Big mart Sales Prediction

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In [129…
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.model_selection import train_test_split

from sklearn.linear_model import LinearRegression
from sklearn.svm import SVR
from sklearn.ensemble import RandomForestRegressor
from sklearn.ensemble import GradientBoostingRegressor

from xgboost import XGBRFRegressor
from catboost import CatBoostRegressor
from lightgbm import LGBMRegressor

import warnings
warnings.filterwarnings('ignore')

import pickle
```

In [2]:
```
dataset = pd.read_csv('train.csv')
```

In [3]:
```
dataset.head()
```

Out[3]:

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier
0	FDA15	9.30	Low Fat	0.016047	Dairy	249.8092	OUT049
1	DRC01	5.92	Regular	0.019278	Soft Drinks	48.2692	OUT018
2	FDN15	17.50	Low Fat	0.016760	Meat	141.6180	OUT049
3	FDX07	19.20	Regular	0.000000	Fruits and Vegetables	182.0950	OUT010
4	NCD19	8.93	Low Fat	0.000000	Household	53.8614	OUT013

In [4]:
```
dataset.tail()
```

Out[4]:

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identif
8518	FDF22	6.865	Low Fat	0.056783	Snack Foods	214.5218	OUT0
8519	FDS36	8.380	Regular	0.046982	Baking Goods	108.1570	OUT0
8520	NCJ29	10.600	Low Fat	0.035186	Health and Hygiene	85.1224	OUT0
8521	FDN46	7.210	Regular	0.145221	Snack Foods	103.1332	OUT0
8522	DRG01	14.800	Low Fat	0.044878	Soft Drinks	75.4670	OUT0

In [5]:
```
dataset.shape
```

Out[5]:
```
(8523, 12)
```

In [6]:
```
print('Number of Rows:',dataset.shape[0])
print('Number of Columns:',dataset.shape[1])
```

```
Number of Rows: 8523
Number of Columns: 12
```

In [7]:
```
dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8523 entries, 0 to 8522
Data columns (total 12 columns):
 #   Column                     Non-Null Count  Dtype  
---  ------                     --------------  -----  
 0   Item_Identifier            8523 non-null   object 
 1   Item_Weight                7060 non-null   float64
 2   Item_Fat_Content           8523 non-null   object 
 3   Item_Visibility            8523 non-null   float64
 4   Item_Type                  8523 non-null   object 
 5   Item_MRP                   8523 non-null   float64
 6   Outlet_Identifier          8523 non-null   object 
 7   Outlet_Establishment_Year  8523 non-null   int64  
 8   Outlet_Size                6113 non-null   object 
 9   Outlet_Location_Type       8523 non-null   object 
 10  Outlet_Type                8523 non-null   object 
 11  Item_Outlet_Sales          8523 non-null   float64
dtypes: float64(4), int64(1), object(7)
memory usage: 799.2+ KB
```

In [8]:
```
dataset.isnull().sum()
```

Out[8]:
```
Item_Identifier                 0
Item_Weight                  1463
Item_Fat_Content                0
Item_Visibility                 0
Item_Type                       0
Item_MRP                        0
Outlet_Identifier               0
Outlet_Establishment_Year       0
Outlet_Size                  2410
Outlet_Location_Type            0
Outlet_Type                     0
Item_Outlet_Sales               0
dtype: int64
```

In [9]:
```
dataset.duplicated().sum()
```

Out[9]:
```
0
```

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

Out[10]:

	Item_Weight	Item_Visibility	Item_MRP	Outlet_Establishment_Year	Item_Outlet_Sales
count	7060.000000	8523.000000	8523.000000	8523.000000	8523.000000
mean	12.857645	0.066132	140.992782	1997.831867	2181.288914
std	4.643456	0.051598	62.275067	8.371760	1706.499616
min	4.555000	0.000000	31.290000	1985.000000	33.290000
25%	8.773750	0.026989	93.826500	1987.000000	834.247400
50%	12.600000	0.053931	143.012800	1999.000000	1794.331000
75%	16.850000	0.094585	185.643700	2004.000000	3101.296400
max	21.350000	0.328391	266.888400	2009.000000	13086.964800

In [11]:
```
dataset.corr()
```

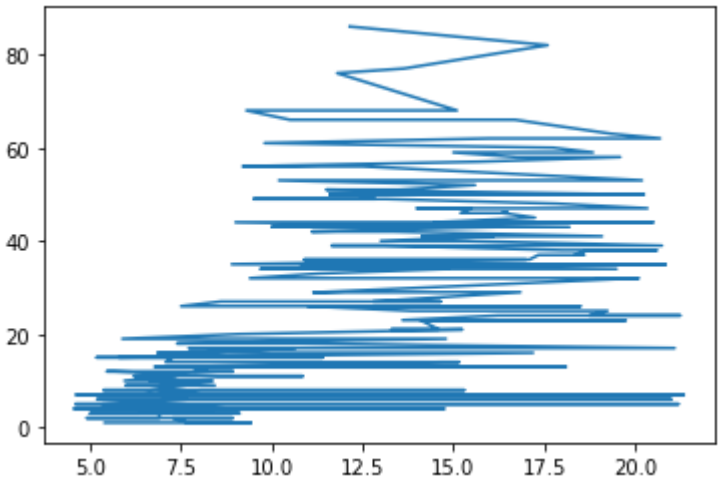
Out[11]:

	Item_Weight	Item_Visibility	Item_MRP	Outlet_Establishment_Year	Item_Outlet
Item_Weight	1.000000	-0.014048	0.027141	-0.011588	0.0
Item_Visibility	-0.014048	1.000000	-0.001315	-0.074834	-0.1
Item_MRP	0.027141	-0.001315	1.000000	0.005020	0.5
Outlet_Establishment_Year	-0.011588	-0.074834	0.005020	1.000000	-0.0
Item_Outlet_Sales	0.014123	-0.128625	0.567574	-0.049135	1.0

In [12]:
```
dataset.columns
```

Out[12]:
```
Index(['Item_Identifier', 'Item_Weight', 'Item_Fat_Content', 'Item_Visibilit
y',
       'Item_Type', 'Item_MRP', 'Outlet_Identifier',
       'Outlet_Establishment_Year', 'Outlet_Size', 'Outlet_Location_Type',
       'Outlet_Type', 'Item_Outlet_Sales'],
      dtype='object')
```

In [13]:
```
dataset['Item_Weight'].value_counts().plot(kind='line')
plt.show()
```



In [14]:
```
dataset['Outlet_Size'].value_counts()
```

Out[14]:
```
Medium    2793
Small     2388
High       932
Name: Outlet_Size, dtype: int64
```

In [15]:
```
dataset['Outlet_Type'].value_counts()
```

Out[15]:
```
Supermarket Type1    5577
Grocery Store        1083
Supermarket Type3     935
Supermarket Type2     928
Name: Outlet_Type, dtype: int64
```

In [16]:
```
dataset['Item_Fat_Content'].value_counts()
```

Out[16]:
```
Low Fat    5089
Regular    2889
LF          316
reg         117
low fat     112
Name: Item_Fat_Content, dtype: int64
```

In [17]:
```
dataset['Item_Type'].value_counts()
```

Out[17]:
```
Fruits and Vegetables    1232
Snack Foods              1200
Household                 910
Frozen Foods              856
Dairy                     682
Canned                    649
Baking Goods              648
Health and Hygiene        520
Soft Drinks               445
Meat                      425
Breads                    251
Hard Drinks               214
Others                    169
Starchy Foods             148
Breakfast                 110
Seafood                    64
Name: Item_Type, dtype: int64
```

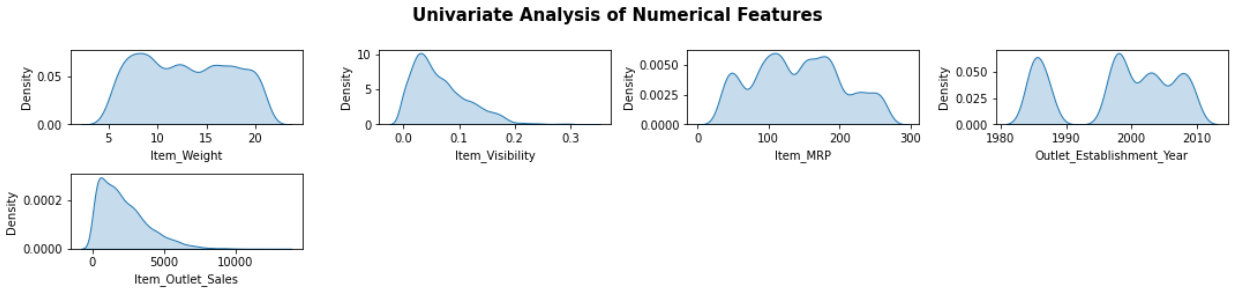
In [18]:
```
dataset['Item_Identifier'].value_counts()
```

Out[18]:
```
FDW13     10
FDG33     10
NCY18      9
FDD38      9
DRE49      9
          ..
FDY43      1
FDQ60      1
FDO33      1
DRF48      1
FDC23      1
Name: Item_Identifier, Length: 1559, dtype: int64
```

In [19]:
```
num_cols = [x for x in dataset.columns if dataset[x].dtypes!='object']
```

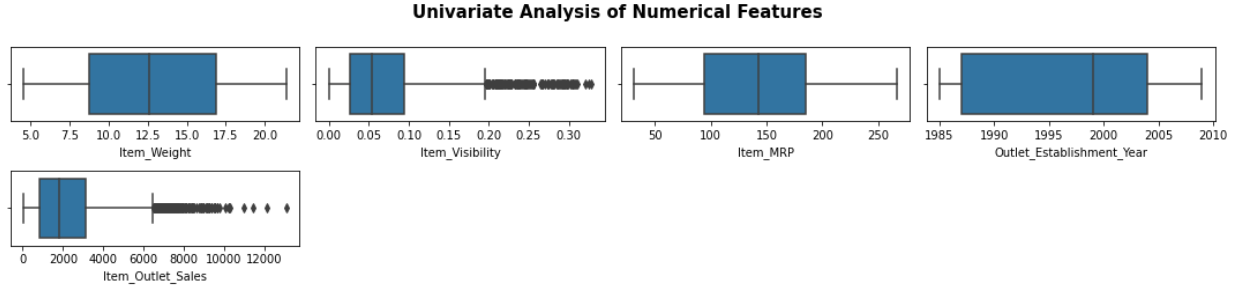
In [20]:
```
plt.figure(figsize=(15,15))
plt.suptitle('Univariate Analysis of Numerical Features',fontweight='bold',fon

for i in range(0,len(num_cols)):
    plt.subplot(10,4,i+1)
    sns.kdeplot(x=dataset[num_cols[i]],shade=True)
    plt.tight_layout()
```



In [21]:
```
plt.figure(figsize=(15,15))
plt.suptitle('Univariate Analysis of Numerical Features',fontweight='bold',fon

for i in range(0,len(num_cols)):
    plt.subplot(10,4,i+1)
    sns.boxplot(x=dataset[num_cols[i]])
    plt.tight_layout()
```



In [22]:
```
dataset.replace({'Item_Fat_Content':{'LF':'Low Fat','low fat':'Low Fat','reg':
```

In [23]:
```
dataset['Item_Fat_Content'].value_counts()
```

Out[23]:
```
Low Fat    5517
Regular    3006
Name: Item_Fat_Content, dtype: int64
```

In [24]:
```
# Univariate Imputation

mean_weight = dataset['Item_Weight'].mean()
median_weight = dataset['Item_Weight'].median()

print(mean_weight, median_weight)
```

```
12.857645184135976 12.6
```

In [25]:
```
dataset['Item_Weight_mean'] = dataset['Item_Weight'].fillna(mean_weight)
dataset['Item_Weight_median'] = dataset['Item_Weight'].fillna(median_weight)
```

In [26]:
```
dataset.head()
```

Out[26]:

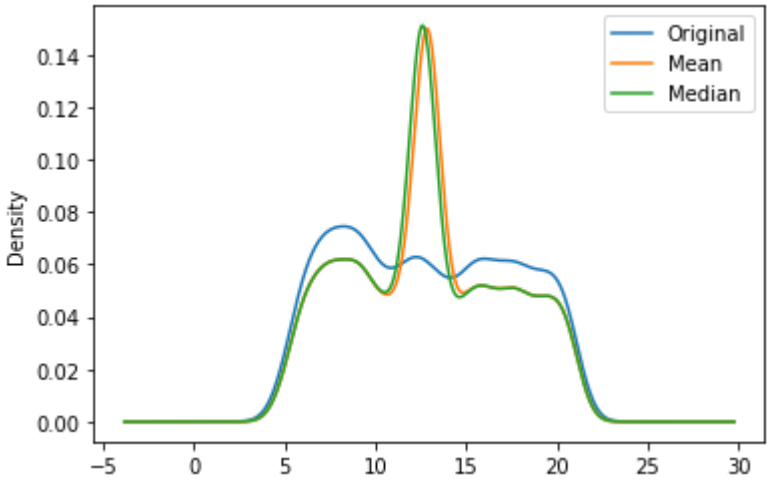
	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier
0	FDA15	9.30	Low Fat	0.016047	Dairy	249.8092	OUT049
1	DRC01	5.92	Regular	0.019278	Soft Drinks	48.2692	OUT018
2	FDN15	17.50	Low Fat	0.016760	Meat	141.6180	OUT049
3	FDX07	19.20	Regular	0.000000	Fruits and Vegetables	182.0950	OUT010
4	NCD19	8.93	Low Fat	0.000000	Household	53.8614	OUT013

In [27]:
```
print('Original Weight Variable Variance :', dataset['Item_Weight'].var())
print('Item Weight Variance After Mean Imputation :', dataset['Item_Weight_mean
print('Item Weight Variance After Median Imputation :', dataset['Item_Weight_m
```

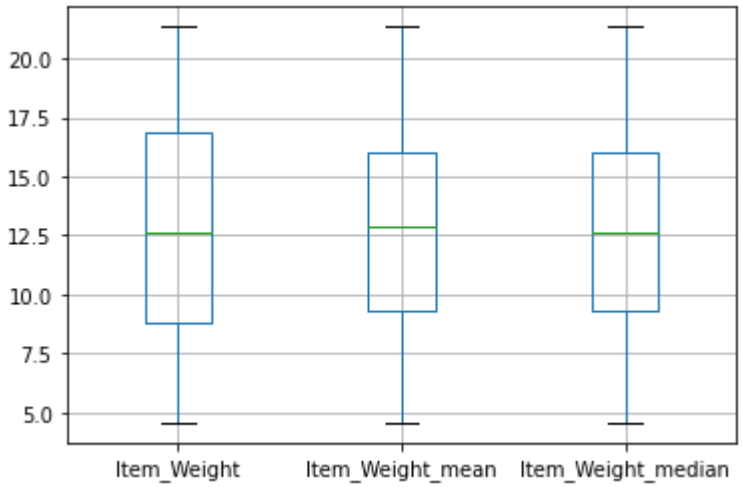
```
Original Weight Variable Variance : 21.561688259836558
Item Weight Variance After Mean Imputation : 17.86012173506058
Item Weight Variance After Median Imputation : 17.869561454073647
```

In [28]:
```
dataset['Item_Weight'].plot(kind='kde', label='Original')
dataset['Item_Weight_mean'].plot(kind='kde', label='Mean')
dataset['Item_Weight_median'].plot(kind='kde', label='Median')

