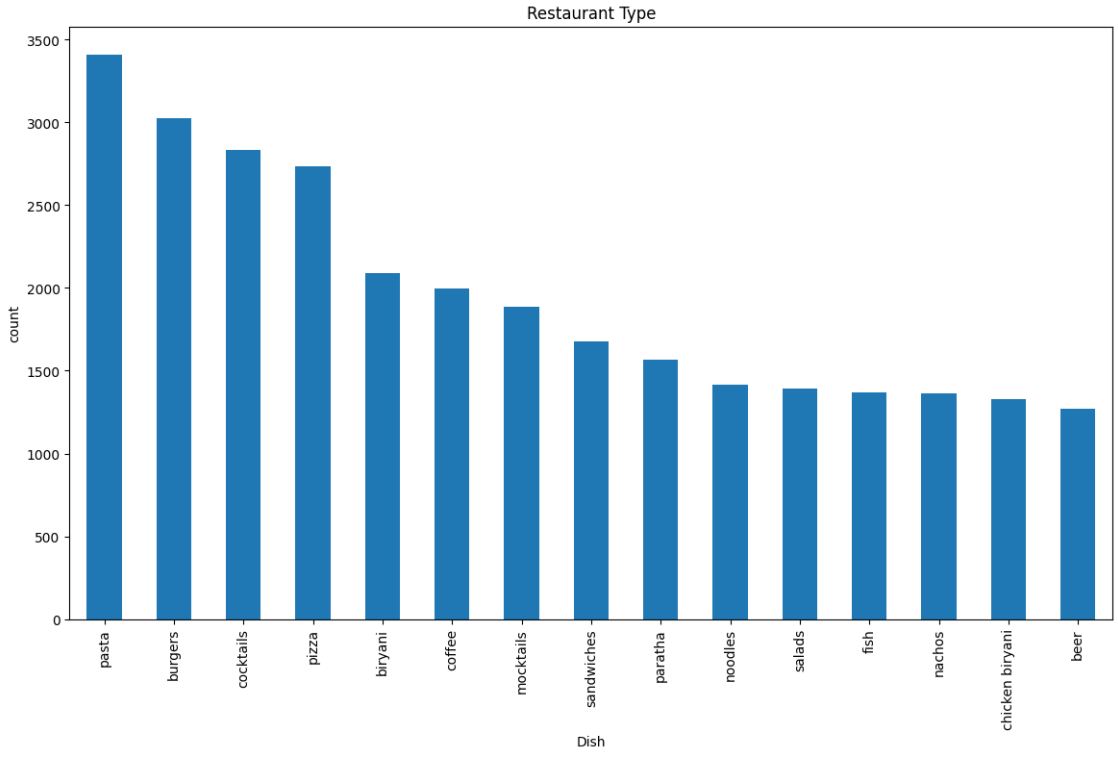
DISH LIKED

[124]:
```
dishes_data = df[df.dish_liked.notnull()]
dishes_data.dish_liked = dishes_data.dish_liked.apply(lambda x:x.lower().
 ↪strip())
```

[125]:
```
dish_count=[]
for i in dishes_data.dish_liked:
    for t in i.split(','):
        t=t.strip()
        dish_count.append(t)
```

[126]:
```
plt.figure(figsize = (14, 8))
pd.Series(dish_count).value_counts()[:15].plot(kind = "bar")
plt.title("Restaurant Type")
plt.xlabel('Dish')
plt.ylabel('count')
```