plt.legend()
plt.show()
```



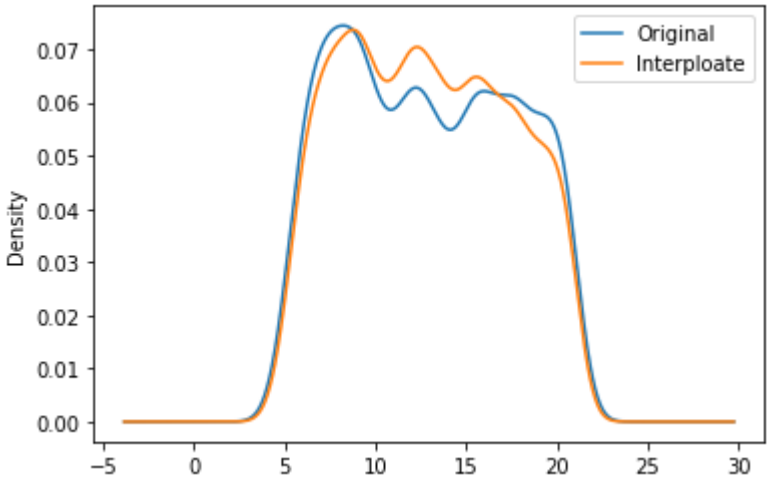
In [29]:
```
dataset[['Item_Weight', 'Item_Weight_mean', 'Item_Weight_median']].boxplot()
plt.show()
```



In [30]:
```
dataset['Item_Weight_interploate'] = dataset['Item_Weight'].interpolate(method
```

In [31]:
```
dataset['Item_Weight'].plot(kind='kde', label='Original')
dataset['Item_Weight_interploate'].plot(kind='kde', label='Interploate')

plt.legend()
plt.show()
```



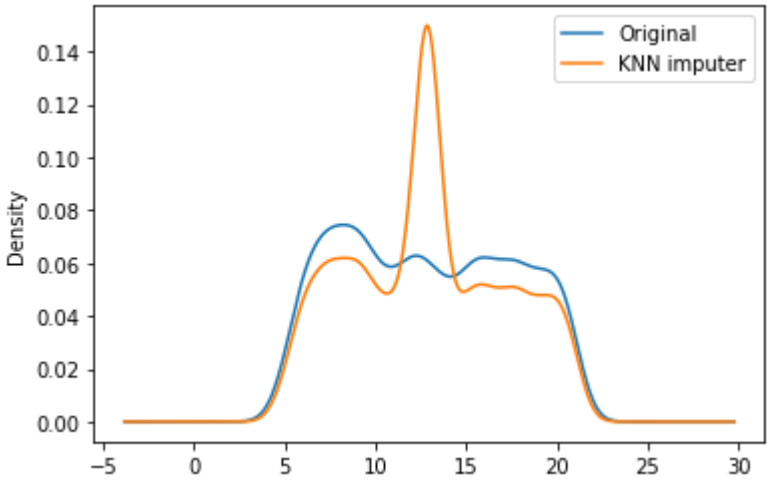
In [32]:
```
# Multivariate Imputaion

from sklearn.impute import KNNImputer

knn = KNNImputer(n_neighbors=10, weights='distance')
dataset['knn_imputer'] = knn.fit_transform(dataset[['Item_Weight']]).ravel()
```

In [33]:
```
dataset['Item_Weight'].plot(kind='kde', label='Original')
dataset['knn_imputer'].plot(kind='kde', label='KNN imputer')

plt.legend()
plt.show()
```



In [34]:
```
# dataset = dataset.drop(['Item_Weight', 'Item_Weight_mean', 'Item_Weight_medi
```

In [35]:
```
mode_outlet = dataset.pivot_table(values='Outlet_Size', columns='Outlet_Type',
```

In [36]:
```
mode_outlet
```

Out[36]:

Outlet_Type	Grocery Store	Supermarket Type1	Supermarket Type2	Supermarket Type3
Outlet_Size	Small	Small	Medium	Medium

In [37]:
```
missing_values = dataset['Outlet_Size'].isnull()
missing_values.sum()
```

Out[37]:
```
2410
```

In [38]:
```
dataset.loc[missing_values, 'Outlet_Size'] = dataset.loc[missing_values, 'Outl
```

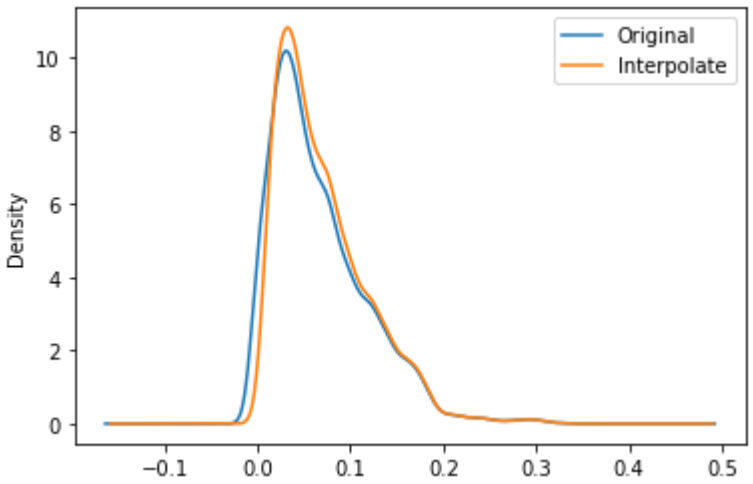
In [39]:
```
dataset['Item_Visibility_interpolate'] = dataset['Item_Visibility'].replace(0,
```

In [40]:
```
dataset['Item_Visibility_interpolate'].value_counts()
```

Out[40]:
```
0.076975    3
0.044024    2
0.040912    2
0.076856    2
0.078759    2
           ..
0.021011    1
0.099189    1
0.076866    1
0.014116    1
0.044878    1
Name: Item_Visibility_interpolate, Length: 8405, dtype: int64
```

In [41]:
```
dataset['Item_Visibility'].plot(kind='kde', label='Original')
dataset['Item_Visibility_interpolate'].plot(kind='kde', label='Interpolate')

plt.legend()
plt.show()
```



In [42]:
```
# dataset = dataset.drop('Item_Visibility', axis=1)
```

In [48]:
```
dataset['Item_Identifier'].value_counts()
```

Out[48]:
```
FDW13    10
FDG33    10
NCY18     9
FDD38     9
DRE49     9
         ..
FDY43     1
FDQ60     1
FDO33     1
DRF48     1
FDC23     1
Name: Item_Identifier, Length: 1559, dtype: int64
```

In [43]:
```
dataset['Item_Identifier'] = dataset['Item_Identifier'].apply(lambda x : x[:2]
```

In [44]:
```
dataset['Item_Identifier'].value_counts()
```

Out[44]:
```
FD    6125
NC    1599
DR     799
Name: Item_Identifier, dtype: int64
```

In [45]:
```
dataset['Outlet_Establishment_Year']
```

Out[45]:
```
0       1999
1       2009
2       1999
3       1998
4       1987
        ...
8518    1987
8519    2002
8520    2004
8521    2009
8522    1997
Name: Outlet_Establishment_Year, Length: 8523, dtype: int64
```

In [46]:
```
import datetime as dt

current_year = dt.datetime.today().year

dataset['Outlet_Age'] = current_year - dataset['Outlet_Establishment_Year']
```

In [47]:
```
dataset = dataset.drop('Outlet_Establishment_Year', axis=1)
```

In [48]:
```
dataset.head()
```

Out[48]:

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Size	Outlet_Location
0	FD	Low Fat	Dairy	249.8092	OUT049	Medium	
1	DR	Regular	Soft Drinks	48.2692	OUT018	Medium	
2	FD	Low Fat	Meat	141.6180	OUT049	Medium	
3	FD	Regular	Fruits and Vegetables	182.0950	OUT010	Small	
4	NC	Low Fat	Household	53.8614	OUT013	High	

In [52]:
```
from sklearn.preprocessing import OrdinalEncoder

dataset_encoded = dataset.copy()

cat_cols = dataset.select_dtypes(include=['object']).columns

for col in cat_cols:
    oe = OrdinalEncoder()
    dataset_encoded[col] = oe.fit_transform(dataset_encoded[[col]])
    print(oe.categories_)
```

```
[array(['DR', 'FD', 'NC'], dtype=object)]
[array(['Low Fat', 'Regular'], dtype=object)]
[array(['Baking Goods', 'Breads', 'Breakfast', 'Canned', 'Dairy',
       'Frozen Foods', 'Fruits and Vegetables', 'Hard Drinks',
       'Health and Hygiene', 'Household', 'Meat', 'Others', 'Seafood',
       'Snack Foods', 'Soft Drinks', 'Starchy Foods'], dtype=object)]
[array(['OUT010', 'OUT013', 'OUT017', 'OUT018', 'OUT019', 'OUT027',
       'OUT035', 'OUT045', 'OUT046', 'OUT049'], dtype=object)]
[array(['High', 'Medium', 'Small'], dtype=object)]
[array(['Tier 1', 'Tier 2', 'Tier 3'], dtype=object)]
[array(['Grocery Store', 'Supermarket Type1', 'Supermarket Type2',
       'Supermarket Type3'], dtype=object)]
```

In [53]:
```
dataset_encoded.head()
```

Out[53]:

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Size	Outlet_Location_
0	1.0	0.0	4.0	249.8092	9.0	1.0	
1	0.0	1.0	14.0	48.2692	3.0	1.0	
2	1.0	0.0	10.0	141.6180	9.0	1.0	
3	1.0	1.0	6.0	182.0950	0.0	2.0	
4	2.0	0.0	9.0	53.8614	1.0	0.0	

In [57]:
```
X = dataset_encoded.drop('Item_Outlet_Sales', axis=1)
y = dataset_encoded['Item_Outlet_Sales']
```

In [81]:
```
X.drop(columns=['Item_Visibility_interpolate', 'Item_Weight_interploate',
                'Item_Type', 'Outlet_Location_Type', 'Item_Identifier', 'Item_I
```

In [95]:
```
lr = LinearRegression()
lr.fit(X_train,y_train)

svr  = SVR()
svr.fit(X_train,y_train)

rf = RandomForestRegressor()
rf.fit(X_train,y_train)

gr = GradientBoostingRegressor()
gr.fit(X_train,y_train)

xg = XGBRFRegressor()
xg.fit(X_train,y_train)

ct = CatBoostRegressor()
ct.fit(X_train,y_train)

lgm = LGBMRegressor()
lgm.fit(X_train,y_train)
```

```
Learning rate set to 0.055449
0:      learn: 1668.9898332     total: 160ms    remaining: 2m 40s
1:      learn: 1620.2758744     total: 168ms    remaining: 1m 23s
2:      learn: 1577.0711152     total: 174ms    remaining: 58s
3:      learn: 1534.1779228     total: 181ms    remaining: 45.1s
4:      learn: 1495.1485770     total: 186ms    remaining: 37s
5:      learn: 1459.4856443     total: 191ms    remaining: 31.7s
6:      learn: 1430.8555868     total: 194ms    remaining: 27.6s
7:      learn: 1401.3861197     total: 199ms    remaining: 24.6s
8:      learn: 1375.3079490     total: 203ms    remaining: 22.4s
9:      learn: 1349.9880321     total: 209ms    remaining: 20.6s
10:     learn: 1326.0270815     total: 213ms    remaining: 19.1s
11:     learn: 1303.8399810     total: 216ms    remaining: 17.8s
12:     learn: 1284.1536717     total: 219ms    remaining: 16.6s
13:     learn: 1265.7466968     total: 222ms    remaining: 15.6s
14:     learn: 1249.9335063     total: 225ms    remaining: 14.7s
15:     learn: 1235.9573103     total: 227ms    remaining: 14s
16:     learn: 1221.9531006     total: 229ms    remaining: 13.3s
17:     learn: 1209.4367119     total: 232ms    remaining: 12.6s
18:     learn: 1197.8455299     total: 234ms    remaining: 12.1s
19:     learn: 1186.9730333     total: 237ms    remaining: 11.6s
20:     learn: 1177.2075461     total: 240ms    remaining: 11.2s
21:     learn: 1168.6702874     total: 243ms    remaining: 10.8s
22:     learn: 1160.6188922     total: 246ms    remaining: 10.4s
23:     learn: 1153.5530473     total: 248ms    remaining: 10.1s
24:     learn: 1146.7635943     total: 250ms    remaining: 9.76s
25:     learn: 1141.3251825     total: 252ms    remaining: 9.44s
26:     learn: 1135.8859600     total: 254ms    remaining: 9.17s
27:     learn: 1131.5618820     total: 257ms    remaining: 8.94s
28:     learn: 1126.9443254     total: 260ms    remaining: 8.69s
29:     learn: 1123.2837729     total: 261ms    remaining: 8.45s
30:     learn: 1120.0323839     total: 263ms    remaining: 8.23s
31:     learn: 1116.9581355     total: 265ms    remaining: 8.02s
32:     learn: 1114.4275644     total: 267ms    remaining: 7.82s
33:     learn: 1111.7214598     total: 269ms    remaining: 7.64s
34:     learn: 1108.8392683     total: 271ms    remaining: 7.47s
35:     learn: 1106.0702332     total: 273ms    remaining: 7.31s
36:     learn: 1103.7559448     total: 275ms    remaining: 7.16s
37:     learn: 1101.9855774     total: 277ms    remaining: 7.01s
38:     learn: 1100.0576308     total: 279ms    remaining: 6.87s
39:     learn: 1098.3049414     total: 281ms    remaining: 6.74s
40:     learn: 1096.5893246     total: 283ms    remaining: 6.61s
41:     learn: 1095.5393794     total: 284ms    remaining: 6.49s
42:     learn: 1094.5870108     total: 286ms    remaining: 6.37s
43:     learn: 1093.2507746     total: 288ms    remaining: 6.26s
44:     learn: 1092.0231330     total: 290ms    remaining: 6.16s
45:     learn: 1091.0442903     total: 292ms    remaining: 6.06s
46:     learn: 1090.1601394     total: 294ms    remaining: 5.96s
47:     learn: 1088.8705394     total: 296ms    remaining: 5.87s
48:     learn: 1088.0259475     total: 298ms    remaining: 5.78s
49:     learn: 1087.2675580     total: 300ms    remaining: 5.7s
50:     learn: 1086.5691140     total: 302ms    remaining: 5.61s
51:     learn: 1086.0725945     total: 304ms    remaining: 5.54s
52:     learn: 1085.7882661     total: 305ms    remaining: 5.45s
53:     learn: 1085.2293388     total: 307ms    remaining: 5.37s
54:     learn: 1084.7903396     total: 309ms    remaining: 5.3s
55:     learn: 1084.2512368     total: 311ms    remaining: 5.24s
56:     learn: 1083.7984871     total: 312ms    remaining: 5.16s
57:     learn: 1083.4039641     total: 314ms    remaining: 5.1s
58:     learn: 1083.0691749     total: 316ms    remaining: 5.04s
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59:     learn: 1082.5951795     total: 318ms    remaining: 4.99s
60:     learn: 1082.3665736     total: 320ms    remaining: 4.93s
61:     learn: 1081.8675847     total: 322ms    remaining: 4.88s
62:     learn: 1081.6944103     total: 324ms    remaining: 4.82s
63:     learn: 1081.4405503     total: 326ms    remaining: 4.76s
64:     learn: 1081.2856910     total: 328ms    remaining: 4.71s
65:     learn: 1080.9647975     total: 330ms    remaining: 4.66s
66:     learn: 1080.5481725     total: 331ms    remaining: 4.62s
67:     learn: 1080.1698983     total: 333ms    remaining: 4.57s
68:     learn: 1080.0245820     total: 335ms    remaining: 4.52s
69:     learn: 1079.7919448     total: 337ms    remaining: 4.48s
70:     learn: 1079.6786133     total: 339ms    remaining: 4.44s
71:     learn: 1079.4429334     total: 341ms    remaining: 4.4s
72:     learn: 1079.2721667     total: 343ms    remaining: 4.36s
73:     learn: 1078.9845032     total: 345ms    remaining: 4.32s
74:     learn: 1078.7082959     total: 347ms    remaining: 4.28s
75:     learn: 1078.6061535     total: 349ms    remaining: 4.24s
76:     learn: 1078.5184138     total: 351ms    remaining: 4.2s
77:     learn: 1078.3937720     total: 353ms    remaining: 4.17s
78:     learn: 1078.1554760     total: 355ms    remaining: 4.13s
79:     learn: 1077.8497818     total: 357ms    remaining: 4.1s
80:     learn: 1077.7406089     total: 359ms    remaining: 4.07s
81:     learn: 1077.6010557     total: 360ms    remaining: 4.04s
82:     learn: 1077.3614489     total: 362ms    remaining: 4s
83:     learn: 1077.1850351     total: 364ms    remaining: 3.97s
84:     learn: 1076.9718680     total: 366ms    remaining: 3.94s
85:     learn: 1076.7513828     total: 368ms    remaining: 3.91s
86:     learn: 1076.5218632     total: 370ms    remaining: 3.89s
87:     learn: 1076.3635229     total: 372ms    remaining: 3.86s
88:     learn: 1076.2371849     total: 374ms    remaining: 3.83s
89:     learn: 1076.2288159     total: 375ms    remaining: 3.79s
90:     learn: 1076.0923887     total: 377ms    remaining: 3.76s
91:     learn: 1076.0780623     total: 378ms    remaining: 3.73s
92:     learn: 1075.9253013     total: 380ms    remaining: 3.71s
93:     learn: 1075.6883620     total: 382ms    remaining: 3.69s
94:     learn: 1075.4866523     total: 384ms    remaining: 3.66s
95:     learn: 1075.3314353     total: 386ms    remaining: 3.64s
96:     learn: 1075.1852793     total: 388ms    remaining: 3.62s
97:     learn: 1074.9581549     total: 390ms    remaining: 3.59s
98:     learn: 1074.8109119     total: 393ms    remaining: 3.57s
99:     learn: 1074.7288804     total: 396ms    remaining: 3.56s
100:    learn: 1074.6018956     total: 398ms    remaining: 3.54s
101:    learn: 1074.5057541     total: 400ms    remaining: 3.52s
102:    learn: 1074.4040896     total: 402ms    remaining: 3.5s
103:    learn: 1074.3876287     total: 404ms    remaining: 3.48s
104:    learn: 1074.2600486     total: 406ms    remaining: 3.46s
105:    learn: 1074.1221838     total: 408ms    remaining: 3.44s
106:    learn: 1074.1188618     total: 410ms    remaining: 3.42s
107:    learn: 1073.7771692     total: 412ms    remaining: 3.4s
108:    learn: 1073.7012151     total: 415ms    remaining: 3.39s
109:    learn: 1073.6053210     total: 416ms    remaining: 3.37s
110:    learn: 1073.4134741     total: 419ms    remaining: 3.35s
111:    learn: 1073.2871675     total: 421ms    remaining: 3.34s
112:    learn: 1073.1581487     total: 423ms    remaining: 3.32s
113:    learn: 1073.1580565     total: 425ms    remaining: 3.3s
114:    learn: 1073.1036971     total: 429ms    remaining: 3.3s
115:    learn: 1073.0225070     total: 432ms    remaining: 3.29s
116:    learn: 1072.8506128     total: 434ms    remaining: 3.27s
117:    learn: 1072.7160101     total: 436ms    remaining: 3.26s
118:    learn: 1072.7154701     total: 437ms    remaining: 3.23s
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119:    learn: 1072.6897929     total: 439ms    remaining: 3.22s
120:    learn: 1072.6161581     total: 441ms    remaining: 3.21s
121:    learn: 1072.4003042     total: 444ms    remaining: 3.19s
122:    learn: 1072.2878122     total: 446ms    remaining: 3.18s
123:    learn: 1072.2577679     total: 448ms    remaining: 3.17s
124:    learn: 1072.1195327     total: 451ms    remaining: 3.15s
125:    learn: 1072.0003269     total: 453ms    remaining: 3.14s
126:    learn: 1071.9116473     total: 456ms    remaining: 3.13s
127:    learn: 1071.8636261     total: 459ms    remaining: 3.13s
128:    learn: 1071.7181453     total: 462ms    remaining: 3.12s
129:    learn: 1071.5310188     total: 464ms    remaining: 3.1s
130:    learn: 1071.5138505     total: 466ms    remaining: 3.09s
131:    learn: 1071.4555410     total: 468ms    remaining: 3.08s
132:    learn: 1071.4358099     total: 470ms    remaining: 3.06s
133:    learn: 1071.3296774     total: 472ms    remaining: 3.05s
134:    learn: 1071.2004197     total: 474ms    remaining: 3.04s
135:    learn: 1071.1916155     total: 475ms    remaining: 3.02s
136:    learn: 1071.1580805     total: 477ms    remaining: 3s
137:    learn: 1071.1107594     total: 479ms    remaining: 2.99s
138:    learn: 1070.9816294     total: 481ms    remaining: 2.98s
139:    learn: 1070.8773797     total: 482ms    remaining: 2.96s
140:    learn: 1070.8578110     total: 484ms    remaining: 2.95s
141:    learn: 1070.6849339     total: 486ms    remaining: 2.94s
142:    learn: 1070.5779364     total: 488ms    remaining: 2.93s
143:    learn: 1070.4116247     total: 490ms    remaining: 2.91s
144:    learn: 1070.3690127     total: 492ms    remaining: 2.9s
145:    learn: 1070.2688916     total: 494ms    remaining: 2.89s
146:    learn: 1070.0683317     total: 496ms    remaining: 2.88s
147:    learn: 1070.0395581     total: 497ms    remaining: 2.86s
148:    learn: 1069.9587927     total: 499ms    remaining: 2.85s
149:    learn: 1069.8155083     total: 501ms    remaining: 2.84s
150:    learn: 1069.6920052     total: 503ms    remaining: 2.83s
151:    learn: 1069.5299818     total: 505ms    remaining: 2.82s
152:    learn: 1069.3784088     total: 507ms    remaining: 2.81s
153:    learn: 1069.2680771     total: 509ms    remaining: 2.79s
154:    learn: 1069.2680702     total: 510ms    remaining: 2.78s
155:    learn: 1069.1221306     total: 512ms    remaining: 2.77s
156:    learn: 1069.0341973     total: 514ms    remaining: 2.76s
157:    learn: 1069.0273127     total: 515ms    remaining: 2.74s
158:    learn: 1068.7898254     total: 517ms    remaining: 2.73s
159:    learn: 1068.7452512     total: 519ms    remaining: 2.72s
160:    learn: 1068.5258482     total: 521ms    remaining: 2.71s
161:    learn: 1068.4512660     total: 523ms    remaining: 2.7s
162:    learn: 1068.3335441     total: 525ms    remaining: 2.69s
163:    learn: 1068.2650108     total: 527ms    remaining: 2.68s
164:    learn: 1068.1347347     total: 529ms    remaining: 2.67s
165:    learn: 1067.8803028     total: 531ms    remaining: 2.67s
166:    learn: 1067.8118014     total: 533ms    remaining: 2.66s
167:    learn: 1067.4749685     total: 534ms    remaining: 2.65s
168:    learn: 1067.1791194     total: 536ms    remaining: 2.64s
169:    learn: 1067.0023994     total: 539ms    remaining: 2.63s
170:    learn: 1066.8405454     total: 540ms    remaining: 2.62s
171:    learn: 1066.8107758     total: 542ms    remaining: 2.61s
172:    learn: 1066.5877708     total: 544ms    remaining: 2.6s
173:    learn: 1066.5821369     total: 545ms    remaining: 2.59s
174:    learn: 1066.2778654     total: 547ms    remaining: 2.58s
175:    learn: 1066.1761699     total: 549ms    remaining: 2.57s
176:    learn: 1066.0751775     total: 551ms    remaining: 2.56s
177:    learn: 1065.9053491     total: 553ms    remaining: 2.55s
178:    learn: 1065.7103610     total: 555ms    remaining: 2.55s
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179:    learn: 1065.4781831    total: 557ms    remaining: 2.54s
180:    learn: 1065.3980567    total: 559ms    remaining: 2.53s
181:    learn: 1065.0571415    total: 561ms    remaining: 2.52s
182:    learn: 1064.8741369    total: 563ms    remaining: 2.51s
183:    learn: 1064.5637562    total: 565ms    remaining: 2.51s
184:    learn: 1064.3209876    total: 567ms    remaining: 2.5s
185:    learn: 1064.0451379    total: 569ms    remaining: 2.49s
186:    learn: 1063.8519037    total: 572ms    remaining: 2.49s
187:    learn: 1063.5234526    total: 574ms    remaining: 2.48s
188:    learn: 1063.2784787    total: 577ms    remaining: 2.47s
189:    learn: 1063.0480032    total: 579ms    remaining: 2.47s
190:    learn: 1062.9844111    total: 581ms    remaining: 2.46s
191:    learn: 1062.8085506    total: 584ms    remaining: 2.46s
192:    learn: 1062.6260234    total: 586ms    remaining: 2.45s
193:    learn: 1062.5142950    total: 588ms    remaining: 2.44s
194:    learn: 1062.2991792    total: 591ms    remaining: 2.44s
195:    learn: 1062.1345037    total: 593ms    remaining: 2.43s
196:    learn: 1062.0972364    total: 596ms    remaining: 2.43s
197:    learn: 1061.8789983    total: 598ms    remaining: 2.42s
198:    learn: 1061.7447022    total: 601ms    remaining: 2.42s