[126]:
```
Text(0, 0.5, 'count')
```



RATE

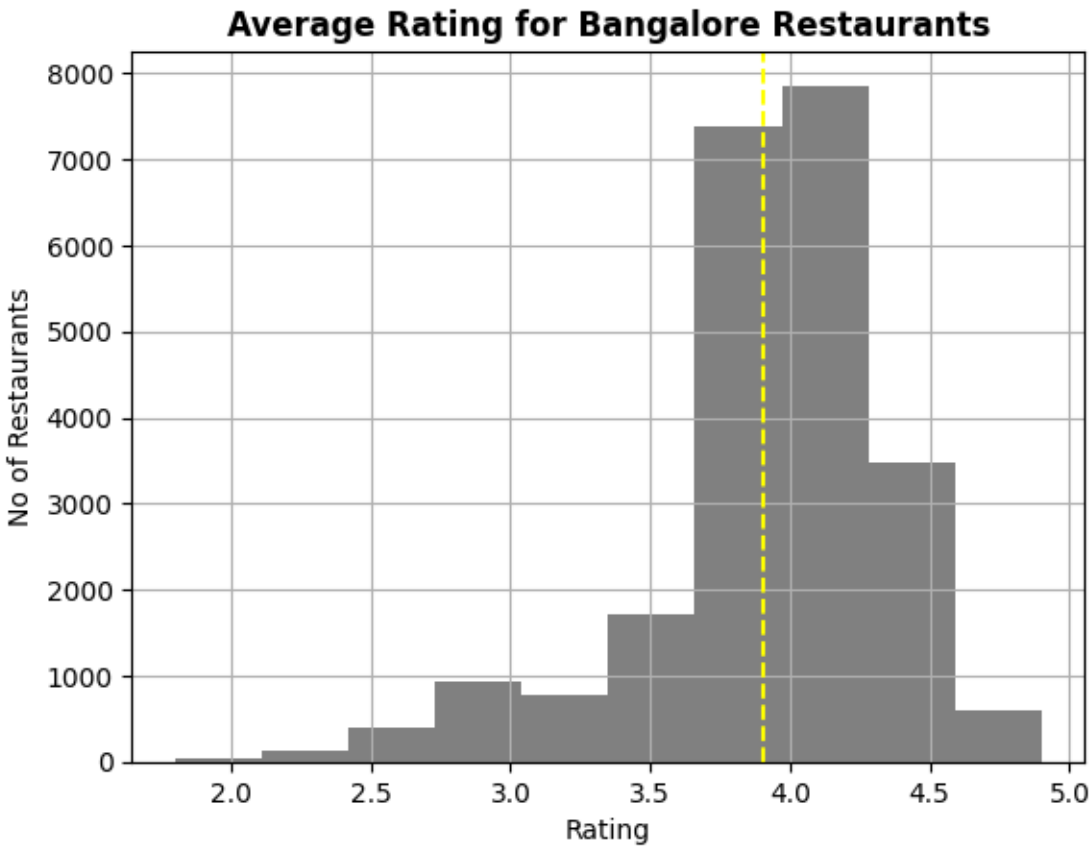
[127]:
```
df['rate'] = df['rate'].replace('NEW',np.NaN)
df['rate'] = df['rate'].replace('-',np.NaN)
df.dropna(how = 'any', inplace = True)
```

[128]:
```
df['rate'] = df.loc[:,'rate'].replace('[ ]','',regex = True)
df['rate'] = df['rate'].astype(str)
df['rate'] = df['rate'].apply(lambda r: r.replace('/5',''))
df['rate'] = df['rate'].apply(lambda r: float(r))
```

[129]:
```
df.rate.hist(color='grey')
plt.axvline(x= df.rate.mean(),ls='--',color='yellow')
plt.title('Average Rating for Bangalore Restaurants',weight='bold')
plt.xlabel('Rating')
```