199:    learn: 1061.5641010    total: 603ms    remaining: 2.41s
200:    learn: 1061.2914173    total: 607ms    remaining: 2.41s
201:    learn: 1060.9353675    total: 609ms    remaining: 2.41s
202:    learn: 1060.7353112    total: 611ms    remaining: 2.4s
203:    learn: 1060.5454644    total: 615ms    remaining: 2.4s
204:    learn: 1060.3324064    total: 617ms    remaining: 2.39s
205:    learn: 1060.0586500    total: 619ms    remaining: 2.38s
206:    learn: 1059.8548362    total: 621ms    remaining: 2.38s
207:    learn: 1059.7958526    total: 623ms    remaining: 2.37s
208:    learn: 1059.5936964    total: 625ms    remaining: 2.37s
209:    learn: 1059.4891580    total: 627ms    remaining: 2.36s
210:    learn: 1059.3053495    total: 630ms    remaining: 2.36s
211:    learn: 1059.1020405    total: 633ms    remaining: 2.35s
212:    learn: 1058.8865303    total: 635ms    remaining: 2.34s
213:    learn: 1058.7582877    total: 637ms    remaining: 2.34s
214:    learn: 1058.6673120    total: 639ms    remaining: 2.33s
215:    learn: 1058.5320290    total: 641ms    remaining: 2.33s
216:    learn: 1058.3406527    total: 643ms    remaining: 2.32s
217:    learn: 1058.1122960    total: 646ms    remaining: 2.32s
218:    learn: 1058.0516848    total: 649ms    remaining: 2.31s
219:    learn: 1057.8473753    total: 651ms    remaining: 2.31s
220:    learn: 1057.5667463    total: 653ms    remaining: 2.3s
221:    learn: 1057.4421948    total: 655ms    remaining: 2.29s
222:    learn: 1057.2473436    total: 657ms    remaining: 2.29s
223:    learn: 1057.1267345    total: 659ms    remaining: 2.28s
224:    learn: 1057.0654406    total: 662ms    remaining: 2.28s
225:    learn: 1056.9645116    total: 664ms    remaining: 2.27s
226:    learn: 1056.7639223    total: 666ms    remaining: 2.27s
227:    learn: 1056.6900261    total: 668ms    remaining: 2.26s
228:    learn: 1056.5080534    total: 670ms    remaining: 2.25s
229:    learn: 1056.3305631    total: 671ms    remaining: 2.25s
230:    learn: 1056.2588380    total: 673ms    remaining: 2.24s
231:    learn: 1056.0143419    total: 676ms    remaining: 2.24s
232:    learn: 1055.8806187    total: 679ms    remaining: 2.23s
233:    learn: 1055.7460252    total: 681ms    remaining: 2.23s
234:    learn: 1055.5173759    total: 683ms    remaining: 2.22s
235:    learn: 1055.3886011    total: 685ms    remaining: 2.22s
236:    learn: 1055.2346229    total: 688ms    remaining: 2.21s
237:    learn: 1055.0380508    total: 690ms    remaining: 2.21s
238:    learn: 1054.9834809    total: 693ms    remaining: 2.21s
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239:    learn: 1054.8744197     total: 695ms    remaining: 2.2s
240:    learn: 1054.7140354     total: 697ms    remaining: 2.19s
241:    learn: 1054.6455971     total: 699ms    remaining: 2.19s
242:    learn: 1054.5218201     total: 702ms    remaining: 2.19s
243:    learn: 1054.2919139     total: 704ms    remaining: 2.18s
244:    learn: 1054.2283213     total: 707ms    remaining: 2.18s
245:    learn: 1054.1826912     total: 709ms    remaining: 2.17s
246:    learn: 1053.9875353     total: 711ms    remaining: 2.17s
247:    learn: 1053.8572686     total: 714ms    remaining: 2.16s
248:    learn: 1053.7911107     total: 716ms    remaining: 2.16s
249:    learn: 1053.6512806     total: 718ms    remaining: 2.15s
250:    learn: 1053.5118437     total: 720ms    remaining: 2.15s
251:    learn: 1053.2974847     total: 722ms    remaining: 2.14s
252:    learn: 1053.1238242     total: 724ms    remaining: 2.14s
253:    learn: 1053.0295831     total: 727ms    remaining: 2.13s
254:    learn: 1052.8542707     total: 729ms    remaining: 2.13s
255:    learn: 1052.7190825     total: 732ms    remaining: 2.13s
256:    learn: 1052.5751578     total: 737ms    remaining: 2.13s
257:    learn: 1052.3317962     total: 739ms    remaining: 2.13s
258:    learn: 1052.1649459     total: 742ms    remaining: 2.12s
259:    learn: 1051.9933417     total: 745ms    remaining: 2.12s
260:    learn: 1051.9071640     total: 748ms    remaining: 2.12s
261:    learn: 1051.8525106     total: 750ms    remaining: 2.11s
262:    learn: 1051.7037398     total: 753ms    remaining: 2.11s
263:    learn: 1051.5599259     total: 756ms    remaining: 2.11s
264:    learn: 1051.4273474     total: 758ms    remaining: 2.1s
265:    learn: 1051.2390633     total: 761ms    remaining: 2.1s
266:    learn: 1051.1791999     total: 764ms    remaining: 2.1s
267:    learn: 1051.0583988     total: 766ms    remaining: 2.09s
268:    learn: 1050.8483744     total: 769ms    remaining: 2.09s
269:    learn: 1050.7091763     total: 772ms    remaining: 2.08s
270:    learn: 1050.6176173     total: 774ms    remaining: 2.08s
271:    learn: 1050.3797003     total: 777ms    remaining: 2.08s
272:    learn: 1050.2141737     total: 780ms    remaining: 2.08s
273:    learn: 1050.0864282     total: 784ms    remaining: 2.08s
274:    learn: 1049.9745274     total: 786ms    remaining: 2.07s
275:    learn: 1049.8140405     total: 789ms    remaining: 2.07s
276:    learn: 1049.7601514     total: 791ms    remaining: 2.06s
277:    learn: 1049.6012323     total: 793ms    remaining: 2.06s
278:    learn: 1049.4657449     total: 796ms    remaining: 2.06s
279:    learn: 1049.3638966     total: 799ms    remaining: 2.06s
280:    learn: 1049.2776199     total: 803ms    remaining: 2.05s
281:    learn: 1049.2019768     total: 805ms    remaining: 2.05s
282:    learn: 1049.0135727     total: 807ms    remaining: 2.04s
283:    learn: 1048.9788750     total: 809ms    remaining: 2.04s
284:    learn: 1048.7559027     total: 811ms    remaining: 2.04s
285:    learn: 1048.6243378     total: 816ms    remaining: 2.04s
286:    learn: 1048.5273726     total: 819ms    remaining: 2.03s
287:    learn: 1048.4438275     total: 822ms    remaining: 2.03s
288:    learn: 1048.2212120     total: 824ms    remaining: 2.03s
289:    learn: 1048.1045165     total: 826ms    remaining: 2.02s
290:    learn: 1047.8784298     total: 828ms    remaining: 2.02s
291:    learn: 1047.7831884     total: 833ms    remaining: 2.02s
292:    learn: 1047.7456643     total: 836ms    remaining: 2.02s
293:    learn: 1047.6668707     total: 838ms    remaining: 2.01s
294:    learn: 1047.5342740     total: 840ms    remaining: 2.01s
295:    learn: 1047.2559836     total: 843ms    remaining: 2s
296:    learn: 1047.0468582     total: 847ms    remaining: 2s
297:    learn: 1046.9589890     total: 850ms    remaining: 2s
298:    learn: 1046.8452250     total: 853ms    remaining: 2s
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299:    learn: 1046.6391585     total: 855ms    remaining: 1.99s
300:    learn: 1046.5368607     total: 857ms    remaining: 1.99s
301:    learn: 1046.4471192     total: 859ms    remaining: 1.99s
302:    learn: 1046.3260359     total: 863ms    remaining: 1.99s
303:    learn: 1046.2007547     total: 867ms    remaining: 1.98s
304:    learn: 1046.1046542     total: 869ms    remaining: 1.98s
305:    learn: 1045.9610105     total: 871ms    remaining: 1.98s
306:    learn: 1045.8646296     total: 873ms    remaining: 1.97s
307:    learn: 1045.7465822     total: 875ms    remaining: 1.97s
308:    learn: 1045.6967294     total: 880ms    remaining: 1.97s
309:    learn: 1045.6114322     total: 883ms    remaining: 1.96s
310:    learn: 1045.5336755     total: 885ms    remaining: 1.96s
311:    learn: 1045.4562151     total: 887ms    remaining: 1.96s
312:    learn: 1045.3105072     total: 889ms    remaining: 1.95s
313:    learn: 1045.2753948     total: 892ms    remaining: 1.95s
314:    learn: 1045.2421224     total: 896ms    remaining: 1.95s
315:    learn: 1045.1450603     total: 898ms    remaining: 1.94s
316:    learn: 1045.0044486     total: 901ms    remaining: 1.94s
317:    learn: 1044.9661588     total: 902ms    remaining: 1.94s
318:    learn: 1044.7949653     total: 904ms    remaining: 1.93s
319:    learn: 1044.6814980     total: 909ms    remaining: 1.93s
320:    learn: 1044.5066173     total: 913ms    remaining: 1.93s
321:    learn: 1044.4175556     total: 915ms    remaining: 1.93s
322:    learn: 1044.3124249     total: 917ms    remaining: 1.92s
323:    learn: 1044.1724586     total: 919ms    remaining: 1.92s
324:    learn: 1044.0506216     total: 921ms    remaining: 1.91s
325:    learn: 1043.9131168     total: 926ms    remaining: 1.91s
326:    learn: 1043.7150695     total: 929ms    remaining: 1.91s
327:    learn: 1043.6175197     total: 931ms    remaining: 1.91s
328:    learn: 1043.4263494     total: 933ms    remaining: 1.9s
329:    learn: 1043.3685975     total: 935ms    remaining: 1.9s
330:    learn: 1043.2353823     total: 939ms    remaining: 1.9s
331:    learn: 1043.1743581     total: 942ms    remaining: 1.9s
332:    learn: 1043.0333323     total: 945ms    remaining: 1.89s
333:    learn: 1042.8541645     total: 947ms    remaining: 1.89s
334:    learn: 1042.7504752     total: 949ms    remaining: 1.88s
335:    learn: 1042.5974473     total: 951ms    remaining: 1.88s
336:    learn: 1042.4465427     total: 956ms    remaining: 1.88s
337:    learn: 1042.3594437     total: 959ms    remaining: 1.88s
338:    learn: 1042.2524474     total: 961ms    remaining: 1.87s
339:    learn: 1042.0979958     total: 963ms    remaining: 1.87s
340:    learn: 1041.9387501     total: 965ms    remaining: 1.86s
341:    learn: 1041.8002605     total: 967ms    remaining: 1.86s
342:    learn: 1041.6863692     total: 972ms    remaining: 1.86s
343:    learn: 1041.5303317     total: 975ms    remaining: 1.86s
344:    learn: 1041.3758666     total: 978ms    remaining: 1.85s
345:    learn: 1041.3087877     total: 980ms    remaining: 1.85s
346:    learn: 1041.2224361     total: 982ms    remaining: 1.85s
347:    learn: 1041.1164624     total: 987ms    remaining: 1.85s
348:    learn: 1041.0352991     total: 990ms    remaining: 1.85s
349:    learn: 1040.9305050     total: 992ms    remaining: 1.84s
350:    learn: 1040.8568647     total: 995ms    remaining: 1.84s
351:    learn: 1040.7202329     total: 997ms    remaining: 1.83s
352:    learn: 1040.6929309     total: 999ms    remaining: 1.83s
353:    learn: 1040.6476333     total: 1s       remaining: 1.83s
354:    learn: 1040.6066353     total: 1s       remaining: 1.82s
355:    learn: 1040.4412409     total: 1.01s    remaining: 1.82s
356:    learn: 1040.3229805     total: 1.01s    remaining: 1.82s
357:    learn: 1040.2039495     total: 1.01s    remaining: 1.82s
358:    learn: 1040.0917786     total: 1.01s    remaining: 1.81s
```

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359:    learn: 1039.9325469     total: 1.02s    remaining: 1.81s
360:    learn: 1039.8553175     total: 1.02s    remaining: 1.8s
361:    learn: 1039.7203972     total: 1.02s    remaining: 1.8s
362:    learn: 1039.6032927     total: 1.02s    remaining: 1.8s
363:    learn: 1039.4477660     total: 1.02s    remaining: 1.79s
364:    learn: 1039.3534499     total: 1.03s    remaining: 1.79s
365:    learn: 1039.2908474     total: 1.03s    remaining: 1.78s
366:    learn: 1039.2316624     total: 1.03s    remaining: 1.78s
367:    learn: 1039.1484121     total: 1.03s    remaining: 1.77s
368:    learn: 1039.0400178     total: 1.03s    remaining: 1.77s
369:    learn: 1038.9380796     total: 1.04s    remaining: 1.76s
370:    learn: 1038.9110993     total: 1.04s    remaining: 1.76s
371:    learn: 1038.8224655     total: 1.04s    remaining: 1.76s
372:    learn: 1038.7980994     total: 1.04s    remaining: 1.75s
373:    learn: 1038.7733085     total: 1.04s    remaining: 1.75s
374:    learn: 1038.7178142     total: 1.05s    remaining: 1.74s
375:    learn: 1038.6207525     total: 1.05s    remaining: 1.74s
376:    learn: 1038.5368285     total: 1.05s    remaining: 1.74s
377:    learn: 1038.4307567     total: 1.05s    remaining: 1.73s
378:    learn: 1038.3246298     total: 1.05s    remaining: 1.73s
379:    learn: 1038.2321254     total: 1.06s    remaining: 1.72s
380:    learn: 1038.1342559     total: 1.06s    remaining: 1.72s
381:    learn: 1038.0444665     total: 1.06s    remaining: 1.71s
382:    learn: 1037.9911670     total: 1.06s    remaining: 1.71s
383:    learn: 1037.8655806     total: 1.06s    remaining: 1.71s
384:    learn: 1037.7846194     total: 1.06s    remaining: 1.7s
385:    learn: 1037.6526679     total: 1.07s    remaining: 1.7s
386:    learn: 1037.5200452     total: 1.07s    remaining: 1.69s
387:    learn: 1037.4821940     total: 1.07s    remaining: 1.69s
388:    learn: 1037.3862250     total: 1.07s    remaining: 1.69s
389:    learn: 1037.2017100     total: 1.07s    remaining: 1.68s
390:    learn: 1037.0793349     total: 1.08s    remaining: 1.68s
391:    learn: 1036.9488990     total: 1.08s    remaining: 1.67s
392:    learn: 1036.9008779     total: 1.08s    remaining: 1.67s
393:    learn: 1036.8128853     total: 1.08s    remaining: 1.66s
394:    learn: 1036.7671124     total: 1.08s    remaining: 1.66s
395:    learn: 1036.5364695     total: 1.09s    remaining: 1.66s
396:    learn: 1036.5121331     total: 1.09s    remaining: 1.65s
397:    learn: 1036.4383121     total: 1.09s    remaining: 1.65s
398:    learn: 1036.3802399     total: 1.09s    remaining: 1.64s
399:    learn: 1036.1931268     total: 1.09s    remaining: 1.64s
400:    learn: 1036.1723293     total: 1.09s    remaining: 1.64s
401:    learn: 1036.0151840     total: 1.1s     remaining: 1.63s
402:    learn: 1035.9349962     total: 1.1s     remaining: 1.63s
403:    learn: 1035.8874892     total: 1.1s     remaining: 1.62s
404:    learn: 1035.7778878     total: 1.1s     remaining: 1.62s
405:    learn: 1035.6584119     total: 1.1s     remaining: 1.62s
406:    learn: 1035.5675005     total: 1.11s    remaining: 1.61s
407:    learn: 1035.4913533     total: 1.11s    remaining: 1.61s
408:    learn: 1035.4543041     total: 1.11s    remaining: 1.6s
409:    learn: 1035.3389745     total: 1.11s    remaining: 1.6s
410:    learn: 1035.3208930     total: 1.11s    remaining: 1.6s
411:    learn: 1035.2690912     total: 1.12s    remaining: 1.59s
412:    learn: 1035.2128439     total: 1.12s    remaining: 1.59s
413:    learn: 1035.1629720     total: 1.12s    remaining: 1.58s
414:    learn: 1035.0419890     total: 1.12s    remaining: 1.58s
415:    learn: 1034.9821853     total: 1.12s    remaining: 1.58s
416:    learn: 1034.8765420     total: 1.13s    remaining: 1.57s
417:    learn: 1034.8616389     total: 1.13s    remaining: 1.57s
418:    learn: 1034.8408534     total: 1.13s    remaining: 1.57s
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419:    learn: 1034.8045244     total: 1.13s    remaining: 1.56s
420:    learn: 1034.7746777     total: 1.13s    remaining: 1.56s
421:    learn: 1034.6694967     total: 1.14s    remaining: 1.55s
422:    learn: 1034.5573315     total: 1.14s    remaining: 1.55s
423:    learn: 1034.4471388     total: 1.14s    remaining: 1.55s
424:    learn: 1034.3279161     total: 1.14s    remaining: 1.54s
425:    learn: 1034.2634903     total: 1.14s    remaining: 1.54s
426:    learn: 1034.2202447     total: 1.15s    remaining: 1.54s
427:    learn: 1034.1678653     total: 1.15s    remaining: 1.53s
428:    learn: 1034.1049030     total: 1.15s    remaining: 1.53s
429:    learn: 1034.0946435     total: 1.15s    remaining: 1.53s
430:    learn: 1033.9641342     total: 1.15s    remaining: 1.52s
431:    learn: 1033.8543925     total: 1.16s    remaining: 1.52s
432:    learn: 1033.8046538     total: 1.16s    remaining: 1.52s
433:    learn: 1033.7230102     total: 1.16s    remaining: 1.51s
434:    learn: 1033.6205495     total: 1.16s    remaining: 1.51s
435:    learn: 1033.5118395     total: 1.16s    remaining: 1.51s
436:    learn: 1033.4207745     total: 1.17s    remaining: 1.5s
437:    learn: 1033.2629551     total: 1.17s    remaining: 1.5s
438:    learn: 1033.2306202     total: 1.17s    remaining: 1.5s
439:    learn: 1033.1341325     total: 1.17s    remaining: 1.49s
440:    learn: 1033.1161615     total: 1.17s    remaining: 1.49s
441:    learn: 1033.0932050     total: 1.18s    remaining: 1.49s
442:    learn: 1033.0026729     total: 1.18s    remaining: 1.48s
443:    learn: 1032.9735792     total: 1.18s    remaining: 1.48s
444:    learn: 1032.8247167     total: 1.18s    remaining: 1.48s
445:    learn: 1032.7438507     total: 1.19s    remaining: 1.47s
446:    learn: 1032.6346025     total: 1.19s    remaining: 1.47s
447:    learn: 1032.5883309     total: 1.19s    remaining: 1.47s
448:    learn: 1032.4982488     total: 1.19s    remaining: 1.47s
449:    learn: 1032.4251767     total: 1.2s     remaining: 1.46s
450:    learn: 1032.3570731     total: 1.2s     remaining: 1.46s
451:    learn: 1032.3207208     total: 1.2s     remaining: 1.46s
452:    learn: 1032.2401202     total: 1.21s    remaining: 1.46s
453:    learn: 1032.1740626     total: 1.21s    remaining: 1.45s
454:    learn: 1032.1533391     total: 1.21s    remaining: 1.45s
455:    learn: 1031.9685349     total: 1.21s    remaining: 1.45s
456:    learn: 1031.8620767     total: 1.21s    remaining: 1.44s
457:    learn: 1031.8309833     total: 1.22s    remaining: 1.44s
458:    learn: 1031.7929158     total: 1.22s    remaining: 1.43s
459:    learn: 1031.7142763     total: 1.22s    remaining: 1.43s
460:    learn: 1031.5494808     total: 1.22s    remaining: 1.43s
461:    learn: 1031.5292143     total: 1.22s    remaining: 1.42s
462:    learn: 1031.3893596     total: 1.23s    remaining: 1.42s
463:    learn: 1031.2778452     total: 1.23s    remaining: 1.42s
464:    learn: 1031.2342114     total: 1.23s    remaining: 1.41s
465:    learn: 1031.1700024     total: 1.23s    remaining: 1.41s
466:    learn: 1031.0982682     total: 1.23s    remaining: 1.41s
467:    learn: 1031.0243506     total: 1.23s    remaining: 1.4s
468:    learn: 1031.0027381     total: 1.24s    remaining: 1.4s
469:    learn: 1030.8820009     total: 1.24s    remaining: 1.4s
470:    learn: 1030.8207420     total: 1.24s    remaining: 1.39s
471:    learn: 1030.7910035     total: 1.24s    remaining: 1.39s
472:    learn: 1030.7237894     total: 1.25s    remaining: 1.39s
473:    learn: 1030.6287429     total: 1.25s    remaining: 1.38s
474:    learn: 1030.4886118     total: 1.25s    remaining: 1.38s
475:    learn: 1030.3620836     total: 1.25s    remaining: 1.38s
476:    learn: 1030.2555158     total: 1.25s    remaining: 1.37s
477:    learn: 1030.1793728     total: 1.26s    remaining: 1.37s
478:    learn: 1030.0752262     total: 1.26s    remaining: 1.37s
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479:    learn: 1029.9242221     total: 1.26s    remaining: 1.36s
480:    learn: 1029.7331922     total: 1.26s    remaining: 1.36s
481:    learn: 1029.6651883     total: 1.26s    remaining: 1.36s
482:    learn: 1029.6325482     total: 1.27s    remaining: 1.35s
483:    learn: 1029.5281306     total: 1.27s    remaining: 1.35s
484:    learn: 1029.4351075     total: 1.27s    remaining: 1.35s
485:    learn: 1029.2184906     total: 1.27s    remaining: 1.34s
486:    learn: 1029.1589518     total: 1.27s    remaining: 1.34s
487:    learn: 1029.0639613     total: 1.28s    remaining: 1.34s
488:    learn: 1028.9530256     total: 1.28s    remaining: 1.33s
489:    learn: 1028.8998590     total: 1.28s    remaining: 1.33s
490:    learn: 1028.8359719     total: 1.28s    remaining: 1.33s
491:    learn: 1028.7591580     total: 1.28s    remaining: 1.32s
492:    learn: 1028.6725646     total: 1.29s    remaining: 1.32s
493:    learn: 1028.6239021     total: 1.29s    remaining: 1.32s
494:    learn: 1028.5503594     total: 1.29s    remaining: 1.32s
495:    learn: 1028.4555535     total: 1.29s    remaining: 1.31s
496:    learn: 1028.4392914     total: 1.29s    remaining: 1.31s
497:    learn: 1028.3265719     total: 1.3s     remaining: 1.31s
498:    learn: 1028.3019034     total: 1.3s     remaining: 1.3s
499:    learn: 1028.2325801     total: 1.3s     remaining: 1.3s
500:    learn: 1028.1475730     total: 1.3s     remaining: 1.3s
501:    learn: 1027.9957661     total: 1.3s     remaining: 1.29s
502:    learn: 1027.9316418     total: 1.31s    remaining: 1.29s
503:    learn: 1027.8953204     total: 1.31s    remaining: 1.29s
504:    learn: 1027.8799727     total: 1.31s    remaining: 1.28s
505:    learn: 1027.7609029     total: 1.31s    remaining: 1.28s
506:    learn: 1027.6010675     total: 1.31s    remaining: 1.28s
507:    learn: 1027.5127490     total: 1.32s    remaining: 1.27s
508:    learn: 1027.4460115     total: 1.32s    remaining: 1.27s
509:    learn: 1027.3858434     total: 1.32s    remaining: 1.27s
510:    learn: 1027.2542710     total: 1.32s    remaining: 1.26s
511:    learn: 1027.1558866     total: 1.32s    remaining: 1.26s
512:    learn: 1027.1215586     total: 1.33s    remaining: 1.26s
513:    learn: 1027.0091122     total: 1.33s    remaining: 1.26s
514:    learn: 1026.9775942     total: 1.33s    remaining: 1.25s
515:    learn: 1026.8635783     total: 1.33s    remaining: 1.25s
516:    learn: 1026.7225437     total: 1.33s    remaining: 1.25s
517:    learn: 1026.6701231     total: 1.34s    remaining: 1.24s
518:    learn: 1026.6032785     total: 1.34s    remaining: 1.24s
519:    learn: 1026.5260972     total: 1.34s    remaining: 1.24s
520:    learn: 1026.4795499     total: 1.34s    remaining: 1.23s
521:    learn: 1026.3763373     total: 1.34s    remaining: 1.23s
522:    learn: 1026.3160775     total: 1.34s    remaining: 1.23s
523:    learn: 1026.2817369     total: 1.35s    remaining: 1.22s
524:    learn: 1026.2152265     total: 1.35s    remaining: 1.22s
525:    learn: 1026.0881765     total: 1.35s    remaining: 1.22s
526:    learn: 1026.0364351     total: 1.35s    remaining: 1.22s
527:    learn: 1025.9272064     total: 1.36s    remaining: 1.21s
528:    learn: 1025.8099809     total: 1.36s    remaining: 1.21s
529:    learn: 1025.7853005     total: 1.36s    remaining: 1.21s
530:    learn: 1025.7542175     total: 1.36s    remaining: 1.2s
531:    learn: 1025.6926841     total: 1.36s    remaining: 1.2s
532:    learn: 1025.6348018     total: 1.37s    remaining: 1.2s
533:    learn: 1025.4674954     total: 1.37s    remaining: 1.19s
534:    learn: 1025.4444235     total: 1.37s    remaining: 1.19s
535:    learn: 1025.4206230     total: 1.37s    remaining: 1.19s
536:    learn: 1025.3835869     total: 1.37s    remaining: 1.18s
537:    learn: 1025.2936923     total: 1.38s    remaining: 1.18s
538:    learn: 1025.1519750     total: 1.38s    remaining: 1.18s
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539:    learn: 1025.0396259    total: 1.38s    remaining: 1.18s
540:    learn: 1024.9794941    total: 1.38s    remaining: 1.17s
541:    learn: 1024.8901437    total: 1.39s    remaining: 1.17s
542:    learn: 1024.8342948    total: 1.39s    remaining: 1.17s
543:    learn: 1024.7060720    total: 1.39s    remaining: 1.17s
544:    learn: 1024.5895156    total: 1.39s    remaining: 1.16s
545:    learn: 1024.4953574    total: 1.39s    remaining: 1.16s
546:    learn: 1024.4303327    total: 1.4s     remaining: 1.16s
547:    learn: 1024.3875124    total: 1.4s     remaining: 1.15s
548:    learn: 1024.2942651    total: 1.4s     remaining: 1.15s
549:    learn: 1024.2262812    total: 1.41s    remaining: 1.15s
550:    learn: 1024.0880082    total: 1.41s    remaining: 1.15s
551:    learn: 1024.0363024    total: 1.41s    remaining: 1.14s
552:    learn: 1023.9841630    total: 1.41s    remaining: 1.14s
553:    learn: 1023.9682779    total: 1.41s    remaining: 1.14s
554:    learn: 1023.9561648    total: 1.42s    remaining: 1.13s
555:    learn: 1023.9269575    total: 1.42s    remaining: 1.13s
556:    learn: 1023.8252091    total: 1.42s    remaining: 1.13s
557:    learn: 1023.7272317    total: 1.42s    remaining: 1.13s
558:    learn: 1023.6735469    total: 1.42s    remaining: 1.12s
559:    learn: 1023.5646761    total: 1.43s    remaining: 1.12s
560:    learn: 1023.5446878    total: 1.43s    remaining: 1.12s
561:    learn: 1023.5233840    total: 1.43s    remaining: 1.11s
562:    learn: 1023.4419707    total: 1.43s    remaining: 1.11s
563:    learn: 1023.3745942    total: 1.43s    remaining: 1.11s
564:    learn: 1023.3214633    total: 1.43s    remaining: 1.1s
565:    learn: 1023.2523912    total: 1.44s    remaining: 1.1s
566:    learn: 1023.1954804    total: 1.44s    remaining: 1.1s
567:    learn: 1023.1348811    total: 1.44s    remaining: 1.09s
568:    learn: 1023.0866110    total: 1.44s    remaining: 1.09s
569:    learn: 1023.0040813    total: 1.44s    remaining: 1.09s
570:    learn: 1022.9500257    total: 1.45s    remaining: 1.09s
571:    learn: 1022.9253572    total: 1.45s    remaining: 1.08s
572:    learn: 1022.9108362    total: 1.45s    remaining: 1.08s
573:    learn: 1022.8916120    total: 1.45s    remaining: 1.08s
574:    learn: 1022.8709978    total: 1.46s    remaining: 1.08s
575:    learn: 1022.8558563    total: 1.46s    remaining: 1.07s
576:    learn: 1022.8292780    total: 1.46s    remaining: 1.07s
577:    learn: 1022.7409978    total: 1.46s    remaining: 1.07s
578:    learn: 1022.7190764    total: 1.47s    remaining: 1.07s
579:    learn: 1022.5808643    total: 1.47s    remaining: 1.06s
580:    learn: 1022.5599256    total: 1.47s    remaining: 1.06s
581:    learn: 1022.5104276    total: 1.47s    remaining: 1.06s
582:    learn: 1022.4690134    total: 1.48s    remaining: 1.05s
583:    learn: 1022.4365705    total: 1.48s    remaining: 1.05s
584:    learn: 1022.3987593    total: 1.48s    remaining: 1.05s
585:    learn: 1022.3699442    total: 1.48s    remaining: 1.05s
586:    learn: 1022.1404303    total: 1.48s    remaining: 1.04s
587:    learn: 1022.1311442    total: 1.49s    remaining: 1.04s
588:    learn: 1022.0835036    total: 1.49s    remaining: 1.04s
589:    learn: 1022.0667766    total: 1.49s    remaining: 1.03s
590:    learn: 1021.9631736    total: 1.49s    remaining: 1.03s
591:    learn: 1021.8353194    total: 1.49s    remaining: 1.03s
592:    learn: 1021.8031969    total: 1.5s     remaining: 1.03s
593:    learn: 1021.6846615    total: 1.5s     remaining: 1.02s
594:    learn: 1021.6332504    total: 1.5s     remaining: 1.02s
595:    learn: 1021.4766939    total: 1.5s     remaining: 1.02s
596:    learn: 1021.4233172    total: 1.51s    remaining: 1.02s
597:    learn: 1021.3579534    total: 1.51s    remaining: 1.01s
598:    learn: 1021.2375988    total: 1.51s    remaining: 1.01s
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599:    learn: 1021.2149765     total: 1.51s    remaining: 1.01s
600:    learn: 1021.1207964     total: 1.51s    remaining: 1s
601:    learn: 1021.0217059     total: 1.52s    remaining: 1s
602:    learn: 1020.9688164     total: 1.52s    remaining: 1s
603:    learn: 1020.9539234     total: 1.52s    remaining: 998ms
604:    learn: 1020.9020716     total: 1.52s    remaining: 995ms
605:    learn: 1020.7216714     total: 1.53s    remaining: 992ms
606:    learn: 1020.6169081     total: 1.53s    remaining: 989ms
607:    learn: 1020.4512272     total: 1.53s    remaining: 987ms
608:    learn: 1020.4135977     total: 1.53s    remaining: 984ms
609:    learn: 1020.3561638     total: 1.53s    remaining: 982ms
610:    learn: 1020.2543645     total: 1.54s    remaining: 979ms
611:    learn: 1020.2298326     total: 1.54s    remaining: 976ms
612:    learn: 1020.1237174     total: 1.54s    remaining: 973ms
613:    learn: 1020.0529934     total: 1.54s    remaining: 971ms
614:    learn: 1020.0192875     total: 1.55s    remaining: 968ms
615:    learn: 1019.9248871     total: 1.55s    remaining: 966ms
616:    learn: 1019.8787977     total: 1.55s    remaining: 963ms
617:    learn: 1019.8319144     total: 1.55s    remaining: 961ms
618:    learn: 1019.7876031     total: 1.56s    remaining: 958ms
619:    learn: 1019.6214404     total: 1.56s    remaining: 955ms
620:    learn: 1019.4851372     total: 1.56s    remaining: 952ms
621:    learn: 1019.4130801     total: 1.56s    remaining: 950ms
622:    learn: 1019.3967665     total: 1.56s    remaining: 947ms
623:    learn: 1019.3307671     total: 1.57s    remaining: 945ms
624:    learn: 1019.2468333     total: 1.57s    remaining: 942ms
625:    learn: 1019.1853989     total: 1.57s    remaining: 940ms
626:    learn: 1019.0885168     total: 1.57s    remaining: 937ms
627:    learn: 1019.0728396     total: 1.58s    remaining: 934ms
628:    learn: 1018.9868139     total: 1.58s    remaining: 932ms
629:    learn: 1018.8781377     total: 1.58s    remaining: 929ms
630:    learn: 1018.8574926     total: 1.58s    remaining: 927ms
631:    learn: 1018.8134190     total: 1.59s    remaining: 924ms
632:    learn: 1018.6602801     total: 1.59s    remaining: 922ms
633:    learn: 1018.6498634     total: 1.59s    remaining: 919ms
634:    learn: 1018.5538640     total: 1.59s    remaining: 917ms
635:    learn: 1018.4702821     total: 1.6s     remaining: 915ms
636:    learn: 1018.4318253     total: 1.6s     remaining: 912ms
637:    learn: 1018.3742182     total: 1.6s     remaining: 910ms
638:    learn: 1018.3318797     total: 1.6s     remaining: 907ms
639:    learn: 1018.3150509     total: 1.61s    remaining: 904ms
640:    learn: 1018.2335043     total: 1.61s    remaining: 901ms
641:    learn: 1018.1546239     total: 1.61s    remaining: 900ms
642:    learn: 1018.0552532     total: 1.61s    remaining: 897ms
643:    learn: 1017.9524889     total: 1.62s    remaining: 894ms
644:    learn: 1017.9350392     total: 1.62s    remaining: 891ms
645:    learn: 1017.8201594     total: 1.62s    remaining: 889ms
646:    learn: 1017.7828326     total: 1.62s    remaining: 886ms
647:    learn: 1017.7465841     total: 1.63s    remaining: 883ms
648:    learn: 1017.6496733     total: 1.63s    remaining: 881ms
649:    learn: 1017.6091286     total: 1.63s    remaining: 878ms
650:    learn: 1017.5908662     total: 1.63s    remaining: 875ms
651:    learn: 1017.5325203     total: 1.63s    remaining: 873ms
652:    learn: 1017.4156771     total: 1.64s    remaining: 870ms
653:    learn: 1017.3402016     total: 1.64s    remaining: 867ms
654:    learn: 1017.2227713     total: 1.64s    remaining: 865ms
655:    learn: 1017.1276590     total: 1.64s    remaining: 862ms
656:    learn: 1017.0663425     total: 1.65s    remaining: 859ms
657:    learn: 1016.9843383     total: 1.65s    remaining: 857ms
658:    learn: 1016.9652248     total: 1.65s    remaining: 854ms
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659:    learn: 1016.9424104     total: 1.65s    remaining: 851ms
660:    learn: 1016.8887543     total: 1.65s    remaining: 848ms
661:    learn: 1016.8393638     total: 1.66s    remaining: 846ms
662:    learn: 1016.7375975     total: 1.66s    remaining: 843ms
663:    learn: 1016.6053876     total: 1.66s    remaining: 840ms
664:    learn: 1016.5310561     total: 1.66s    remaining: 838ms
665:    learn: 1016.4384347     total: 1.67s    remaining: 835ms
666:    learn: 1016.3790904     total: 1.67s    remaining: 833ms
667:    learn: 1016.3180388     total: 1.67s    remaining: 830ms
668:    learn: 1016.2991676     total: 1.67s    remaining: 828ms
669:    learn: 1016.2098199     total: 1.68s    remaining: 825ms
670:    learn: 1016.1998487     total: 1.68s    remaining: 822ms
671:    learn: 1016.0704670     total: 1.68s    remaining: 820ms
672:    learn: 1016.0559416     total: 1.68s    remaining: 817ms
673:    learn: 1015.9602925     total: 1.68s    remaining: 814ms
674:    learn: 1015.9170692     total: 1.69s    remaining: 812ms
675:    learn: 1015.8469560     total: 1.69s    remaining: 809ms
676:    learn: 1015.7338559     total: 1.69s    remaining: 807ms
677:    learn: 1015.6887081     total: 1.69s    remaining: 804ms
678:    learn: 1015.5995475     total: 1.7s     remaining: 802ms
679:    learn: 1015.5528365     total: 1.7s     remaining: 799ms
680:    learn: 1015.5042510     total: 1.7s     remaining: 796ms
681:    learn: 1015.4407871     total: 1.7s     remaining: 794ms
682:    learn: 1015.3772123     total: 1.71s    remaining: 791ms
683:    learn: 1015.2837683     total: 1.71s    remaining: 789ms
684:    learn: 1015.2261954     total: 1.71s    remaining: 786ms
685:    learn: 1015.1111757     total: 1.71s    remaining: 784ms
686:    learn: 1015.0755384     total: 1.72s    remaining: 782ms
687:    learn: 1015.0323533     total: 1.72s    remaining: 779ms
688:    learn: 1014.9394632     total: 1.72s    remaining: 777ms
689:    learn: 1014.8685938     total: 1.72s    remaining: 775ms
690:    learn: 1014.7744703     total: 1.73s    remaining: 772ms
691:    learn: 1014.6281723     total: 1.73s    remaining: 770ms
692:    learn: 1014.5619036     total: 1.73s    remaining: 767ms
693:    learn: 1014.5345783     total: 1.74s    remaining: 765ms
694:    learn: 1014.4802827     total: 1.74s    remaining: 763ms
695:    learn: 1014.3751589     total: 1.74s    remaining: 760ms
696:    learn: 1014.2908724     total: 1.74s    remaining: 758ms
697:    learn: 1014.1729007     total: 1.75s    remaining: 755ms
698:    learn: 1014.1475524     total: 1.75s    remaining: 753ms
699:    learn: 1014.1302473     total: 1.75s    remaining: 751ms
700:    learn: 1014.0227321     total: 1.75s    remaining: 748ms
701:    learn: 1013.9065260     total: 1.76s    remaining: 746ms
702:    learn: 1013.8776012     total: 1.76s    remaining: 743ms
703:    learn: 1013.7892087     total: 1.76s    remaining: 741ms
704:    learn: 1013.7618922     total: 1.77s    remaining: 739ms
705:    learn: 1013.7459499     total: 1.77s    remaining: 737ms
706:    learn: 1013.6402313     total: 1.77s    remaining: 734ms
707:    learn: 1013.5888353     total: 1.77s    remaining: 732ms
708:    learn: 1013.5007194     total: 1.78s    remaining: 730ms
709:    learn: 1013.4191393     total: 1.78s    remaining: 727ms
710:    learn: 1013.2779150     total: 1.78s    remaining: 725ms
711:    learn: 1013.2277097     total: 1.78s    remaining: 722ms
712:    learn: 1013.1444983     total: 1.79s    remaining: 720ms
713:    learn: 1013.1021447     total: 1.79s    remaining: 717ms
714:    learn: 1013.0751332     total: 1.79s    remaining: 715ms
715:    learn: 1012.9349106     total: 1.79s    remaining: 712ms
716:    learn: 1012.8518322     total: 1.8s     remaining: 710ms
717:    learn: 1012.8296595     total: 1.8s     remaining: 708ms
718:    learn: 1012.7515302     total: 1.8s     remaining: 706ms
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719:    learn: 1012.6750204     total: 1.81s    remaining: 703ms
720:    learn: 1012.6025315     total: 1.81s    remaining: 701ms
721:    learn: 1012.5770014     total: 1.81s    remaining: 699ms
722:    learn: 1012.5099382     total: 1.82s    remaining: 697ms
723:    learn: 1012.3758966     total: 1.82s    remaining: 694ms
724:    learn: 1012.2370104     total: 1.82s    remaining: 691ms
725:    learn: 1012.1759372     total: 1.82s    remaining: 689ms
726:    learn: 1012.1325155     total: 1.83s    remaining: 687ms
727:    learn: 1012.0286762     total: 1.83s    remaining: 685ms
728:    learn: 1012.0192429     total: 1.83s    remaining: 682ms
729:    learn: 1011.9533936     total: 1.84s    remaining: 679ms
730:    learn: 1011.8957078     total: 1.84s    remaining: 677ms
731:    learn: 1011.8759950     total: 1.84s    remaining: 675ms
732:    learn: 1011.8635968     total: 1.85s    remaining: 673ms
733:    learn: 1011.7558591     total: 1.85s    remaining: 670ms
734:    learn: 1011.6640787     total: 1.85s    remaining: 667ms
735:    learn: 1011.6468408     total: 1.85s    remaining: 665ms
736:    learn: 1011.6144295     total: 1.86s    remaining: 662ms
737:    learn: 1011.5521538     total: 1.86s    remaining: 660ms
738:    learn: 1011.4404522     total: 1.86s    remaining: 658ms
739:    learn: 1011.3631607     total: 1.86s    remaining: 655ms
740:    learn: 1011.2947720     total: 1.87s    remaining: 652ms
741:    learn: 1011.2222008     total: 1.87s    remaining: 650ms
742:    learn: 1011.1246525     total: 1.87s    remaining: 647ms
743:    learn: 1011.0894585     total: 1.88s    remaining: 645ms
744:    learn: 1011.0428431     total: 1.88s    remaining: 643ms
745:    learn: 1010.9809557     total: 1.88s    remaining: 640ms
746:    learn: 1010.9433918     total: 1.88s    remaining: 638ms
747:    learn: 1010.8768973     total: 1.88s    remaining: 635ms
748:    learn: 1010.7793009     total: 1.89s    remaining: 633ms
749:    learn: 1010.7574401     total: 1.89s    remaining: 630ms
750:    learn: 1010.6825062     total: 1.89s    remaining: 628ms
751:    learn: 1010.6145166     total: 1.9s     remaining: 625ms
752:    learn: 1010.5475769     total: 1.9s     remaining: 623ms
753:    learn: 1010.4651271     total: 1.9s     remaining: 620ms
754:    learn: 1010.3634241     total: 1.9s     remaining: 618ms
755:    learn: 1010.3195676     total: 1.91s    remaining: 615ms
756:    learn: 1010.2241365     total: 1.91s    remaining: 612ms
757:    learn: 1010.1687852     total: 1.91s    remaining: 610ms
758:    learn: 1010.0975707     total: 1.91s    remaining: 607ms
759:    learn: 1010.0767534     total: 1.91s    remaining: 604ms
760:    learn: 1010.0658708     total: 1.92s    remaining: 602ms
761:    learn: 1009.9951015     total: 1.92s    remaining: 599ms
762:    learn: 1009.9569223     total: 1.92s    remaining: 597ms
763:    learn: 1009.8671687     total: 1.92s    remaining: 594ms
764:    learn: 1009.8332541     total: 1.92s    remaining: 591ms
765:    learn: 1009.7569173     total: 1.93s    remaining: 589ms
766:    learn: 1009.7488040     total: 1.93s    remaining: 586ms
767:    learn: 1009.7379134     total: 1.93s    remaining: 583ms
768:    learn: 1009.6534780     total: 1.93s    remaining: 581ms
769:    learn: 1009.5928712     total: 1.94s    remaining: 579ms
770:    learn: 1009.5005698     total: 1.94s    remaining: 576ms
771:    learn: 1009.4210181     total: 1.94s    remaining: 573ms
772:    learn: 1009.4089210     total: 1.94s    remaining: 571ms
773:    learn: 1009.3797728     total: 1.94s    remaining: 568ms
774:    learn: 1009.3424654     total: 1.95s    remaining: 565ms
775:    learn: 1009.2332950     total: 1.95s    remaining: 563ms
776:    learn: 1009.1695725     total: 1.95s    remaining: 560ms
777:    learn: 1009.0879326     total: 1.95s    remaining: 558ms
778:    learn: 1009.0282628     total: 1.96s    remaining: 555ms
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779:    learn: 1008.9991109     total: 1.96s    remaining: 552ms
780:    learn: 1008.9874907     total: 1.96s    remaining: 550ms
781:    learn: 1008.8642992     total: 1.96s    remaining: 547ms
782:    learn: 1008.8182714     total: 1.97s    remaining: 545ms
783:    learn: 1008.7987247     total: 1.97s    remaining: 542ms
784:    learn: 1008.7518555     total: 1.97s    remaining: 540ms
785:    learn: 1008.6311213     total: 1.97s    remaining: 537ms
786:    learn: 1008.5623644     total: 1.98s    remaining: 535ms
787:    learn: 1008.4757682     total: 1.98s    remaining: 532ms
788:    learn: 1008.4067709     total: 1.98s    remaining: 530ms
789:    learn: 1008.3382459     total: 1.98s    remaining: 528ms
790:    learn: 1008.2428344     total: 1.99s    remaining: 525ms
791:    learn: 1008.1468427     total: 1.99s    remaining: 522ms
792:    learn: 1008.1104004     total: 1.99s    remaining: 520ms
793:    learn: 1008.0110222     total: 1.99s    remaining: 517ms
794:    learn: 1007.9385884     total: 2s       remaining: 515ms
795:    learn: 1007.8391630     total: 2s       remaining: 512ms
796:    learn: 1007.8020258     total: 2s       remaining: 509ms
797:    learn: 1007.7322142     total: 2s       remaining: 507ms
798:    learn: 1007.6606916     total: 2s       remaining: 504ms
799:    learn: 1007.5580160     total: 2.01s    remaining: 502ms
800:    learn: 1007.5244592     total: 2.01s    remaining: 499ms
801:    learn: 1007.5048279     total: 2.01s    remaining: 497ms
802:    learn: 1007.4703623     total: 2.01s    remaining: 494ms
803:    learn: 1007.3812677     total: 2.02s    remaining: 491ms
804:    learn: 1007.3077168     total: 2.02s    remaining: 489ms
805:    learn: 1007.2417401     total: 2.02s    remaining: 486ms
806:    learn: 1007.2235982     total: 2.02s    remaining: 484ms
807:    learn: 1007.1643210     total: 2.02s    remaining: 481ms
808:    learn: 1007.0745509     total: 2.03s    remaining: 479ms
809:    learn: 1007.0002511     total: 2.03s    remaining: 476ms
810:    learn: 1006.9639132     total: 2.03s    remaining: 474ms
811:    learn: 1006.9078704     total: 2.04s    remaining: 471ms
812:    learn: 1006.8952697     total: 2.04s    remaining: 469ms
813:    learn: 1006.8902198     total: 2.04s    remaining: 466ms
814:    learn: 1006.7854408     total: 2.04s    remaining: 464ms
815:    learn: 1006.7555657     total: 2.05s    remaining: 462ms
816:    learn: 1006.7186479     total: 2.05s    remaining: 459ms
817:    learn: 1006.6511326     total: 2.05s    remaining: 457ms
818:    learn: 1006.5956951     total: 2.05s    remaining: 454ms
819:    learn: 1006.5348797     total: 2.06s    remaining: 452ms
820:    learn: 1006.4858296     total: 2.06s    remaining: 449ms
821:    learn: 1006.4580967     total: 2.06s    remaining: 447ms
822:    learn: 1006.3968373     total: 2.06s    remaining: 444ms
823:    learn: 1006.3127723     total: 2.07s    remaining: 442ms
824:    learn: 1006.2698084     total: 2.07s    remaining: 439ms
825:    learn: 1006.2461079     total: 2.07s    remaining: 437ms
826:    learn: 1006.1370473     total: 2.08s    remaining: 434ms
827:    learn: 1006.0426680     total: 2.08s    remaining: 432ms
828:    learn: 1005.9934492     total: 2.08s    remaining: 429ms
829:    learn: 1005.9447413     total: 2.08s    remaining: 427ms
830:    learn: 1005.9183725     total: 2.08s    remaining: 424ms
831:    learn: 1005.8953114     total: 2.09s    remaining: 422ms
832:    learn: 1005.8740061     total: 2.09s    remaining: 419ms
833:    learn: 1005.8053621     total: 2.09s    remaining: 417ms
834:    learn: 1005.7202345     total: 2.1s     remaining: 414ms
835:    learn: 1005.6219744     total: 2.1s     remaining: 412ms
836:    learn: 1005.5241064     total: 2.1s     remaining: 409ms
837:    learn: 1005.4155061     total: 2.1s     remaining: 407ms
838:    learn: 1005.3491158     total: 2.11s    remaining: 404ms
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839:    learn: 1005.3221838    total: 2.11s    remaining: 402ms
840:    learn: 1005.2901330    total: 2.11s    remaining: 399ms
841:    learn: 1005.1842256    total: 2.11s    remaining: 397ms
842:    learn: 1005.1294042    total: 2.12s    remaining: 394ms
843:    learn: 1005.1210970    total: 2.12s    remaining: 392ms
844:    learn: 1005.0446014    total: 2.12s    remaining: 389ms
845:    learn: 1005.0377506    total: 2.13s    remaining: 387ms
846:    learn: 1005.0216161    total: 2.13s    remaining: 384ms
847:    learn: 1005.0133895    total: 2.13s    remaining: 382ms
848:    learn: 1004.9621547    total: 2.13s    remaining: 379ms
849:    learn: 1004.8337410    total: 2.13s    remaining: 377ms
850:    learn: 1004.8070711    total: 2.14s    remaining: 374ms
851:    learn: 1004.7291352    total: 2.14s    remaining: 372ms
852:    learn: 1004.6416083    total: 2.14s    remaining: 369ms
853:    learn: 1004.6226210    total: 2.15s    remaining: 367ms
854:    learn: 1004.5963094    total: 2.15s    remaining: 364ms
855:    learn: 1004.5427451    total: 2.15s    remaining: 362ms
856:    learn: 1004.5023147    total: 2.15s    remaining: 359ms
857:    learn: 1004.4807557    total: 2.16s    remaining: 357ms
858:    learn: 1004.4650646    total: 2.16s    remaining: 354ms
859:    learn: 1004.4549837    total: 2.16s    remaining: 352ms
860:    learn: 1004.4231572    total: 2.16s    remaining: 349ms
861:    learn: 1004.3963684    total: 2.17s    remaining: 347ms
862:    learn: 1004.2835487    total: 2.17s    remaining: 344ms
863:    learn: 1004.2053030    total: 2.17s    remaining: 342ms
864:    learn: 1004.1932405    total: 2.17s    remaining: 339ms
865:    learn: 1004.1859435    total: 2.17s    remaining: 337ms
866:    learn: 1004.1109445    total: 2.18s    remaining: 334ms
867:    learn: 1004.0624825    total: 2.18s    remaining: 332ms
868:    learn: 1004.0299529    total: 2.18s    remaining: 329ms
869:    learn: 1003.9665895    total: 2.19s    remaining: 327ms
870:    learn: 1003.9179054    total: 2.19s    remaining: 324ms
871:    learn: 1003.8571628    total: 2.19s    remaining: 322ms
872:    learn: 1003.7819345    total: 2.19s    remaining: 319ms
873:    learn: 1003.7133234    total: 2.2s     remaining: 317ms
874:    learn: 1003.6692547    total: 2.2s     remaining: 314ms
875:    learn: 1003.6461567    total: 2.2s     remaining: 312ms
876:    learn: 1003.5751825    total: 2.2s     remaining: 309ms
877:    learn: 1003.5067578    total: 2.21s    remaining: 307ms
878:    learn: 1003.4369291    total: 2.21s    remaining: 304ms
879:    learn: 1003.3462924    total: 2.21s    remaining: 302ms
880:    learn: 1003.2668958    total: 2.21s    remaining: 299ms
881:    learn: 1003.2275966    total: 2.22s    remaining: 297ms
882:    learn: 1003.1597876    total: 2.22s    remaining: 294ms
883:    learn: 1003.0723923    total: 2.22s    remaining: 292ms
884:    learn: 1003.0635351    total: 2.23s    remaining: 289ms
885:    learn: 1002.9733591    total: 2.23s    remaining: 287ms
886:    learn: 1002.9479079    total: 2.23s    remaining: 284ms
887:    learn: 1002.8726055    total: 2.23s    remaining: 282ms
888:    learn: 1002.8429681    total: 2.24s    remaining: 279ms
889:    learn: 1002.7975682    total: 2.24s    remaining: 277ms
890:    learn: 1002.7673401    total: 2.24s    remaining: 274ms
891:    learn: 1002.6484978    total: 2.25s    remaining: 272ms
892:    learn: 1002.5784186    total: 2.25s    remaining: 269ms
893:    learn: 1002.4831871    total: 2.25s    remaining: 267ms
894:    learn: 1002.4561044    total: 2.25s    remaining: 264ms
895:    learn: 1002.3783484    total: 2.25s    remaining: 262ms
896:    learn: 1002.2978221    total: 2.26s    remaining: 259ms
897:    learn: 1002.2685534    total: 2.26s    remaining: 257ms
898:    learn: 1002.2204813    total: 2.26s    remaining: 254ms
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899:    learn: 1002.1893402     total: 2.27s    remaining: 252ms
900:    learn: 1002.1835514     total: 2.27s    remaining: 249ms
901:    learn: 1002.1144129     total: 2.27s    remaining: 247ms
902:    learn: 1002.0412181     total: 2.27s    remaining: 244ms
903:    learn: 1001.9954653     total: 2.28s    remaining: 242ms
904:    learn: 1001.9661261     total: 2.28s    remaining: 239ms
905:    learn: 1001.8780071     total: 2.28s    remaining: 237ms
906:    learn: 1001.8069251     total: 2.28s    remaining: 234ms
907:    learn: 1001.7948903     total: 2.29s    remaining: 232ms
908:    learn: 1001.7844196     total: 2.29s    remaining: 229ms
909:    learn: 1001.7474874     total: 2.29s    remaining: 227ms
910:    learn: 1001.6962911     total: 2.3s     remaining: 224ms
911:    learn: 1001.6192803     total: 2.3s     remaining: 222ms
912:    learn: 1001.5209418     total: 2.3s     remaining: 219ms
913:    learn: 1001.4716765     total: 2.3s     remaining: 217ms
914:    learn: 1001.4447393     total: 2.31s    remaining: 214ms
915:    learn: 1001.3994320     total: 2.31s    remaining: 212ms
916:    learn: 1001.3523749     total: 2.31s    remaining: 209ms
917:    learn: 1001.2755355     total: 2.31s    remaining: 207ms
918:    learn: 1001.2586303     total: 2.31s    remaining: 204ms
919:    learn: 1001.1900018     total: 2.32s    remaining: 202ms
920:    learn: 1001.1749723     total: 2.32s    remaining: 199ms
921:    learn: 1001.0967506     total: 2.33s    remaining: 197ms
922:    learn: 1001.0540974     total: 2.33s    remaining: 194ms
923:    learn: 1000.9865582     total: 2.33s    remaining: 192ms
924:    learn: 1000.9057098     total: 2.33s    remaining: 189ms
925:    learn: 1000.8415431     total: 2.34s    remaining: 187ms
926:    learn: 1000.8017979     total: 2.34s    remaining: 184ms
927:    learn: 1000.7662783     total: 2.34s    remaining: 182ms
928:    learn: 1000.7046052     total: 2.34s    remaining: 179ms
929:    learn: 1000.6614961     total: 2.35s    remaining: 177ms
930:    learn: 1000.6526593     total: 2.35s    remaining: 174ms
931:    learn: 1000.6167821     total: 2.35s    remaining: 172ms
932:    learn: 1000.5831116     total: 2.36s    remaining: 169ms
933:    learn: 1000.5171338     total: 2.36s    remaining: 167ms
934:    learn: 1000.4442749     total: 2.36s    remaining: 164ms
935:    learn: 1000.4310565     total: 2.37s    remaining: 162ms
936:    learn: 1000.3598275     total: 2.37s    remaining: 159ms
937:    learn: 1000.2647557     total: 2.37s    remaining: 157ms
938:    learn: 1000.1757871     total: 2.37s    remaining: 154ms
939:    learn: 1000.1010957     total: 2.38s    remaining: 152ms
940:    learn: 1000.0715429     total: 2.38s    remaining: 149ms
941:    learn: 1000.0644772     total: 2.38s    remaining: 147ms
942:    learn: 1000.0156021     total: 2.38s    remaining: 144ms
943:    learn: 999.9177859      total: 2.39s    remaining: 142ms
944:    learn: 999.8902577      total: 2.39s    remaining: 139ms
945:    learn: 999.8753505      total: 2.39s    remaining: 137ms
946:    learn: 999.8178048      total: 2.39s    remaining: 134ms
947:    learn: 999.7767546      total: 2.4s     remaining: 132ms
948:    learn: 999.7580543      total: 2.4s     remaining: 129ms
949:    learn: 999.6887851      total: 2.4s     remaining: 126ms
950:    learn: 999.6258352      total: 2.4s     remaining: 124ms
951:    learn: 999.5836119      total: 2.41s    remaining: 121ms
952:    learn: 999.4994981      total: 2.41s    remaining: 119ms
953:    learn: 999.4927740      total: 2.41s    remaining: 116ms
954:    learn: 999.4393013      total: 2.42s    remaining: 114ms
955:    learn: 999.3678643      total: 2.42s    remaining: 111ms
956:    learn: 999.3536781      total: 2.42s    remaining: 109ms
957:    learn: 999.2613936      total: 2.42s    remaining: 106ms
958:    learn: 999.1843213      total: 2.42s    remaining: 104ms
```

```
959:    learn: 999.1729248      total: 2.43s    remaining: 101ms
960:    learn: 999.1456988      total: 2.43s    remaining: 98.7ms
961:    learn: 999.0805046      total: 2.43s    remaining: 96.1ms
962:    learn: 999.0534342      total: 2.44s    remaining: 93.6ms
963:    learn: 998.9992978      total: 2.44s    remaining: 91ms
964:    learn: 998.9944688      total: 2.44s    remaining: 88.5ms
965:    learn: 998.9323735      total: 2.44s    remaining: 86ms
966:    learn: 998.9267647      total: 2.45s    remaining: 83.5ms
967:    learn: 998.8840616      total: 2.45s    remaining: 80.9ms
968:    learn: 998.8350062      total: 2.45s    remaining: 78.4ms
969:    learn: 998.7624367      total: 2.45s    remaining: 75.9ms
970:    learn: 998.7143107      total: 2.46s    remaining: 73.4ms
971:    learn: 998.6914896      total: 2.46s    remaining: 70.8ms
972:    learn: 998.6511096      total: 2.46s    remaining: 68.3ms
973:    learn: 998.6277373      total: 2.46s    remaining: 65.8ms
974:    learn: 998.6196162      total: 2.46s    remaining: 63.2ms
975:    learn: 998.6095517      total: 2.47s    remaining: 60.7ms
976:    learn: 998.5789184      total: 2.47s    remaining: 58.2ms
977:    learn: 998.5199687      total: 2.47s    remaining: 55.7ms
978:    learn: 998.4884915      total: 2.48s    remaining: 53.1ms
979:    learn: 998.4390235      total: 2.48s    remaining: 50.6ms
980:    learn: 998.3896063      total: 2.48s    remaining: 48.1ms
981:    learn: 998.3665219      total: 2.48s    remaining: 45.5ms
982:    learn: 998.2763248      total: 2.48s    remaining: 43ms
983:    learn: 998.2491018      total: 2.49s    remaining: 40.5ms
984:    learn: 998.1872922      total: 2.49s    remaining: 38ms
985:    learn: 998.1318479      total: 2.49s    remaining: 35.4ms
986:    learn: 998.0675067      total: 2.5s     remaining: 32.9ms
987:    learn: 998.0548676      total: 2.5s     remaining: 30.3ms
988:    learn: 998.0485089      total: 2.5s     remaining: 27.8ms
989:    learn: 997.9802353      total: 2.5s     remaining: 25.3ms
990:    learn: 997.8993091      total: 2.51s    remaining: 22.8ms
991:    learn: 997.8592717      total: 2.51s    remaining: 20.2ms
992:    learn: 997.8497467      total: 2.51s    remaining: 17.7ms
993:    learn: 997.8103820      total: 2.51s    remaining: 15.2ms
994:    learn: 997.7598750      total: 2.52s    remaining: 12.6ms
995:    learn: 997.7463014      total: 2.52s    remaining: 10.1ms
996:    learn: 997.7349076      total: 2.52s    remaining: 7.59ms
997:    learn: 997.7266285      total: 2.52s    remaining: 5.06ms
998:    learn: 997.6591556      total: 2.53s    remaining: 2.53ms
999:    learn: 997.6291289      total: 2.53s    remaining: 0us
```

Out[95]:

▾ LGBMRegressor

LGBMRegressor()

In [99]:

```
y_pred1 = lr.predict(X_test)
y_pred2 = svr.predict(X_test)
y_pred3 = rf.predict(X_test)
y_pred4 = gr.predict(X_test)
y_pred5 = xg.predict(X_test)
y_pred6 = ct.predict(X_test)
y_pred7 = lgm.predict(X_test)

df = pd.DataFrame({'Actual':y_test,
                   'lr':y_pred1,
                   'svr':y_pred2,
                   'rf':y_pred3,
                   'gr':y_pred4,
```

```
                    'xg':y_pred5,
                    'ct':y_pred6,
                    'lgm':y_pred7})
df.head(11)
```

Out[99]:

	Actual	lr	svr	rf	gr	xg	ct	
7503	1743.0644	973.712917	1388.407569	765.237230	1280.795841	1221.579346	1177.272268	1
2957	356.8688	687.292306	1201.010580	651.898096	665.702570	683.051697	730.747639	
7031	377.5086	913.525120	1199.211005	743.618704	690.768936	671.410828	702.566221	
1084	5778.4782	4180.055968	2219.510955	3186.165926	4771.954791	4947.487305	4719.502459	4
856	2356.9320	2936.186102	2372.864553	2230.443316	3206.285252	3084.644043	3058.090254	3
4304	865.5400	764.653778	1178.925951	330.926569	624.594908	620.882080	505.802073	
2132	4613.9940	4730.359876	2422.146981	8437.896456	5635.861598	5416.589844	5967.299696	5
1385	2410.8618	2754.588091	1942.089022	874.561590	1911.490825	1853.765503	1697.353764	1
5239	1948.1308	2148.810702	1574.117535	796.210246	1427.489153	1519.089233	1353.975631	1
6516	1937.4780	3535.641488	2340.240219	3373.668522	2798.182473	2906.603760	3203.352099	2
4509	210.3928	193.657279	1579.881211	206.557792	291.143866	215.041809	305.159888	

In [117…

```
plt.figure(figsize = (5,10))

plt.subplot(421)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['lr'].iloc[0:11],label='lr')
plt.legend()

plt.subplot(422)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['svr'].iloc[0:11],label='svm')
plt.legend()

plt.subplot(423)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['rf'].iloc[0:11],label='rf')
plt.legend()

plt.subplot(424)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['gr'].iloc[0:11],label='gr')
plt.legend()

plt.subplot(425)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['xg'].iloc[0:11],label='xg')
plt.legend()

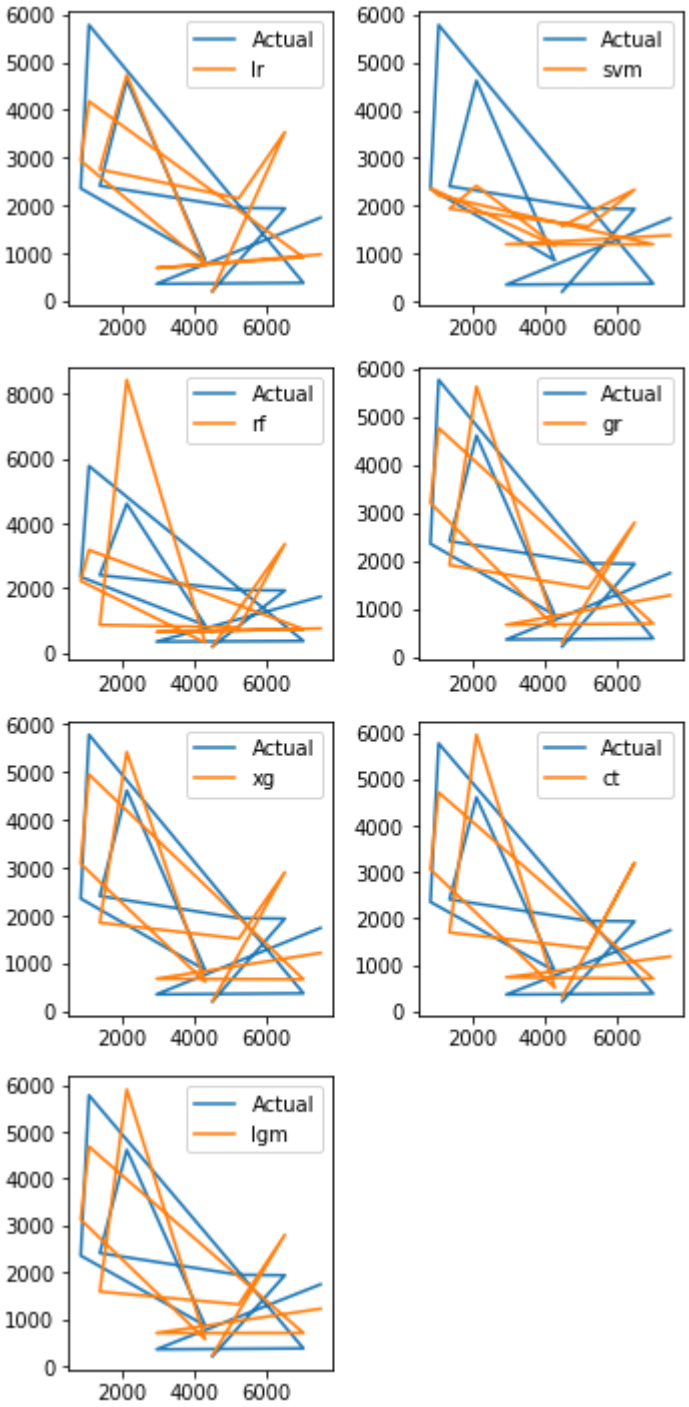
plt.subplot(426)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
plt.plot(df['ct'].iloc[0:11],label='ct')
plt.legend()

plt.subplot(427)
plt.plot(df['Actual'].iloc[0:11],label='Actual')
```

```
plt.plot(df['lgm'].iloc[0:11],label='lgm')
plt.legend()

plt.tight_layout()

plt.show()
```



In [131…
```
pickle.dump(xg,open('big_mart_sales_predictor.pkl','wb'))
```

In [132…
```
model = pickle.load(open('big_mart_sales_predictor.pkl','rb'))
```

In [135…
```
df_new = pd.DataFrame({'Item_MRP':141.6180,
                       'Outlet_Identifier':9.0,
                       'Outlet_Size':1.0,
```

```
                        'Outlet_Type':1.0,
                        'Outlet_Age':24
                        },index=[2])
```

In [136…
```
model.predict(df_new)
```

Out[136]:
```
array([2059.0977], dtype=float32)
```

In [144…
```
from tkinter import *

current_year = dt.datetime.today().year
def show_entry_fields():
    p1=float(e1.get())

    text = clicked.get()
    if text == 'OUT010':
        p2=0
        print(p2)
    elif text=='OUT013':
        p2=1
        print(p2)
    elif text=='OUT017':
        p2=2
        print(p2)
    elif text=='OUT018':
        p2=3
        print(p2)
    elif text=='OUT019':
        p2=4
        print(p2)
    elif text=='OUT027':
        p2=5
        print(p2)
    elif text=='OUT035':
        p2=6
        print(p2)
    elif text=='OUT045':
        p2=7
        print(p2)
    elif text=='OUT046':
        p2=8
        print(p2)
    elif text=='OUT049':
        p2=9
        print(p2)
    text0 = clicked0.get()
    if text0=='High':
        p3=0
        print(p3)
    elif text0=='Medium':
        p3=1
        print(p3)
    elif text0=='Small':
        p3=2
        print(p3)

    text1 = clicked1.get()
    if text1=='Supermarket Type1':
        p4=1
```

```
        print(p4)
    elif text1=='Supermarket Type2':
        p4=2
        print(p4)
    elif text1=='Supermarket Type3':
        p4=3
        print(p4)
    elif text1=='Grocery Store':
        p4=0
        print(p4)

    p5=current_year - int(e5.get())
    print(p5)

    model=pickle.load(open('big_mart_sales_predictor.pkl','rb'))
    result=model.predict(np.array([[p1,p2,p3,p4,p5]]))
    Label(master, text='Sales').grid(row=8)
    Label(master, text=result).grid(row=10)
    print('Sales Amount', result)

master = Tk()
master.title('Big Mart Sales Prediction Using Machine Learning')


label = Label(master, text='Big Mart Sales Prediction Using ML'
                          , bg='black', fg='white'). \
                              grid(row=0,columnspan=2)

Label(master, text='Item_MRP').grid(row=1)
Label(master, text='Outlet_Identifier').grid(row=2)
Label(master, text='Outlet_Size').grid(row=3)
Label(master, text='Outlet_Type').grid(row=4)
Label(master, text='Outlet_Establishment_Year').grid(row=5)


clicked = StringVar()
options = ['OUT010', 'OUT013', 'OUT017', 'OUT018', 'OUT019', 'OUT027',
       'OUT035', 'OUT045', 'OUT046', 'OUT049']

clicked0 = StringVar()

options0 = ['High', 'Medium', 'Small']

clicked1 = StringVar()
options1 = ['Grocery Store', 'Supermarket Type1', 'Supermarket Type2',
       'Supermarket Type3']

e1 = Entry(master)

e2 = OptionMenu(master , clicked , *options )
e2.configure(width=15)


e3 = OptionMenu(master , clicked0 , *options0 )
e3.configure(width=15)


e4 = OptionMenu(master , clicked1 , *options1 )
e4.configure(width=15)
```

```
e5 = Entry(master)

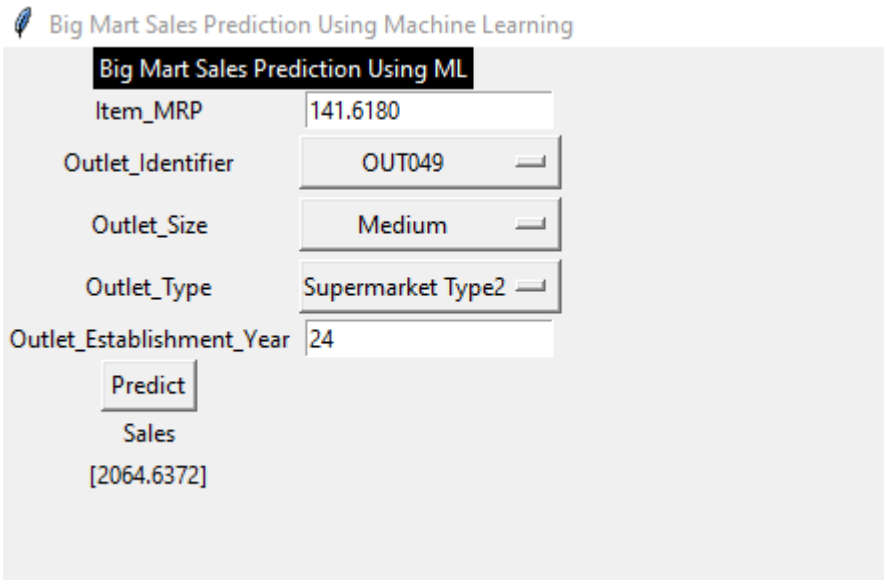

e1.grid(row=1, column=1)
e2.grid(row=2, column=1)
e3.grid(row=3, column=1)
e4.grid(row=4, column=1)
e5.grid(row=5, column=1)



Button(master, text='Predict', command=show_entry_fields).grid()

mainloop()
```

```
4
1
1
1999
Sales Amount [2216.4587]
2
1
1
1999
Sales Amount [2236.3906]
9
1
1
1999
Sales Amount [2215.4607]
9
1
2
1999
Sales Amount [2064.6372]
```



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