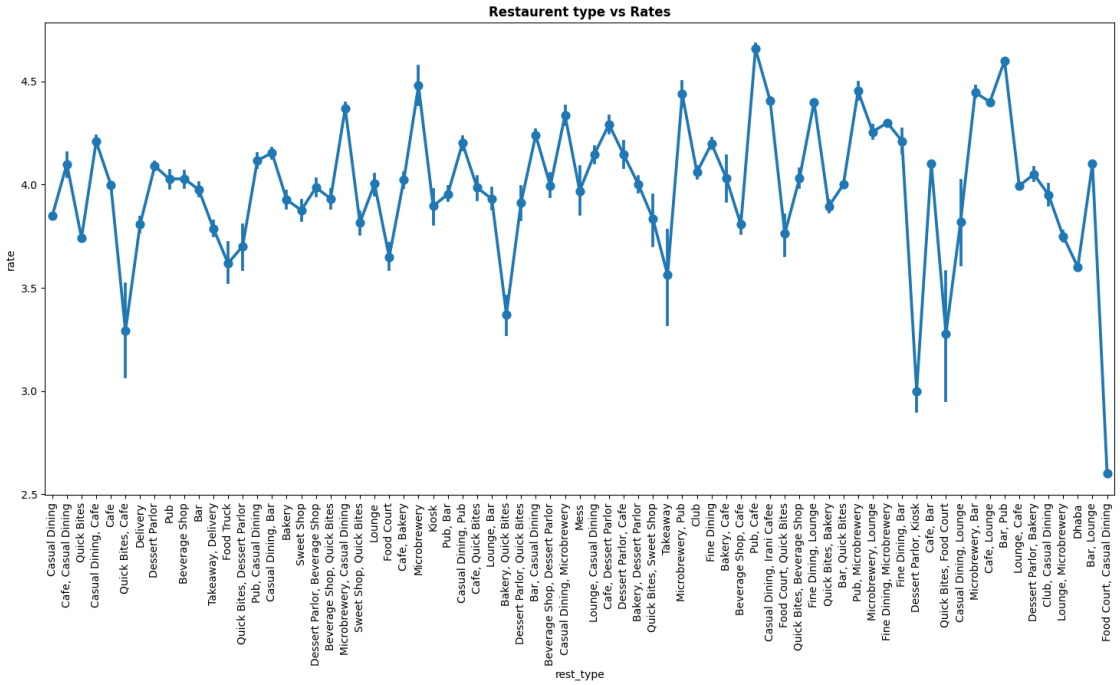
```
plt.ylabel('No of Restaurants')
print(df.rate.mean())
```

3.9058343007008034



RESTAURANT TYPE VS RATING

[130]:
```
f,ax=plt.subplots(figsize=(18,8))
g = sns.pointplot(x=df["rest_type"], y=df["rate"], data=df)
g.set_xticklabels(g.get_xticklabels(), rotation=90)
plt.title('Restaurent type vs Rates', weight = 'bold')
plt.show()
```



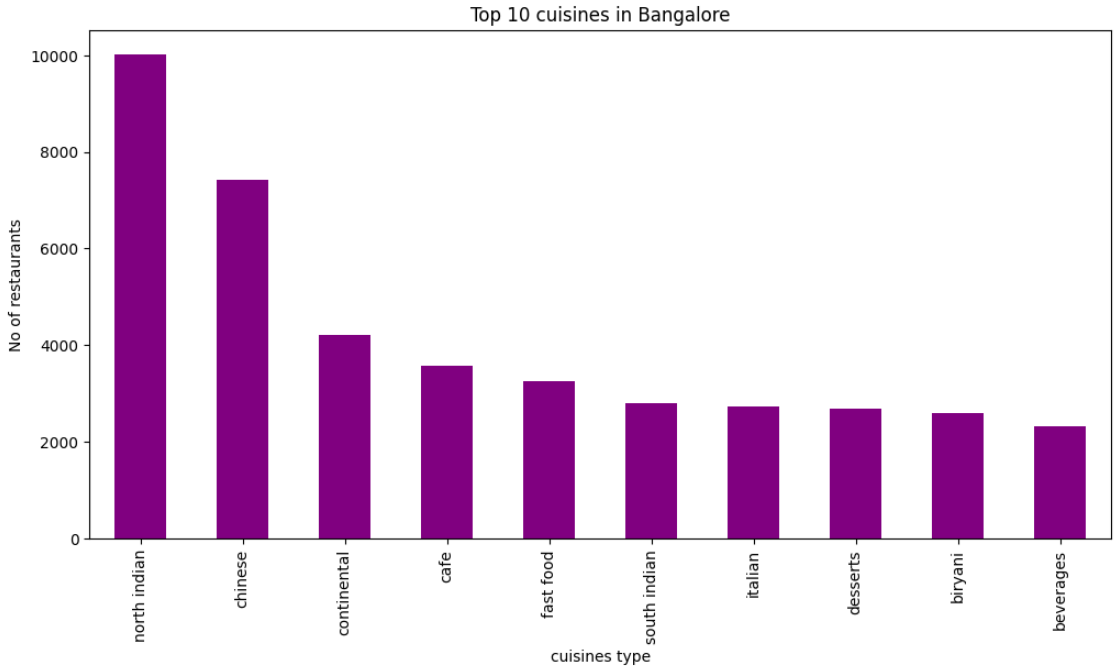
CUISINES

[131]:
```
cuisines_data = df[df.cuisines.notnull()]
cuisines_data.cuisines = cuisines_data.cuisines.apply(lambda x:x.lower().
 ↪strip())
```

[132]:
```
cuisines_count= []
for i in cuisines_data.cuisines:
    for j in i.split(','):
        j = j.strip()
        cuisines_count.append(j)
```

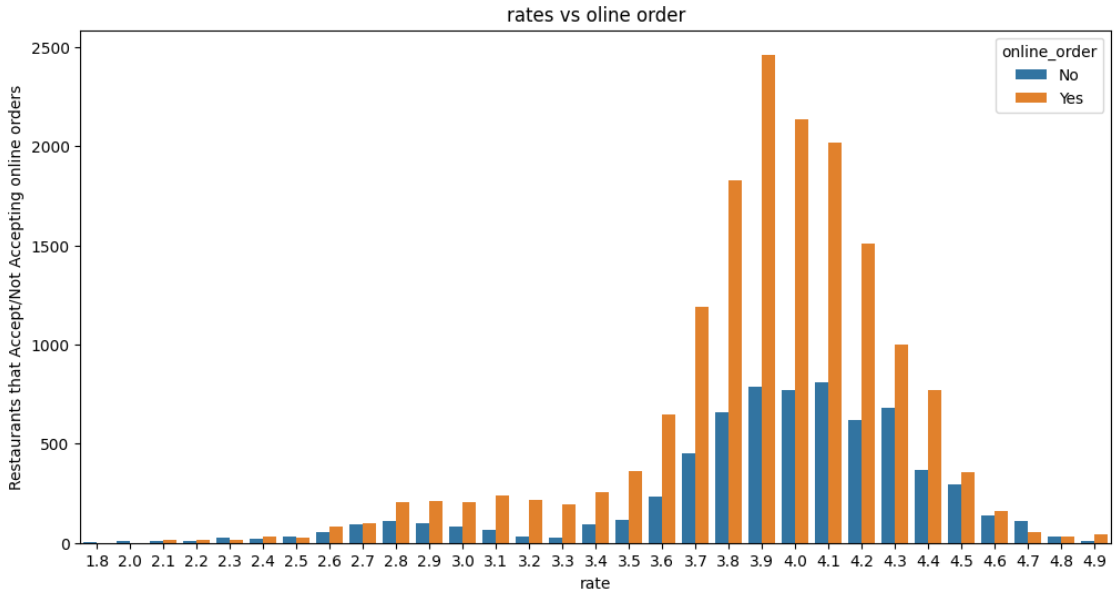
[133]:
```
plt.figure(figsize=(12,6))
pd.Series(cuisines_count).value_counts()[:10].plot(kind='bar',color= 'Purple')
plt.title('Top 10 cuisines in Bangalore')
plt.xlabel('cuisines type')
plt.ylabel('No of restaurants')
```

[133]: Text(0, 0.5, 'No of restaurants')



[134]:
```
plt.figure(figsize = (12,6))
sns.countplot(x=df['rate'], hue = df['online_order'])
plt.ylabel("Restaurants that Accept/Not Accepting online orders")
plt.title("rates vs oline order")
```

[134]: Text(0.5, 1.0, 'rates vs oline order')



MODEL BUILDING

[135]:
```
df['online_order']= pd.get_dummies(df.online_order, drop_first=True)
df['book_table']= pd.get_dummies(df.book_table, drop_first=True)
df
```

[135]:

	name	online_order	book_table	rate	votes	location	rest_type	dish_liked	cuisines	average_cost
0	Jalsa	True	True	4.1	775	Banashankari	Casual Dining	Pasta, Lunch Buffet, Masala Papad, Paneer Laja…		
1	Spice Elephant	True	False	4.1	787	Banashankari	Casual Dining	Momos, Lunch Buffet, Chocolate Nirvana, Thai G…		
2	San Churro Cafe	True	False	3.8	918	Banashankari	Cafe, Casual Dining	Churros, Cannelloni, Minestrone Soup, Hot Choc…		
3	Addhuri Udupi Bhojana	False	False	3.7	88	Banashankari	Quick Bites	Masala Dosa		
4	Grand Village	False	False	3.8	166	Basavanagudi	Casual Dining	Panipuri, Gol Gappe		
…	…	…	…	…	…	…	…	…		
51705	Izakaya Gastro Pub	True	True	3.8	128	Whitefield	Bar, Casual Dining	Beer, Chicken Guntur, Paneer Tikka, Fish, Nood…		
51707	M Bar - Bengaluru Marriott Hotel Whitefield	False	False	3.9	77	Whitefield	Fine Dining, Bar	Rooftop Ambience		
51708	Keys Cafe - Keys Hotel	False	False	2.8	161	Whitefield	Casual Dining, Bar	Salads, Coffee, Breakfast Buffet, Halwa, Chick…		
51711	Bhagini	False	False	2.5	81	Whitefield	Casual Dining, Bar	Biryani, Andhra Meal		
51715	Chime - Sheraton Grand Bengaluru Whitefield Ho…	False	True	4.3	236	ITPL Main Road, Whitefield	Bar	Cocktails, Pizza, Buttermilk		

```
0                   North Indian, Mughlai, Chinese          800
1                      Chinese, North Indian, Thai          800
2                           Cafe, Mexican, Italian          800
3                        South Indian, North Indian          300
4                          North Indian, Rajasthani          600
…                                                  …          …
51705     North Indian, Continental, Mediterranean        1,200
51707                                  Finger Food        2,000
51708           Chinese, Continental, North Indian        1,200
51711  Andhra, South Indian, Chinese, North Indian          800
51715                                  Finger Food        2,500

                                            reviews_list menu_item  \
0      [('Rated 4.0', 'RATED\n  A beautiful place to …         []
1      [('Rated 4.0', 'RATED\n  Had been here for din…         []
2      [('Rated 3.0', "RATED\n  Ambience is not that …         []
3      [('Rated 4.0', "RATED\n  Great food and proper…         []
4      [('Rated 4.0', 'RATED\n  Very good restaurant …         []
…                                                    …       …
51705  [('Rated 3.0', "RATED\n  Nice place to hangout…         []
51707  [('Rated 4.0', 'RATED\n  Went there post dinne…         []
51708  [('Rated 3.0', 'RATED\n  Place is good not tha…         []
51711  [('Rated 4.0', 'RATED\n  A fine place to chill…         []
51715  [('Rated 4.0', 'RATED\n  Nice and friendly pla…         []

      listed_in(type)
0             Buffet
1             Buffet
2             Buffet
3             Buffet
4             Buffet
…               …
51705   Pubs and bars
51707   Pubs and bars
51708   Pubs and bars
51711   Pubs and bars
51715   Pubs and bars

[23259 rows x 13 columns]
```

[136]:
```
df.drop(columns=['dish_liked','reviews_list','menu_item','listed_in(type)'],␣
↪inplace  =True)
```

[137]:
```
df['rest_type'] = df['rest_type'].str.replace(',' , '')
df['rest_type'] = df['rest_type'].astype(str).apply(lambda x: ' '.join(sorted(x.
↪split())))
df['rest_type'].value_counts().head()
```

[137]:
```
rest_type
Casual Dining          7331
Bites Quick            5253
Cafe                   2375
Bar Casual Dining      1321
Dessert Parlor         1083
Name: count, dtype: int64
```

[138]:
```
df['cuisines'] = df['cuisines'].str.replace(',' , '')
df['cuisines'] = df['cuisines'].astype(str).apply(lambda x: ' '.join(sorted(x.
 ↪split())))
df['cuisines'].value_counts().head()
```

[138]:
```
cuisines
Indian North                           1152
Chinese Indian North                    852
Chinese Indian Indian North South       455
Indian South                            366
Cream Desserts Ice                      334
Name: count, dtype: int64
```

LABEL ENCODING

[139]:
```
from sklearn.preprocessing import LabelEncoder
T = LabelEncoder()
df['location'] = T.fit_transform(df['location'])
df['rest_type'] = T.fit_transform(df['rest_type'])
df['cuisines'] = T.fit_transform(df['cuisines'])
```

[140]:
```
df["average_cost"] = df["average_cost"].str.replace(',' , '')
```

[141]:
```
df["average_cost"] = df["average_cost"].astype('float')
```

[142]:
```
df.head()
```

[142]:

	name	online_order	book_table	rate	votes	location	rest_type	cuisines	average_cost
0	Jalsa	True	True	4.1	775	1	29	951	800.0
1	Spice Elephant	True	False	4.1	787	1	29	963	800.0
2	San Churro Cafe	True	False	3.8	918	1	22	806	800.0
3	Addhuri Udupi Bhojana	False	False	3.7	88	1	19	1201	300.0
4	Grand Village	False	False	3.8	166	4			

```
4          29       1237          600.0
```

[143]:
```
x = df.drop(['rate','name'],axis = 1)
```

[144]:
```
y = df['rate']
```

[145]:
```
x.shape
```

[145]:
```
(23259, 7)
```

[146]:
```
y.shape
```

[146]:
```
(23259,)
```

SPLITTING DATA FOR MODEL BUILDING

[147]:
```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test = train_test_split(x,y,test_size = 0.
↪3,random_state = 33)
```

[148]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 23259 entries, 0 to 51715
Data columns (total 9 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   name          23259 non-null  object
 1   online_order  23259 non-null  bool
 2   book_table    23259 non-null  bool
 3   rate          23259 non-null  float64
 4   votes         23259 non-null  int64
 5   location      23259 non-null  int32
 6   rest_type     23259 non-null  int32
 7   cuisines      23259 non-null  int32
 8   average_cost  23259 non-null  float64
dtypes: bool(2), float64(2), int32(3), int64(1), object(1)
memory usage: 1.2+ MB
```

[149]:
```
from sklearn.preprocessing import StandardScaler
num_values1=df.select_dtypes(['float64','int64']).columns
scaler = StandardScaler()
scaler.fit(df[num_values1])
df[num_values1]=scaler.transform(df[num_values1])
```

[150]:
```
df.head()
```

[150]:
```
                    name  online_order  book_table      rate     votes  \
0                  Jalsa          True        True  0.455722  0.152328
1         Spice Elephant          True       False  0.455722  0.163105
2        San Churro Cafe          True       False -0.248401  0.280757
3  Addhuri Udupi Bhojana         False       False -0.483109 -0.464668
4          Grand Village         False       False -0.248401 -0.394616

   location  rest_type  cuisines  average_cost
0         1         29       951      0.089176
1         1         29       963      0.089176
2         1         22       806      0.089176
3         1         19      1201     -0.871467
4         4         29      1237     -0.295081
```

MODEL 1 Linear Regression

[151]:
```
from sklearn.linear_model import LinearRegression
lr = LinearRegression()
lr.fit(X_train,y_train)
y_pred_lr = lr.predict(X_test)
```

[152]:
```
lr.score(X_test, y_test)*100
```

[152]:
```
21.076424408263183
```

MODEL 2 Random Forest

[153]:
```
from sklearn import metrics
from sklearn.ensemble import RandomForestRegressor
rfr = RandomForestRegressor()
rfr.fit(X_train,y_train)
y_pred_rfr = rfr.predict(X_test)
```

[154]:
```
rfr.score(X_test,y_test)*100
```

[154]:
```
91.03313748519184
```

MODEL 3 Lasso Regression

[155]:
```
from sklearn.linear_model import Lasso
ls = Lasso()
ls.fit(X_train,y_train)
y_pred_ls = ls.predict(X_test)
```

[156]:
```
ls.score(X_test,y_test)*100
```

[156]:
```
18.05145407448734
```

CONCLUSION : Out of 3 model RANDOM FOREST has yield maximum accuracy

Comparision of ACTUAL and PREDICTED VALUES

RANDOM FOREST REGRESSOR PREDICTION

[157]:
```
Randpred = pd.DataFrame({ "actual": y_test, "pred": y_pred_rfr })
Randpred
```

[157]:

	actual	pred
26296	4.0	3.815800
2577	3.3	3.300000
9737	4.0	3.991000
42192	3.9	4.065000
38504	4.0	4.000000
…	…	…
40535	4.6	4.591333
43929	4.2	4.200000
4802	4.2	4.204000
10230	3.7	3.702000
19948	4.0	4.031000

[6978 rows x 2 columns]

[ ]: