Recruit Restaurant Visitor Forecasting

Mounting the Google Drive to access the data

In [1]:

```python
from google.colab import drive
drive.mount('/content/drive')
```

Drive already mounted at /content/drive; to attempt to forcibly remount, call
drive.mount("/content/drive", force_remount=True).

Importing the neccessary library

In [2]:

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import calendar
import gc
gc.collect()
```

/usr/local/lib/python3.6/dist-packages/statsmodels/tools/_testing.py:19: FutureWarning:
pandas.util.testing is deprecated. Use the functions in the public API at pandas.testing instead.
  import pandas.util.testing as tm

Out[2]:

0

Loading the Data of AirVisit

In [3]:

```python
airvisit_df=pd.read_csv('/content/drive/My Drive/air_visit_data.csv')
airvisit_df.head()
```

Out[3]:

	air_store_id	visit_date	visitors
0	air_ba937bf13d40fb24	2016-01-13	25
1	air_ba937bf13d40fb24	2016-01-14	32
2	air_ba937bf13d40fb24	2016-01-15	29
3	air_ba937bf13d40fb24	2016-01-16	22
4	air_ba937bf13d40fb24	2016-01-18	6

In [4]:

```python
airvisit_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 252108 entries, 0 to 252107
Data columns (total 3 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   air_store_id  252108 non-null  object
 1   visit_date    252108 non-null  object
 2   visitors      252108 non-null  int64
dtypes: int64(1), object(2)
memory usage: 5.8+ MB
```

Check How many Unique values are there in the Airvisit

```
airvisit_df.nunique()
```

Out[5]:

```
air_store_id    829
visit_date      478
visitors        204
dtype: int64
```

Check How any null values are there in the airvisit

In [6]:

```
airvisit_df.isnull().sum().any()
```

Out[6]:

```
False
```

Check How any duplicate values are there in the airvisit

In [7]:

```
airvisit_duplicated=airvisit_df[airvisit_df.duplicated()]
airvisit_duplicated
```

Out[7]:

air_store_id	visit_date	visitors

In [8]:

```
airvisit_df.describe()
```

Out[8]:

	visitors
count	252108.000000
mean	20.973761
std	16.757007
min	1.000000
25%	9.000000
50%	17.000000
75%	29.000000
max	877.000000

Load the airstore_data

In [9]:

```
air_store_info=pd.read_csv('/content/drive/My Drive/air_store_info.csv')
air_store_info.head()
```

Out[9]:

| air_store_id | air_genre_name | air_area_name | latitude | longitude |

	air_store_id	air_genre_name	air_area_name	latitude	longitude
0	air_0f0cdeee6c9bf3d7	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
1	air_7cc17a324ae5c7dc	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
2	air_fee8dcf4d619598e	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
3	air_a17f0778617c76e2	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
4	air_83db5aff8f50478e	Italian/French	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599

In [10]:

```
air_store_info.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 829 entries, 0 to 828
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   air_store_id    829 non-null    object
 1   air_genre_name  829 non-null    object
 2   air_area_name   829 non-null    object
 3   latitude        829 non-null    float64
 4   longitude       829 non-null    float64
dtypes: float64(2), object(3)
memory usage: 32.5+ KB
```

In [11]:

```
air_store_info.describe()
```

Out[11]:

	latitude	longitude
count	829.000000	829.000000
mean	35.647042	137.415311
std	2.084659	3.650971
min	33.211967	130.195555
25%	34.695124	135.341564
50%	35.658068	139.685474
75%	35.694003	139.751599
max	44.020632	144.273398

Check any null values are there in the AirStore dataset

In [12]:

```
air_store_info.isnull().sum().any()
```

Out[12]:

```
False
```

Loading the HPG store Dataset

In [13]:

```
hpg_store_info_df=pd.read_csv('/content/drive/My Drive/hpg_store_info.csv')
hpg_store_info_df.head()
```

Out[13]:

	hpg_store_id	hpg_genre_name	hpg_area_name	latitude	longitude
0	hpg_6622b62385aec8bf	Japanese style	Tōkyō-to Setagaya-ku	35.643675	139.668221

	hpg_store_id	hpg_genre_name	hpg_area_name	latitude	longitude
0	hpg_6622b62385aec8bf	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
1	hpg_e9e068dd49c5fa00	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
2	hpg_2976f7acb4b3a3bc	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
3	hpg_e51a522e098f024c	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
4	hpg_e3d0e1519894f275	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221

In [14]:

```
hpg_store_info_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4690 entries, 0 to 4689
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   hpg_store_id    4690 non-null   object
 1   hpg_genre_name  4690 non-null   object
 2   hpg_area_name   4690 non-null   object
 3   latitude        4690 non-null   float64
 4   longitude       4690 non-null   float64
dtypes: float64(2), object(3)
memory usage: 183.3+ KB
```

In [15]:

```
hpg_store_info_df.describe()
```

Out[15]:

	latitude	longitude
count	4690.000000	4690.000000
mean	35.810261	137.675816
std	2.138755	3.197233
min	33.311645	130.339313
25%	34.692109	135.498859
50%	35.659214	139.495733
75%	35.703381	139.737998
max	43.774846	143.714585

Checking Any Null values are there in the HPG store dataset

In [16]:

```
hpg_store_info_df.isnull().sum().any()
```

Out[16]:

```
False
```

Checking Any duplicate values are there in the HPG store dataset

In [17]:

```
hpg_store_info_df_duplicate=hpg_store_info_df[hpg_store_info_df.duplicated()]
hpg_store_info_df_duplicate
```

Out[17]:

Loading storeid_relation_dataset

In [18]:

```
store_id_df=pd.read_csv('/content/drive/My Drive/store_id_relation.csv')
store_id_df.head()
```

Out[18]:

	air_store_id	hpg_store_id
0	air_63b13c56b7201bd9	hpg_4bc649e72e2a239a
1	air_a24bf50c3e90d583	hpg_c34b496d0305a809
2	air_c7f78b4f3cba33ff	hpg_cd8ae0d9bbd58ff9
3	air_947eb2cae4f3e8f2	hpg_de24ea49dc25d6b8
4	air_965b2e0cf4119003	hpg_653238a84804d8e7

In [19]:

```
store_id_df.nunique()
```

Out[19]:

```
air_store_id    150
hpg_store_id    150
dtype: int64
```

In [20]:

```
store_id_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 2 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   air_store_id  150 non-null    object
 1   hpg_store_id  150 non-null    object
dtypes: object(2)
memory usage: 2.5+ KB
```

Investigate HPG store are there in the storeId relation

In [21]:

```
hpg_store_info_df['hpg_store_id'].isin(store_id_df['hpg_store_id']).sum()
```

Out[21]:

```
63
```

Investigate store storeId are there in the HPG

In [22]:

```
store_id_df['hpg_store_id'].isin(hpg_store_info_df['hpg_store_id']).sum()
```

Out[22]:

```
63
```

In [23]:

```
hpg_store_info_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4690 entries, 0 to 4689
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   hpg_store_id    4690 non-null   object
 1   hpg_genre_name  4690 non-null   object
 2   hpg_area_name   4690 non-null   object
 3   latitude        4690 non-null   float64
 4   longitude       4690 non-null   float64
dtypes: float64(2), object(3)
memory usage: 183.3+ KB
```

In [24]:

```
hpg_store_info_df.nunique()
```

Out[24]:

```
hpg_store_id     4690
hpg_genre_name     34
hpg_area_name     119
latitude          129
longitude         129
dtype: int64
```

In [25]:

```
store_id_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 2 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   air_store_id  150 non-null    object
 1   hpg_store_id  150 non-null    object
dtypes: object(2)
memory usage: 2.5+ KB
```

In [26]:

```
store_id_df.nunique()
```

Out[26]:

```
air_store_id    150
hpg_store_id    150
dtype: int64
```

How many airstoreId are there in the storeId

In [27]:

```
air_store_info['air_store_id'].isin(store_id_df['air_store_id']).sum()
```

Out[27]:

```
150
```

How many storeId are there in the airstoreId

In [28]:

```
store_id_df['air_store_id'].isin(air_store_info['air_store_id']).sum()
```

```
Out[28]:

150
```

Only 150 stores which are related to the hpgstore out of 829 through the store_id relation and we are having only airvisit data

Investigate the airstore_id in air_store_info and air_visit

```
In [29]:
```

```python
airvisit_df['air_store_id'].isin(air_store_info['air_store_id']).sum()
```

```
Out[29]:

252108
```

```
In [30]:
```

```python
air_store_info['air_store_id'].isin(airvisit_df['air_store_id']).sum()
```

```
Out[30]:

829
```

```
In [31]:
```

```python
air_store_info.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 829 entries, 0 to 828
Data columns (total 5 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   air_store_id    829 non-null    object
 1   air_genre_name  829 non-null    object
 2   air_area_name   829 non-null    object
 3   latitude        829 non-null    float64
 4   longitude       829 non-null    float64
dtypes: float64(2), object(3)
memory usage: 32.5+ KB
```

```
In [32]:
```

```python
airvisit_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 252108 entries, 0 to 252107
Data columns (total 3 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   air_store_id  252108 non-null  object
 1   visit_date    252108 non-null  object
 2   visitors      252108 non-null  int64
dtypes: int64(1), object(2)
memory usage: 5.8+ MB
```

```
In [33]:
```

```python
airvisit_df.nunique()
```

```
Out[33]:

air_store_id    829
visit_date      478
visitors        204
dtype: int64
```

In [34]:

```
air_store_info.nunique()
```

Out[34]:

```
air_store_id    829
air_genre_name   14
air_area_name   103
latitude        108
longitude       108
dtype: int64
```

The entry of the airstoreid is their in the airstoreinfo of airstoreid so we have to merge this two dataset

In [35]:

```
df=airvisit_df.merge(air_store_info, on='air_store_id',how='inner')
df.head()
```

Out[35]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
0	air_ba937bf13d40fb24	2016-01-13	25	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
1	air_ba937bf13d40fb24	2016-01-14	32	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
2	air_ba937bf13d40fb24	2016-01-15	29	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
3	air_ba937bf13d40fb24	2016-01-16	22	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
4	air_ba937bf13d40fb24	2016-01-18	6	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599

In [36]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 252108 entries, 0 to 252107
Data columns (total 7 columns):
 #   Column          Non-Null Count   Dtype
---  ------          --------------   -----
 0   air_store_id    252108 non-null  object
 1   visit_date      252108 non-null  object
 2   visitors        252108 non-null  int64
 3   air_genre_name  252108 non-null  object
 4   air_area_name   252108 non-null  object
 5   latitude        252108 non-null  float64
 6   longitude       252108 non-null  float64
dtypes: float64(2), int64(1), object(4)
memory usage: 15.4+ MB
```

Convert an object to date in the dataframe

In [37]:

```
df['visit_date']=pd.to_datetime(df['visit_date'],format='%Y-%m-%d')
df.head()
```

Out[37]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
0	air_ba937bf13d40fb24	2016-01-13	25	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
1	air_ba937bf13d40fb24	2016-01-14	32	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
2	air_ba937bf13d40fb24	2016-01-15	29	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
3	air_ba937bf13d40fb24	2016-01-16	22	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599
4	air_ba937bf13d40fb24	2016-01-18	6	Dining bar	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599

In [38]:

```
df=df.sort_values(by=['air_store_id','visit_date']).reset_index(drop=True)
```

In [39]:

```
df.head()
```

Out[39]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595
1	air_00a91d42b08b08d9	2016-07-02	9	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595
2	air_00a91d42b08b08d9	2016-07-04	20	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595
3	air_00a91d42b08b08d9	2016-07-05	25	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595
4	air_00a91d42b08b08d9	2016-07-06	29	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595

In [40]:

```
df.nunique()
```

Out[40]:

```
air_store_id      829
visit_date        478
visitors          204
air_genre_name     14
air_area_name     103
latitude          108
longitude         108
dtype: int64
```

Investigate the number of unique areanames in the dataframe

In [41]:

```
area_names=df.groupby(by=['air_area_name']).nunique()
area_names
```

Out[41]:

air_area_name	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
Fukuoka-ken Fukuoka-shi Daimyō	64	478	113	9	1	2	2
Fukuoka-ken Fukuoka-shi Hakata Ekimae	16	476	85	5	1	1	1
Fukuoka-ken Fukuoka-shi Imaizumi	2	287	43	1	1	1	1
Fukuoka-ken Fukuoka-shi Momochi	6	478	82	2	1	1	1
Fukuoka-ken Fukuoka-shi Shiobaru	7	477	77	2	1	1	1
...	...	...	...	...	...	...	...
Ōsaka-fu Ōsaka-shi Nakanochō	2	463	49	1	1	1	1
Ōsaka-fu Ōsaka-shi Nanbasennichimae	2	296	62	1	1	1	1
Ōsaka-fu Ōsaka-shi Shinmachi	10	477	103	4	1	1	1
Ōsaka-fu Ōsaka-shi Ōgimachi	25	478	94	7	1	1	1
Ōsaka-fu Ōsaka-shi Ōhiraki	4	294	52	2	1	1	1

| | air_store_id | visit_date | visitors | air_genre_name | air_area_name | latitude | longitude |

air_area_name

Investigate the unique area name where the latitude and longitude have the same coordinates

In [42]:

```
multiple_cord=area_names.loc[(area_names['latitude'] >1) | (area_names['longitude'] >1),:]
multiple_cord
```

Out[42]:

air_area_name	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
Fukuoka-ken Fukuoka-shi Daimyō	64	478	113	9	1	2	2
Hokkaidō Sapporo-shi Minami 3 Jōnishi	21	478	120	7	1	2	2
Tōkyō-to Nakano-ku Nakano	6	475	65	2	1	2	2
Tōkyō-to Setagaya-ku Setagaya	30	478	93	6	1	2	2
Tōkyō-to Toshima-ku Minamiikebukuro	12	477	87	4	1	2	2

Loading the airReserve Dataset

In [43]:

```
air_reserve=pd.read_csv('/content/drive/My Drive/air_reserve.csv')
air_reserve.head()
```

Out[43]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5

In [44]:

```
air_reserve.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 92378 entries, 0 to 92377
Data columns (total 4 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   air_store_id      92378 non-null  object
 1   visit_datetime    92378 non-null  object
 2   reserve_datetime  92378 non-null  object
 3   reserve_visitors  92378 non-null  int64
dtypes: int64(1), object(3)
memory usage: 2.8+ MB
```

In [45]:

```
air_reserve.isnull().any().sum()
```

Out[45]:

0

```
In [46]:
```

```
air_reserve.describe()
```

```
Out[46]:
```

	reserve_visitors
count	92378.000000
mean	4.481749
std	4.919669
min	1.000000
25%	2.000000
50%	3.000000
75%	5.000000
max	100.000000

Loading the Hpg reserve dataset

```
In [47]:
```

```
hpg_reserve=pd.read_csv('/content/drive/My Drive/hpg_reserve.csv')
hpg_reserve.head()
```

```
Out[47]:
```

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13

```
In [48]:
```

```
hpg_reserve.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2000320 entries, 0 to 2000319
Data columns (total 4 columns):
 #   Column            Dtype
---  ------            -----
 0   hpg_store_id      object
 1   visit_datetime    object
 2   reserve_datetime  object
 3   reserve_visitors  int64
dtypes: int64(1), object(3)
memory usage: 61.0+ MB
```

```
In [49]:
```

```
hpg_reserve.isnull().any().sum()
```

```
Out[49]:
```

```
0
```

```
In [50]:
```

```
hpg_reserve.describe()
```

```
Out[50]:
```

	reserve_visitors
count	2.000320e+06
mean	5.073785e+00
std	5.416172e+00
min	1.000000e+00
25%	2.000000e+00
50%	3.000000e+00
75%	6.000000e+00
max	1.000000e+02

Loading the date dataset

In [51]:

```
date_info=pd.read_csv('/content/drive/My Drive/date_info.csv')
date_info.head()
```

Out[51]:

	calendar_date	day_of_week	holiday_flg
0	2016-01-01	Friday	1
1	2016-01-02	Saturday	1
2	2016-01-03	Sunday	1
3	2016-01-04	Monday	0
4	2016-01-05	Tuesday	0

In [52]:

```
date_info.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 517 entries, 0 to 516
Data columns (total 3 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   calendar_date  517 non-null    object
 1   day_of_week    517 non-null    object
 2   holiday_flg    517 non-null    int64
dtypes: int64(1), object(2)
memory usage: 12.2+ KB
```

In [53]:

```
date_info.isnull().any().sum()
```

Out[53]:

0

Loading the test Dataset

In [54]:

```
predicted_data=pd.read_csv('/content/drive/My Drive/sample_submission.csv')
predicted_data.head()
```

Out[54]:

	id	visitors

	id	visitors
0	air_00a91d42b08b08d9_2017-04-23	0
1	air_00a91d42b08b08d9_2017-04-24	0
2	air_00a91d42b08b08d9_2017-04-25	0
3	air_00a91d42b08b08d9_2017-04-26	0
4	air_00a91d42b08b08d9_2017-04-27	0

id can be splitted from the air_storeId, visit_date

In [55]:

```
id_split = predicted_data['id'].str.split('_', expand=True)
id_split.columns=['source','store_id','visit_date']
predicted_data=pd.concat([id_split,predicted_data],axis=1)
predicted_data['air_store_id']=predicted_data['source'].str.cat(predicted_data['store_id'],sep='_')
predicted_data=predicted_data[['id','air_store_id','visit_date','visitors']]
predicted_data['visit_date'] = pd.to_datetime(predicted_data['visit_date'])
predicted_data.head()
```

Out[55]:

	id	air_store_id	visit_date	visitors
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	0
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	0
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	0
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	0

In [56]:

```
predicted_data.air_store_id.nunique()
```

Out[56]:

821

AirVisit EDA

Convert the Visit_date to datetime

In [57]:

```
airvisit_df.visit_date=pd.to_datetime(airvisit_df.visit_date)
airvisit_df.head()
```

Out[57]:

	air_store_id	visit_date	visitors
0	air_ba937bf13d40fb24	2016-01-13	25
1	air_ba937bf13d40fb24	2016-01-14	32
2	air_ba937bf13d40fb24	2016-01-15	29
3	air_ba937bf13d40fb24	2016-01-16	22
4	air_ba937bf13d40fb24	2016-01-18	6

Objective of the Analysis& Plotting.

1)The objective of this analysis is to show how many visitors by each visit date in the airvisit restaurants and see the trend that when it was raised to the highest pick as compared the lowet pick.

2)This analysis is useful for reataurant owner to purchase ingredients for the next day on the basis of the number of visitors

came to the restaurants based on the previous date visitors numbers.

Count Total number of visitors by date and plotting

Here we found the total number of visitors by visit date in the Airvisit restaurants between 2016 to 2017

In [58]:

```
visitors_by_date=airvisit_df.groupby('visit_date').sum()
visitors_by_date.head()
```
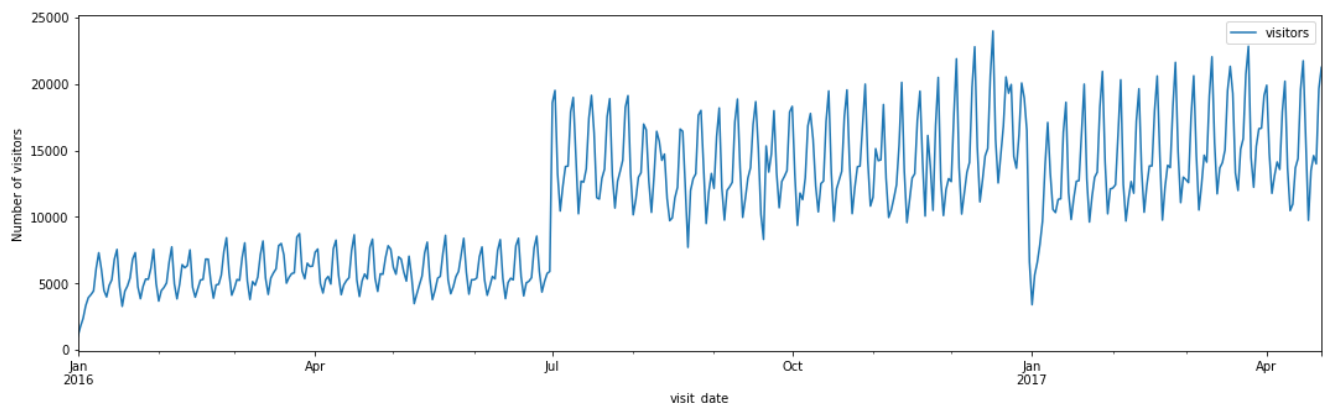
Out[58]:

	visitors
visit_date	
2016-01-01	1033
2016-01-02	1764
2016-01-03	2368
2016-01-04	3326
2016-01-05	3927

In [59]:

```
ax=visitors_by_date.plot(figsize=[18,5])
ax.set_ylabel('Number of visitors')
```

Out[59]:

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


Observation

1)It started with Jan2016 and fluctuated trend of visitiors by visit_date till july and then on we steep increase happened from approx 4500 visitors to above 15000 visitors.

2)After july again it was fluctuated till november and in the end of the December the trend shows 3 times drop from the current values of visitors.

3)After Jan2017 again one time steep increased and then fluctuated.

Conclusion:

1)Overall there is a similar trend from first 6 month and ater that there is a peak till end of the year and then again the similar trend observerd from january 2017 to till the Apr end of the 2017.

2) we are now moved to do analysis by summarize the results and do the analysis by monthly &weekly &daily the number of visitors and see the trend.

```
airvisit_df.head()
```

	air_store_id	visit_date	visitors
0	air_ba937bf13d40fb24	2016-01-13	25
1	air_ba937bf13d40fb24	2016-01-14	32
2	air_ba937bf13d40fb24	2016-01-15	29
3	air_ba937bf13d40fb24	2016-01-16	22
4	air_ba937bf13d40fb24	2016-01-18	6

Calculate the weekday from the visitDate

```
airvisit_df['weekday']=airvisit_df['visit_date'].dt.weekday
```

```
airvisit_df.head()
```

	air_store_id	visit_date	visitors	weekday
0	air_ba937bf13d40fb24	2016-01-13	25	2
1	air_ba937bf13d40fb24	2016-01-14	32	3
2	air_ba937bf13d40fb24	2016-01-15	29	4
3	air_ba937bf13d40fb24	2016-01-16	22	5
4	air_ba937bf13d40fb24	2016-01-18	6	0

Objective of the Analysis& Plotting.

1)The objective of the analysis is to show that how many number of visitors by weekday.i.e means that visitors that came between Monday to Saturday and amongst all the day which day is the highest peak against others in terms of visitors.

2)By looking this plot The restaurant owner get an idea about amongst the 7 days of week which day is the highest visitors and also get an idea about the highest selling food amongst the other days.

3)This plot is also useful for impact of the seasonal visitors to normal viistors by the weekday.

Count the Number of visitors by weekdays &Plot the bar chart

--> Here we calculate the number of visitors by the weekdays.

```
visitor_by_weekday=airvisit_df.groupby('weekday')['visitors'].sum()
visitor_by_weekday.head()
```

```
weekday
0    544202
1    636462
2    707880
3    718987
4    931008
Name: visitors, dtype: int64
```

```
sns.barplot(x=airvisit_df['weekday'],y=airvisit_df['visitors'])
```

Out[64]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8e0ee3dcf8>
```
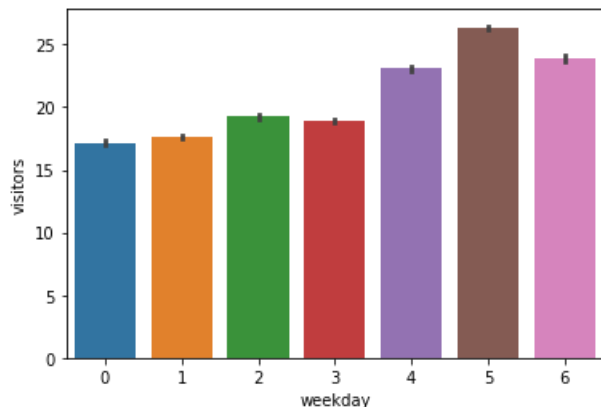

Observation

In the first 4 weeks there is a small amount of increase in the trend of visitors by weekday as compared to the 5 the week and then in the last week which shows the decreased trend of visitors.

There is a increasing trend of the visitors from the starting to the end of the week and there is a slightly increase and decrease of the visitors from all the weekday.

Conclusion

1)Overall there is a increasing trend of the visitors that shows in the plot from all the weekday and weekend and also the highest number of visitors are in the weekend i.e on saturday and all the other days there are slight changes from day to day of the week, so that we need to do again deeper analysis on the monthly visitors and show the trend of them.

2)This analysis also useful for restaurants to know the idea about the prefrences of the visitors went for the restaurant from weekday to weekends.

Calculate the month from the visitdate

Here we calculate the number of visitors by monthly.

In [65]:

```
airvisit_df['month']=airvisit_df['visit_date'].dt.month
airvisit_df['month'] = airvisit_df['month'].apply(lambda x: calendar.month_abbr[x])
airvisit_df.head()
```

Out[65]:

	air_store_id	visit_date	visitors	weekday	month
0	air_ba937bf13d40fb24	2016-01-13	25	2	Jan
1	air_ba937bf13d40fb24	2016-01-14	32	3	Jan
2	air_ba937bf13d40fb24	2016-01-15	29	4	Jan
3	air_ba937bf13d40fb24	2016-01-16	22	5	Jan
4	air_ba937bf13d40fb24	2016-01-18	6	0	Jan

Objective of the Analysis& Plotting.

1)The objective of analysis is useful for showing the trend of the visitors by month and also compare the number of more visitors who came in the particular month to other months.

2)Based on this analysis the restaurant owners/managers need to know the purchase of resturant ingredient by month and

also allocate the staff accordingly to serve the customers.

3)This analysis also useful for comparing the trend of selling food by monthly

Number of visitor by Month&Visualize

Here we calculate the month wise visitors went to the restaurants and take the food.

In [66]:

```
visitor_by_month=airvisit_df.groupby('month')['visitors'].sum()
visitor_by_month.head()
```
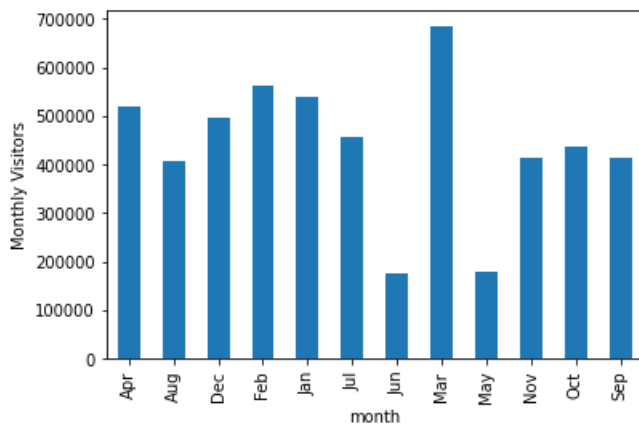
Out[66]:

```
month
Apr    520508
Aug    408300
Dec    497617
Feb    561396
Jan    539772
Name: visitors, dtype: int64
```

In [67]:

```
ax=visitor_by_month.plot.bar()
ax.set_ylabel('Monthly Visitors')
```

Out[67]:

```
Text(0, 0.5, 'Monthly Visitors')
```


Obeservation

1)The highest visitors are in the month of march as compared to all the months and lowest visitors contribution from the month of May and June.*

2)There are slight change of visitors went to restaurants from every month except the march, may and june

Conclusion

1)Overall there is a increaing trend of the visitors by month visit to a restaurant and taking the food.

2)This analysis also useful for restaurants to know the idea about the prefrences of the visitors went for the restaurant monthly

Calculate the day from the visitDate

Here we calculate the day from the visit date and shows the trend of visitors by daily of visitors.

```
airvisit_df['day']=airvisit_df['visit_date'].dt.day
airvisit_df.head()
```

	air_store_id	visit_date	visitors	weekday	month	day
0	air_ba937bf13d40fb24	2016-01-13	25	2	Jan	13
1	air_ba937bf13d40fb24	2016-01-14	32	3	Jan	14
2	air_ba937bf13d40fb24	2016-01-15	29	4	Jan	15
3	air_ba937bf13d40fb24	2016-01-16	22	5	Jan	16
4	air_ba937bf13d40fb24	2016-01-18	6	0	Jan	18

Calculate Visitiors By day and Visualize

```
visitors_by_day=airvisit_df.groupby('day')['visitors'].sum()
visitors_by_day.head()
```

```
day
1    159755
2    168461
3    173242
4    171852
5    164872
Name: visitors, dtype: int64
```

Objective of the Analysis& Plotting.

1)The objective of analysis is useful for showing the trend of the visitors by daily and also compare the number of more visitors who came in the particular day to other days of the month.

2)Based on this analysis the restaurant owners/managers need to know the purchase of resturant ingredient by daily and also allocate the staff accordingly to serve the customers.

3)This analysis also useful for comparing the trend of selling food by daily

```
ax1=visitors_by_day.plot.bar()
ax1.set_ylabel('# of Visitiors')
```
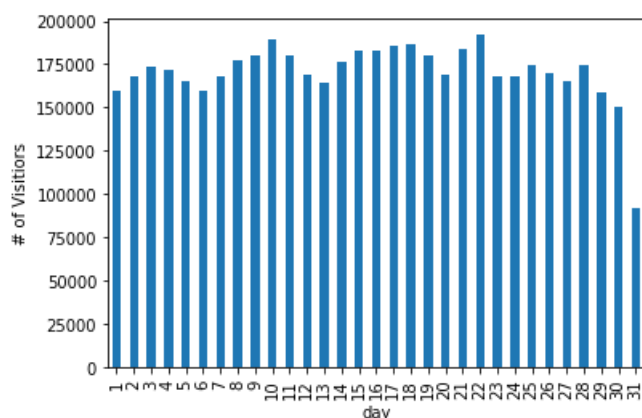
```
Text(0, 0.5, '# of Visitiors')
```

Observation

1)It is a fluctuated tred starti ng with the first day to the end of the day of the month.

2)The highest visitors are on the 23rd day and the lowest visitors are on the last day of the month other days are fluctuated.

Conclusions

1)Overall There are fluctuated trend of visitors by daily, i.e means someday there are slight increase and someday decrease.This analysis shows the per day how many number of visitors came to the restaurant and take the food.

2)By comparing the visitors from month to week and week to day the restaurant owners need a complete idea of visiting behaviour of the visitors and purchasing ingredients from the market.

Calculate Weekly mean visitors &Visualize

Here we calculate the weekly mean visitors by weekday.

In [71]:

```python
weekly_median_visitors=airvisit_df.groupby('weekday')['visitors'].mean()
weekly_median_visitors.head()
df1=pd.DataFrame(weekly_median_visitors)
df1
```

Out[71]:

	visitors
weekday	
0	17.177009
1	17.672137
2	19.230121
3	18.922702
4	23.072737
5	26.313688
6	23.873362

Objective of the analysis and plotting

1)The objective of this analysis to see how many numbers of the mean visitors by weekday and get the overall idea on day there is a chance of mean numbers of visitors to a restaurant.

2)This analysis is useful for restaurants owners for making decision for preparing the food for customers and avoid the wastage of the food.
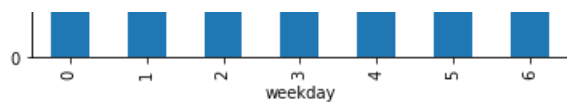
In [72]:

```python
ax2=df1.plot.bar()
ax2.set_ylabel('weekly  Mean  visitors')
```

Out[72]:

```
Text(0, 0.5, 'weekly  Mean  visitors')
```
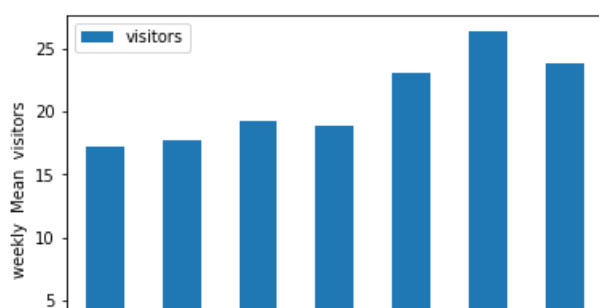
Observation

1)The first four weeks of the mean visitors are increasing and in the last week theer is a small amount of a steep decrease in the mean visitors.

2)The highest mean visitors are in the last week adn the lowest mean visitors are in the first and third week

Conclusion

1)The overall trend of the mean visitors by weekday are in the increasing by day every weekday, this shows the seeling of food to the customers by every week is increasing.

Calculate Montly mean visitors &Visualize

Here we calcuate the Mean number of visitors by month

In [73]:

```
Monthly_mean_visitors=airvisit_df.groupby('month')['visitors'].mean()
Monthly_mean_visitors.head()
```

Out[73]:

```
month
Apr    21.816002
Aug    19.748489
Dec    23.128840
Feb    20.477695
Jan    19.976758
Name: visitors, dtype: float64
```

Objective of Analysis and Plotting

1)The objective of this analysis to see how many numbers of the mean visitors by Month and get the overall idea on month, there is a chance of mean numbers of visitors to a restaurant.

2)This analysis is useful for restaurants owners for making decision for preparing the food for customers and avoid the wastage of the food.

In [74]:

```
ax2=Monthly_mean_visitors.plot.bar()
ax2.set_ylabel('Monthly mean visitors')
```

Out[74]:

```
Text(0, 0.5, 'Monthly mean visitors')
```
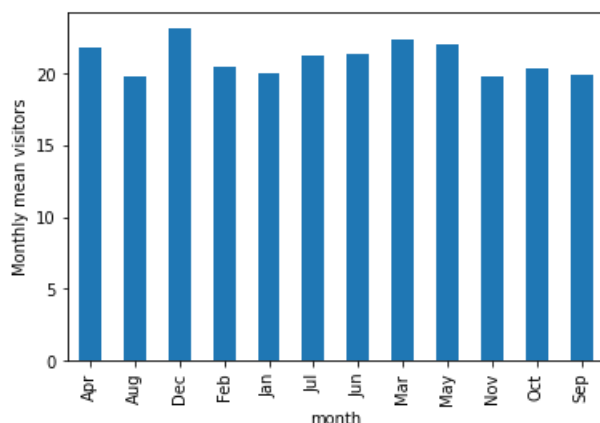
Observation

1)In the Dec month there is a highest mean visitors and and all other months are culmulatively increasing by small number of the visitors and in the Aug there is small decrease in the visitors.

2)Overall there are slightly fluctuated trend of the visitors to went to the restaurant and take the food.

Conclusion

1)The overall trend of the mean visitors by month are in the fluctuated by every month, this shows the selling of food to the customers by every month is slighly changed..

Calculate the daily mean visitors

Here we calculate the mean visitors by daily.

In [75]:

```
daily_mean_visitors=airvisit_df.groupby('day')['visitors'].mean()
daily_mean_visitors.head()
```

Out[75]:

```
day
1    19.981864
2    21.107756
3    21.788706
4    21.057714
5    20.076961
Name: visitors, dtype: float64
```

Objective of the Analysis and PLotting

1)The objective of this analysis to see how many numbers of the mean visitors by day and get the overall idea on day, there is a chance of mean numbers of visitors to a restaurant.

2)This analysis is useful for restaurants owners for making decision for preparing the food for customers and avoid the wastage of the food.

In [76]:

```
ax4=daily_mean_visitors.plot.bar()
ax4.set_ylabel('monthly mean visitors')
```

Out[76]:

```
Text(0, 0.5, 'monthly mean visitors')
```
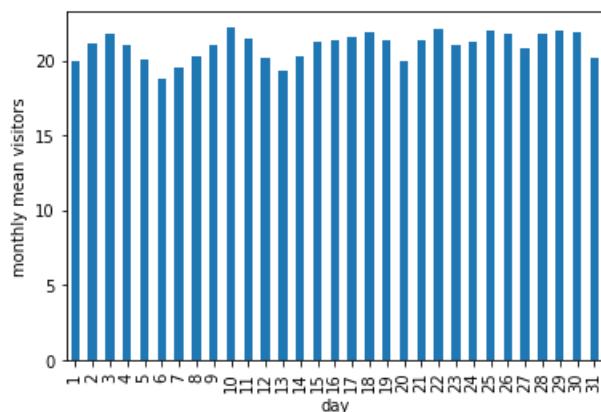

Observation

1)It is a fluctuated tred starting with the first day to the end of the day of the month.

2)The highest visitors are on the 10th day and the lowest visitors are on the 7th day of the month other days are fluctuated.

Conclusion

1)The overall trend of the mean visitors by day are in the fluctuated by every day, this shows the selling of food to the customers by every day is slighly changed..

Filter out the golden week from visit to a restaurants

Here we are sppliting the visit date between two long periods and find the golden week of visiting to a restaurants.

In [77]:

```
mask=(airvisit_df['visit_date']>('2016-04-15')) & (airvisit_df['visit_date']<('2016-06-15'))
```

In [78]:

```
airvisit_df=airvisit_df.loc[mask]
airvisit_df
```

Out[78]:

	air_store_id	visit_date	visitors	weekday	month	day
79	air_ba937bf13d40fb24	2016-04-16	35	5	Apr	16
80	air_ba937bf13d40fb24	2016-04-18	21	0	Apr	18
81	air_ba937bf13d40fb24	2016-04-19	23	1	Apr	19
82	air_ba937bf13d40fb24	2016-04-20	33	2	Apr	20
83	air_ba937bf13d40fb24	2016-04-21	11	3	Apr	21
...	...	...	...	...	...	...
251599	air_c7d30ab0e07f31d5	2016-06-10	17	4	Jun	10
251600	air_c7d30ab0e07f31d5	2016-06-11	22	5	Jun	11
251601	air_c7d30ab0e07f31d5	2016-06-12	12	6	Jun	12
251602	air_c7d30ab0e07f31d5	2016-06-13	10	0	Jun	13
251603	air_c7d30ab0e07f31d5	2016-06-14	17	1	Jun	14

16042 rows × 6 columns

Objective of this analysis &plotting

1)The objective of this analysis is to find the golden week between the 2 months in which the visitors are at the peak between 2 months as compared to the another months.

2)Based on this analysis the restaurants owner need to get an idea of the most important month of the year where the rush of the visitors to a restaurant is more.

In [79]:

```
visitiors_new_filter=airvisit_df.groupby('visit_date')['visitors'].sum()
visitiors_new_filter.head()
```
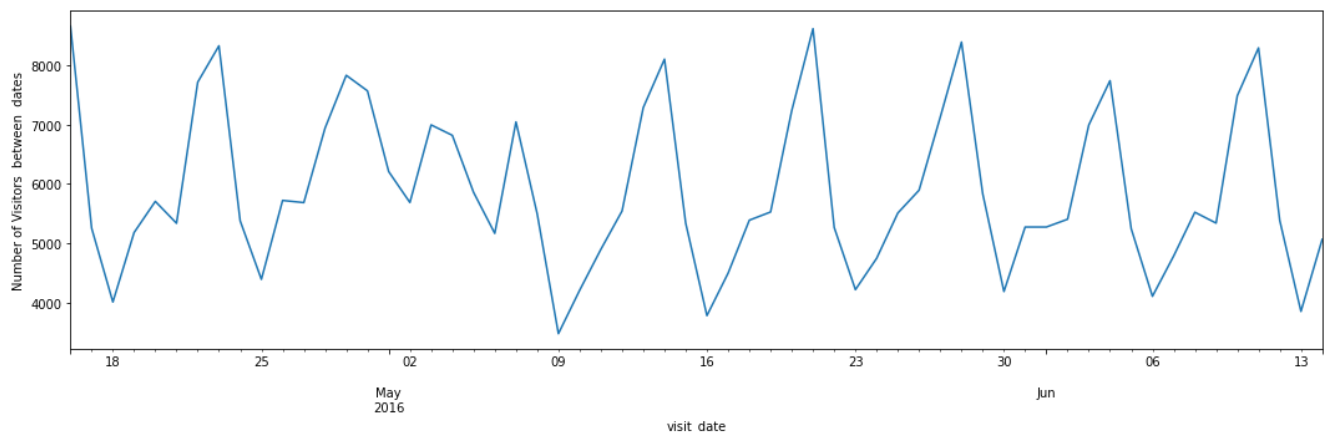
Out[79]:

```
visit_date
2016-04-16    8656
2016-04-17    5253
2016-04-18    4011
2016-04-19    5181
2016-04-20    5706
Name: visitors, dtype: int64
```

In [80]:

```
ax4=visitiors_new_filter.plot(figsize=[18,5])
ax4.set_ylabel('Number of Visitors  between  dates')
```

Out[80]:

```
Text(0, 0.5, 'Number of Visitors  between  dates')
```


Observation

1)There is a golden week from Apr 29 to May05 and starting with steep decrease in the visitors, while after 18th of april there is increase trend and simulteneously it is fluctuating and in the mid week of june it is started to raising the visitors.

2)There are so much ups and downs from the two months of visits by a visitor to a restaurant.

Conclusion

1)The overall conclusion from this plot is that midmonths of the year is the golden week where there are many visitors who can visit to a restaurant.

AirReserVation EDA

In [81]:

```
air_reserve.head()
```

Out[81]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5

Convert the visit_datetime to datetime

In [82]:

```
air_reserve.visit_datetime=pd.to_datetime(air_reserve.visit_datetime)
air_reserve.head()
```

Out[82]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5

Calculate the number of reserve visitors by visit date&Visualize

---

Objective of Analysis &plotting

1)The objective of this analysis to check the number of reserve visitors by visitdate and based on this observation the restaurant owners decide to setup the seating arrangements of the visitors on a number of tables in the restaurant.

2)based on this analysis we know the impact of the reservation on that day before the visitor visit to a restaurant.

In [83]:

```
reservervisitors_by_visit_date=air_reserve.groupby('visit_datetime')['reserve_visitors'].sum()
reservervisitors_by_visit_date.head()
```

Out[83]:

```
visit_datetime
2016-01-01 19:00:00    10
2016-01-01 20:00:00     7
2016-01-02 01:00:00     6
2016-01-02 16:00:00     4
2016-01-02 17:00:00    77
Name: reserve_visitors, dtype: int64
```

In [84]:

```
ax5=reservervisitors_by_visit_date.plot(figsize=[18,5])
ax5.set_ylabel('Total  # of  Reservation by visit datetime')
```

Out[84]:

```
Text(0, 0.5, 'Total  # of  Reservation by visit datetime')
```
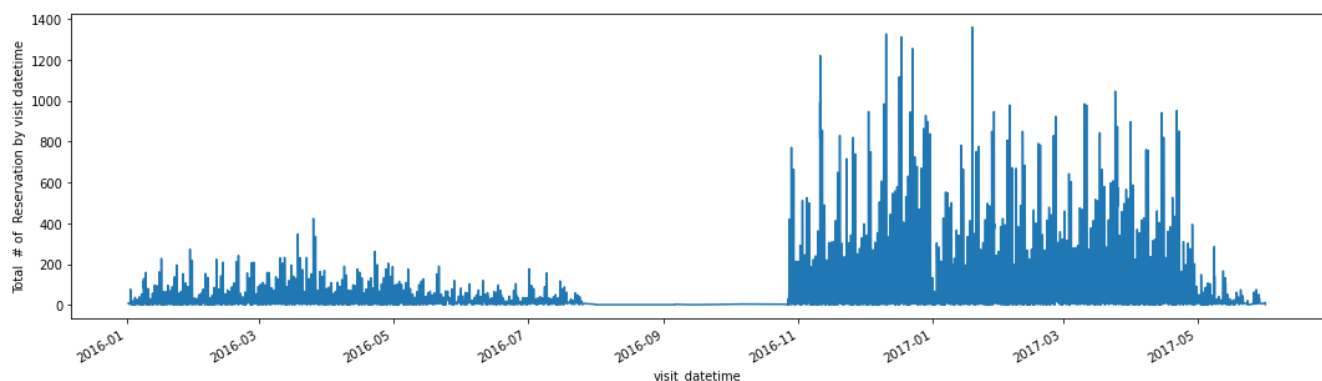

observation

1)Reservation starts after the 5th day of the first month of january in 2016 and then fluctuated till the end of Aug month of 2016.

2)There is a same contribution of the visitors from sept 2016 upto November 2016 and then after it is fluctuated and in the end of the jun 2017 it is consistently decreasing.

Conclusion

1)The overall conclusion from this plot is that the reservation is considerablly done from starting month of january till the end of the may 2017 but sometimes the reservation done by very less visitors and sometimes the reservation done by many visitors, so season is also important factor for reservation of the visitors.

Calcuate the hour from the reservation system

```
air_reserve['hour']=air_reserve['visit_datetime'].dt.hour
air_reserve.head()
```

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20

Objective of the analysis& plotting

1)The objective of this analysis is to show the hourly reserve visitors from the reservation system.

2)This is an important analysis for the visitors and restaurant owner to judge the timings of the particular customer visits for taking food without wasting any time and also the other visitors from the other hourly slot are not waiting for their time for food.

Calculate the reserve visitors by the hour &Visulize

```
reservedvisitors_by_hour=air_reserve.groupby('hour')['reserve_visitors'].sum()
reservedvisitors_by_hour.head()
```
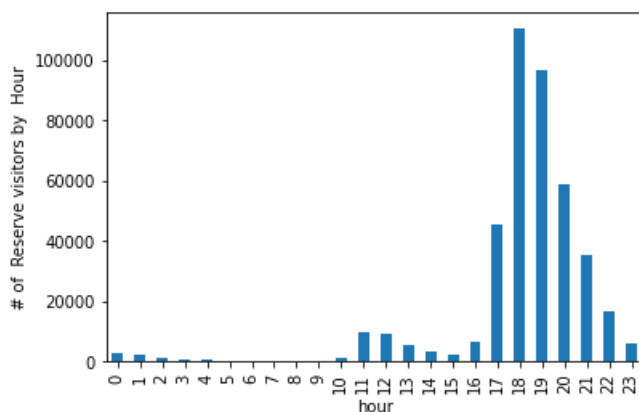
```
hour
0    2758
1    2190
2    1218
3     707
4     414
Name: reserve_visitors, dtype: int64
```

```
ax6=reservedvisitors_by_hour.plot.bar()
ax6.set_ylabel('# of  Reserve visitors by  Hour')
```

```
Text(0, 0.5, '# of  Reserve visitors by  Hour')
```

Observation

1)The contribution of Visitor reservation by hourly is small in the early morning and in the afternoon it is steep increasing till the 8 oclock in the evening and then steep decrease after 11 PM in the night.

2)This plot shows that in the initial hours there are not that much of the reservation happend but after in the afternoon there is a increase in the reservation

Convert the reserve datetime to datetime and calculate the hour from reserve_datetime

In [88]:

```
air_reserve.reserve_datetime=pd.to_datetime(air_reserve.reserve_datetime)
air_reserve['reserve_hour']=air_reserve['reserve_datetime'].dt.hour
air_reserve.head()
```

Out[88]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1

Calculate the time between Visit and Reservation &Visualize

In [89]:

```
air_reserve['difference_hour']=air_reserve['hour']-air_reserve['reserve_hour']
air_reserve.head()
```

Out[89]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19

Objective of Analysis&plotting

1)The objective of this analysis is to check the number of visitors between reservation to visits, so that it is useful to know that the particular visitor can reserve the number of seats on this day and visit to a restaurant on the next day or the day of the week.

In [90]:

```
visitors_by_diff_hours=air_reserve.groupby('difference_hour')['reserve_visitors'].sum()
visitors_by_diff_hours.head()
```
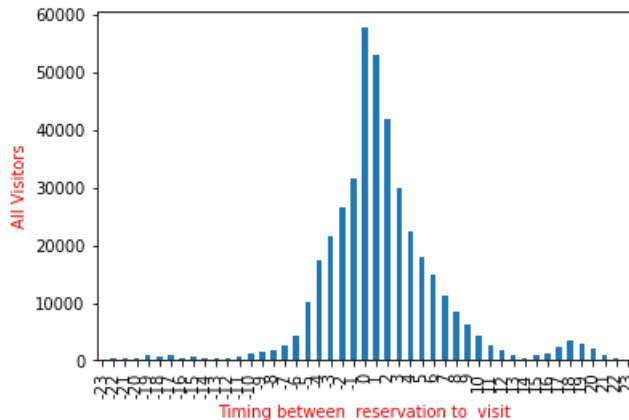
Out[90]:

```
difference_hour
-23    229
-22    293
-21    369
-20    523
-19    937
Name: reserve_visitors, dtype: int64
```

```
ax1=visitors_by_diff_hours.plot.bar()
ax1.set_xlabel('Timing between  reservation to  visit',color='red')
ax1.set_ylabel('All Visitors',color='red')
```

Out[91]:

```
Text(0, 0.5, 'All Visitors')
```


Observation

1)There is very long scale break between a reservation and visit and those are the most extreme values for the airdata as there is format of hour is between before 24 hour to next day 24 hour.

2)This plot shows the difference between the reserve time and visit time and based on that the number of visitors are visits on that particular hour and there are breaks in between the visit and reservation.

Conclusion

1)The overallconclusion from this plot is that theer is break between visit to a reservation in the initial hours and in the afternoon it shows the fluctuations.

Calculate the Day difference between the visit_datetime and reserve_datetime and Visualize

In [92]:

```
air_reserve['Difference'] = (air_reserve['visit_datetime'] - air_reserve['reserve_datetime']).dt.days

air_reserve.head()
```

Out[92]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0

Objective of the analysis &plotting

1)The objective of this analysis is to show the visitors between the difference of visit day and reserve day.

2)This analysis is useful for the restaurant owners to know that how many days are vacant of a particular visitors for reserve day and the vist to a restaurant.

In [93]:

```
visitors_by_diff_day=air_reserve.groupby('Difference')['reserve_visitors'].sum()
visitors_by_diff_day
```

Out[93]:

```
Difference
0        104048
1         39718
2         27971
3         22884
4         17686
          ...
381          12
382           6
386           5
392           3
393          20
Name: reserve_visitors, Length: 372, dtype: int64
```
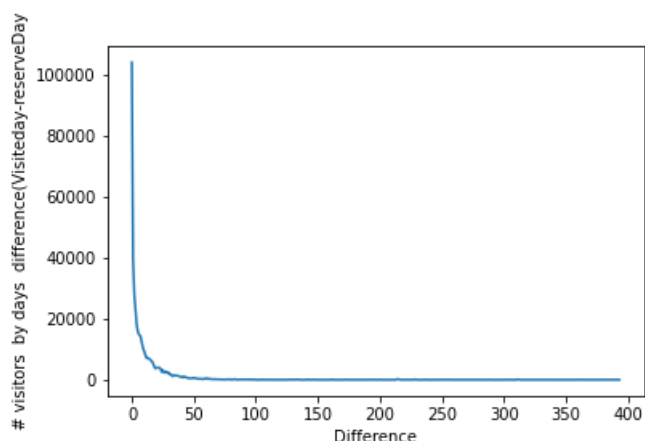
In [94]:

```
ax7=visitors_by_diff_day.plot()
ax7.set_ylabel('# visitors  by days  difference(Visiteday-reserveDay')
```

Out[94]:

```
Text(0, 0.5, '# visitors  by days  difference(Visiteday-reserveDay')
```


Observation

1)In the Initial days i.e.from 1 to 45 days visitors are at the highest pick and after completing 50 th day there is a similar trend of visitors till days of 400 difference.

2)By the difference of the days between visits and reservation there is a drop of visitors when the days are increasing and after some days there are similar visitors consistently.

In [95]:

```
air_reserve.head()
```

Out[95]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0

Count the number of unique reserve stores &Visualize

In [96]:

```
air_reserve['air_store_id'].nunique()
```

Out[96]:

```
314
```

In [97]:
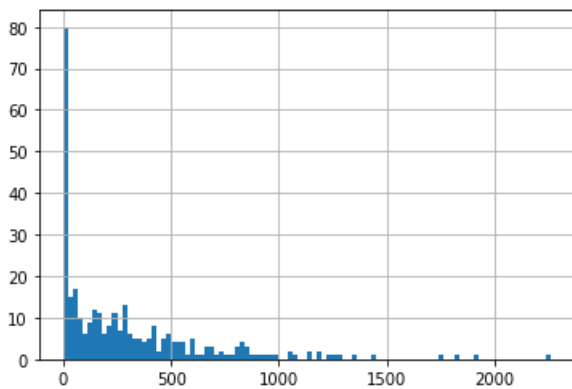
```
air_reserve['air_store_id'].value_counts().hist(bins=100)
```

Out[97]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8e0a8944a8>
```


Calculate the Number of airstore by reserve vistiors and visualize

In [98]:

```
air_reserve.groupby('air_store_id')['reserve_visitors'].sum()
```

Out[98]:

```
air_store_id
air_00a91d42b08b08d9      70
air_0164b9927d20bcc3     517
air_034a3d5b40d5b1b1      93
air_03963426c9312048    8200
air_04341b588bde96cd     208
                        ...
air_fcfbdcf7b1f82c6e     333
air_fdc02ec4a3d21ea4     166
air_fe22ef5a9cbef123    1393
air_fea5dc9594450608     471
air_fee8dcf4d619598e       5
Name: reserve_visitors, Length: 314, dtype: int64
```

Objective of the Analysis &plotting

1)The objective of the analysis is to show the number of visitors by day of the hour of weekday and make a decision that at which hour on a particular day name how many number of visitors came to the restaurant and take the food

In [99]:

```
#air_reserve.head()
air_reserve['month']=air_reserve['reserve_datetime'].dt.month
air_reserve['month'] = air_reserve['month'].apply(lambda x: calendar.month_abbr[x])
air_reserve.head()
```

Out[99]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan

In [100]:

```python
air_reserve['reserve_datetime_weekdayname'] = air_reserve['reserve_datetime'].dt.day_name()
air_reserve.head()
```

Out[100]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

In [101]:

```python
ax=air_reserve.pivot_table(index=air_reserve['reserve_hour'],columns='reserve_datetime_weekdayname'
,values='reserve_visitors',aggfunc='sum').plot(figsize=(12,8),title='making reservation  by hour
by weekday', xticks=np.arange(0, 24, 1))
ax.set_xlabel('Hour of day')
ax.set_ylabel('number  of  visitors')
```

Out[101]:

```
Text(0, 0.5, 'number  of  visitors')
```
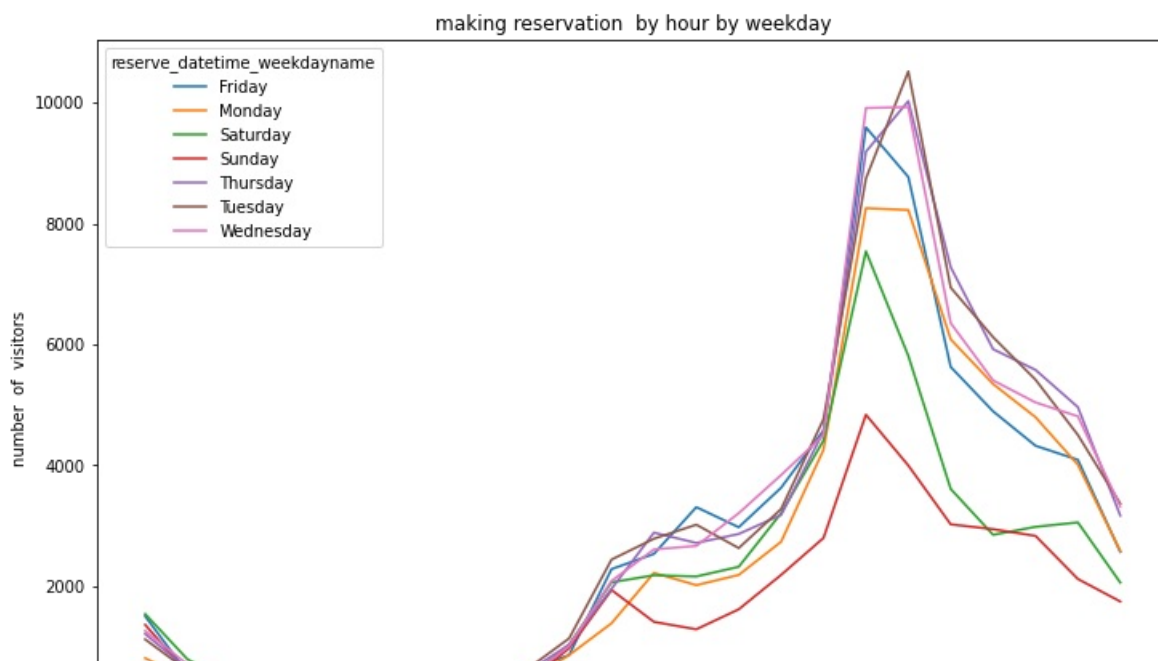
Observation

In all the days starting from Monday to Sunday the inital hours shows the upward trend of visitors till the evening 6 oclock and after that there is a downward trend of visitors till the night 11 PM

This plot is based on the reserveweekdayname of the day of the hour how many visitors visits to a restaurants and also compares the more visitors on day of the hour between the time interval.

Conclusion

The overall conclusion of this plot is to show the impact of each weekday associated with hour on visitors numbers and justify the rush hour of the entire day of the week.

Calculate the Hour of the day of visitweek and visualize

In [102]:

```
air_reserve['visit_datetime_weekdayname'] = air_reserve['visit_datetime'].dt.day_name()
air_reserve.head()
```

Out[102]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

Objective of the Analysis &plotting

1)The objective of the analysis is to show the number of visitors by day of the hour of weekday and make a decision that at which hour on a particular day name how many number of visitors came to the restaurant and take the food

2) This analysis is based on the visit weekday name

In [103]:

```
ax=air_reserve.pivot_table(index=air_reserve['reserve_hour'],columns='visit_datetime_weekdayname',
values='reserve_visitors',aggfunc='sum').plot(figsize=(12,8),title='making visit to a restaurant
by hour by weekday', xticks=np.arange(0, 24, 1))
ax.set_xlabel('Hour of day')
ax.set_ylabel('number  of  visitors')
```

Out[103]:

```
Text(0, 0.5, 'number  of  visitors')
```
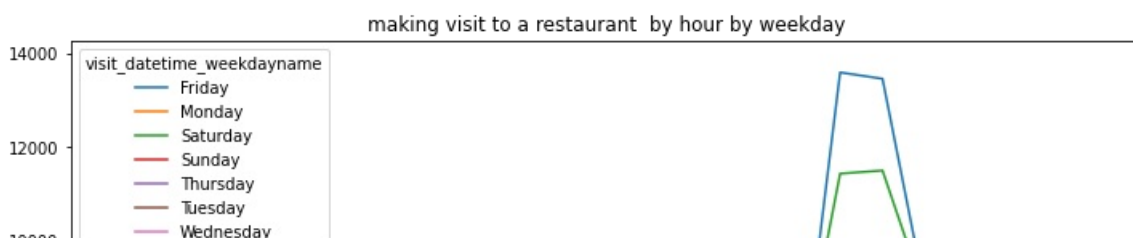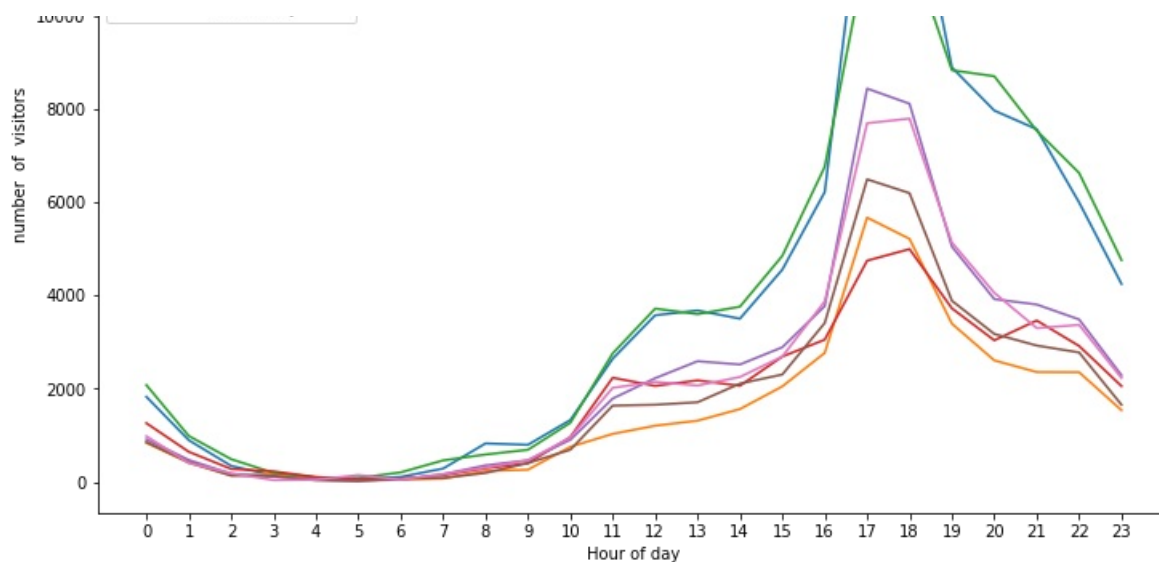
Observation

1)In all the days starting from Monday to Sunday the inital hours shows the similar trend of visitors till 9 oclock in the morning and then shows the upward trend till evening 6 oclock and after that there is a downward trend of visitors till the night 11 PM

2)As compared to Saturday and Sunday there is a high peak of visitors in between the afternoon 3PM to evening 7PM

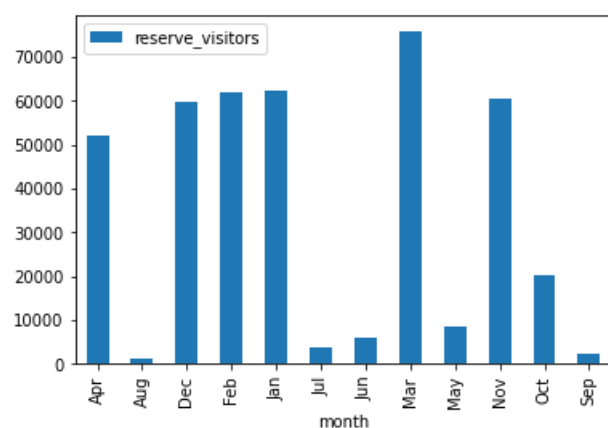**Calculate the Monthly Reserve Visitors**

Objective of the analysis&plotting

The objective of the analysis is to show the number of reserved visitors monthly.

In [104]:

```
monthly_reservation=air_reserve.groupby('month')['reserve_visitors'].sum()
monthly_reservation.head()
df1=pd.DataFrame(monthly_reservation)
df1.plot.bar()
```

Out[104]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8e0978ddd8>
```


Observation

1)In the Month of Matrch has the highest reservation made by visitors and in the august lowest rservation made by visitors.

2)From december of previous year to the April there is increase trend in the reservation of visitors after it is decreasing.

3)Seasonality is important in the monthly reserved visitors based on the festivals or some events which needs to be occur on that day

on that day..

Conclusion

1)The overallconclusion of this plot is to show the the reserved visitors amongst the month where some of the months has the highest number of visitors as compared to other months due to seasonality and festivals.

Calculate the Yearly reservation made by the Visitors

Objective of the analysis &plotting

1)The objective of this analysis is to show the bunch of visitors from year and compared agaonst each year for more visitors amongst the other.

In [105]:

```
air_reserve['year']=air_reserve['reserve_datetime'].dt.year
yearly_reservation=air_reserve.groupby('year')['reserve_visitors'].sum()
df2=pd.DataFrame(yearly_reservation)
df2.plot.bar(color='red')
```

Out[105]:
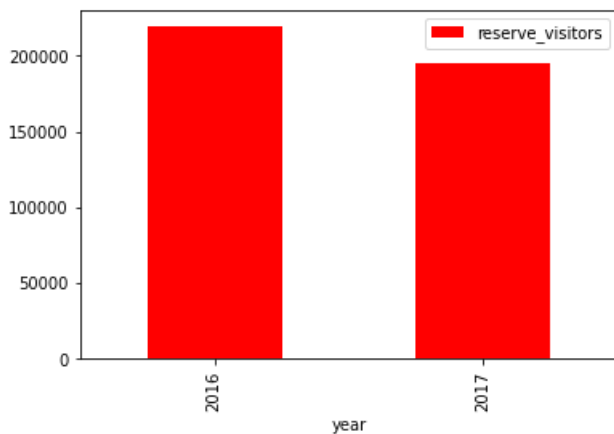
```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8e097b3f60>
```


Observation

1)There are more visitors who made more reservation in 2016 as comapred to 2017

HPG Reservation

In [106]:

```
hpg_reserve.head()
```

Out[106]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13

Convert the hpg_visit_datetime to datetime

In [107]:

```
hpg_reserve_visit_datetime=pd.to_datetime(hpg_reserve_visit_datetime)
```

```
hpg_reserve.visit_datetime=pd.to_datetime(hpg_reserve.visit_datetime)
hpg_reserve.head()
```

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13

Objective of Analysis &plotting

1)The objective of this analysis to check the number of hpg reserve visitors by visitdate and based on this observation the restaurant owners decide to setup the seating arrangements of the visitors on a number of tables in the restaurant.

2)based on this analysis we know the impact of the reservation on that day before the visitor visit to a restaurant.

Calculate the number of reserve visitor by date &Visualize

In [108]:

```
hpg_visitors_by_date=hpg_reserve.groupby('visit_datetime')['reserve_visitors'].sum()
hpg_visitors_by_date.head()
```
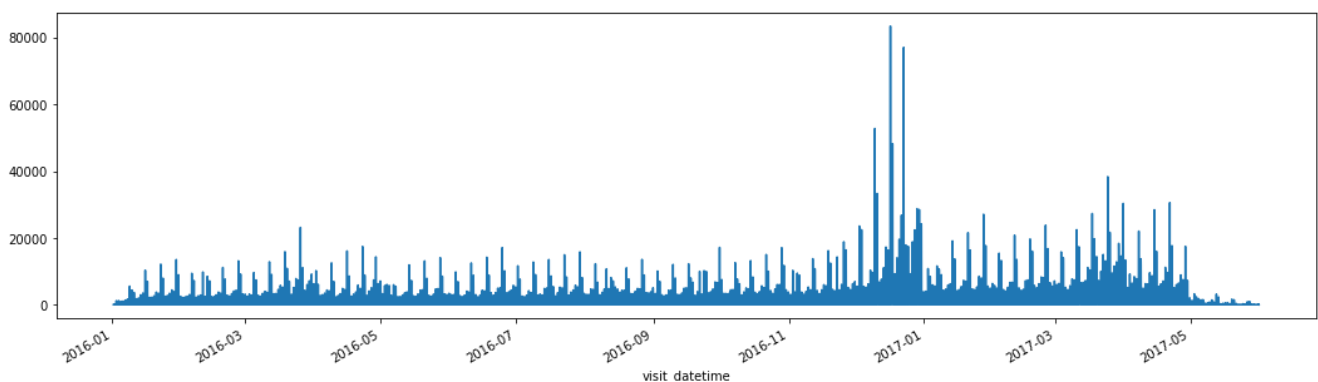
Out[108]:

```
visit_datetime
2016-01-01 11:00:00      1
2016-01-01 13:00:00      3
2016-01-01 16:00:00      2
2016-01-01 17:00:00    112
2016-01-01 18:00:00    156
Name: reserve_visitors, dtype: int64
```

In [109]:

```
hpg_visitors_by_date.plot(figsize=[18,5])
```

Out[109]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8e0961d5c0>
```


observation

1)Reservation starts after the 5th day of the first month of january in 2016 and then fluctuated till the end of year of 2016.

2)There is a updward trend in the starting months of 2017 and it stays till the month of may after then it is a steep decrease.

Conclusion

1)The overall conclusion from this plot is that the reservation is considerablly done from starting month of january till the end of the may 2017 but sometimes the reservation done by very less visitors and sometimes the reservation done by many visitors, so season is also important factor for reservation of the visitors.

Calculate the hour from the HPG_reserve visit_datetime

In [110]:

```
hpg_reserve['hour']=hpg_reserve['visit_datetime'].dt.hour
hpg_reserve.head()
```

Out[110]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17

Objective of the analysis& plotting

1)The objective of this analysis is to show the hourly reserve visitors from the hpg reservation system.

2)This is an important analysis for the visitors and restaurant owner to judge the timings of the particular customer visits for taking food without wasting any time and also the other visitors from the other hourly slot are not waiting for their time for food.

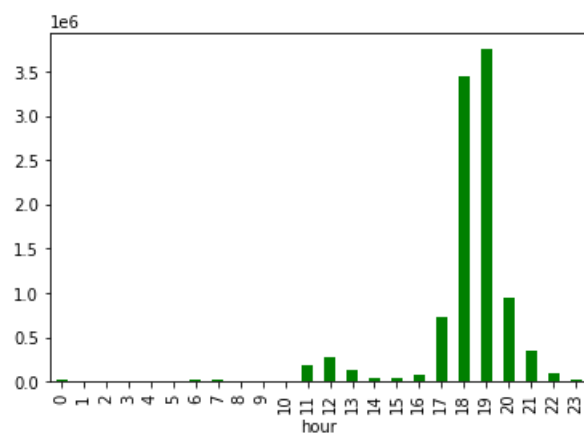**Calculate the number of reservevisitors by hour &Visualize**

In [111]:

```
hpg_reserve_visitors_by_hour=hpg_reserve.groupby('hour')['reserve_visitors'].sum()
hpg_reserve_visitors_by_hour.head()
```

Out[111]:

```
hour
0    12443
1     8113
2     2948
3     1022
4      875
Name: reserve_visitors, dtype: int64
```

In [112]:

```
ax1=hpg_reserve_visitors_by_hour.plot.bar(color='green')
```

Observation

1)No reservation made by the visitors till the 10 oclock in the morining and after that is started with very little amount of reservation made till 5 oclock in the evening and in the 6 PM to 7PM there is highest number of reservation happened as compared to the all the other hours of the day and in the night there is a decreasing trend of the reservation made by visitor.

2)This plot shows that in the initial hours there are not that much of the reservation happend but after in the afternoon there is a increase in the reservation

In [113]:

```
hpg_reserve.reserve_datetime=pd.to_datetime(hpg_reserve.reserve_datetime)
hpg_reserve['reserve_hour']=hpg_reserve['reserve_datetime'].dt.hour
hpg_reserve.head()
```

Out[113]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3

Calculate the Time between the Reservation to Visit

In [114]:

```
hpg_reserve['difference_hour']=hpg_reserve['hour']-hpg_reserve['reserve_hour']
hpg_reserve.head()
```

Out[114]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3	14

Objective of Analysis&plotting

1)The objective of this analysis is to check the number of visitors between reservation to visits, so that it is useful to know that the particular visitor can reserve the number of seats on this day and visit to a restaurant on the next day or the day of the week.

In [115]:

```
hpg_reserve_visitors_by_diff_hours=hpg_reserve.groupby('difference_hour')['reserve_visitors'].sum()
hpg_reserve_visitors_by_diff_hours.head()
```
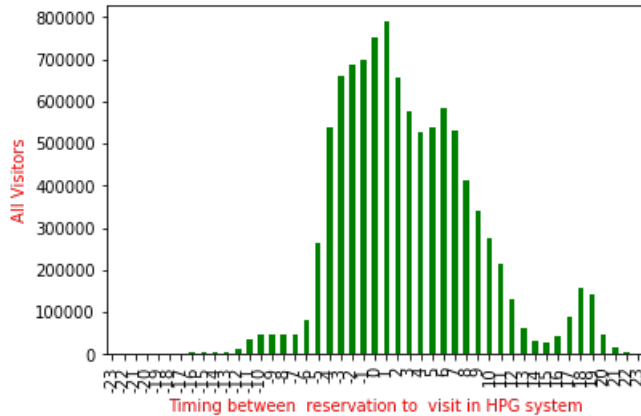
Out[115]:

```
difference_hour
-23     778
-22    1268
-21    1244
-20    1458
-19    1203
Name: reserve_visitors, dtype: int64
```

```
ax2=hpg_reserve_visitors_by_diff_hours.plot.bar(color='green')
ax2.set_xlabel('Timing between  reservation to  visit in HPG system',color='red')
ax2.set_ylabel('All Visitors',color='red')
```

Out[116]:

```
Text(0, 0.5, 'All Visitors')
```


Observation

1)There is very frequent scale happened between a reservation and visit and those are the most extreme values for the hpgreservedata as there is format of hour is between before 24 hour to next day 24 hour.

2)This plot shows the difference between the reserve time and visit time and based on that the number of visitors are visits on that particular hour and there are breaks in between the visit and reservation.

Conclusion

1)The overall conclusion from this plot is that theer is break between visit to a reservation in the initial hours and in the afternoon it shows the frequent fluctuations.

Calculate the Day difference between the visit_datetime and reserve_datetime and Visualize

In [117]:

```
hpg_reserve['Difference_days'] = (hpg_reserve['visit_datetime'] - hpg_reserve['reserve_datetime']).
dt.days

hpg_reserve.head()
```

Out[117]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2	0
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7	0
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2	0
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6	0
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3	14	0

Objective of the analysis &plotting

1)The objective of this analysis is to show the visitors between the difference of visit day and reserve day.

2)This analysis is useful for the restaurant owners to know that how many days are vacant of a particular visitors for reserve day and the vist to a restaurant.
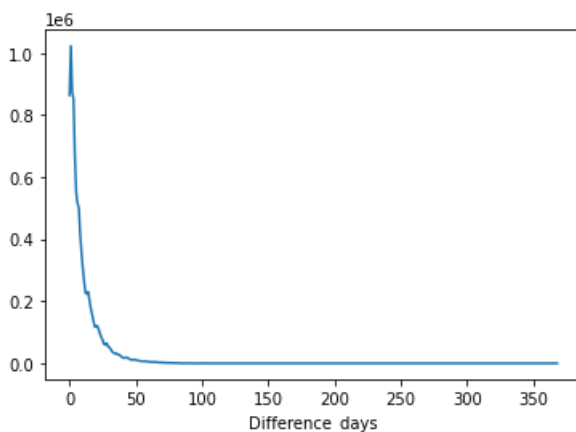
In [118]:

```python
Visitors_by_day_hpg_reserve=hpg_reserve.groupby('Difference_days')['reserve_visitors'].sum()
Visitors_by_day_hpg_reserve
```

Out[118]:

```
Difference_days
0        863918
1       1023046
2        873459
3        851107
4        671549
         ...
156           4
164           6
195           2
362           5
368           2
Name: reserve_visitors, Length: 123, dtype: int64
```

In [119]:

```python
ax1=Visitors_by_day_hpg_reserve.plot()
```


Observation

1)In the Initial days i.e.from 1 to 45 days visitors are at the highest pick and after completing 50 th day there is a similar trend of visitors till days of 350 difference.

2)By the difference of the days between visits and reservation there is a drop of visitors when the days are increasing and after some days there are similar visitors consistently.

In [120]:

```python
hpg_reserve.head()
```

Out[120]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2	0
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7	0
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2	0
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6	0
4	hpg_25291c542ebb3bc2	2016-01-01	2016-01-01	13	17	3	14	0

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days

(17:00:00   03:00:00)

In [121]:

```
#air_reserve.head()
hpg_reserve['month']=hpg_reserve['reserve_datetime'].dt.month
hpg_reserve['month'] = hpg_reserve['month'].apply(lambda x: calendar.month_abbr[x])
hpg_reserve.head()
```

Out[121]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mor
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2	0	J
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7	0	J
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2	0	J
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6	0	J
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3	14	0	J

In [122]:

```
hpg_reserve['reserve_datetime_weekdayname'] = hpg_reserve['reserve_datetime'].dt.day_name()
hpg_reserve.head()
```

Out[122]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mor
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2	0	J
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7	0	J
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2	0	J
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6	0	J
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3	14	0	J

Objective of the Analysis &plotting

1)The objective of the analysis is to show the number of visitors by day of the hour of weekday and make a decision that at which hour on a particular day name how many number of visitors came to the restaurant and take the food
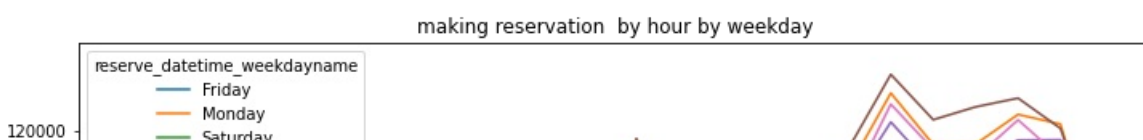
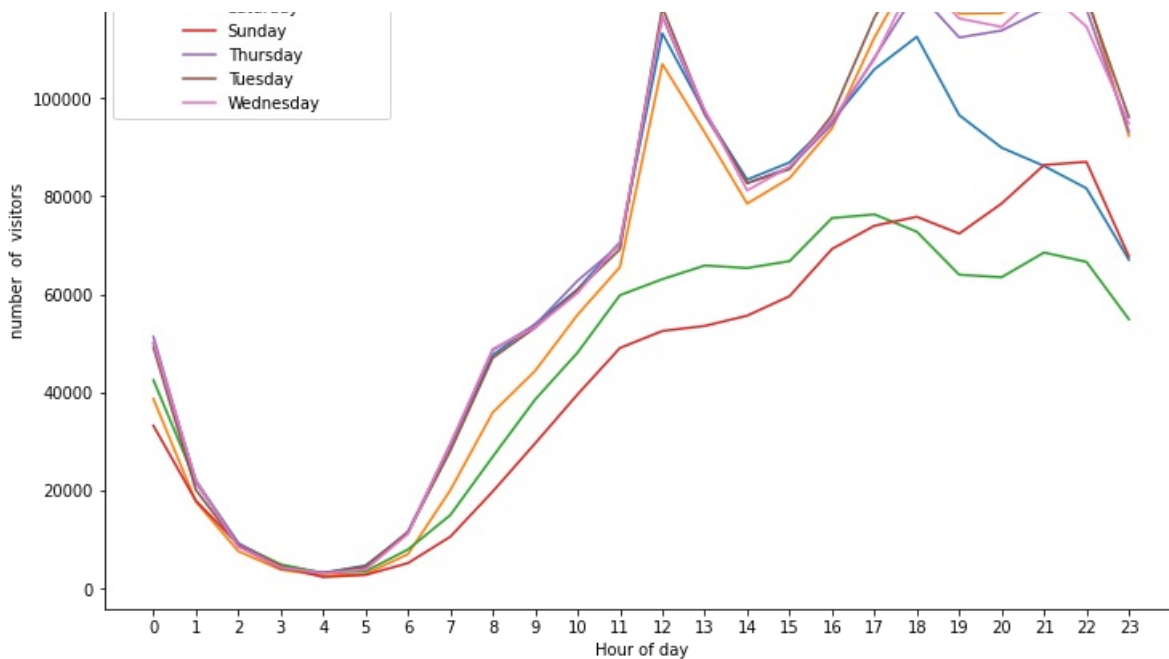**2) This analysis is based on the Reserve weekday name**

In [123]:

```
ax=hpg_reserve.pivot_table(index=hpg_reserve['reserve_hour'],columns='reserve_datetime_weekdayname'
,values='reserve_visitors',aggfunc='sum').plot(figsize=(12,8),title='making reservation  by hour
by weekday', xticks=np.arange(0, 24, 1))
ax.set_xlabel('Hour of day')
ax.set_ylabel('number  of  visitors')
```

Out[123]:

```
Text(0, 0.5, 'number  of  visitors')
```

making reservation by hour by weekday

reserve_datetime_weekdayname
— Friday
— Monday
— Saturday

120000

Observation

1)In all the days starting from Monday to Sunday the inital hours shows the similar trend of visitors till 7 oclock in the morning and then shows the fluctuted trend till evening 6 oclock and after that there is a downward trend of visitors till the night 11 PM

2)On Monday, Friday and wednesday there is a high peak of visitors in between the afternoon 12:30PM to evening 15:30 PM

Conclusion

The overall conclusion of this plot is to show the impact of each weekday associated with hour on visitors numbers and justify the rush hour of the entire day of the week.

In [124]:

```
hpg_reserve['visit_datetime_weekdayname'] = hpg_reserve['visit_datetime'].dt.day_name()
hpg_reserve.head()
```

Out[124]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mor
0	hpg_c63f6f42e088e50f	2016-01-01 11:00:00	2016-01-01 09:00:00	1	11	9	2	0	J
1	hpg_dac72789163a3f47	2016-01-01 13:00:00	2016-01-01 06:00:00	3	13	6	7	0	J
2	hpg_c8e24dcf51ca1eb5	2016-01-01 16:00:00	2016-01-01 14:00:00	2	16	14	2	0	J
3	hpg_24bb207e5fd49d4a	2016-01-01 17:00:00	2016-01-01 11:00:00	5	17	11	6	0	J
4	hpg_25291c542ebb3bc2	2016-01-01 17:00:00	2016-01-01 03:00:00	13	17	3	14	0	J

Objective of the Analysis &plotting

1)The objective of the analysis is to show the number of visitors by day of the hour of weekday and make a decision that at which hour on a particular day name how many number of visitors came to the restaurant and take the food

2) This analysis is based on the visit weekday name
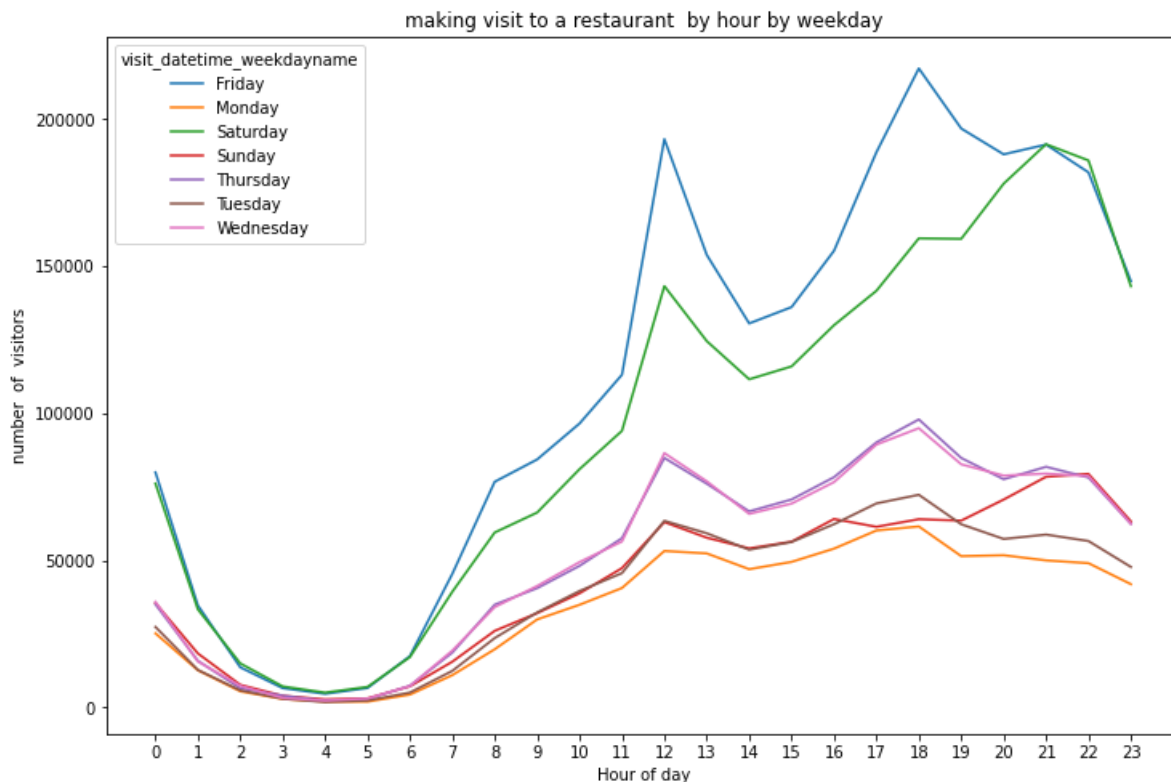
In [125]:

```
ax=hpg_reserve.pivot_table(index=hpg_reserve['reserve_hour'],columns='visit_datetime_weekdayname',
values='reserve_visitors',aggfunc='sum').plot(figsize=(12,8),title='making visit to a restaurant
by hour by weekday', xticks=np.arange(0, 24, 1))
```

```
ax.set_xlabel('Hour of day')
ax.set_ylabel('number  of  visitors')
```

```
Text(0, 0.5, 'number  of  visitors')
```


Observation

1)In all the days starting from Monday to Sunday the inital hours shows the downward trend of visitors till 7 oclock in the morning and then shows the upward trend till afternoon 1 oclock and after that there is a fluctuated trend of visitors till the night 11 PM

2)On Saturday and Friday there is a high peak of visitors in between the afternoon 11:00PM to afternoon 2:00 PM

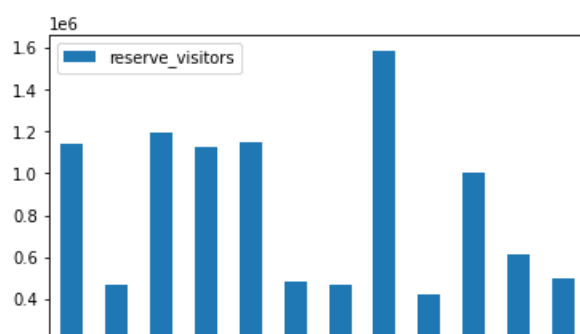**Objective of the analysis&plotting**

The objective of the analysis is to show the number of reserved visitors monthly.
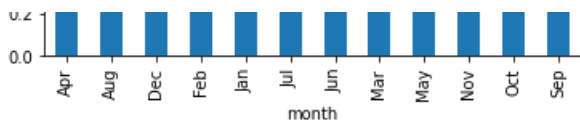
In [126]:

```
monthly_reservation=hpg_reserve.groupby('month')['reserve_visitors'].sum()
monthly_reservation.head()
df1=pd.DataFrame(monthly_reservation)
df1.plot.bar()
```

Out[126]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8df3e73d30>
```

Observation

1)In the Month of March has the highest reservation made by visitors and lowest in the month of May rservation made by visitors.

2)From december of previous year to the April there is increase trend in the reservation of visitors after it is decreasing.

3)Seasonality is important in the monthly reserved visitors based on the festivals or some events which needs to be occur on that day..

Conclusion

1)The overall conclusion of this plot is to show the the reserved visitors amongst the month where some of the months has the highest number of visitors as compared to other months due to seasonality and festivals.

## Objective of the analysis &plotting

The objective of this analysis is to show the bunch of visitors from year and compared against each year for more visitors amongst the other.

In [127]:

```
hpg_reserve['year']=hpg_reserve['reserve_datetime'].dt.year
yearly_reservation=hpg_reserve.groupby('year')['reserve_visitors'].sum()
yerly_dataframe=pd.DataFrame(yearly_reservation)
yerly_dataframe.plot.bar(color='red')
```

Out[127]:
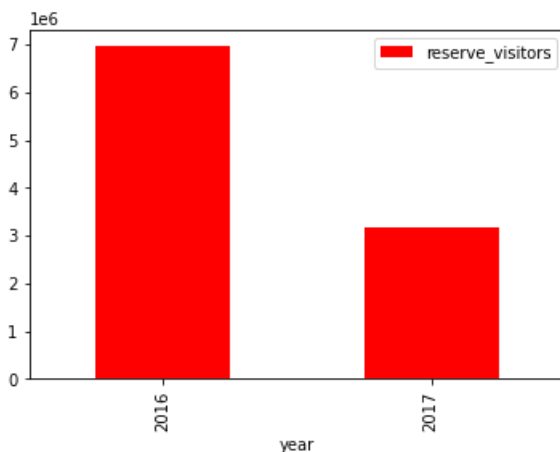
```
<matplotlib.axes._subplots.AxesSubplot at 0x7f8dfb211e10>
```


Observation

1)There are more visitors who made more reservation in 2016 as comapred to 2017

AirStoreEDA(area&Genre)

In [128]:

```
air_store_info.head()
```

Out[128]:

	air_store_id	air_genre_name	air_area_name	latitude	longitude
0	air_0f0cdeee6c9bf3d7	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852

	air_store_id	air_genre_name	air_area_name	latitude	longitude
1	air_7cc17a324ae5c7dc	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
2	air_fee8dcf4d619598e	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
3	air_a17f0778617c76e2	Italian/French	Hyōgo-ken Kōbe-shi Kumoidōri	34.695124	135.197852
4	air_83db5aff8f50478e	Italian/French	Tōkyō-to Minato-ku Shibakōen	35.658068	139.751599

Count the numbe of restaurant by genre_name

Objective of the analysis &plotting

1)The Objective of this analysis is to show the number of restaurant based on the genre in the particular area.
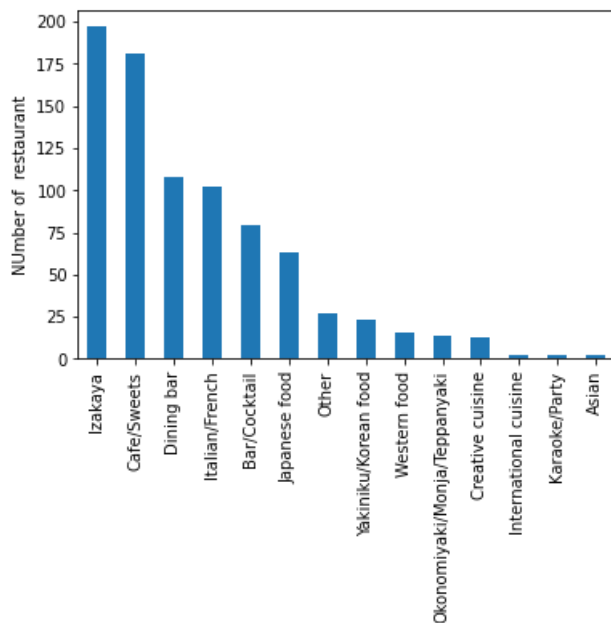
2)This analysis is useful when the visitor wants to eat specific type of dish from the particluar restaurants in their specific area.

In [129]:

```
df9=air_store_info.groupby('air_store_id')['air_genre_name'].sum().value_counts()
ax=df9.plot.bar()
ax.set_ylabel('NUmber of  restaurant')
```

Out[129]:

```
Text(0, 0.5, 'NUmber of  restaurant')
```


Observation

1)Izakaya has the highest number of restaurant followed by Cafe/Sweets and Dining Bar , while International cuisine has the lowest number of restaurant.

2)This analysis shows the preferences of going to the specific type of restaurant by the number of their branches in the particular area.

Merge The airvisit_df to airstore by air_store_id

In [130]:

```
#store_info = airvisit_df.copy()
#store_info = airvisit_df.merge(air_store_info,on = "air_store_id", how = 'inner')
#print(store_info['air_store_id'].nunique())
#store_info.head()
#df['air_store_id'].nunique()
df_merge=pd.DataFrame(df)
df_merge.head(2)
```

`Out[130]:`

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595
1	air_00a91d42b08b08d9	2016-07-02	9	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595

Split the area name into 3 areas like area1, area2, area3

`In [131]:`

```
df_merge['area1'],df_merge['area2'],df_merge['area3']=df_merge['air_area_name'].str.split(' ',2).st
r
df_merge.head()
```

/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:1: FutureWarning: Columnar iteration over characters will be deprecated in future releases.
  """Entry point for launching an IPython kernel.

`Out[131]:`

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami
1	air_00a91d42b08b08d9	2016-07-02	9	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami
2	air_00a91d42b08b08d9	2016-07-04	20	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami
3	air_00a91d42b08b08d9	2016-07-05	25	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami
4	air_00a91d42b08b08d9	2016-07-06	29	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami

`In [132]:`

```
area1 = df_merge.groupby("area1")["visitors"].mean().reset_index()
area1.head()
```

`Out[132]:`

	area1	visitors
0	Fukuoka-ken	20.434758
1	Hiroshima-ken	21.822986
2	Hokkaidō	21.114745
3	Hyōgo-ken	23.284209
4	Miyagi-ken	20.463668

`In [133]:`

```
area2=df_merge.groupby('area2')['visitors'].mean().reset_index()
area2.head()
```

`Out[133]:`

	area2	visitors
0	Abashiri-shi	28.844828

	area2	visitors
1	Adachi-ku	27.075547
2	Amagasaki-shi	32.338462
3	Asahikawa-shi	23.404226
4	Bunkyō-ku	21.094005

In [134]:

```
area3=df_merge.groupby('area3')['visitors'].mean().reset_index()
area3.head()
```

Out[134]:

	area3	visitors
0	6 Jōdōri	23.404226
1	Akasaka	23.535158
2	Aramotokita	11.064246
3	Asagayaminami	17.370677
4	Asakusa	25.829694

Objective of the analysis &plotting

1)The objective of this analysis to see the number of mean visitors by the preferences of genre

2)This analysis is useful for the restaurant managers to get an idea of preparing the specific type of food in particular quatity based on the visitors.
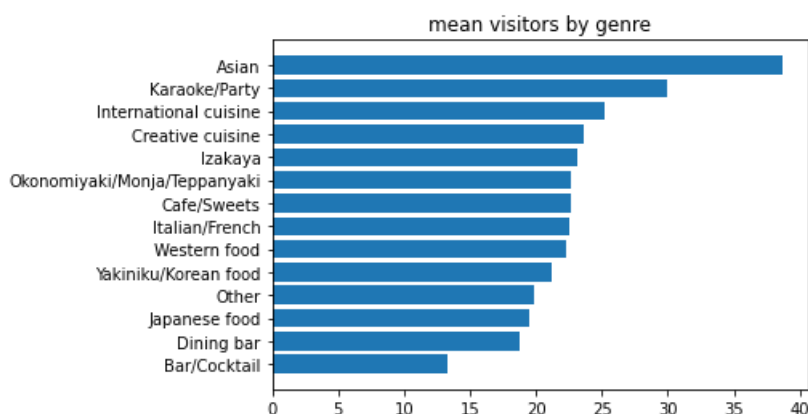
Count the Mean visitors by the Genre

In [135]:

```
mean_visitors_by_genre_name=df_merge.groupby('air_genre_name')['visitors'].mean().sort_values()
plt.barh(mean_visitors_by_genre_name.index,mean_visitors_by_genre_name)
plt.title('mean visitors by genre')
```

Out[135]:

```
Text(0.5, 1.0, 'mean visitors by genre')
```


Observation

The most prefrence of the genre of visitors is Asian folllowed by Westernfood and Cafe/Sweets and Bar/Coktail is not the interest of visitors.

Here the Season(Winter, Summer,Rainy) is most important factor for viistors to decide which food needs to eat and based on the visitor preferences the restaurant owner made the food available in within the particular hours.

Count the Mean visitors by AreaNames

Objective of the analysis &plotting

1)The objective of this analysis is to show the mean visitors by the area names of the restaurants in which the visitors are visiting.

In [136]:

```
mean_visitors_by_area_name=df_merge.groupby('area1')['visitors'].mean().sort_values()
plt.barh(mean_visitors_by_area_name.index,mean_visitors_by_area_name)
plt.title('mean visitors by area1')
```

Out[136]:

```
Text(0.5, 1.0, 'mean visitors by area1')
```
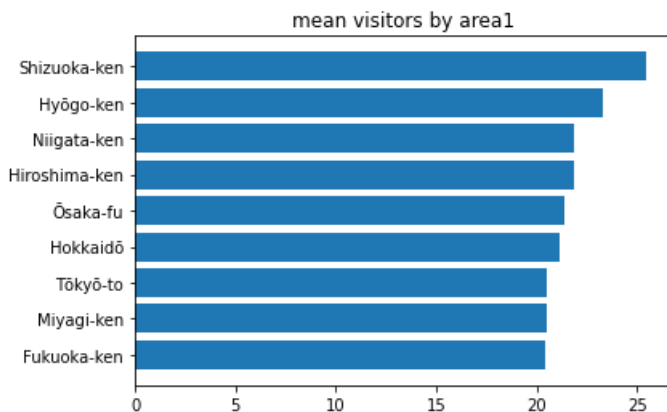

Observation

The most number of visitors visits in the Shizuoka-ken followed by the Osaka-fu and Hiroshima-ken and the less number of visitor in the Nigata-ken location

Here distance of the restaurant from the visitors home are matters based on the Weather condition.

Count the Top 10 visitors by genreName
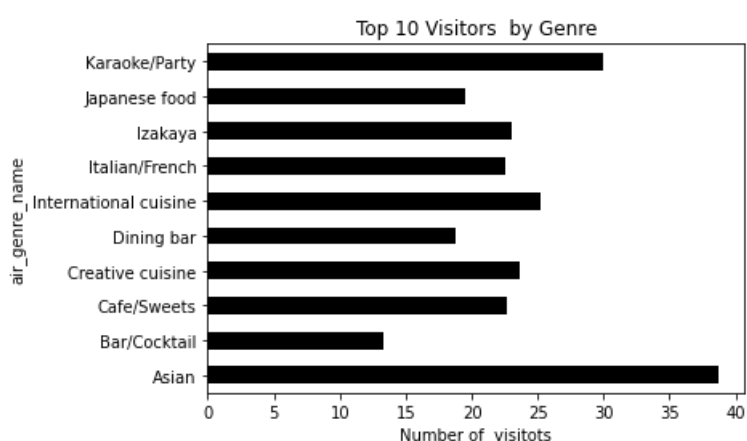
Objective of the analysis &plotting

The Objective of this analysis to show the number of top visitors by their prefernces of eating food.

In [137]:

```
ax11=df_merge.groupby('air_genre_name')['visitors'].mean()[:10].plot(kind='barh',color='black')
ax11.set_xlabel('Number of  visitots')
ax11.set_title('Top 10 Visitors  by Genre')
```

Out[137]:

```
Text(0.5, 1.0, 'Top 10 Visitors  by Genre')
```

Observation

In the Top 10 categories Asian is the hottest genre amongst the other , which is Cafe/Sweets &Izakya and Bar/Cocktail is the less choice of the Visitors in this category
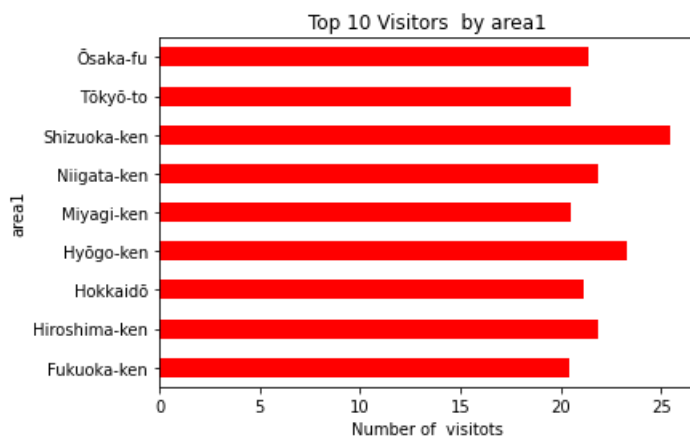
Count the top 10 mean Visitors based on areas(area1, area2, area3)

In [138]:

```
ax12=df_merge.groupby('area1')['visitors'].mean()[:10].plot(kind='barh',color='red')
ax12.set_xlabel('Number of  visitots')
ax12.set_title('Top 10 Visitors  by area1')
```

Out[138]:

```
Text(0.5, 1.0, 'Top 10 Visitors  by area1')
```
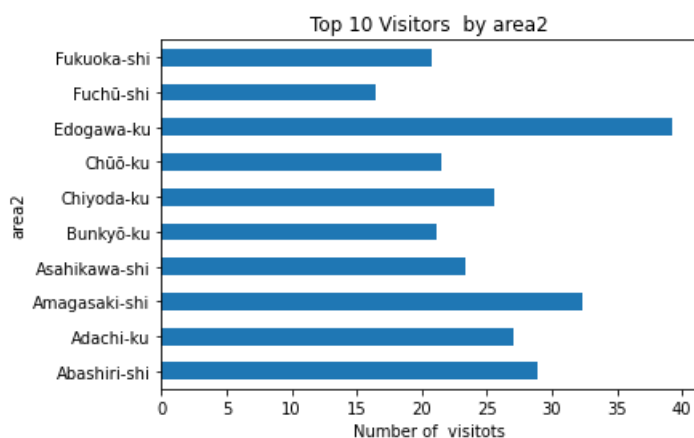
In [139]:

```
ax13=df_merge.groupby('area2')['visitors'].mean()[:10].plot(kind='barh')
ax13.set_xlabel('Number of  visitots')
ax13.set_title('Top 10 Visitors  by area2')
```

Out[139]:

```
Text(0.5, 1.0, 'Top 10 Visitors  by area2')
```
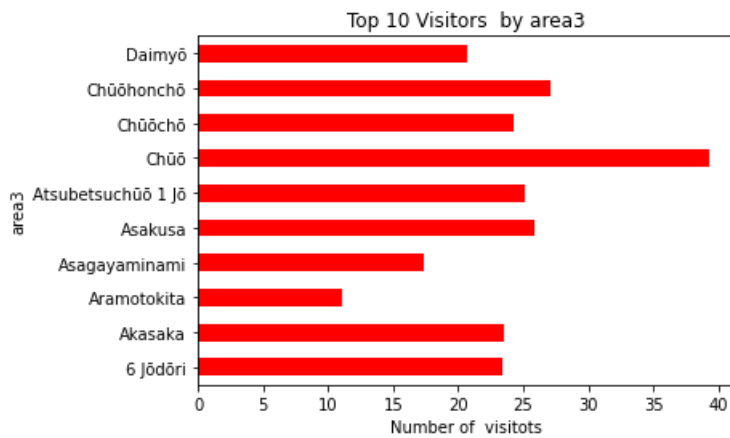
In [140]:

```
ax14=df_merge.groupby('area3')['visitors'].mean()[:10].plot(kind='barh',color='red')
ax14.set_xlabel('Number of  visitots')
ax14.set_title('Top 10 Visitors  by area3')
```

Out[140]:

```
Text(0.5, 1.0, 'Top 10 Visitors  by area3')
```


Observations

In the top ten categories of Mean visitors by area1, Shizuoka-ken is the hottest area amongst the other , which are followed by Osaka-fu &Hyongo-ken

In the top ten categories of Mean visitors by area2, Adachi-ku is the hottest area amongst the other , which are followed by Abashiri-shi &Chiyoda-ku

In the top ten categories of Mean visitors by area3, Chuohoncho is the hottest area amongst the other , which are followed by Fuminosato &Akaska

In [141]:

```
hpg_store_info_df.head()
```

Out[141]:

	hpg_store_id	hpg_genre_name	hpg_area_name	latitude	longitude
0	hpg_6622b62385aec8bf	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
1	hpg_e9e068dd49c5fa00	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
2	hpg_2976f7acb4b3a3bc	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
3	hpg_e51a522e098f024c	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221
4	hpg_e3d0e1519894f275	Japanese style	Tōkyō-to Setagaya-ku Taishidō	35.643675	139.668221

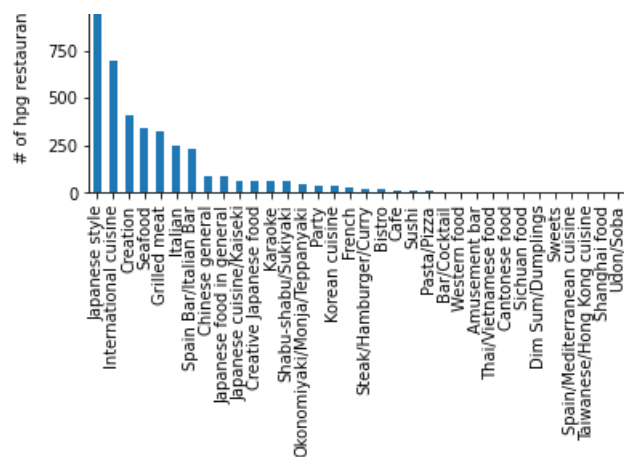**Count the Number of Hpg restaurants based on the Genre name**

In [142]:

```
hpg_restaurant_by_Genre_name=hpg_store_info_df.groupby('hpg_store_id')
['hpg_genre_name'].sum().value_counts()
ax8=hpg_restaurant_by_Genre_name.plot.bar()
ax8.set_ylabel('# of hpg restaurant by Genre_name')
```

Out[142]:

```
Text(0, 0.5, '# of hpg restaurant by Genre_name')
```

Observation

1)Japanese style has the highest number of the restaurants followed by the International cuisine and creation

2)There are number of Genres who has either a less restaurants or no restaurants.

In [143]:

```python
#date_info.head()
date_info=date_info.rename(columns={'calendar_date':'visit_date'})
date_info.visit_date=pd.to_datetime(date_info.visit_date)
```

In [144]:

```python
#date_info=date_info.rename(columns={'calendar_date':'visit_date'})
air_visit_holiday=airvisit_df.merge(date_info, on='visit_date', how='inner')
holiday_days=air_visit_holiday.groupby('holiday_flg')['visitors'].mean()
holiday_days.index=['not holiday','holiday']
holiday_days.plot(kind='bar')
plt.xticks(rotation = 'horizontal', fontsize = 16)
plt.ylabel('visitors', fontsize =16)
```

Out[144]:

```
Text(0, 0.5, 'visitors')
```
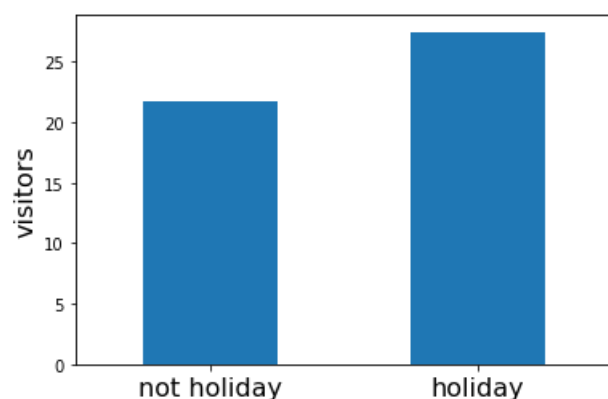

Observations

There are more number of visitors on holiday days then the nonholiday days.

Conclusion

In [145]:

```python
air_reserve.head()
```

Out[145]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

Feature Engineering

1):total visitors that are visits to a restaurants by the each weekdays:

this feature is helpful to determine the total number of Visitors on each week day i.e from(Mon to Sat) by all the stores

In [146]:

```
tm5=air_reserve.groupby(['reserve_datetime_weekdayname'])[['reserve_visitors']].sum().rename(colum
ns={'reserve_datetime_weekdayname':'Day of the
week','reserve_visitors':'Total_visitors_Day_of_week'})
tm5
```

Out[146]:

	Total_visitors_Day_of_week
reserve_datetime_weekdayname	
Friday	64025
Monday	57381
Saturday	49263
Sunday	36943
Thursday	68929
Tuesday	69197
Wednesday	68277

In [147]:

```
air_reserve['visit_datetime']=pd.to_datetime(air_reserve['visit_datetime'])
tm1=air_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)
['reserve_visitors'].sum().rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_
visitors_by_date'})
tm2=air_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)
['reserve_visitors'].min().rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_
min_visitors_by_date'})
tm3=air_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)
['reserve_visitors'].max().rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_
max_visitors_by_date'})
m1=pd.merge(tm1,tm2,on=['air_store_id','visit_date'])
m2=pd.merge(m1,tm3,on=['air_store_id','visit_date'])
```

In [148]:

```
air_reserve.head()
```

Out[148]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

2)Total Number of visitors by per store and per day of week in air:

this feature is helpful to determine the total number of Visitors on each This feature is helpful for determine the number of visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores

In [149]:

```
tmp1 = air_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].sum().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_visitors_by_wk_id_air'})
```

In [150]:

```
tmp1
```

Out[150]:

	air_store_id	day_of_week	Total_visitors_by_wk_id_air
0	air_00a91d42b08b08d9	Monday	11
1	air_00a91d42b08b08d9	Saturday	3
2	air_00a91d42b08b08d9	Sunday	8
3	air_00a91d42b08b08d9	Thursday	32
4	air_00a91d42b08b08d9	Tuesday	16
...	...	...	...
1820	air_fea5dc9594450608	Thursday	86
1821	air_fea5dc9594450608	Tuesday	86
1822	air_fea5dc9594450608	Wednesday	69
1823	air_fee8dcf4d619598e	Friday	3
1824	air_fee8dcf4d619598e	Tuesday	2

1825 rows × 3 columns

In [151]:

```
air_reserve['Total_visitors_by_wk_id_air']=tmp1['Total_visitors_by_wk_id_air']
```

3)Total Number of Min visitors by per store and per day of week in air:

This feature is helpful for determine the number of Min visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores

In [152]:

```
tmp2=air_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].min().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_min_visitors_by_wk_id_air'})
```

In [153]:

```
tmp2
```

Out[153]:

	air_store_id	day_of_week	Total_min_visitors_by_wk_id_air
0	air_00a91d42b08b08d9	Monday	2
1	air_00a91d42b08b08d9	Saturday	3
2	air_00a91d42b08b08d9	Sunday	2
3	air_00a91d42b08b08d9	Thursday	2
4	air_00a91d42b08b08d9	Tuesday	4
...	...	...	...
1820	air_fea5dc9594450608	Thursday	2
1821	air_fea5dc9594450608	Tuesday	2
1822	air_fea5dc9594450608	Wednesday	2
1823	air_fee8dcf4d619598e	Friday	3
1824	air_fee8dcf4d619598e	Tuesday	2

1825 rows × 3 columns

In [154]:

```
air_reserve['Total_min_visitors_by_wk_id_air']=tmp2['Total_min_visitors_by_wk_id_air']
```

Merge the two dataframe

In [155]:

```
tmp3=pd.merge(tmp1, tmp2,how='inner',on=['air_store_id','day_of_week'])
t1=pd.DataFrame(tmp3)
```

4)Total Number of maximum visitors by per store and per day of week in air:

This feature is helpful for determine the number of maximum visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores

In [156]:

```
tmp4=air_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].min().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_max_visitors_by_wk_id__air'})
tmp4
```

Out[156]:

	air_store_id	day_of_week	Total_max_visitors_by_wk_id__air
0	air_00a91d42b08b08d9	Monday	2
1	air_00a91d42b08b08d9	Saturday	3
2	air_00a91d42b08b08d9	Sunday	2
3	air_00a91d42b08b08d9	Thursday	2
4	air_00a91d42b08b08d9	Tuesday	4
...	...	...	...
1820	air_fea5dc9594450608	Thursday	2
1821	air_fea5dc9594450608	Tuesday	2
1822	air_fea5dc9594450608	Wednesday	2
1823	air_fee8dcf4d619598e	Friday	3
1824	air_fee8dcf4d619598e	Tuesday	2

1825 rows × 3 columns

In [157]:

```
air_reserve['Total_max_visitors_by_wk_id__air']=tmp4['Total_max_visitors_by_wk_id__air']
```

Merge the two dataframe for final Merge

```
final_t1=pd.merge(t1,tmp4,how='inner',on=['air_store_id','day_of_week'])
final_t1
```

	air_store_id	day_of_week	Total_visitors_by_wk_id_air	Total_min_visitors_by_wk_id_air	Total_max_visitors_by_wk_id__a
0	air_00a91d42b08b08d9	Monday	11	2	
1	air_00a91d42b08b08d9	Saturday	3	3	
2	air_00a91d42b08b08d9	Sunday	8	2	
3	air_00a91d42b08b08d9	Thursday	32	2	
4	air_00a91d42b08b08d9	Tuesday	16	4	
...	...	...	...	...	.
1820	air_fea5dc9594450608	Thursday	86	2	
1821	air_fea5dc9594450608	Tuesday	86	2	
1822	air_fea5dc9594450608	Wednesday	69	2	
1823	air_fee8dcf4d619598e	Friday	3	3	
1824	air_fee8dcf4d619598e	Tuesday	2	2	

1825 rows × 5 columns

```
final_1_merge=pd.merge(m2,final_t1,on=['air_store_id'])
final_1_merge.head()
```

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
1	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Saturday	
2	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Sunday	
3	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Thursday	
4	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Tuesday	

```
air_reserve.head()
```

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00						Jan	
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

5)Total Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in air:

This feature is helpful for determine the Total number of visitors by each and every store and also from each Hour difference

In [161]:

```
tmp5=air_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[ 'reserve_visitors'].
sum().rename(columns={'difference_hour':'difference_hour',
'reserve_visitors':'Total_visitors_by_hour__air'})
tmp5
```

Out[161]:

	air_store_id	difference_hour	Total_visitors_by_hour__air
0	air_00a91d42b08b08d9	-1	12
1	air_00a91d42b08b08d9	3	6
2	air_00a91d42b08b08d9	4	20
3	air_00a91d42b08b08d9	5	2
4	air_00a91d42b08b08d9	9	18
...	...	...	...
5870	air_fea5dc9594450608	16	2
5871	air_fea5dc9594450608	18	8
5872	air_fea5dc9594450608	19	5
5873	air_fee8dcf4d619598e	3	3
5874	air_fee8dcf4d619598e	5	2

5875 rows × 3 columns

In [162]:

```
air_reserve['Total_visitors_by_hour__air']=tmp5['Total_visitors_by_hour__air']
```

6)Min Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in air:

This feature is helpful for determine the Min number of visitors by each and every store and also from each Hour difference

In [163]:

```
tmp6=air_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[ 'reserve_visitors'].
min().rename(columns={'difference_hour':'difference_hour',
'reserve_visitors':'Total_min_visitors_by_hour__air'})
tmp6
```

Out[163]:

	air_store_id	difference_hour	Total_min_visitors_by_hour__air
0	air_00a91d42b08b08d9	-1	12
1	air_00a91d42b08b08d9	3	2
2	air_00a91d42b08b08d9	4	2

	air_store_id	difference_hour	Total_min_visitors_by_hour__air
3	air_00a91d42b08b08d9	5	2
4	air_00a91d42b08b08d9	9	18
...	...	...	...
5870	air_fea5dc9594450608	16	2
5871	air_fea5dc9594450608	18	2
5872	air_fea5dc9594450608	19	2
5873	air_fee8dcf4d619598e	3	3
5874	air_fee8dcf4d619598e	5	2

5875 rows × 3 columns

```
air_reserve['Total_min_visitors_by_hour__air']=tmp6['Total_min_visitors_by_hour__air']
```

7)Max Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in air:

This feature is helpful for determine the Max number of visitors by each and every store and also from each Hour difference

```
tmp7=air_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[ 'reserve_visitors'].
max().rename(columns={'difference_hour':'difference_hour',
'reserve_visitors':'Total_max_visitors_by_hour__air'})
tmp7
```

	air_store_id	difference_hour	Total_max_visitors_by_hour__air
0	air_00a91d42b08b08d9	-1	12
1	air_00a91d42b08b08d9	3	4
2	air_00a91d42b08b08d9	4	9
3	air_00a91d42b08b08d9	5	2
4	air_00a91d42b08b08d9	9	18
...	...	...	...
5870	air_fea5dc9594450608	16	2
5871	air_fea5dc9594450608	18	6
5872	air_fea5dc9594450608	19	3
5873	air_fee8dcf4d619598e	3	3
5874	air_fee8dcf4d619598e	5	2

5875 rows × 3 columns

```
air_reserve['Total_max_visitors_by_hour__air']=tmp7['Total_max_visitors_by_hour__air']
```

Merge Two dataFrame

```
#final_t2=pd.merge()
tmp9=pd.merge(tmp5, tmp6,how='inner',on=['air_store_id','difference_hour'])
t2=pd.DataFrame(tmp9)
t2
```

| air_store_id | difference_hour | Total_visitors_by_hour__air | Total_min_visitors_by_hour__air |

	air_store_id	difference_hour	Total_visitors_by_hour__air	Total_min_visitors_by_hour__air
0	air_00a91d42b08b08d9	-1	12	12
1	air_00a91d42b08b08d9	3	6	2
2	air_00a91d42b08b08d9	4	20	2
3	air_00a91d42b08b08d9	5	2	2
4	air_00a91d42b08b08d9	9	18	18
...	...	...	...	...
5870	air_fea5dc9594450608	16	2	2
5871	air_fea5dc9594450608	18	8	2
5872	air_fea5dc9594450608	19	5	2
5873	air_fee8dcf4d619598e	3	3	3
5874	air_fee8dcf4d619598e	5	2	2

5875 rows × 4 columns

Final Merge

In [168]:

```
final_t2=pd.merge(t2,tmp7,how='inner',on=['air_store_id','difference_hour'])
final_t2
```

Out[168]:

	air_store_id	difference_hour	Total_visitors_by_hour__air	Total_min_visitors_by_hour__air	Total_max_visitors_by_hour__
0	air_00a91d42b08b08d9	-1	12	12	
1	air_00a91d42b08b08d9	3	6	2	
2	air_00a91d42b08b08d9	4	20	2	
3	air_00a91d42b08b08d9	5	2	2	
4	air_00a91d42b08b08d9	9	18	18	
...	...	...	...	...	
5870	air_fea5dc9594450608	16	2	2	
5871	air_fea5dc9594450608	18	8	2	
5872	air_fea5dc9594450608	19	5	2	
5873	air_fee8dcf4d619598e	3	3	3	
5874	air_fee8dcf4d619598e	5	2	2	

5875 rows × 5 columns

In [169]:

```
#final_merge=pd.concat([final_1_merge, final_t2],ignore_index=False)
final_merge=pd.merge(final_1_merge,final_t2,on=['air_store_id'])
final_merge.head()
```

Out[169]:

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
1	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
2	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
3	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
4	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	

In [170]:

```
final_merge.head()
```

Out[170]:

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
1	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
2	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
3	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
4	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	

8)Total Number of visitors by per store and differnce of days between(visit_datetime-Reserved_datetime) in air:

This feature is helpful for determine the Total number of visitors by each and every store and also from each day difference

In [171]:

```
tmp11 = air_reserve.groupby(['air_store_id','Difference'], as_index=False)[ 'reserve_visitors'].sum
().rename(columns={'Difference':'Difference_days',  'reserve_visitors':'Total_visitors_by_day_air'
})
tmp11
```

Out[171]:

	air_store_id	Difference_days	Total_visitors_by_day_air
0	air_00a91d42b08b08d9	0	6
1	air_00a91d42b08b08d9	1	14
2	air_00a91d42b08b08d9	2	6
3	air_00a91d42b08b08d9	4	9
4	air_00a91d42b08b08d9	5	12
...	...	...	...
8003	air_fea5dc9594450608	52	11
8004	air_fea5dc9594450608	56	7
8005	air_fea5dc9594450608	61	6
8006	air_fee8dcf4d619598e	3	3
8007	air_fee8dcf4d619598e	13	2

8008 rows × 3 columns

In [172]:

```
air_reserve['Total_visitors_by_day_air']=tmp11['Total_visitors_by_day_air']
```

9)Min Number of visitors by per store and differnce of days between(visit_datetime-Reserved_datetime):

This feature is helpful for determine the Min number of visitors by each and every store and also from each day difference

This feature is helpful for determine the Min number of visitors by each and every store and also from each day difference

In [173]:

```
tmp12 = air_reserve.groupby(['air_store_id','Difference'], as_index=False)[ 'reserve_visitors'].min
().rename(columns={'Difference':'Difference_days',
'reserve_visitors':'Total_min_visitors_by_day_air'})
tmp12
```

Out[173]:

	air_store_id	Difference_days	Total_min_visitors_by_day_air
0	air_00a91d42b08b08d9	0	2
1	air_00a91d42b08b08d9	1	2
2	air_00a91d42b08b08d9	2	2
3	air_00a91d42b08b08d9	4	9
4	air_00a91d42b08b08d9	5	3
...	...	...	...
8003	air_fea5dc9594450608	52	11
8004	air_fea5dc9594450608	56	7
8005	air_fea5dc9594450608	61	6
8006	air_fee8dcf4d619598e	3	3
8007	air_fee8dcf4d619598e	13	2

8008 rows × 3 columns

In [174]:

```
air_reserve['Total_min_visitors_by_day_air']=tmp12['Total_min_visitors_by_day_air']
```

10)Max Number of visitors by per store and differnce of days between(visit_datetime-Reserved_datetime):

This feature is helpful for determine the Maximum number of visitors by each and every store and also from each day difference

In [175]:

```
tmp13 = air_reserve.groupby(['air_store_id','Difference'], as_index=False)[ 'reserve_visitors'].max
().rename(columns={'Difference':'Difference_days',
'reserve_visitors':'Total_max_visitors_by_day_air'})
tmp13
```

Out[175]:

	air_store_id	Difference_days	Total_max_visitors_by_day_air
0	air_00a91d42b08b08d9	0	4
1	air_00a91d42b08b08d9	1	12
2	air_00a91d42b08b08d9	2	4
3	air_00a91d42b08b08d9	4	9
4	air_00a91d42b08b08d9	5	9
...	...	...	...
8003	air_fea5dc9594450608	52	11
8004	air_fea5dc9594450608	56	7
8005	air_fea5dc9594450608	61	6
8006	air_fee8dcf4d619598e	3	3
8007	air_fee8dcf4d619598e	13	2

8008 rows × 3 columns

```
air_reserve['Total_max_visitors_by_day_air']=tmp13['Total_max_visitors_by_day_air']
```

Merge The dataframe

```
t11=pd.merge(tmp11, tmp12,on=['air_store_id','Difference_days'],how='inner')
t12=pd.DataFrame(t11)
t12
```

	air_store_id	Difference_days	Total_visitors_by_day_air	Total_min_visitors_by_day_air
0	air_00a91d42b08b08d9	0	6	2
1	air_00a91d42b08b08d9	1	14	2
2	air_00a91d42b08b08d9	2	6	2
3	air_00a91d42b08b08d9	4	9	9
4	air_00a91d42b08b08d9	5	12	3
...	...	...	...	...
8003	air_fea5dc9594450608	52	11	11
8004	air_fea5dc9594450608	56	7	7
8005	air_fea5dc9594450608	61	6	6
8006	air_fee8dcf4d619598e	3	3	3
8007	air_fee8dcf4d619598e	13	2	2

8008 rows × 4 columns

```
pip install dask[dataframe]
```

```
Requirement already satisfied: dask[dataframe] in /usr/local/lib/python3.6/dist-packages (2.12.0)
Requirement already satisfied: pandas>=0.23.0; extra == "dataframe" in
/usr/local/lib/python3.6/dist-packages (from dask[dataframe]) (1.0.5)
Requirement already satisfied: partd>=0.3.10; extra == "dataframe" in
/usr/local/lib/python3.6/dist-packages (from dask[dataframe]) (1.1.0)
Requirement already satisfied: numpy>=1.13.0; extra == "dataframe" in
/usr/local/lib/python3.6/dist-packages (from dask[dataframe]) (1.18.5)
Requirement already satisfied: fsspec>=0.6.0; extra == "dataframe" in
/usr/local/lib/python3.6/dist-packages (from dask[dataframe]) (0.8.2)
Requirement already satisfied: toolz>=0.7.3; extra == "dataframe" in
/usr/local/lib/python3.6/dist-packages (from dask[dataframe]) (0.10.0)
Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.6/dist-packages (from
pandas>=0.23.0; extra == "dataframe"->dask[dataframe]) (2018.9)
Requirement already satisfied: python-dateutil>=2.6.1 in /usr/local/lib/python3.6/dist-packages
(from pandas>=0.23.0; extra == "dataframe"->dask[dataframe]) (2.8.1)
Requirement already satisfied: locket in /usr/local/lib/python3.6/dist-packages (from
partd>=0.3.10; extra == "dataframe"->dask[dataframe]) (0.2.0)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.6/dist-packages (from python-
dateutil>=2.6.1->pandas>=0.23.0; extra == "dataframe"->dask[dataframe]) (1.15.0)
```

```
import dask.dataframe as dd
final_t3=dd.merge(t12,tmp13,on=['air_store_id','Difference_days'])
f1=pd.DataFrame(final_t3)
f1.head(2)
```

	air_store_id	Difference_days	Total_visitors_by_day_air	Total_min_visitors_by_day_air	Total_max_visitors_by_day_air

	air_store_id	Difference_days	Total_visitors_by_day_air	Total_min_visitors_by_day_air	Total_max_visitors_by_day_air
0	air_00a91d42b08b08d9	0	6	2	4
1	air_00a91d42b08b08d9	1	14	2	12

In [180]:

```
f1=f1.drop(columns=['air_store_id'])
```

In [181]:

```
d1=dd.concat([final_merge,f1],axis=1)
d1.head()
```

Out[181]:

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
1	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
2	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
3	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
4	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	

In [182]:

```
air_reserve.head()
```

Out[182]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Jan	
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Jan	
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Jan	
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Jan	

In [183]:

```
air_reserve_merge=dd.concat([final_merge,f1],axis=1)
air_reserve_merge.head()
```

Out[183]:

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
1	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
		2016-10-					

	air_store_id	visit_date	Total_visitors_by_date	Total_min_visitors_by_date	Total_max_visitors_by_date	day_of_week	Total_
2	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
3	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	
4	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	2	2	Monday	

In [184]:

```
hpg_reserve=pd.merge(hpg_reserve,store_id_df, on=['hpg_store_id'])
hpg_reserve.head(2)
```

Out[184]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mon
0	hpg_878cc70b1abc76f7	2016-01-01 19:00:00	2016-01-01 15:00:00	4	19	15	4	0	Ja
1	hpg_878cc70b1abc76f7	2016-01-02 19:00:00	2016-01-02 14:00:00	2	19	14	5	0	Ja

In [185]:

```
hpg_reserve['visit_datetime']=pd.to_datetime(hpg_reserve['visit_datetime'])
m5=hpg_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)['reserve_visitors'].sum()
.rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_hpg_visitors_by_date'})
m6=hpg_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)['reserve_visitors'].min()
.rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_min_hpg_visitors_by_date'
})
m7=hpg_reserve.groupby(['air_store_id','visit_datetime'],as_index=False)['reserve_visitors'].max()
.rename(columns={'visit_datetime':'visit_date','reserve_visitors':'Total_max_hpg_visitors_by_date'
})
tms=pd.merge(m5,m6,on=['air_store_id','visit_date'])
tms1=pd.merge(tms,m7,on=['air_store_id','visit_date'])
```

11)Total Number of visitors by per store and per day of week in hpg:

This feature is helpful for determine the number of visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores.

In [186]:

```
hpg1 = hpg_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].sum().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_visitors_by_wk_id_hpg'})
tsd1=pd.DataFrame(hpg1)
```

In [187]:

```
hpg_reserve['Total_visitors_by_wk_id_hpg']=tsd1['Total_visitors_by_wk_id_hpg']
```

12)Min Number of visitors by per store and per day of week in hpg:

This feature is helpful for determine the Minimum number of visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores

In [188]:

```
hpg2=hpg_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].min().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_min_visitors_by_wk_id_hpg'})
tsd3=pd.DataFrame(hpg2)
tsd3.head(2)
```

Out[188]:

	air_store_id	day_of_week	Total_min_visitors_by_wk_id_hpg
0	air_00a91d42b08b08d9	Friday	1
1	air_00a91d42b08b08d9	Monday	1

In [189]:

```
hpg_reserve['Total_min_visitors_by_wk_id_hpg']=tsd3['Total_min_visitors_by_wk_id_hpg']
```

13)Max Number of visitors by per store and per day of week in hpg:

This feature is helpful for determine the Maximum number of visitors by each and every store and also from each week day i.e from(Mon to Sat) by all the stores

In [190]:

```
hpg3=hpg_reserve.groupby(['air_store_id','reserve_datetime_weekdayname'], as_index=False)[
'reserve_visitors'].max().rename(columns={'reserve_datetime_weekdayname':'day_of_week',
'reserve_visitors':'Total_max_visitors_by_wk_id_hpg'})
tsd4=pd.DataFrame(hpg3)
```

In [191]:

```
hpg_reserve['Total_max_visitors_by_wk_id_hpg']=tsd4['Total_max_visitors_by_wk_id_hpg']
```

Merge the DataFrame

In [192]:

```
t1_merge=pd.merge(tsd1, tsd3, how='inner', on=['air_store_id','day_of_week'])
tsd5=pd.DataFrame(t1_merge)
tsd5.head()
```

Out[192]:

	air_store_id	day_of_week	Total_visitors_by_wk_id_hpg	Total_min_visitors_by_wk_id_hpg
0	air_00a91d42b08b08d9	Friday	98	1
1	air_00a91d42b08b08d9	Monday	33	1
2	air_00a91d42b08b08d9	Saturday	73	1
3	air_00a91d42b08b08d9	Sunday	32	1
4	air_00a91d42b08b08d9	Thursday	99	1

In [193]:

```
t2_merge=pd.merge(tsd5,tsd4,how='inner', on=['air_store_id','day_of_week'])
tsd6=pd.DataFrame(t2_merge)
tsd6.head(2)
```

Out[193]:

	air_store_id	day_of_week	Total_visitors_by_wk_id_hpg	Total_min_visitors_by_wk_id_hpg	Total_max_visitors_by_wk_id_hpg
0	air_00a91d42b08b08d9	Friday	98	1	22
1	air_00a91d42b08b08d9	Monday	33	1	9

In [194]:

```
final_merge_hpg=pd.merge(tms1,tsd6,how='inner',on=['air_store_id'])
final_merge_hpg.head(2)
```

Out[194]:

	air_store_id	visit_date	Total_hpg_visitors_by_date	Total_min_hpg_visitors_by_date	Total_max_hpg_visitors_by_date	day_
0	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	
1	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	

14)Total Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in hpg:

This feature is helpful for determine the Total number of visitors by each and every store and also from each Hour difference

In [195]:

```
tmp_hpg_1=hpg_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[
'reserve_visitors'].sum().rename(columns={'difference_hour':'difference_hour', 'reserve_visitors'
:'Total_visitors_by_hour_hpg'})
tsd7=pd.DataFrame(tmp_hpg_1)
```

In [196]:

```
hpg_reserve['Total_visitors_by_hour_hpg']=tsd7['Total_visitors_by_hour_hpg']
```

15)Min Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in hpg:

This feature is helpful for determine the Min number of visitors by each and every store and also from each Hour difference

In [197]:

```
tmp_hpg_2=hpg_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[
'reserve_visitors'].min().rename(columns={'difference_hour':'difference_hour', 'reserve_visitors'
:'Total_min_visitors_by_hour_hpg'})
tsd8=pd.DataFrame(tmp_hpg_2)
```

In [198]:

```
hpg_reserve['Total_min_visitors_by_hour_hpg']=tsd8['Total_min_visitors_by_hour_hpg']
```

16)Max Number of visitors by per store and differnce of hours between(visit_datetime-Reserved_datetime) in hpg:

This feature is helpful for determine the Max number of visitors by each and every store and also from each Hour difference

In [199]:

```
tmp_hpg_3=hpg_reserve.groupby(['air_store_id','difference_hour'], as_index=False)[
'reserve_visitors'].max().rename(columns={'difference_hour':'difference_hour', 'reserve_visitors'
:'Total_max_visitors_by_hour_hpg'})
tsd9=pd.DataFrame(tmp_hpg_3)
```

In [200]:

```
hpg_reserve['Total_max_visitors_by_hour_hpg']=tsd9['Total_max_visitors_by_hour_hpg']
```

In [201]:

```
hpg_reserve.head(1)
```

Out[201]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mon
0	hpg_878cc70b1abc76f7	2016-01-01 19:00:00	2016-01-01 15:00:00	4	19	15	4	0	Ja

Merge the Dataframe

```
hpg_hrs_merge=pd.merge(tsd7, tsd8,how='inner',on=['air_store_id','difference_hour'])
tsd11=pd.DataFrame(hpg_hrs_merge)
```

In [203]:

```
hpg_hrs_merge1=pd.merge(tsd11,tsd9,how='inner',on=['air_store_id','difference_hour'])
tsd10=pd.DataFrame(hpg_hrs_merge1)
```

In [204]:

```
final_merge_2=pd.merge(final_merge_hpg,tsd10,on=['air_store_id'])
final_merge_2.head(2)
```

Out[204]:

	air_store_id	visit_date	Total_hpg_visitors_by_date	Total_min_hpg_visitors_by_date	Total_max_hpg_visitors_by_date	day_c
0	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	
1	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	

In [205]:

```
tsd10=tsd10.drop(columns=['air_store_id'])
```

In [206]:

```
d2=pd.concat([final_merge_hpg,tsd10],axis=1)
d3=pd.DataFrame(d2)
d3.head(2)
```

Out[206]:

	air_store_id	visit_date	Total_hpg_visitors_by_date	Total_min_hpg_visitors_by_date	Total_max_hpg_visitors_by_date	day_c
0	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	
1	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	

In [207]:

```
hpg_reserve_merge=pd.concat([final_merge_hpg,tsd10],axis=1)
hpg_reserve_merge.head()
```

Out[207]:

	air_store_id	visit_date	Total_hpg_visitors_by_date	Total_min_hpg_visitors_by_date	Total_max_hpg_visitors_by_date	day_c
0	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	
1	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	
2	air_00a91d42b08b08d9	2016-01-14 19:00:00	2	2	2	S
3	air_00a91d42b08b08d9	2016-01-14	2	2	2	

	air_store_id	19:00:00 visit_date	Total_hpg_visitors_by_date	Total_min_hpg_visitors_by_date	Total_max_hpg_visitors_by_date	day_o
4	air_00a91d42b08b08d9	2016-01- 14 19:00:00	2	2	2	T

In [208]:

```
air_reserve.head(1)
```

Out[208]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference	month	res
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Jan	

In [209]:

```
hpg_reserve.head(1)
```

Out[209]:

	hpg_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	mon
0	hpg_878cc70b1abc76f7	2016-01-01 19:00:00	2016-01-01 15:00:00	4	19	15	4	0	Ja

In [210]:

```
air_reserve=air_reserve.rename(columns={'Difference':'Difference_days'})
```

In [211]:

```
cols_to_use = hpg_reserve.columns.difference(air_reserve.columns)
```

In [212]:

```
dfNew =pd.merge(air_reserve, hpg_reserve[cols_to_use], left_index=True, right_index=True, how='inne
r')
```

In [213]:

```
dfNew.head()
```

Out[213]:

	air_store_id	visit_datetime	reserve_datetime	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	month
0	air_877f79706adbfb06	2016-01-01 19:00:00	2016-01-01 16:00:00	1	19	16	3	0	Ja
1	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	3	19	19	0	0	Ja
2	air_db4b38ebe7a7ceff	2016-01-01 19:00:00	2016-01-01 19:00:00	6	19	19	0	0	Ja
3	air_877f79706adbfb06	2016-01-01 20:00:00	2016-01-01 16:00:00	2	20	16	4	0	Ja
4	air_db80363d35f10926	2016-01-01 20:00:00	2016-01-01 01:00:00	5	20	1	19	0	Ja

In [214]:

```
#import dask.dataframe as dd
#reserve=dd.merge(air_reserve_merge, hpg_reserve_merge,on=
['air_store_id','visit_date','day_of_week','difference_hour'])
```

In [215]:

```
#reserve.head(1)
```

In [216]:

```
#df1=reserve.compute()
```

In [217]:

```
#total_reserve1=pd.merge(air_reserve,hpg_reserve)
```

In [218]:

```
#total_reserve1.head(2)
```

In [219]:

```
#final_merge1=total_reserve1.rename(columns={'visit_datetime':'visit_date'})
```

In [220]:

```
#df1.head(1)
#fd1=pd.merge(final_merge1,df1,on=['air_store_id','visit_date'],how='inner')
```

In [221]:

```
#f1=fd1.rename(columns={'difference_hour_x':'difference_hour'})
```

In [222]:

```
#f2=f1.rename(columns={'Difference_days_x':'Difference_days'})
#f2.head()
```

In [223]:

```
#f2.drop(columns=['Difference'],inplace=True)
```

In [224]:

```
#f2.rename(columns = {'air_store_id':'store_id'}, inplace = True)
#f2.rename(columns = {'hpg_store_id':'store_id'}, inplace = True)
```

In [225]:

```
#df_merge['air_store_id'].nunique()
#df_merge.head(1)
#airvisit_df.head()
```

In [226]:

```
df_merge['year']=df_merge['visit_date'].dt.year
df_merge['weekday_no']=df_merge['visit_date'].dt.dayofweek
df_merge['month']=df_merge['visit_date'].dt.month
df_merge['day']=df_merge['visit_date'].dt.day
```

In [227]:

```
df_merge.head(2)
#airvisit_df=pd.merge(airvisit_df,air_store_info,how='inner',on=['air_store_id'])
#airvisit_df['air_store_id'].nunique()
```

Out[227]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	y
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	2(
1	air_00a91d42b08b08d9	2016-07-02	9	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	2(

Find the new features in the Test data

In [228]:

```
#predicted_data.head()
predicted_data['visit_date']=pd.to_datetime(predicted_data['visit_date'])
predicted_data['weekday']=predicted_data['visit_date'].dt.dayofweek
predicted_data['year']=predicted_data['visit_date'].dt.year
predicted_data['month']=predicted_data['visit_date'].dt.month
predicted_data['day']=predicted_data['visit_date'].dt.day
sample_Total_visitors=predicted_data.groupby(['air_store_id','day'],as_index=False)
['visitors'].sum().rename(columns={'visitors':'Total_visitors'})
sample_min_visitors=predicted_data.groupby(['air_store_id','day'],as_index=False)
['visitors'].min().rename(columns={'visitors':'min_visitors'})
sample_max_visitors=predicted_data.groupby(['air_store_id','day'],as_index=False)
['visitors'].max().rename(columns={'visitors':'max_visitors'})
```

In [229]:

```
test1_merge=pd.merge(sample_Total_visitors, sample_min_visitors,on=['air_store_id','day'],how='inner')
test2_merge=pd.merge(test1_merge,sample_max_visitors,on=['air_store_id','day'],how='inner')
```

In [230]:

```
predicted_data_new=predicted_data.merge(test2_merge,on=['air_store_id','day'],how='left')
predicted_data_new.head()
```

Out[230]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day	Total_visitors	min_visitors	ma
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	6	2017	4	23	0	0	
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	0	0	2017	4	24	0	0	
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	0	1	2017	4	25	0	0	
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	0	2	2017	4	26	0	0	
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	0	3	2017	4	27	0	0	

In [231]:

```
predicted_data_new = pd.merge(predicted_data_new, air_store_info, how='left', on=['air_store_id'])
predicted_data_new.head()
```

Out[231]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day	Total_visitors	min_visitors	ma
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	6	2017	4	23	0	0	
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	0	0	2017	4	24	0	0	

	id	air_store_id	visit_date	visitors	weekday	year	month	day	Total_visitors	min_visitors	ma
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	0		2017		25	0	0	
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	0	2	2017	4	26	0	0	
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	0	3	2017	4	27	0	0	

In [231]:

In [232]:

```
#predicted_data_new['Total_visitors']=test2_merge['Total_visitors']
#predicted_data_new['min_visitors']=test2_merge['min_visitors']
#predicted_data_new['max_visitors']=test2_merge['max_visitors']
```

In [233]:

```
df_merge.head(2)
```

Out[233]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	y
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20
1	air_00a91d42b08b08d9	2016-07-02	9	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20

In [234]:

```
airvisit_df.head(3)
```

Out[234]:

	air_store_id	visit_date	visitors	weekday	month	day
79	air_ba937bf13d40fb24	2016-04-16	35	5	Apr	16
80	air_ba937bf13d40fb24	2016-04-18	21	0	Apr	18
81	air_ba937bf13d40fb24	2016-04-19	23	1	Apr	19

17)(Total,Min,Max) Number of visits by visitor on each day and by each store:

This feature is useful for determining the total visitors by each day and each store

In [235]:

```
t1=df_merge.groupby(['air_store_id','day'],as_index=False)['visitors'].sum().rename(columns={'visitors':'Total_visitors'})
t2=df_merge.groupby(['air_store_id','day'],as_index=False)['visitors'].min().rename(columns={'visitors':'min_visitors'})
t3=df_merge.groupby(['air_store_id','day'],as_index=False)['visitors'].max().rename(columns={'visitors':'max_visitors'})
```

Merge the DataFrame

In [236]:

```
air1_merge=pd.merge(t1, t2,on=['air_store_id','day'],how='inner')
air2_merge=pd.merge(air1_merge,t3,on=['air_store_id','day'],how='inner')
```

```
airvisit_df_new=df_merge.merge(air2_merge,on=['air_store_id','day'],how='inner')
airvisit_df_new.head()
```

Out[237]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	y
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20
1	air_00a91d42b08b08d9	2016-08-01	16	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20
2	air_00a91d42b08b08d9	2016-09-01	24	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20
3	air_00a91d42b08b08d9	2016-10-01	56	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20
4	air_00a91d42b08b08d9	2016-11-01	22	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20

In [237]:

Conclusion after EDA+FE:

There are many visitors who went to restaurant from july2016 to dec-2016 as compared to 2017 till apr

when drill down to monthly , weekly and daily the visitors are fluctuated according to the number of visitors by week, month and the daily

There are many visitors in the late days of the 2017 as compared to initial days of 2016 in air&hpg

The preferences of the visitors in air should reserved the seat in the restaurants from the time intreval in between afternoon to night till 10 oclock, while in hpg preferences of the visitors to reserved the seat in the restaurants from the time intreval in between afternoon to evening till 7 oclock

The impact between the Time for reservation to visit is scaled much in air restaurants, while there is not much scaled between resevation to visit in hpg restaurants

There are many visitors visits to a restaurants in the area Izakya as compared to the other areas and most prefereble food for visitors are Asian

There are many visitors who visits to a japanese restaurant in hpg system as compared to the other genre restaurants in the hpg system.

There are many visitors who reserve seats on holidays as compared to the nonholidays in hpg system

-----------------------FeatureEnginnering---

After concluding the overall observation from the EDA we come up with a feature which will give the summarize as well as consolidated results and which will give an better idea for accurate feature selection

Total Number of visitors by per day of week and per store in air/hpg:

This feature will give an idea of the each store contribution of visitors perday of week and also get the Mininum and maximum visitors from each weekday i.e from(Monday to Saturday)

Total Number of visitors by per store and diffrence of hours in air/hpg:

This feature will give an idea of the each store contribution of visitors by difference of hours from time to reservation to visit and this will give the idea of the visitors stays in the restaurant for the time interval i.e(Visit_time-reservetime)

Total Number of visitors by per store and diffrence of days in air/hpg:

This feature will give an idea of the each store contribution of visitors by difference of days from time to reservation to visit and this will give the idea of the visitor can make a reservation on that day and went to the restaurant on the next day.

Total Number of visits by visitors by per store and per day in airvisits:

This feature will give an idea of the each store contribution of visits to a visitors by per day and this feature is helpful for restaurant owners to judge the total amount of cost by each day on that particular store.

In [238]:

```python
holiday=date_info.head(3)
```

In [239]:

```python
!pip install partd
import partd
from sklearn import preprocessing
from sklearn.ensemble import RandomForestRegressor

holiday.head(3)
```

```
Requirement already satisfied: partd in /usr/local/lib/python3.6/dist-packages (1.1.0)
Requirement already satisfied: locket in /usr/local/lib/python3.6/dist-packages (from partd)
(0.2.0)
Requirement already satisfied: toolz in /usr/local/lib/python3.6/dist-packages (from partd)
(0.10.0)
```

Out[239]:

	visit_date	day_of_week	holiday_flg
0	2016-01-01	Friday	1
1	2016-01-02	Saturday	1
2	2016-01-03	Sunday	1

In [242]:

```python
train=airvisit_df_new.copy()

train=train.merge(holiday,how='left',on='visit_date')
train["day_of_week"] = train["weekday_no"]
train.drop(['weekday_no'],axis=1,inplace=True)
train["holiday_flg"]=date_info["holiday_flg"].fillna(0).astype(np.int64)
train['holiday_flg']=train['holiday_flg'].values.astype(np.int64)
train["month"] = train["visit_date"].dt.month
train["area1"],train["area2"],train["area3"] = train["air_area_name"].str.split(' ', 2).str
train = train.merge(visitors_area1,on = ["area1"],how = "left")
train['air_store_id'].nunique()


test=predicted_data_new.copy()
test=test.merge(holiday,how='left',on='visit_date')
test["day_of_week"] = test["weekday"]
test.drop(['weekday'],axis=1,inplace=True)
test["holiday_flg"]=date_info["holiday_flg"].fillna(0).astype(np.int64)
test['holiday_flg']=test['holiday_flg'].values.astype(np.int64)
test["area1"],test["area2"],test["area3"] = test["air_area_name"].str.split(' ', 2).str
test = test.merge(visitors_area1,on = ["area1"],how = "left")
test.head(1)
```

```
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:9: FutureWarning: Columnar iteration
over characters will be deprecated in future releases.
  if __name__ == '__main__':
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:20: FutureWarning: Columnar iteration
over characters will be deprecated in future releases.
```

Out[242]:

	id	air_store_id	visit_date	visitors	year	month	day	Total_visitors	min_visitors	max_visitors
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	2017	4	23	0	0	0

```
train.head(1)
```

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	y
0	air_00a91d42b08b08d9	2016-07-01	35	Italian/French	Tōkyō-to Chiyoda-ku Kudanminami	35.694003	139.753595	Tōkyō-to	Chiyoda-ku	Kudanminami	20

```
visitors_area1=df_merge.groupby("area1")
["visitors"].aggregate([max,np.median,np.mean]).reset_index()
visitors_area1.rename(columns={'max': 'area1_visitor_max', 'median': 'area1_visitor_median','mean':
'area1_visitor_mean'},inplace=True)
visitors_area1.head(3)
```

	area1	area1_visitor_max	area1_visitor_median	area1_visitor_mean
0	Fukuoka-ken	627	16	20.434758
1	Hiroshima-ken	199	18	21.822986
2	Hokkaidō	369	16	21.114745

```
lbl=preprocessing.LabelEncoder()
train['air_genre_name']=lbl.fit_transform(train['air_genre_name'])
test['air_genre_name']=lbl.fit_transform(test['air_genre_name'])
train['air_area_name']=lbl.fit_transform(train['air_area_name'])
test['air_area_name']=lbl.fit_transform(test['air_area_name'])
train['area1']=lbl.fit_transform(train['area1'])
test['area1']=lbl.fit_transform(test['area1'])
train['area2']=lbl.fit_transform(train['area2'])
test['area2']=lbl.fit_transform(test['area2'])
train['area3']=lbl.fit_transform(train['area3'])
test['area3']=lbl.fit_transform(test['area3'])
train['air_store_id']=lbl.fit_transform(train['air_store_id'])
test['air_store_id']=lbl.fit_transform(test['air_store_id'])
```

```
visit_by_day_store=train.groupby(['air_store_id','day'],as_index=False)['visitors'].aggregate([min
,max,np.median,np.mean]).reset_index()
train = train.merge(visit_by_day_store,how = "left", on = ["air_store_id","day"])
#test = test.merge(visit_by_day_store,how = "left", on = ["air_store_id","day"])
train.head(1)
```

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	year	month	day	To
0	0	2016-07-01	35	6	44	35.694003	139.753595	7	5	45	2016	7	1	

```
visit_by_day_store_test=test.groupby(['air_store_id','day'],as_index=False)['visitors'].aggregate(
```

```
[min,max,np.median,np.mean]).reset_index()
test = test.merge(visit_by_day_store_test,how = "left", on = ["air_store_id","day"])
test.head(1)
```

	id	air_store_id	visit_date	visitors	year	month	day	Total_visitors	min_visitors	max_visitors	air_genre
0	air_00a91d42b08b08d9_2017-04-23	0	2017-04-23	0	2017	4	23	0	0	0	0

In [247]:

```
visit_by_store_weekly = train.groupby(["air_store_id","day_of_week"])["visitors"].aggregate([min,m
ax,np.median,np.mean]).reset_index()
train = train.merge(visit_by_store_weekly,how = "left", on = ["air_store_id","day_of_week"],suffixe
s=["_all", "_weekday"])
#test = test.merge(visit_by_store_weekly,how = "left", on =
["air_store_id","day_of_week"],suffixes=["_all", "_weekday"])
train.head(1)
```

Out[247]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	year	month	day	To
0	0	2016-07-01	35	6		44	35.694003	139.753595	7	5	45	2016	7	1	

In [248]:

```
visit_by_store_weekly_test = test.groupby(["air_store_id","day_of_week"])["visitors"].aggregate([m
in,max,np.median,np.mean]).reset_index()
test = test.merge(visit_by_store_weekly_test,how = "left", on = ["air_store_id","day_of_week"],suff
ixes=["_all", "_weekday"])
#test = test.merge(visit_by_store_weekly,how = "left", on =
["air_store_id","day_of_week"],suffixes=["_all", "_weekday"])
test.head(1)
```

Out[248]:

	id	air_store_id	visit_date	visitors	year	month	day	Total_visitors	min_visitors	max_visitors	air_genre
0	air_00a91d42b08b08d9_2017-04-23	0	2017-04-23	0	2017	4	23	0	0	0	0

In [249]:

```
#airvisit_df.head(2)
#air_reserve.rename(columns = {'air_store_id':'store_id'}, inplace = True)
#hpg_reserve.rename(columns = {'hpg_store_id':'store_id'}, inplace = True)
#total_reserve = pd.concat([air_reserve, hpg_reserve])
#dfNew['date'] = dfNew['visit_datetime'].apply(lambda x:x.date())
#reserve_by_date = dfNew.groupby(["air_store_id","date"]).sum().reset_index()
#reserve_by_date = reserve_by_date.rename(columns = {'date':'visit_date'})
#reserve_by_date["visit_date"] = pd.to_datetime(reserve_by_date["visit_date"])
#reserve_by_date.head(1)
cols_to_use_new=dfNew.columns.difference(train)
dfNew1 = pd.merge(train, dfNew[cols_to_use], left_index=True, right_index=True, how='left')
dfNew1.head()

dfNew1['reserve_visitors']=dfNew['reserve_visitors']
```

In [250]:

```
dfNew2 = pd.merge(test, dfNew[cols_to_use], left_index=True, right_index=True, how='left')
dfNew2.head()
dfNew2['reserve_visitors']=dfNew['reserve_visitors']
```

In [251]:

```
reserve_by_date = dfNew.groupby(["air_store_id","visit_datetime"]).sum().reset_index()
reserve_by_date = reserve_by_date.rename(columns = {'visit_datetime':'visit_date'})
reserve_by_date["visit_date"] = pd.to_datetime(reserve_by_date["visit_date"])
```

In [252]:

```
#reserve_by_date['air_store_id'].nunique()
reserve_by_date.head(1)
```

Out[252]:

	air_store_id	visit_date	reserve_visitors	hour	reserve_hour	difference_hour	Difference_days	year	Total_visitors_by_wk_
0	air_00a91d42b08b08d9	2016-10-31 20:00:00	2	20	16	4	0	2016	

In [253]:

```
#df.head(1)
#train=pd.merge(train,df,on=
["air_store_id","visit_date","day_of_week","difference_hour","Difference_days"],how='outer')
#dfNew1.merge(reserve_by_date,how = "left", on=["air_store_id","visit_date"])
#dfNew1.head(1)
#dfNew2.merge(reserve_by_date,how = "left", on=["air_store_id","visit_date"])
#dfNew2.head(1)
```

In [254]:

```
#test=pd.merge(test,df,on=
["air_store_id","visit_date","day_of_week","difference_hour","Difference_days"],how='left')
dfNew1.head(1)
```

Out[254]:

	air_store_id	visit_date	visitors	air_genre_name	air_area_name	latitude	longitude	area1	area2	area3	year	month	day	To
0	0	2016-07-01	35	6	44	35.694003	139.753595	7	5	45	2016	7	1	

In [255]:

```
print("There are {} unique restaurants in train data set, while just {} of them have reservation."
.format(
    dfNew1["air_store_id"].nunique(),reserve_by_date["air_store_id"].nunique()))
```

There are 829 unique restaurants in train data set, while just 275 of them have reservation.

In [256]:

```
dfNew1.loc[dfNew1['air_store_id'].isin(reserve_by_date['air_store_id'].unique()),"reserve_visitors"
]=\
dfNew1.loc[dfNew1['air_store_id'].isin(reserve_by_date['air_store_id'].unique())]['reserve_visitors
'].fillna(0)
```

In [257]:

```
dfNew2.loc[dfNew2["air_store_id"].isin(reserve_by_date["air_store_id"].unique()),"reserve_visitors"
] = \
dfNew2[dfNew2["air_store_id"].isin(reserve_by_date["air_store_id"].unique())]["reserve_visitors"].f
illna(0)
```

In [258]:

```
dfNew1.loc[~dfNew1['air_store_id'].isin(reserve_by_date['air_store_id'].unique()),"reserve_visitors
"]=\
dfNew1.loc[~dfNew1['air_store_id'].isin(reserve_by_date['air_store_id'].unique())]['reserve_visitor
s'].fillna(-1)
```

```
dfNew2.loc[~dfNew2["air_store_id"].isin(reserve_by_date["air_store_id"].unique()),"reserve_visitors
"] = \
dfNew2[~dfNew2["air_store_id"].isin(reserve_by_date["air_store_id"].unique())]["reserve_visitors"].
fillna(-1)
```

```
dfNew1.columns
```

```
Index(['air_store_id', 'visit_date', 'visitors', 'air_genre_name',
       'air_area_name', 'latitude', 'longitude', 'area1', 'area2', 'area3',
       'year', 'month', 'day', 'Total_visitors', 'min_visitors',
       'max_visitors', 'day_of_week', 'holiday_flg', 'area1_visitor_max',
       'area1_visitor_median', 'area1_visitor_mean', 'min_all', 'max_all',
       'median_all', 'mean_all', 'min_weekday', 'max_weekday',
       'median_weekday', 'mean_weekday', 'Total_max_visitors_by_hour_hpg',
       'Total_max_visitors_by_wk_id_hpg', 'Total_min_visitors_by_hour_hpg',
       'Total_min_visitors_by_wk_id_hpg', 'Total_visitors_by_hour_hpg',
       'Total_visitors_by_wk_id_hpg', 'hpg_store_id', 'reserve_visitors'],
      dtype='object')
```

```
Xtrain =
dfNew1.drop(["visitors","air_store_id","visit_date","day_of_week","air_area_name","hpg_store_id"],
axis=1)
Xtrain = Xtrain.fillna(-1)
Ytrain = dfNew1["visitors"]
```

```
Xtest =
dfNew2.drop(["id","visitors","air_store_id","visit_date","day_of_week","air_area_name","hpg_store_i
d"],axis=1)
Xtest = Xtest.fillna(-1)
```

```
Xtrain.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 252108 entries, 0 to 252107
Data columns (total 31 columns):
 #   Column                 Non-Null Count   Dtype
---  ------                 --------------   -----
 0   air_genre_name         252108 non-null  int64
 1   latitude               252108 non-null  float64
 2   longitude              252108 non-null  float64
 3   area1                  252108 non-null  int64
 4   area2                  252108 non-null  int64
 5   area3                  252108 non-null  int64
 6   year                   252108 non-null  int64
 7   month                  252108 non-null  int64
 8   day                    252108 non-null  int64
 9   Total_visitors         252108 non-null  int64
 10  min_visitors           252108 non-null  int64
 11  max_visitors           252108 non-null  int64
 12  holiday_flg            252108 non-null  int64
 13  area1_visitor_max      252108 non-null  int64
 14  area1_visitor_median   252108 non-null  int64
 15  area1_visitor_mean     252108 non-null  float64
 16  min_all                252108 non-null  int64
 17  max_all                252108 non-null  int64
 18  median_all             252108 non-null  float64
 19  mean_all               252108 non-null  float64
 20  min_weekday            252108 non-null  int64
```

```
 21   max_weekday                    252108 non-null   int64
 22   median_weekday                 252108 non-null   float64
 23   mean_weekday                   252108 non-null   float64
 24   Total_max_visitors_by_hour_hpg  252108 non-null   float64
 25   Total_max_visitors_by_wk_id_hpg  252108 non-null   float64
 26   Total_min_visitors_by_hour_hpg  252108 non-null   float64
 27   Total_min_visitors_by_wk_id_hpg  252108 non-null   float64
 28   Total_visitors_by_hour_hpg     252108 non-null   float64
 29   Total_visitors_by_wk_id_hpg    252108 non-null   float64
 30   reserve_visitors               252108 non-null   float64
dtypes: float64(14), int64(17)
memory usage: 71.5 MB
```

Modeling

In [264]:

```python
from sklearn.model_selection import train_test_split,cross_val_score
from sklearn.model_selection import GridSearchCV,RandomizedSearchCV
from sklearn.model_selection  import KFold
```

In [265]:

```python
train_x, test_x, train_y, test_y = train_test_split(Xtrain, Ytrain, random_state=0, test_size=.2)
print(train_x.shape, train_y.shape,test_x.shape,test_y.shape)
```

```
(201686, 31) (201686,) (50422, 31) (50422,)
```

In [297]:

```python
from sklearn.metrics import make_scorer
np.seterr(divide='ignore', invalid='ignore')
def RMSLE(y_true,y_pred):
    assert len(y_true) == len(y_pred)
    return np.square(np.log(y_pred + 1) - np.log(y_true + 1)).mean() ** 0.5
acc_scorer = make_scorer(score_func = RMSLE, greater_is_better = False)
```

In [ ]:

```python
def random_forest(train_x,train_y,test_x,**kwargs):
    forest = RandomForestRegressor(**kwargs)
    forest.fit(train_x, train_y)
    pred_y = forest.predict(test_x)
    return forest,pred_y
```

In [ ]:

```python
def plot_important_feature_rf(forest):
  important=pd.DataFrame(forest.feature_importances_,columns=['Importance'],index=train_x.columns)
  imp=important.sort_values(['Importance'],ascending=True)

  imp[:15].plot(kind='barh')
```

In [ ]:

```python
def model_rf_eval(rf_model,X_test,y_test):
 pred=rf_model.predict(X_test)
 return(RMSLE(np.expm1(pred),np.expm1(y_test)))
```

In [ ]:

```python
#acc_scorer = make_scorer(score_func = RMSLE, greater_is_better = False)
model = RandomForestRegressor(n_estimators=3000,max_depth=5, random_state=42)
model.fit(train_x,train_y)
```

Out[ ]:

```
RandomForestRegressor(bootstrap=True, ccp_alpha=0.0, criterion='mse',
                      max_depth=5, max_features='auto', max_leaf_nodes=None
```

```
                    max_depth=5, max_features='auto', max_leaf_nodes=None,
                    max_samples=None, min_impurity_decrease=0.0,
                    min_impurity_split=None, min_samples_leaf=1,
                    min_samples_split=2, min_weight_fraction_leaf=0.0,
                    n_estimators=3000, n_jobs=None, oob_score=False,
                    random_state=42, verbose=0, warm_start=False)
```

In [ ]:

```python
rmsle_rf = model_rf_eval(model,test_x,test_y)
print('RF Test RMSLE: %.3f' % rmsle_rf)
```

RF Test RMSLE: 10.592

In [ ]:

```python
#model_params={'max_depth':12,
#              'max_features':'auto',
#              'min_samples_split':3,
#              'n_estimators':100
#          }
#forest,pred_test_y=random_forest(train_x,train_y,test_x,**model_params)
#plot_important_feature_rf(forest)
#RMSLE(test_y,pred_test_y)

plot_important_feature_rf(model)
```


In [ ]:
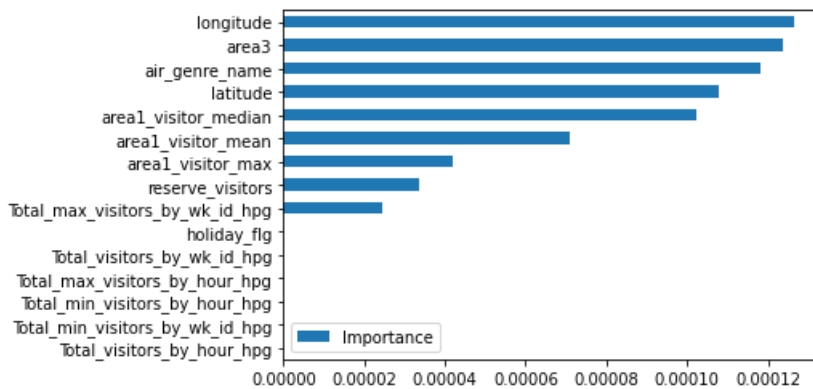
```python
rf=model.predict(test_x)
rf
```

Out[ ]:

```
array([17.90422625, 21.33970724, 25.46029415, ..., 24.27913682,
       16.76996527, 12.83223275])
```

In [ ]:

```python
rf1=pd.DataFrame(rf)
predicted_data['visitors']=rf1
```

In [ ]:

```python
predicted_data["visitors"] = predicted_data["visitors"].apply(lambda x: 0 if x<0 else int(x))
```

In [ ]:

```python
predicted_data.head()
```

Out[ ]:

id	air_store_id	visit_date	visitors	weekday	year	month	day

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	9	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	21	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	25	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	26	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	11	3	2017	4	27

In [ ]:

```python
rf_model=predicted_data.to_csv('/content/drive/My Drive/Dataset/rf_model_prediction.csv')
```

Linear Regression

In [ ]:

```python
import statsmodels.api  as  sm
from sklearn import linear_model

from sklearn.preprocessing import StandardScaler
```

In [ ]:

```python
clf=linear_model.SGDRegressor(alpha=0.01,loss='squared_loss',penalty='l2',max_iter=3500,average=True)
scaler = StandardScaler(with_mean=False)
scaler.fit(train_x)
train_x = scaler.transform(train_x)
test_x = scaler.transform(test_x)
clf.fit(train_x,train_y)
```

Out[ ]:

```
SGDRegressor(alpha=0.01, average=True, early_stopping=False, epsilon=0.1,
             eta0=0.01, fit_intercept=True, l1_ratio=0.15,
             learning_rate='invscaling', loss='squared_loss', max_iter=3500,
             n_iter_no_change=5, penalty='l2', power_t=0.25, random_state=None,
             shuffle=True, tol=0.001, validation_fraction=0.1, verbose=0,
             warm_start=False)
```

In [ ]:

```python
pred_y=clf.predict(test_x)
rmsle_SGD =RMSLE(test_y,pred_y)
print('RF Test RMSLE: %.3f' % rmsle_SGD)
```

```
RF Test RMSLE: 29.868
```

In [ ]:

```python
SGD_1=pd.DataFrame(pred_y)
```

In [ ]:

```python
SGD_1.round(2)
```

Out[ ]:

	0
0	1.521562e+14
1	1.522039e+14
2	1.520662e+14
3	1.518361e+14
4	1.525020e+14

	0
50417	1.524952e+14
50418	1.522301e+14
50419	1.517368e+14
50420	1.523781e+14
50421	1.527174e+14

50422 rows × 1 columns

In [ ]:

```
predicted_data['visitors']=SGD_1
```

In [ ]:

```
predicted_data["visitors"] = predicted_data["visitors"].apply(lambda x: 0 if x<0 else int(x))
```

In [ ]:

```
predicted_data[predicted_data['visitors']>0]
```

Out[ ]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	1.521562e+14	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	1.522039e+14	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	1.520662e+14	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	1.518361e+14	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	1.525020e+14	3	2017	4	27
...	...	...	...	...	...	...	...	...
32014	air_fff68b929994bfbd_2017-05-27	air_fff68b929994bfbd	2017-05-27	1.525544e+14	5	2017	5	27
32015	air_fff68b929994bfbd_2017-05-28	air_fff68b929994bfbd	2017-05-28	1.520238e+14	6	2017	5	28
32016	air_fff68b929994bfbd_2017-05-29	air_fff68b929994bfbd	2017-05-29	1.517825e+14	0	2017	5	29
32017	air_fff68b929994bfbd_2017-05-30	air_fff68b929994bfbd	2017-05-30	1.528929e+14	1	2017	5	30
32018	air_fff68b929994bfbd_2017-05-31	air_fff68b929994bfbd	2017-05-31	1.524383e+14	2	2017	5	31

32019 rows × 8 columns

In [ ]:

```
predicted_data.to_csv('/content/drive/My Drive/Dataset/Linear_SGD_Regression.csv')
```

Ridge Regression

In [ ]:

```
from statistics import mean
cross_val_scores_ridge = []
alpha=[]
for i  in range(1,9):
  RidgeModel=Ridge(alpha=i*0.25)
  RidgeModel.fit(train_x,train_y)
  scores=cross_val_score(RidgeModel,Xtrain,Ytrain ,cv=10)
  avg_cross_val_score = mean(scores)*100
  cross_val_scores_ridge.append(avg_cross_val_score)
  alpha.append(i * 0.25)
for i in range(0, len(alpha)):
    print(str(alpha[i])+' : '+str(cross_val_scores_ridge[i]))
```

```
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=8.6385e-40): result may not be accurate.
```

```
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61985e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61986e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61988e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61986e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61988e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61981e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61987e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61985e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.61986e-40): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.72661e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32334e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32335e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32336e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32335e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32335e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32333e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32335e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32334e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.32335e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.58829e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98407e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98409e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98411e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98409e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.9841e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
```

```
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98404e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.9841e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98408e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=1.98409e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.44888e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64418e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.6442e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64424e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.6442e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64423e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64412e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64422e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.64419e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=2.6442e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.3084e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30366e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.3037e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30375e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.3037e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30374e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30358e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30373e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.30368e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.3037e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.16683e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96252e-39): result may not be accurate.
  overwrite_a=True).T
```

```
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96258e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96265e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96258e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96264e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.9624e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96262e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96254e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=3.96257e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.02419e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62076e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62083e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62094e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62083e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62092e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62059e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.6209e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62079e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=4.62083e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=6.88047e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27838e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27847e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27861e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27847e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27858e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27815e-39): result may not be accurate.
  overwrite_a=True).T
/usr/local/lib/python3.6/dist-packages/sklearn/linear_model/_ridge.py:148: LinAlgWarning: Ill-cond
itioned matrix (rcond=5.27855e-39): result may not be accurate.
```

```
0.25 : 57.77238227940871
0.5 : 57.77238238333568
0.75 : 57.77238248725657
1.0 : 57.77238259117136
1.25 : 57.77238269508004
1.5 : 57.77238279898263
1.75 : 57.772382902879116
2.0 : 57.77238300676952
```

In [ ]:

```
ridgeModelChosen = Ridge(alpha = 2)
ridgeModelChosen.fit(train_x, train_y)
```

Out[ ]:

```
Ridge(alpha=2, copy_X=True, fit_intercept=True, max_iter=None, normalize=False,
      random_state=None, solver='auto', tol=0.001)
```

In [ ]:

```
print(ridgeModelChosen.score(test_x, test_y))
```

```
0.5967509448320796
```

In [ ]:

```
pred_y=ridgeModelChosen.predict(test_x)
rmsle_Ridge =RMSLE(test_y,pred_y)
print('RF Test RMSLE: %.3f' % rmsle_Ridge)
```

```
RF Test RMSLE: 0.539
```

In [ ]:

```
Ridge_pred=pd.DataFrame(pred_y)
Ridge_pred.head()
```

Out[ ]:

	0
0	20.619237
1	21.458070
2	23.012318
3	29.531176
4	11.473483

In [ ]:

```
predicted_data['visitors']=Ridge_pred
```

In [ ]:

```python
predicted_data["visitors"] = predicted_data["visitors"].apply(lambda x: 0 if x<0 else int(x))
```

In [ ]:

```python
predicted_data.to_csv('/content/drive/My Drive/Dataset/Ridge_prediction.csv')
```

DecisionTree

In [ ]:

```python
from sklearn.tree import DecisionTreeRegressor
def DecisionTree(train_x, train_y, test_x, **kwargs):
  Tree=DecisionTreeRegressor(**kwargs)
  Tree.fit(train_x,train_y)
  pred_y=Tree.predict(test_x)
  return(Tree,pred_y)
```

In [ ]:

```python
model = DecisionTreeRegressor()
parameters = {
              "min_samples_split": [10, 20, 40],
              "max_depth": [2, 6, 8],
              "min_samples_leaf": [20, 40, 100],
              "max_leaf_nodes": [5, 20, 100],
              }
grid_obj = GridSearchCV(model, parameters, scoring=acc_scorer)
grid_obj = grid_obj.fit(train_x, train_y)
model_params = grid_obj.best_params_
model_params
```

Out[ ]:

```
{'max_depth': 8,
 'max_leaf_nodes': 100,
 'min_samples_leaf': 100,
 'min_samples_split': 10}
```

In [ ]:

```python
def plot_important_feature_DT(tree):
  important=pd.DataFrame(tree.feature_importances_,columns=['Importance'],index=train_x.columns)
  imp=important.sort_values(['Importance'],ascending=True)

  imp[:15].plot(kind='barh')
```

In [ ]:

```python
model_params = {'max_depth': 8,
 'max_leaf_nodes': 100,
 'min_samples_leaf': 100,
 'min_samples_split': 10}
Tree, pred_testy = DecisionTree(train_x,train_y,test_x,**model_params)
#plot_important_feature_DT(Tree)
RMSLE(test_y,pred_testy)
```

Out[ ]:

```
0.5341697959598496
```

In [ ]:

```python
Tree, pred_y = DecisionTree(Xtrain,Ytrain,Xtest,**model_params)
predicted_data["visitors"] = pred_y
predicted_data["visitors"] = predicted_data["visitors"].apply(lambda x: 0 if x<0 else int(x))
predicted_data.head()
```

Out[ ]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	3	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	3	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	3	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	3	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	3	3	2017	4	27

In [ ]:

```python
predicted_data.to_csv('/content/drive/My Drive/Dataset/DT_model_prediction.csv')
```

CatBoost

In [ ]:

```python
#!pip install catboost
from catboost import CatBoostRegressor
def Catboost(train_x,train_y, test_x,**kwargs):
  Cat=CatBoostRegressor(**kwargs)
  Cat.fit(train_x, train_y)
  pred_y=Cat.predict(test_x)
  return(Cat,pred_y)
```

```
Collecting catboost
  Downloading
https://files.pythonhosted.org/packages/90/86/c3dcb600b4f9e7584ed90ea9d30a717fb5c0111574675f442c3e7
535/catboost-0.24.1-cp36-none-manylinux1_x86_64.whl (66.1MB)
     |████████████████████████████████| 66.1MB 97kB/s
Requirement already satisfied: six in /usr/local/lib/python3.6/dist-packages (from catboost)
(1.15.0)
Requirement already satisfied: pandas>=0.24.0 in /usr/local/lib/python3.6/dist-packages (from
catboost) (1.0.5)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.6/dist-packages (from
catboost) (3.2.2)
Requirement already satisfied: numpy>=1.16.0 in /usr/local/lib/python3.6/dist-packages (from
catboost) (1.18.5)
Requirement already satisfied: graphviz in /usr/local/lib/python3.6/dist-packages (from catboost)
(0.10.1)
Requirement already satisfied: plotly in /usr/local/lib/python3.6/dist-packages (from catboost)
(4.4.1)
Requirement already satisfied: scipy in /usr/local/lib/python3.6/dist-packages (from catboost)
(1.4.1)
Requirement already satisfied: python-dateutil>=2.6.1 in /usr/local/lib/python3.6/dist-packages
(from pandas>=0.24.0->catboost) (2.8.1)
Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.6/dist-packages (from
pandas>=0.24.0->catboost) (2018.9)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.6/dist-packages (from
matplotlib->catboost) (1.2.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in
/usr/local/lib/python3.6/dist-packages (from matplotlib->catboost) (2.4.7)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.6/dist-packages (from
matplotlib->catboost) (0.10.0)
Requirement already satisfied: retrying>=1.3.3 in /usr/local/lib/python3.6/dist-packages (from
plotly->catboost) (1.3.3)
Installing collected packages: catboost
Successfully installed catboost-0.24.1
```

In [ ]:

Out[ ]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	6	2017	4	23

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	0	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	0	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	0	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	0	3	2017	4	27

In [ ]:

```
model = CatBoostRegressor()
parameters = {    'depth'         : [6,8,10],
                  'learning_rate' : [0.01, 0.05, 0.1],
                  'iterations'    : [2000]
              }
grid_obj = GridSearchCV(model, parameters, scoring=acc_scorer,cv=2, n_jobs=-1)
grid_obj = grid_obj.fit(train_x, train_y)
model_params = grid_obj.best_params_
model_params
```

/usr/local/lib/python3.6/dist-packages/joblib/externals/loky/process_executor.py:691: UserWarning:
A worker stopped while some jobs were given to the executor. This can be caused by a too short wor
ker timeout or by a memory leak.
  "timeout or by a memory leak.", UserWarning

```
0: learn: 16.4124233 total: 199ms remaining: 6m 37s
1: learn: 15.9832892 total: 354ms remaining: 5m 53s
2: learn: 15.5757375 total: 492ms remaining: 5m 27s
3: learn: 15.2057369 total: 622ms remaining: 5m 10s
4: learn: 14.8593143 total: 755ms remaining: 5m 1s
5: learn: 14.5372049 total: 894ms remaining: 4m 57s
6: learn: 14.2337530 total: 1.03s remaining: 4m 52s
7: learn: 13.9493307 total: 1.17s remaining: 4m 50s
8: learn: 13.6836602 total: 1.3s remaining: 4m 47s
9: learn: 13.4404074 total: 1.44s remaining: 4m 47s
10: learn: 13.2132936 total: 1.58s remaining: 4m 45s
11: learn: 13.0015213 total: 1.71s remaining: 4m 42s
12: learn: 12.8032366 total: 1.84s remaining: 4m 41s
13: learn: 12.6240042 total: 1.98s remaining: 4m 40s
14: learn: 12.4552909 total: 2.12s remaining: 4m 40s
15: learn: 12.2970468 total: 2.25s remaining: 4m 39s
16: learn: 12.1546269 total: 2.39s remaining: 4m 38s
17: learn: 12.0215231 total: 2.53s remaining: 4m 38s
18: learn: 11.8973766 total: 2.67s remaining: 4m 38s
19: learn: 11.7834103 total: 2.8s remaining: 4m 37s
20: learn: 11.6763442 total: 2.94s remaining: 4m 37s
21: learn: 11.5821615 total: 3.08s remaining: 4m 36s
22: learn: 11.4922357 total: 3.22s remaining: 4m 36s
23: learn: 11.4065528 total: 3.35s remaining: 4m 35s
24: learn: 11.3281835 total: 3.48s remaining: 4m 35s
25: learn: 11.2569124 total: 3.62s remaining: 4m 34s
26: learn: 11.1882153 total: 3.75s remaining: 4m 34s
27: learn: 11.1283187 total: 3.89s remaining: 4m 33s
28: learn: 11.0650542 total: 4.04s remaining: 4m 34s
29: learn: 11.0082113 total: 4.19s remaining: 4m 34s
30: learn: 10.9534917 total: 4.32s remaining: 4m 34s
31: learn: 10.9081634 total: 4.46s remaining: 4m 34s
32: learn: 10.8653797 total: 4.6s remaining: 4m 33s
33: learn: 10.8225972 total: 4.73s remaining: 4m 33s
34: learn: 10.7813340 total: 4.87s remaining: 4m 33s
35: learn: 10.7466325 total: 5s remaining: 4m 33s
36: learn: 10.7117902 total: 5.15s remaining: 4m 33s
37: learn: 10.6742373 total: 5.28s remaining: 4m 32s
38: learn: 10.6455641 total: 5.42s remaining: 4m 32s
39: learn: 10.6160727 total: 5.55s remaining: 4m 32s
40: learn: 10.5902558 total: 5.69s remaining: 4m 31s
41: learn: 10.5617898 total: 5.82s remaining: 4m 31s
42: learn: 10.5372008 total: 5.96s remaining: 4m 31s
43: learn: 10.5122461 total: 6.1s remaining: 4m 31s
44: learn: 10.4895619 total: 6.24s remaining: 4m 31s
45: learn: 10.4693756 total: 6.37s remaining: 4m 30s
46: learn: 10.4463404 total: 6.51s remaining: 4m 30s
47: learn: 10.4288365 total: 6.64s remaining: 4m 29s
48: learn: 10.4114332 total: 6.77s remaining: 4m 29s
49: learn: 10.3936750 total: 6.91s remaining: 4m 29s
```

```
50: learn: 10.3785932 total: 7.05s remaining: 4m 29s
51: learn: 10.3617184 total: 7.19s remaining: 4m 29s
52: learn: 10.3457765 total: 7.33s remaining: 4m 29s
53: learn: 10.3307931 total: 7.46s remaining: 4m 29s
54: learn: 10.3176769 total: 7.61s remaining: 4m 29s
55: learn: 10.3032108 total: 7.75s remaining: 4m 28s
56: learn: 10.2905467 total: 7.88s remaining: 4m 28s
57: learn: 10.2793034 total: 8.02s remaining: 4m 28s
58: learn: 10.2676975 total: 8.16s remaining: 4m 28s
59: learn: 10.2553314 total: 8.3s remaining: 4m 28s
60: learn: 10.2432044 total: 8.44s remaining: 4m 28s
61: learn: 10.2350733 total: 8.57s remaining: 4m 27s
62: learn: 10.2207500 total: 8.71s remaining: 4m 27s
63: learn: 10.2104211 total: 8.84s remaining: 4m 27s
64: learn: 10.2004139 total: 8.98s remaining: 4m 27s
65: learn: 10.1921866 total: 9.12s remaining: 4m 27s
66: learn: 10.1799891 total: 9.27s remaining: 4m 27s
67: learn: 10.1733253 total: 9.4s remaining: 4m 27s
68: learn: 10.1618840 total: 9.54s remaining: 4m 26s
69: learn: 10.1533460 total: 9.67s remaining: 4m 26s
70: learn: 10.1458680 total: 9.8s remaining: 4m 26s
71: learn: 10.1328610 total: 9.94s remaining: 4m 26s
72: learn: 10.1218083 total: 10.1s remaining: 4m 26s
73: learn: 10.1137402 total: 10.2s remaining: 4m 26s
74: learn: 10.1070640 total: 10.4s remaining: 4m 25s
75: learn: 10.0980949 total: 10.5s remaining: 4m 25s
76: learn: 10.0898293 total: 10.6s remaining: 4m 25s
77: learn: 10.0820661 total: 10.8s remaining: 4m 25s
78: learn: 10.0739792 total: 10.9s remaining: 4m 25s
79: learn: 10.0671801 total: 11.1s remaining: 4m 25s
80: learn: 10.0593742 total: 11.2s remaining: 4m 25s
81: learn: 10.0517957 total: 11.3s remaining: 4m 25s
82: learn: 10.0474248 total: 11.5s remaining: 4m 25s
83: learn: 10.0393367 total: 11.6s remaining: 4m 25s
84: learn: 10.0344965 total: 11.8s remaining: 4m 24s
85: learn: 10.0276782 total: 11.9s remaining: 4m 24s
86: learn: 10.0212682 total: 12s remaining: 4m 24s
87: learn: 10.0155034 total: 12.2s remaining: 4m 24s
88: learn: 10.0094264 total: 12.3s remaining: 4m 24s
89: learn: 10.0031284 total: 12.4s remaining: 4m 24s
90: learn: 9.9984400 total: 12.6s remaining: 4m 24s
91: learn: 9.9951157 total: 12.7s remaining: 4m 23s
92: learn: 9.9884017 total: 12.9s remaining: 4m 23s
93: learn: 9.9824433 total: 13s remaining: 4m 23s
94: learn: 9.9771791 total: 13.1s remaining: 4m 23s
95: learn: 9.9715075 total: 13.3s remaining: 4m 23s
96: learn: 9.9674814 total: 13.4s remaining: 4m 23s
97: learn: 9.9597465 total: 13.6s remaining: 4m 23s
98: learn: 9.9554670 total: 13.7s remaining: 4m 22s
99: learn: 9.9506875 total: 13.8s remaining: 4m 22s
100: learn: 9.9475170 total: 14s remaining: 4m 22s
101: learn: 9.9429421 total: 14.1s remaining: 4m 22s
102: learn: 9.9374514 total: 14.2s remaining: 4m 22s
103: learn: 9.9340397 total: 14.4s remaining: 4m 22s
104: learn: 9.9296820 total: 14.5s remaining: 4m 22s
105: learn: 9.9252698 total: 14.7s remaining: 4m 22s
106: learn: 9.9204045 total: 14.8s remaining: 4m 22s
107: learn: 9.9121841 total: 15s remaining: 4m 22s
108: learn: 9.9066873 total: 15.1s remaining: 4m 21s
109: learn: 9.8969636 total: 15.2s remaining: 4m 21s
110: learn: 9.8894141 total: 15.4s remaining: 4m 21s
111: learn: 9.8856686 total: 15.5s remaining: 4m 21s
112: learn: 9.8810747 total: 15.7s remaining: 4m 21s
113: learn: 9.8770594 total: 15.8s remaining: 4m 21s
114: learn: 9.8731583 total: 15.9s remaining: 4m 21s
115: learn: 9.8686916 total: 16.1s remaining: 4m 21s
116: learn: 9.8655410 total: 16.2s remaining: 4m 20s
117: learn: 9.8624003 total: 16.4s remaining: 4m 20s
118: learn: 9.8566281 total: 16.5s remaining: 4m 20s
119: learn: 9.8527885 total: 16.6s remaining: 4m 20s
120: learn: 9.8475133 total: 16.8s remaining: 4m 20s
121: learn: 9.8442656 total: 16.9s remaining: 4m 20s
122: learn: 9.8427684 total: 17s remaining: 4m 20s
123: learn: 9.8372802 total: 17.2s remaining: 4m 19s
124: learn: 9.8343369 total: 17.3s remaining: 4m 19s
125: learn: 9.8285645 total: 17.5s remaining: 4m 19s
126: learn: 9.8268357 total: 17.6s remaining: 4m 19s
```

```
127: learn: 9.8236763 total: 17.7s remaining: 4m 19s
128: learn: 9.8187427 total: 17.9s remaining: 4m 19s
129: learn: 9.8144143 total: 18s remaining: 4m 19s
130: learn: 9.8105305 total: 18.2s remaining: 4m 19s
131: learn: 9.8049785 total: 18.3s remaining: 4m 18s
132: learn: 9.8006399 total: 18.4s remaining: 4m 18s
133: learn: 9.7982847 total: 18.6s remaining: 4m 18s
134: learn: 9.7933932 total: 18.7s remaining: 4m 18s
135: learn: 9.7870928 total: 18.8s remaining: 4m 18s
136: learn: 9.7830414 total: 19s remaining: 4m 18s
137: learn: 9.7810368 total: 19.1s remaining: 4m 17s
138: learn: 9.7761924 total: 19.2s remaining: 4m 17s
139: learn: 9.7732159 total: 19.4s remaining: 4m 17s
140: learn: 9.7694268 total: 19.5s remaining: 4m 17s
141: learn: 9.7634061 total: 19.7s remaining: 4m 17s
142: learn: 9.7608845 total: 19.8s remaining: 4m 16s
143: learn: 9.7581143 total: 19.9s remaining: 4m 16s
144: learn: 9.7553989 total: 20.1s remaining: 4m 16s
145: learn: 9.7530562 total: 20.2s remaining: 4m 16s
146: learn: 9.7504358 total: 20.3s remaining: 4m 16s
147: learn: 9.7480509 total: 20.5s remaining: 4m 16s
148: learn: 9.7445896 total: 20.6s remaining: 4m 16s
149: learn: 9.7418198 total: 20.7s remaining: 4m 15s
150: learn: 9.7394828 total: 20.9s remaining: 4m 15s
151: learn: 9.7366986 total: 21s remaining: 4m 15s
152: learn: 9.7329954 total: 21.2s remaining: 4m 15s
153: learn: 9.7299672 total: 21.3s remaining: 4m 15s
154: learn: 9.7285647 total: 21.4s remaining: 4m 15s
155: learn: 9.7267892 total: 21.6s remaining: 4m 14s
156: learn: 9.7222728 total: 21.7s remaining: 4m 14s
157: learn: 9.7163668 total: 21.8s remaining: 4m 14s
158: learn: 9.7147878 total: 22s remaining: 4m 14s
159: learn: 9.7126071 total: 22.1s remaining: 4m 14s
160: learn: 9.7091376 total: 22.3s remaining: 4m 14s
161: learn: 9.7065188 total: 22.4s remaining: 4m 14s
162: learn: 9.7009637 total: 22.6s remaining: 4m 14s
163: learn: 9.6991482 total: 22.7s remaining: 4m 13s
164: learn: 9.6960309 total: 22.8s remaining: 4m 13s
165: learn: 9.6925115 total: 23s remaining: 4m 13s
166: learn: 9.6898445 total: 23.1s remaining: 4m 13s
167: learn: 9.6874092 total: 23.2s remaining: 4m 13s
168: learn: 9.6843602 total: 23.4s remaining: 4m 13s
169: learn: 9.6810232 total: 23.5s remaining: 4m 13s
170: learn: 9.6760844 total: 23.7s remaining: 4m 13s
171: learn: 9.6742090 total: 23.8s remaining: 4m 12s
172: learn: 9.6685787 total: 23.9s remaining: 4m 12s
173: learn: 9.6629596 total: 24.1s remaining: 4m 12s
174: learn: 9.6571460 total: 24.2s remaining: 4m 12s
175: learn: 9.6553630 total: 24.4s remaining: 4m 12s
176: learn: 9.6522783 total: 24.5s remaining: 4m 12s
177: learn: 9.6500139 total: 24.7s remaining: 4m 12s
178: learn: 9.6486624 total: 24.8s remaining: 4m 12s
179: learn: 9.6450663 total: 24.9s remaining: 4m 11s
180: learn: 9.6414767 total: 25.1s remaining: 4m 11s
181: learn: 9.6376084 total: 25.2s remaining: 4m 11s
182: learn: 9.6363818 total: 25.3s remaining: 4m 11s
183: learn: 9.6310727 total: 25.5s remaining: 4m 11s
184: learn: 9.6284761 total: 25.6s remaining: 4m 11s
185: learn: 9.6267248 total: 25.7s remaining: 4m 11s
186: learn: 9.6218153 total: 25.9s remaining: 4m 10s
187: learn: 9.6173038 total: 26s remaining: 4m 10s
188: learn: 9.6138222 total: 26.2s remaining: 4m 10s
189: learn: 9.6112101 total: 26.3s remaining: 4m 10s
190: learn: 9.6093077 total: 26.4s remaining: 4m 10s
191: learn: 9.6060604 total: 26.6s remaining: 4m 10s
192: learn: 9.6017356 total: 26.7s remaining: 4m 10s
193: learn: 9.5972490 total: 26.9s remaining: 4m 10s
194: learn: 9.5950341 total: 27s remaining: 4m 9s
195: learn: 9.5939195 total: 27.1s remaining: 4m 9s
196: learn: 9.5899251 total: 27.3s remaining: 4m 9s
197: learn: 9.5868014 total: 27.4s remaining: 4m 9s
198: learn: 9.5841719 total: 27.6s remaining: 4m 9s
199: learn: 9.5804587 total: 27.7s remaining: 4m 9s
200: learn: 9.5775248 total: 27.8s remaining: 4m 9s
201: learn: 9.5750755 total: 28s remaining: 4m 9s
202: learn: 9.5702767 total: 28.1s remaining: 4m 8s
203: learn: 9.5678559 total: 28.3s remaining: 4m 8s
```

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204: learn: 9.5629358 total: 28.4s remaining: 4m 8s
205: learn: 9.5603660 total: 28.5s remaining: 4m 8s
206: learn: 9.5560431 total: 28.7s remaining: 4m 8s
207: learn: 9.5505554 total: 28.8s remaining: 4m 8s
208: learn: 9.5465258 total: 29s remaining: 4m 8s
209: learn: 9.5429526 total: 29.1s remaining: 4m 8s
210: learn: 9.5395828 total: 29.2s remaining: 4m 7s
211: learn: 9.5364921 total: 29.4s remaining: 4m 7s
212: learn: 9.5347599 total: 29.5s remaining: 4m 7s
213: learn: 9.5317667 total: 29.7s remaining: 4m 7s
214: learn: 9.5284229 total: 29.8s remaining: 4m 7s
215: learn: 9.5242012 total: 29.9s remaining: 4m 7s
216: learn: 9.5207035 total: 30.1s remaining: 4m 7s
217: learn: 9.5166757 total: 30.2s remaining: 4m 6s
218: learn: 9.5149202 total: 30.4s remaining: 4m 6s
219: learn: 9.5121476 total: 30.5s remaining: 4m 6s
220: learn: 9.5077811 total: 30.6s remaining: 4m 6s
221: learn: 9.5036957 total: 30.8s remaining: 4m 6s
222: learn: 9.5015938 total: 30.9s remaining: 4m 6s
223: learn: 9.4981317 total: 31s remaining: 4m 6s
224: learn: 9.4963647 total: 31.2s remaining: 4m 5s
225: learn: 9.4942726 total: 31.3s remaining: 4m 5s
226: learn: 9.4913238 total: 31.5s remaining: 4m 5s
227: learn: 9.4872903 total: 31.6s remaining: 4m 5s
228: learn: 9.4856717 total: 31.7s remaining: 4m 5s
229: learn: 9.4827373 total: 31.9s remaining: 4m 5s
230: learn: 9.4797744 total: 32s remaining: 4m 5s
231: learn: 9.4785514 total: 32.1s remaining: 4m 4s
232: learn: 9.4750803 total: 32.3s remaining: 4m 4s
233: learn: 9.4721299 total: 32.4s remaining: 4m 4s
234: learn: 9.4683857 total: 32.6s remaining: 4m 4s
235: learn: 9.4659212 total: 32.7s remaining: 4m 4s
236: learn: 9.4633871 total: 32.8s remaining: 4m 4s
237: learn: 9.4595842 total: 33s remaining: 4m 4s
238: learn: 9.4574659 total: 33.1s remaining: 4m 4s
239: learn: 9.4538470 total: 33.3s remaining: 4m 3s
240: learn: 9.4515733 total: 33.4s remaining: 4m 3s
241: learn: 9.4485790 total: 33.6s remaining: 4m 3s
242: learn: 9.4466020 total: 33.7s remaining: 4m 3s
243: learn: 9.4443559 total: 33.8s remaining: 4m 3s
244: learn: 9.4423419 total: 34s remaining: 4m 3s
245: learn: 9.4395788 total: 34.1s remaining: 4m 3s
246: learn: 9.4359983 total: 34.2s remaining: 4m 2s
247: learn: 9.4342445 total: 34.4s remaining: 4m 2s
248: learn: 9.4334093 total: 34.5s remaining: 4m 2s
249: learn: 9.4296609 total: 34.7s remaining: 4m 2s
250: learn: 9.4265699 total: 34.8s remaining: 4m 2s
251: learn: 9.4224343 total: 34.9s remaining: 4m 2s
252: learn: 9.4203553 total: 35.1s remaining: 4m 2s
253: learn: 9.4171922 total: 35.2s remaining: 4m 2s
254: learn: 9.4137531 total: 35.4s remaining: 4m 1s
255: learn: 9.4102485 total: 35.5s remaining: 4m 1s
256: learn: 9.4089952 total: 35.6s remaining: 4m 1s
257: learn: 9.4052576 total: 35.8s remaining: 4m 1s
258: learn: 9.4017106 total: 35.9s remaining: 4m 1s
259: learn: 9.3979081 total: 36.1s remaining: 4m 1s
260: learn: 9.3955170 total: 36.2s remaining: 4m 1s
261: learn: 9.3930596 total: 36.3s remaining: 4m 1s
262: learn: 9.3897261 total: 36.5s remaining: 4m
263: learn: 9.3860388 total: 36.6s remaining: 4m
264: learn: 9.3859219 total: 36.7s remaining: 4m
265: learn: 9.3841904 total: 36.8s remaining: 3m 59s
266: learn: 9.3819994 total: 36.9s remaining: 3m 59s
267: learn: 9.3773690 total: 37.1s remaining: 3m 59s
268: learn: 9.3745206 total: 37.2s remaining: 3m 59s
269: learn: 9.3732699 total: 37.4s remaining: 3m 59s
270: learn: 9.3717250 total: 37.5s remaining: 3m 59s
271: learn: 9.3690982 total: 37.6s remaining: 3m 59s
272: learn: 9.3649746 total: 37.8s remaining: 3m 58s
273: learn: 9.3625445 total: 37.9s remaining: 3m 58s
274: learn: 9.3614205 total: 38s remaining: 3m 58s
275: learn: 9.3586270 total: 38.2s remaining: 3m 58s
276: learn: 9.3564397 total: 38.3s remaining: 3m 58s
277: learn: 9.3550498 total: 38.4s remaining: 3m 58s
278: learn: 9.3516691 total: 38.6s remaining: 3m 57s
279: learn: 9.3478248 total: 38.7s remaining: 3m 57s
280: learn: 9.3445109 total: 38.9s remaining: 3m 57s
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281: learn: 9.3423475 total: 39s remaining: 3m 57s
282: learn: 9.3392658 total: 39.1s remaining: 3m 57s
283: learn: 9.3362176 total: 39.3s remaining: 3m 57s
284: learn: 9.3341110 total: 39.4s remaining: 3m 57s
285: learn: 9.3334172 total: 39.5s remaining: 3m 57s
286: learn: 9.3314640 total: 39.7s remaining: 3m 56s
287: learn: 9.3264823 total: 39.8s remaining: 3m 56s
288: learn: 9.3235476 total: 40s remaining: 3m 56s
289: learn: 9.3203670 total: 40.1s remaining: 3m 56s
290: learn: 9.3191898 total: 40.2s remaining: 3m 56s
291: learn: 9.3184078 total: 40.4s remaining: 3m 56s
292: learn: 9.3160747 total: 40.5s remaining: 3m 56s
293: learn: 9.3145125 total: 40.7s remaining: 3m 55s
294: learn: 9.3120929 total: 40.8s remaining: 3m 55s
295: learn: 9.3112755 total: 40.9s remaining: 3m 55s
296: learn: 9.3098302 total: 41.1s remaining: 3m 55s
297: learn: 9.3088936 total: 41.2s remaining: 3m 55s
298: learn: 9.3063011 total: 41.3s remaining: 3m 55s
299: learn: 9.3032193 total: 41.5s remaining: 3m 55s
300: learn: 9.3007860 total: 41.6s remaining: 3m 54s
301: learn: 9.2983382 total: 41.8s remaining: 3m 54s
302: learn: 9.2959485 total: 41.9s remaining: 3m 54s
303: learn: 9.2932538 total: 42s remaining: 3m 54s
304: learn: 9.2903713 total: 42.2s remaining: 3m 54s
305: learn: 9.2894654 total: 42.3s remaining: 3m 54s
306: learn: 9.2888179 total: 42.5s remaining: 3m 54s
307: learn: 9.2866372 total: 42.6s remaining: 3m 54s
308: learn: 9.2836071 total: 42.8s remaining: 3m 53s
309: learn: 9.2823886 total: 42.9s remaining: 3m 53s
310: learn: 9.2799781 total: 43.1s remaining: 3m 53s
311: learn: 9.2787125 total: 43.2s remaining: 3m 53s
312: learn: 9.2760129 total: 43.4s remaining: 3m 53s
313: learn: 9.2716486 total: 43.5s remaining: 3m 53s
314: learn: 9.2691540 total: 43.6s remaining: 3m 53s
315: learn: 9.2661019 total: 43.8s remaining: 3m 53s
316: learn: 9.2631846 total: 43.9s remaining: 3m 53s
317: learn: 9.2606125 total: 44.1s remaining: 3m 53s
318: learn: 9.2584089 total: 44.2s remaining: 3m 52s
319: learn: 9.2567027 total: 44.4s remaining: 3m 52s
320: learn: 9.2559192 total: 44.5s remaining: 3m 52s
321: learn: 9.2527455 total: 44.6s remaining: 3m 52s
322: learn: 9.2516696 total: 44.8s remaining: 3m 52s
323: learn: 9.2487361 total: 44.9s remaining: 3m 52s
324: learn: 9.2449774 total: 45s remaining: 3m 52s
325: learn: 9.2438403 total: 45.2s remaining: 3m 52s
326: learn: 9.2399914 total: 45.3s remaining: 3m 51s
327: learn: 9.2370356 total: 45.5s remaining: 3m 51s
328: learn: 9.2328575 total: 45.6s remaining: 3m 51s
329: learn: 9.2299553 total: 45.7s remaining: 3m 51s
330: learn: 9.2271071 total: 45.9s remaining: 3m 51s
331: learn: 9.2245308 total: 46s remaining: 3m 51s
332: learn: 9.2231458 total: 46.2s remaining: 3m 51s
333: learn: 9.2216015 total: 46.3s remaining: 3m 50s
334: learn: 9.2188793 total: 46.4s remaining: 3m 50s
335: learn: 9.2158138 total: 46.6s remaining: 3m 50s
336: learn: 9.2137168 total: 46.7s remaining: 3m 50s
337: learn: 9.2117167 total: 46.9s remaining: 3m 50s
338: learn: 9.2105916 total: 47s remaining: 3m 50s
339: learn: 9.2069812 total: 47.1s remaining: 3m 50s
340: learn: 9.2041196 total: 47.3s remaining: 3m 49s
341: learn: 9.2016979 total: 47.4s remaining: 3m 49s
342: learn: 9.2002657 total: 47.6s remaining: 3m 49s
343: learn: 9.1986908 total: 47.7s remaining: 3m 49s
344: learn: 9.1952035 total: 47.8s remaining: 3m 49s
345: learn: 9.1927053 total: 48s remaining: 3m 49s
346: learn: 9.1889263 total: 48.1s remaining: 3m 49s
347: learn: 9.1857794 total: 48.2s remaining: 3m 49s
348: learn: 9.1830984 total: 48.4s remaining: 3m 48s
349: learn: 9.1818413 total: 48.5s remaining: 3m 48s
350: learn: 9.1794253 total: 48.7s remaining: 3m 48s
351: learn: 9.1770415 total: 48.8s remaining: 3m 48s
352: learn: 9.1738681 total: 48.9s remaining: 3m 48s
353: learn: 9.1711643 total: 49.1s remaining: 3m 48s
354: learn: 9.1702059 total: 49.2s remaining: 3m 48s
355: learn: 9.1687011 total: 49.4s remaining: 3m 47s
356: learn: 9.1658768 total: 49.5s remaining: 3m 47s
357: learn: 9.1633944 total: 49.6s remaining: 3m 47s
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357: learn: 9.1633311 total: 19.8s remaining: 3m 47s
358: learn: 9.1605844 total: 49.8s remaining: 3m 47s
359: learn: 9.1593238 total: 49.9s remaining: 3m 47s
360: learn: 9.1579034 total: 50s remaining: 3m 47s
361: learn: 9.1570207 total: 50.2s remaining: 3m 47s
362: learn: 9.1557071 total: 50.3s remaining: 3m 46s
363: learn: 9.1533219 total: 50.5s remaining: 3m 46s
364: learn: 9.1518753 total: 50.6s remaining: 3m 46s
365: learn: 9.1491153 total: 50.7s remaining: 3m 46s
366: learn: 9.1473686 total: 50.9s remaining: 3m 46s
367: learn: 9.1460388 total: 51s remaining: 3m 46s
368: learn: 9.1443689 total: 51.2s remaining: 3m 46s
369: learn: 9.1412085 total: 51.3s remaining: 3m 46s
370: learn: 9.1394191 total: 51.4s remaining: 3m 45s
371: learn: 9.1382351 total: 51.6s remaining: 3m 45s
372: learn: 9.1352933 total: 51.7s remaining: 3m 45s
373: learn: 9.1321335 total: 51.9s remaining: 3m 45s
374: learn: 9.1282154 total: 52s remaining: 3m 45s
375: learn: 9.1274629 total: 52.1s remaining: 3m 45s
376: learn: 9.1255929 total: 52.3s remaining: 3m 45s
377: learn: 9.1244443 total: 52.4s remaining: 3m 44s
378: learn: 9.1207412 total: 52.6s remaining: 3m 44s
379: learn: 9.1183807 total: 52.7s remaining: 3m 44s
380: learn: 9.1163376 total: 52.8s remaining: 3m 44s
381: learn: 9.1133718 total: 53s remaining: 3m 44s
382: learn: 9.1105244 total: 53.1s remaining: 3m 44s
383: learn: 9.1104389 total: 53.2s remaining: 3m 43s
384: learn: 9.1089197 total: 53.3s remaining: 3m 43s
385: learn: 9.1069046 total: 53.5s remaining: 3m 43s
386: learn: 9.1053794 total: 53.6s remaining: 3m 43s
387: learn: 9.1031435 total: 53.8s remaining: 3m 43s
388: learn: 9.1021124 total: 53.9s remaining: 3m 43s
389: learn: 9.0997988 total: 54s remaining: 3m 43s
390: learn: 9.0982850 total: 54.2s remaining: 3m 42s
391: learn: 9.0976362 total: 54.3s remaining: 3m 42s
392: learn: 9.0970439 total: 54.5s remaining: 3m 42s
393: learn: 9.0945369 total: 54.6s remaining: 3m 42s
394: learn: 9.0931524 total: 54.8s remaining: 3m 42s
395: learn: 9.0910617 total: 54.9s remaining: 3m 42s
396: learn: 9.0896013 total: 55s remaining: 3m 42s
397: learn: 9.0869026 total: 55.2s remaining: 3m 42s
398: learn: 9.0843298 total: 55.3s remaining: 3m 41s
399: learn: 9.0818508 total: 55.5s remaining: 3m 41s
400: learn: 9.0797680 total: 55.6s remaining: 3m 41s
401: learn: 9.0769674 total: 55.7s remaining: 3m 41s
402: learn: 9.0744827 total: 55.9s remaining: 3m 41s
403: learn: 9.0731299 total: 56s remaining: 3m 41s
404: learn: 9.0705201 total: 56.1s remaining: 3m 41s
405: learn: 9.0703848 total: 56.3s remaining: 3m 40s
406: learn: 9.0692247 total: 56.4s remaining: 3m 40s
407: learn: 9.0691457 total: 56.5s remaining: 3m 40s
408: learn: 9.0667637 total: 56.7s remaining: 3m 40s
409: learn: 9.0664066 total: 56.8s remaining: 3m 40s
410: learn: 9.0646398 total: 57s remaining: 3m 40s
411: learn: 9.0635631 total: 57.1s remaining: 3m 40s
412: learn: 9.0610647 total: 57.2s remaining: 3m 39s
413: learn: 9.0591377 total: 57.4s remaining: 3m 39s
414: learn: 9.0569327 total: 57.5s remaining: 3m 39s
415: learn: 9.0544135 total: 57.7s remaining: 3m 39s
416: learn: 9.0533915 total: 57.8s remaining: 3m 39s
417: learn: 9.0510861 total: 57.9s remaining: 3m 39s
418: learn: 9.0495138 total: 58.1s remaining: 3m 39s
419: learn: 9.0482860 total: 58.2s remaining: 3m 38s
420: learn: 9.0470905 total: 58.3s remaining: 3m 38s
421: learn: 9.0456954 total: 58.5s remaining: 3m 38s
422: learn: 9.0437818 total: 58.6s remaining: 3m 38s
423: learn: 9.0417677 total: 58.8s remaining: 3m 38s
424: learn: 9.0396214 total: 58.9s remaining: 3m 38s
425: learn: 9.0395790 total: 59s remaining: 3m 37s
426: learn: 9.0384816 total: 59.1s remaining: 3m 37s
427: learn: 9.0373460 total: 59.3s remaining: 3m 37s
428: learn: 9.0372870 total: 59.4s remaining: 3m 37s
429: learn: 9.0359805 total: 59.5s remaining: 3m 37s
430: learn: 9.0338176 total: 59.6s remaining: 3m 37s
431: learn: 9.0333160 total: 59.8s remaining: 3m 37s
432: learn: 9.0307796 total: 59.9s remaining: 3m 36s
433: learn: 9.0287009 total: 1m remaining: 3m 36s
434: learn: 9.0248542 total: 1m remaining: 3m 36s
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434: learn: 9.0240542 total: 1m remaining: 3m 36s
435: learn: 9.0227666 total: 1m remaining: 3m 36s
436: learn: 9.0206686 total: 1m remaining: 3m 36s
437: learn: 9.0194971 total: 1m remaining: 3m 36s
438: learn: 9.0174171 total: 1m remaining: 3m 36s
439: learn: 9.0149791 total: 1m remaining: 3m 35s
440: learn: 9.0131203 total: 1m 1s remaining: 3m 35s
441: learn: 9.0111362 total: 1m 1s remaining: 3m 35s
442: learn: 9.0090482 total: 1m 1s remaining: 3m 35s
443: learn: 9.0073914 total: 1m 1s remaining: 3m 35s
444: learn: 9.0040157 total: 1m 1s remaining: 3m 35s
445: learn: 9.0030024 total: 1m 1s remaining: 3m 35s
446: learn: 9.0019811 total: 1m 1s remaining: 3m 34s
447: learn: 9.0006726 total: 1m 2s remaining: 3m 34s
448: learn: 8.9986353 total: 1m 2s remaining: 3m 34s
449: learn: 8.9984994 total: 1m 2s remaining: 3m 34s
450: learn: 8.9981880 total: 1m 2s remaining: 3m 34s
451: learn: 8.9935031 total: 1m 2s remaining: 3m 34s
452: learn: 8.9925033 total: 1m 2s remaining: 3m 34s
453: learn: 8.9924966 total: 1m 2s remaining: 3m 33s
454: learn: 8.9909098 total: 1m 2s remaining: 3m 33s
455: learn: 8.9909034 total: 1m 3s remaining: 3m 33s
456: learn: 8.9906550 total: 1m 3s remaining: 3m 33s
457: learn: 8.9900885 total: 1m 3s remaining: 3m 33s
458: learn: 8.9878918 total: 1m 3s remaining: 3m 32s
459: learn: 8.9862177 total: 1m 3s remaining: 3m 32s
460: learn: 8.9829382 total: 1m 3s remaining: 3m 32s
461: learn: 8.9792442 total: 1m 3s remaining: 3m 32s
462: learn: 8.9768307 total: 1m 3s remaining: 3m 32s
463: learn: 8.9762292 total: 1m 4s remaining: 3m 32s
464: learn: 8.9750553 total: 1m 4s remaining: 3m 32s
465: learn: 8.9739901 total: 1m 4s remaining: 3m 32s
466: learn: 8.9735386 total: 1m 4s remaining: 3m 31s
467: learn: 8.9718685 total: 1m 4s remaining: 3m 31s
468: learn: 8.9683177 total: 1m 4s remaining: 3m 31s
469: learn: 8.9670647 total: 1m 4s remaining: 3m 31s
470: learn: 8.9659061 total: 1m 5s remaining: 3m 31s
471: learn: 8.9642609 total: 1m 5s remaining: 3m 31s
472: learn: 8.9625267 total: 1m 5s remaining: 3m 31s
473: learn: 8.9598164 total: 1m 5s remaining: 3m 30s
474: learn: 8.9568991 total: 1m 5s remaining: 3m 30s
475: learn: 8.9556074 total: 1m 5s remaining: 3m 30s
476: learn: 8.9525223 total: 1m 5s remaining: 3m 30s
477: learn: 8.9513347 total: 1m 6s remaining: 3m 30s
478: learn: 8.9490810 total: 1m 6s remaining: 3m 30s
479: learn: 8.9471078 total: 1m 6s remaining: 3m 30s
480: learn: 8.9455447 total: 1m 6s remaining: 3m 30s
481: learn: 8.9435840 total: 1m 6s remaining: 3m 29s
482: learn: 8.9409401 total: 1m 6s remaining: 3m 29s
483: learn: 8.9389487 total: 1m 6s remaining: 3m 29s
484: learn: 8.9359882 total: 1m 7s remaining: 3m 29s
485: learn: 8.9357982 total: 1m 7s remaining: 3m 29s
486: learn: 8.9336631 total: 1m 7s remaining: 3m 29s
487: learn: 8.9323241 total: 1m 7s remaining: 3m 29s
488: learn: 8.9296123 total: 1m 7s remaining: 3m 29s
489: learn: 8.9275624 total: 1m 7s remaining: 3m 29s
490: learn: 8.9259585 total: 1m 7s remaining: 3m 28s
491: learn: 8.9240964 total: 1m 8s remaining: 3m 28s
492: learn: 8.9224102 total: 1m 8s remaining: 3m 28s
493: learn: 8.9199805 total: 1m 8s remaining: 3m 28s
494: learn: 8.9198392 total: 1m 8s remaining: 3m 28s
495: learn: 8.9188545 total: 1m 8s remaining: 3m 28s
496: learn: 8.9188495 total: 1m 8s remaining: 3m 27s
497: learn: 8.9170663 total: 1m 8s remaining: 3m 27s
498: learn: 8.9162762 total: 1m 9s remaining: 3m 27s
499: learn: 8.9139158 total: 1m 9s remaining: 3m 27s
500: learn: 8.9110008 total: 1m 9s remaining: 3m 27s
501: learn: 8.9082762 total: 1m 9s remaining: 3m 27s
502: learn: 8.9058492 total: 1m 9s remaining: 3m 27s
503: learn: 8.9029256 total: 1m 9s remaining: 3m 26s
504: learn: 8.9016650 total: 1m 9s remaining: 3m 26s
505: learn: 8.9000068 total: 1m 10s remaining: 3m 26s
506: learn: 8.8980699 total: 1m 10s remaining: 3m 26s
507: learn: 8.8965283 total: 1m 10s remaining: 3m 26s
508: learn: 8.8964542 total: 1m 10s remaining: 3m 26s
509: learn: 8.8951273 total: 1m 10s remaining: 3m 26s
510: learn: 8.8918301 total: 1m 10s remaining: 3m 25s
511: learn: 8.8906300 total: 1m 10s remaining: 3m 25s
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511: learn: 8.8908300 total: 1m 10s remaining: 3m 25s
512: learn: 8.8887998 total: 1m 10s remaining: 3m 25s
513: learn: 8.8872247 total: 1m 11s remaining: 3m 25s
514: learn: 8.8849751 total: 1m 11s remaining: 3m 25s
515: learn: 8.8836187 total: 1m 11s remaining: 3m 25s
516: learn: 8.8819280 total: 1m 11s remaining: 3m 25s
517: learn: 8.8798484 total: 1m 11s remaining: 3m 24s
518: learn: 8.8785736 total: 1m 11s remaining: 3m 24s
519: learn: 8.8781732 total: 1m 11s remaining: 3m 24s
520: learn: 8.8756108 total: 1m 12s remaining: 3m 24s
521: learn: 8.8749215 total: 1m 12s remaining: 3m 24s
522: learn: 8.8738194 total: 1m 12s remaining: 3m 24s
523: learn: 8.8711997 total: 1m 12s remaining: 3m 24s
524: learn: 8.8685597 total: 1m 12s remaining: 3m 24s
525: learn: 8.8666107 total: 1m 12s remaining: 3m 23s
526: learn: 8.8648998 total: 1m 12s remaining: 3m 23s
527: learn: 8.8630816 total: 1m 13s remaining: 3m 23s
528: learn: 8.8614258 total: 1m 13s remaining: 3m 23s
529: learn: 8.8602392 total: 1m 13s remaining: 3m 23s
530: learn: 8.8600802 total: 1m 13s remaining: 3m 23s
531: learn: 8.8570969 total: 1m 13s remaining: 3m 23s
532: learn: 8.8556749 total: 1m 13s remaining: 3m 22s
533: learn: 8.8541031 total: 1m 13s remaining: 3m 22s
534: learn: 8.8526621 total: 1m 13s remaining: 3m 22s
535: learn: 8.8490997 total: 1m 14s remaining: 3m 22s
536: learn: 8.8481544 total: 1m 14s remaining: 3m 22s
537: learn: 8.8461601 total: 1m 14s remaining: 3m 22s
538: learn: 8.8443011 total: 1m 14s remaining: 3m 22s
539: learn: 8.8425029 total: 1m 14s remaining: 3m 21s
540: learn: 8.8418954 total: 1m 14s remaining: 3m 21s
541: learn: 8.8404187 total: 1m 14s remaining: 3m 21s
542: learn: 8.8398005 total: 1m 15s remaining: 3m 21s
543: learn: 8.8387514 total: 1m 15s remaining: 3m 21s
544: learn: 8.8371248 total: 1m 15s remaining: 3m 21s
545: learn: 8.8359752 total: 1m 15s remaining: 3m 21s
546: learn: 8.8324078 total: 1m 15s remaining: 3m 21s
547: learn: 8.8312969 total: 1m 15s remaining: 3m 20s
548: learn: 8.8304723 total: 1m 15s remaining: 3m 20s
549: learn: 8.8290868 total: 1m 16s remaining: 3m 20s
550: learn: 8.8272704 total: 1m 16s remaining: 3m 20s
551: learn: 8.8248280 total: 1m 16s remaining: 3m 20s
552: learn: 8.8234597 total: 1m 16s remaining: 3m 20s
553: learn: 8.8215085 total: 1m 16s remaining: 3m 20s
554: learn: 8.8196569 total: 1m 16s remaining: 3m 19s
555: learn: 8.8173495 total: 1m 16s remaining: 3m 19s
556: learn: 8.8171607 total: 1m 17s remaining: 3m 19s
557: learn: 8.8163240 total: 1m 17s remaining: 3m 19s
558: learn: 8.8147236 total: 1m 17s remaining: 3m 19s
559: learn: 8.8143975 total: 1m 17s remaining: 3m 19s
560: learn: 8.8142467 total: 1m 17s remaining: 3m 19s
561: learn: 8.8102891 total: 1m 17s remaining: 3m 19s
562: learn: 8.8089753 total: 1m 17s remaining: 3m 18s
563: learn: 8.8089685 total: 1m 18s remaining: 3m 18s
564: learn: 8.8071829 total: 1m 18s remaining: 3m 18s
565: learn: 8.8058838 total: 1m 18s remaining: 3m 18s
566: learn: 8.8042435 total: 1m 18s remaining: 3m 18s
567: learn: 8.8030078 total: 1m 18s remaining: 3m 18s
568: learn: 8.8017618 total: 1m 18s remaining: 3m 18s
569: learn: 8.7994858 total: 1m 18s remaining: 3m 17s
570: learn: 8.7974436 total: 1m 19s remaining: 3m 17s
571: learn: 8.7967238 total: 1m 19s remaining: 3m 17s
572: learn: 8.7967176 total: 1m 19s remaining: 3m 17s
573: learn: 8.7967112 total: 1m 19s remaining: 3m 17s
574: learn: 8.7966148 total: 1m 19s remaining: 3m 17s
575: learn: 8.7946492 total: 1m 19s remaining: 3m 17s
576: learn: 8.7926184 total: 1m 19s remaining: 3m 16s
577: learn: 8.7911396 total: 1m 20s remaining: 3m 16s
578: learn: 8.7878286 total: 1m 20s remaining: 3m 16s
579: learn: 8.7866212 total: 1m 20s remaining: 3m 16s
580: learn: 8.7854439 total: 1m 20s remaining: 3m 16s
581: learn: 8.7834831 total: 1m 20s remaining: 3m 16s
582: learn: 8.7806740 total: 1m 20s remaining: 3m 16s
583: learn: 8.7791766 total: 1m 20s remaining: 3m 16s
584: learn: 8.7775336 total: 1m 20s remaining: 3m 15s
585: learn: 8.7759960 total: 1m 21s remaining: 3m 15s
586: learn: 8.7759902 total: 1m 21s remaining: 3m 15s
587: learn: 8.7740161 total: 1m 21s remaining: 3m 15s
588: learn: 8.7718863 total: 1m 21s remaining: 3m 15s
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588: learn: 8.7718862 total: 1m 21s remaining: 3m 15s
589: learn: 8.7706116 total: 1m 21s remaining: 3m 15s
590: learn: 8.7694391 total: 1m 21s remaining: 3m 15s
591: learn: 8.7675825 total: 1m 21s remaining: 3m 14s
592: learn: 8.7664122 total: 1m 22s remaining: 3m 14s
593: learn: 8.7651712 total: 1m 22s remaining: 3m 14s
594: learn: 8.7638242 total: 1m 22s remaining: 3m 14s
595: learn: 8.7621395 total: 1m 22s remaining: 3m 14s
596: learn: 8.7590836 total: 1m 22s remaining: 3m 14s
597: learn: 8.7590779 total: 1m 22s remaining: 3m 14s
598: learn: 8.7572315 total: 1m 22s remaining: 3m 13s
599: learn: 8.7564438 total: 1m 23s remaining: 3m 13s
600: learn: 8.7547692 total: 1m 23s remaining: 3m 13s
601: learn: 8.7539238 total: 1m 23s remaining: 3m 13s
602: learn: 8.7529840 total: 1m 23s remaining: 3m 13s
603: learn: 8.7516056 total: 1m 23s remaining: 3m 13s
604: learn: 8.7503315 total: 1m 23s remaining: 3m 13s
605: learn: 8.7476928 total: 1m 23s remaining: 3m 12s
606: learn: 8.7476874 total: 1m 24s remaining: 3m 12s
607: learn: 8.7444611 total: 1m 24s remaining: 3m 12s
608: learn: 8.7437159 total: 1m 24s remaining: 3m 12s
609: learn: 8.7427552 total: 1m 24s remaining: 3m 12s
610: learn: 8.7407853 total: 1m 24s remaining: 3m 12s
611: learn: 8.7387663 total: 1m 24s remaining: 3m 12s
612: learn: 8.7372500 total: 1m 24s remaining: 3m 12s
613: learn: 8.7361858 total: 1m 25s remaining: 3m 11s
614: learn: 8.7343070 total: 1m 25s remaining: 3m 11s
615: learn: 8.7329639 total: 1m 25s remaining: 3m 11s
616: learn: 8.7319222 total: 1m 25s remaining: 3m 11s
617: learn: 8.7313428 total: 1m 25s remaining: 3m 11s
618: learn: 8.7288231 total: 1m 25s remaining: 3m 11s
619: learn: 8.7277449 total: 1m 25s remaining: 3m 11s
620: learn: 8.7267719 total: 1m 26s remaining: 3m 10s
621: learn: 8.7258112 total: 1m 26s remaining: 3m 10s
622: learn: 8.7252730 total: 1m 26s remaining: 3m 10s
623: learn: 8.7243551 total: 1m 26s remaining: 3m 10s
624: learn: 8.7233304 total: 1m 26s remaining: 3m 10s
625: learn: 8.7222060 total: 1m 26s remaining: 3m 10s
626: learn: 8.7205480 total: 1m 26s remaining: 3m 10s
627: learn: 8.7188735 total: 1m 26s remaining: 3m 10s
628: learn: 8.7173223 total: 1m 27s remaining: 3m 9s
629: learn: 8.7167669 total: 1m 27s remaining: 3m 9s
630: learn: 8.7153538 total: 1m 27s remaining: 3m 9s
631: learn: 8.7135574 total: 1m 27s remaining: 3m 9s
632: learn: 8.7126769 total: 1m 27s remaining: 3m 9s
633: learn: 8.7101709 total: 1m 27s remaining: 3m 9s
634: learn: 8.7088520 total: 1m 27s remaining: 3m 9s
635: learn: 8.7074895 total: 1m 28s remaining: 3m 8s
636: learn: 8.7066683 total: 1m 28s remaining: 3m 8s
637: learn: 8.7042677 total: 1m 28s remaining: 3m 8s
638: learn: 8.7021813 total: 1m 28s remaining: 3m 8s
639: learn: 8.7004263 total: 1m 28s remaining: 3m 8s
640: learn: 8.6994587 total: 1m 28s remaining: 3m 8s
641: learn: 8.6986666 total: 1m 28s remaining: 3m 8s
642: learn: 8.6975534 total: 1m 29s remaining: 3m 8s
643: learn: 8.6952036 total: 1m 29s remaining: 3m 7s
644: learn: 8.6936556 total: 1m 29s remaining: 3m 7s
645: learn: 8.6916432 total: 1m 29s remaining: 3m 7s
646: learn: 8.6909378 total: 1m 29s remaining: 3m 7s
647: learn: 8.6909322 total: 1m 29s remaining: 3m 7s
648: learn: 8.6893213 total: 1m 29s remaining: 3m 7s
649: learn: 8.6885830 total: 1m 30s remaining: 3m 7s
650: learn: 8.6877725 total: 1m 30s remaining: 3m 6s
651: learn: 8.6874792 total: 1m 30s remaining: 3m 6s
652: learn: 8.6872614 total: 1m 30s remaining: 3m 6s
653: learn: 8.6866377 total: 1m 30s remaining: 3m 6s
654: learn: 8.6857078 total: 1m 30s remaining: 3m 6s
655: learn: 8.6839700 total: 1m 30s remaining: 3m 6s
656: learn: 8.6839649 total: 1m 31s remaining: 3m 6s
657: learn: 8.6825764 total: 1m 31s remaining: 3m 5s
658: learn: 8.6821205 total: 1m 31s remaining: 3m 5s
659: learn: 8.6817027 total: 1m 31s remaining: 3m 5s
660: learn: 8.6801828 total: 1m 31s remaining: 3m 5s
661: learn: 8.6796884 total: 1m 31s remaining: 3m 5s
662: learn: 8.6796831 total: 1m 31s remaining: 3m 5s
663: learn: 8.6790738 total: 1m 32s remaining: 3m 5s
664: learn: 8.6777898 total: 1m 32s remaining: 3m 4s
665: learn: 8.6769323 total: 1m 32s remaining: 3m 4s
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665: learn: 8.6769333 total: 1m 32s remaining: 3m 4s
666: learn: 8.6762465 total: 1m 32s remaining: 3m 4s
667: learn: 8.6749160 total: 1m 32s remaining: 3m 4s
668: learn: 8.6736155 total: 1m 32s remaining: 3m 4s
669: learn: 8.6727655 total: 1m 32s remaining: 3m 4s
670: learn: 8.6718907 total: 1m 32s remaining: 3m 4s
671: learn: 8.6708284 total: 1m 33s remaining: 3m 4s
672: learn: 8.6695269 total: 1m 33s remaining: 3m 3s
673: learn: 8.6682775 total: 1m 33s remaining: 3m 3s
674: learn: 8.6669012 total: 1m 33s remaining: 3m 3s
675: learn: 8.6659851 total: 1m 33s remaining: 3m 3s
676: learn: 8.6647772 total: 1m 33s remaining: 3m 3s
677: learn: 8.6640170 total: 1m 33s remaining: 3m 3s
678: learn: 8.6631746 total: 1m 34s remaining: 3m 3s
679: learn: 8.6626491 total: 1m 34s remaining: 3m 2s
680: learn: 8.6613040 total: 1m 34s remaining: 3m 2s
681: learn: 8.6605823 total: 1m 34s remaining: 3m 2s
682: learn: 8.6605784 total: 1m 34s remaining: 3m 2s
683: learn: 8.6595291 total: 1m 34s remaining: 3m 2s
684: learn: 8.6574713 total: 1m 34s remaining: 3m 2s
685: learn: 8.6565696 total: 1m 35s remaining: 3m 2s
686: learn: 8.6540506 total: 1m 35s remaining: 3m 1s
687: learn: 8.6510683 total: 1m 35s remaining: 3m 1s
688: learn: 8.6496986 total: 1m 35s remaining: 3m 1s
689: learn: 8.6489208 total: 1m 35s remaining: 3m 1s
690: learn: 8.6476875 total: 1m 35s remaining: 3m 1s
691: learn: 8.6453374 total: 1m 35s remaining: 3m 1s
692: learn: 8.6445198 total: 1m 36s remaining: 3m 1s
693: learn: 8.6442263 total: 1m 36s remaining: 3m 1s
694: learn: 8.6427612 total: 1m 36s remaining: 3m
695: learn: 8.6415335 total: 1m 36s remaining: 3m
696: learn: 8.6391342 total: 1m 36s remaining: 3m
697: learn: 8.6383809 total: 1m 36s remaining: 3m
698: learn: 8.6372555 total: 1m 36s remaining: 3m
699: learn: 8.6362588 total: 1m 37s remaining: 3m
700: learn: 8.6349737 total: 1m 37s remaining: 3m
701: learn: 8.6337290 total: 1m 37s remaining: 2m 59s
702: learn: 8.6326026 total: 1m 37s remaining: 2m 59s
703: learn: 8.6318504 total: 1m 37s remaining: 2m 59s
704: learn: 8.6312691 total: 1m 37s remaining: 2m 59s
705: learn: 8.6299781 total: 1m 37s remaining: 2m 59s
706: learn: 8.6293550 total: 1m 38s remaining: 2m 59s
707: learn: 8.6265651 total: 1m 38s remaining: 2m 59s
708: learn: 8.6262921 total: 1m 38s remaining: 2m 58s
709: learn: 8.6258262 total: 1m 38s remaining: 2m 58s
710: learn: 8.6239900 total: 1m 38s remaining: 2m 58s
711: learn: 8.6229447 total: 1m 38s remaining: 2m 58s
712: learn: 8.6212490 total: 1m 38s remaining: 2m 58s
713: learn: 8.6196342 total: 1m 38s remaining: 2m 58s
714: learn: 8.6177293 total: 1m 39s remaining: 2m 58s
715: learn: 8.6166205 total: 1m 39s remaining: 2m 58s
716: learn: 8.6150779 total: 1m 39s remaining: 2m 57s
717: learn: 8.6145064 total: 1m 39s remaining: 2m 57s
718: learn: 8.6131524 total: 1m 39s remaining: 2m 57s
719: learn: 8.6117118 total: 1m 39s remaining: 2m 57s
720: learn: 8.6099393 total: 1m 39s remaining: 2m 57s
721: learn: 8.6080308 total: 1m 40s remaining: 2m 57s
722: learn: 8.6066870 total: 1m 40s remaining: 2m 57s
723: learn: 8.6058193 total: 1m 40s remaining: 2m 56s
724: learn: 8.6052263 total: 1m 40s remaining: 2m 56s
725: learn: 8.6034183 total: 1m 40s remaining: 2m 56s
726: learn: 8.6012968 total: 1m 40s remaining: 2m 56s
727: learn: 8.5999765 total: 1m 40s remaining: 2m 56s
728: learn: 8.5990156 total: 1m 41s remaining: 2m 56s
729: learn: 8.5979136 total: 1m 41s remaining: 2m 56s
730: learn: 8.5976518 total: 1m 41s remaining: 2m 55s
731: learn: 8.5968268 total: 1m 41s remaining: 2m 55s
732: learn: 8.5945736 total: 1m 41s remaining: 2m 55s
733: learn: 8.5926650 total: 1m 41s remaining: 2m 55s
734: learn: 8.5912136 total: 1m 41s remaining: 2m 55s
735: learn: 8.5879540 total: 1m 42s remaining: 2m 55s
736: learn: 8.5879497 total: 1m 42s remaining: 2m 55s
737: learn: 8.5861819 total: 1m 42s remaining: 2m 54s
738: learn: 8.5835501 total: 1m 42s remaining: 2m 54s
739: learn: 8.5825016 total: 1m 42s remaining: 2m 54s
740: learn: 8.5817973 total: 1m 42s remaining: 2m 54s
741: learn: 8.5806911 total: 1m 42s remaining: 2m 54s
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742: learn: 8.5802805 total: 1m 42s remaining: 2m 54s
743: learn: 8.5793006 total: 1m 43s remaining: 2m 54s
744: learn: 8.5781578 total: 1m 43s remaining: 2m 53s
745: learn: 8.5768223 total: 1m 43s remaining: 2m 53s
746: learn: 8.5754325 total: 1m 43s remaining: 2m 53s
747: learn: 8.5743111 total: 1m 43s remaining: 2m 53s
748: learn: 8.5725281 total: 1m 43s remaining: 2m 53s
749: learn: 8.5716250 total: 1m 43s remaining: 2m 53s
750: learn: 8.5704352 total: 1m 44s remaining: 2m 53s
751: learn: 8.5694128 total: 1m 44s remaining: 2m 53s
752: learn: 8.5677932 total: 1m 44s remaining: 2m 52s
753: learn: 8.5669636 total: 1m 44s remaining: 2m 52s
754: learn: 8.5667020 total: 1m 44s remaining: 2m 52s
755: learn: 8.5649971 total: 1m 44s remaining: 2m 52s
756: learn: 8.5642274 total: 1m 44s remaining: 2m 52s
757: learn: 8.5627146 total: 1m 45s remaining: 2m 52s
758: learn: 8.5604105 total: 1m 45s remaining: 2m 52s
759: learn: 8.5583041 total: 1m 45s remaining: 2m 51s
760: learn: 8.5568278 total: 1m 45s remaining: 2m 51s
761: learn: 8.5552405 total: 1m 45s remaining: 2m 51s
762: learn: 8.5538983 total: 1m 45s remaining: 2m 51s
763: learn: 8.5534416 total: 1m 45s remaining: 2m 51s
764: learn: 8.5533994 total: 1m 46s remaining: 2m 51s
765: learn: 8.5513800 total: 1m 46s remaining: 2m 51s
766: learn: 8.5503843 total: 1m 46s remaining: 2m 50s
767: learn: 8.5495543 total: 1m 46s remaining: 2m 50s
768: learn: 8.5485789 total: 1m 46s remaining: 2m 50s
769: learn: 8.5475763 total: 1m 46s remaining: 2m 50s
770: learn: 8.5461459 total: 1m 46s remaining: 2m 50s
771: learn: 8.5457135 total: 1m 47s remaining: 2m 50s
772: learn: 8.5456715 total: 1m 47s remaining: 2m 50s
773: learn: 8.5449197 total: 1m 47s remaining: 2m 49s
774: learn: 8.5434302 total: 1m 47s remaining: 2m 49s
775: learn: 8.5434168 total: 1m 47s remaining: 2m 49s
776: learn: 8.5423060 total: 1m 47s remaining: 2m 49s
777: learn: 8.5411599 total: 1m 47s remaining: 2m 49s
778: learn: 8.5393713 total: 1m 47s remaining: 2m 49s
779: learn: 8.5385780 total: 1m 48s remaining: 2m 49s
780: learn: 8.5374465 total: 1m 48s remaining: 2m 48s
781: learn: 8.5364771 total: 1m 48s remaining: 2m 48s
782: learn: 8.5357709 total: 1m 48s remaining: 2m 48s
783: learn: 8.5339685 total: 1m 48s remaining: 2m 48s
784: learn: 8.5323209 total: 1m 48s remaining: 2m 48s
785: learn: 8.5310244 total: 1m 48s remaining: 2m 48s
786: learn: 8.5299824 total: 1m 49s remaining: 2m 48s
787: learn: 8.5292192 total: 1m 49s remaining: 2m 47s
788: learn: 8.5292012 total: 1m 49s remaining: 2m 47s
789: learn: 8.5280165 total: 1m 49s remaining: 2m 47s
790: learn: 8.5270554 total: 1m 49s remaining: 2m 47s
791: learn: 8.5261693 total: 1m 49s remaining: 2m 47s
792: learn: 8.5248057 total: 1m 49s remaining: 2m 47s
793: learn: 8.5238058 total: 1m 49s remaining: 2m 47s
794: learn: 8.5231404 total: 1m 50s remaining: 2m 46s
795: learn: 8.5231148 total: 1m 50s remaining: 2m 46s
796: learn: 8.5216622 total: 1m 50s remaining: 2m 46s
797: learn: 8.5204974 total: 1m 50s remaining: 2m 46s
798: learn: 8.5193422 total: 1m 50s remaining: 2m 46s
799: learn: 8.5176351 total: 1m 50s remaining: 2m 46s
800: learn: 8.5171466 total: 1m 50s remaining: 2m 46s
801: learn: 8.5161616 total: 1m 51s remaining: 2m 45s
802: learn: 8.5151555 total: 1m 51s remaining: 2m 45s
803: learn: 8.5144863 total: 1m 51s remaining: 2m 45s
804: learn: 8.5131132 total: 1m 51s remaining: 2m 45s
805: learn: 8.5131099 total: 1m 51s remaining: 2m 45s
806: learn: 8.5116212 total: 1m 51s remaining: 2m 45s
807: learn: 8.5116183 total: 1m 51s remaining: 2m 45s
808: learn: 8.5107193 total: 1m 51s remaining: 2m 44s
809: learn: 8.5097443 total: 1m 52s remaining: 2m 44s
810: learn: 8.5075649 total: 1m 52s remaining: 2m 44s
811: learn: 8.5066379 total: 1m 52s remaining: 2m 44s
812: learn: 8.5041678 total: 1m 52s remaining: 2m 44s
813: learn: 8.5027897 total: 1m 52s remaining: 2m 44s
814: learn: 8.5018749 total: 1m 52s remaining: 2m 44s
815: learn: 8.5016174 total: 1m 52s remaining: 2m 43s
816: learn: 8.5010563 total: 1m 53s remaining: 2m 43s
817: learn: 8.4983338 total: 1m 53s remaining: 2m 43s
818: learn: 8.4973680 total: 1m 53s remaining: 2m 43s
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819: learn: 8.4960606 total: 1m 53s remaining: 2m 43s
820: learn: 8.4941051 total: 1m 53s remaining: 2m 43s
821: learn: 8.4940350 total: 1m 53s remaining: 2m 43s
822: learn: 8.4936091 total: 1m 53s remaining: 2m 42s
823: learn: 8.4926544 total: 1m 54s remaining: 2m 42s
824: learn: 8.4923259 total: 1m 54s remaining: 2m 42s
825: learn: 8.4918639 total: 1m 54s remaining: 2m 42s
826: learn: 8.4918613 total: 1m 54s remaining: 2m 42s
827: learn: 8.4903199 total: 1m 54s remaining: 2m 42s
828: learn: 8.4892044 total: 1m 54s remaining: 2m 42s
829: learn: 8.4878709 total: 1m 54s remaining: 2m 41s
830: learn: 8.4870383 total: 1m 55s remaining: 2m 41s
831: learn: 8.4861503 total: 1m 55s remaining: 2m 41s
832: learn: 8.4850465 total: 1m 55s remaining: 2m 41s
833: learn: 8.4850274 total: 1m 55s remaining: 2m 41s
834: learn: 8.4838831 total: 1m 55s remaining: 2m 41s
835: learn: 8.4821101 total: 1m 55s remaining: 2m 41s
836: learn: 8.4805720 total: 1m 55s remaining: 2m 41s
837: learn: 8.4796100 total: 1m 56s remaining: 2m 40s
838: learn: 8.4795677 total: 1m 56s remaining: 2m 40s
839: learn: 8.4774826 total: 1m 56s remaining: 2m 40s
840: learn: 8.4760146 total: 1m 56s remaining: 2m 40s
841: learn: 8.4735741 total: 1m 56s remaining: 2m 40s
842: learn: 8.4735413 total: 1m 56s remaining: 2m 40s
843: learn: 8.4735273 total: 1m 56s remaining: 2m 39s
844: learn: 8.4727821 total: 1m 56s remaining: 2m 39s
845: learn: 8.4702559 total: 1m 57s remaining: 2m 39s
846: learn: 8.4692939 total: 1m 57s remaining: 2m 39s
847: learn: 8.4683067 total: 1m 57s remaining: 2m 39s
848: learn: 8.4658929 total: 1m 57s remaining: 2m 39s
849: learn: 8.4653097 total: 1m 57s remaining: 2m 39s
850: learn: 8.4647653 total: 1m 57s remaining: 2m 39s
851: learn: 8.4633024 total: 1m 57s remaining: 2m 38s
852: learn: 8.4620972 total: 1m 58s remaining: 2m 38s
853: learn: 8.4603897 total: 1m 58s remaining: 2m 38s
854: learn: 8.4599087 total: 1m 58s remaining: 2m 38s
855: learn: 8.4589362 total: 1m 58s remaining: 2m 38s
856: learn: 8.4577077 total: 1m 58s remaining: 2m 38s
857: learn: 8.4554290 total: 1m 58s remaining: 2m 38s
858: learn: 8.4541912 total: 1m 58s remaining: 2m 37s
859: learn: 8.4522886 total: 1m 59s remaining: 2m 37s
860: learn: 8.4508182 total: 1m 59s remaining: 2m 37s
861: learn: 8.4504903 total: 1m 59s remaining: 2m 37s
862: learn: 8.4492681 total: 1m 59s remaining: 2m 37s
863: learn: 8.4468652 total: 1m 59s remaining: 2m 37s
864: learn: 8.4461753 total: 1m 59s remaining: 2m 37s
865: learn: 8.4457917 total: 1m 59s remaining: 2m 36s
866: learn: 8.4436475 total: 2m remaining: 2m 36s
867: learn: 8.4423608 total: 2m remaining: 2m 36s
868: learn: 8.4415117 total: 2m remaining: 2m 36s
869: learn: 8.4409075 total: 2m remaining: 2m 36s
870: learn: 8.4400374 total: 2m remaining: 2m 36s
871: learn: 8.4387969 total: 2m remaining: 2m 36s
872: learn: 8.4381730 total: 2m remaining: 2m 36s
873: learn: 8.4357371 total: 2m 1s remaining: 2m 35s
874: learn: 8.4343980 total: 2m 1s remaining: 2m 35s
875: learn: 8.4337610 total: 2m 1s remaining: 2m 35s
876: learn: 8.4331898 total: 2m 1s remaining: 2m 35s
877: learn: 8.4317234 total: 2m 1s remaining: 2m 35s
878: learn: 8.4301581 total: 2m 1s remaining: 2m 35s
879: learn: 8.4288445 total: 2m 1s remaining: 2m 35s
880: learn: 8.4271001 total: 2m 1s remaining: 2m 34s
881: learn: 8.4260803 total: 2m 2s remaining: 2m 34s
882: learn: 8.4247586 total: 2m 2s remaining: 2m 34s
883: learn: 8.4234744 total: 2m 2s remaining: 2m 34s
884: learn: 8.4221491 total: 2m 2s remaining: 2m 34s
885: learn: 8.4214425 total: 2m 2s remaining: 2m 34s
886: learn: 8.4197304 total: 2m 2s remaining: 2m 34s
887: learn: 8.4188853 total: 2m 2s remaining: 2m 33s
888: learn: 8.4179331 total: 2m 3s remaining: 2m 33s
889: learn: 8.4165822 total: 2m 3s remaining: 2m 33s
890: learn: 8.4138226 total: 2m 3s remaining: 2m 33s
891: learn: 8.4135007 total: 2m 3s remaining: 2m 33s
892: learn: 8.4126871 total: 2m 3s remaining: 2m 33s
893: learn: 8.4112993 total: 2m 3s remaining: 2m 33s
894: learn: 8.4102145 total: 2m 3s remaining: 2m 33s
895: learn: 8.4082348 total: 2m 4s remaining: 2m 32s
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896: learn: 8.4070856 total: 2m 4s remaining: 2m 32s
897: learn: 8.4062156 total: 2m 4s remaining: 2m 32s
898: learn: 8.4052382 total: 2m 4s remaining: 2m 32s
899: learn: 8.4037548 total: 2m 4s remaining: 2m 32s
900: learn: 8.4028445 total: 2m 4s remaining: 2m 32s
901: learn: 8.4022772 total: 2m 4s remaining: 2m 32s
902: learn: 8.4015550 total: 2m 5s remaining: 2m 32s
903: learn: 8.4007446 total: 2m 5s remaining: 2m 31s
904: learn: 8.3989771 total: 2m 5s remaining: 2m 31s
905: learn: 8.3977568 total: 2m 5s remaining: 2m 31s
906: learn: 8.3970037 total: 2m 5s remaining: 2m 31s
907: learn: 8.3957057 total: 2m 5s remaining: 2m 31s
908: learn: 8.3943629 total: 2m 5s remaining: 2m 31s
909: learn: 8.3938428 total: 2m 6s remaining: 2m 31s
910: learn: 8.3930383 total: 2m 6s remaining: 2m 30s
911: learn: 8.3922264 total: 2m 6s remaining: 2m 30s
912: learn: 8.3917359 total: 2m 6s remaining: 2m 30s
913: learn: 8.3915749 total: 2m 6s remaining: 2m 30s
914: learn: 8.3896349 total: 2m 6s remaining: 2m 30s
915: learn: 8.3890481 total: 2m 6s remaining: 2m 30s
916: learn: 8.3885573 total: 2m 7s remaining: 2m 30s
917: learn: 8.3870940 total: 2m 7s remaining: 2m 29s
918: learn: 8.3857907 total: 2m 7s remaining: 2m 29s
919: learn: 8.3847284 total: 2m 7s remaining: 2m 29s
920: learn: 8.3840486 total: 2m 7s remaining: 2m 29s
921: learn: 8.3828952 total: 2m 7s remaining: 2m 29s
922: learn: 8.3819228 total: 2m 7s remaining: 2m 29s
923: learn: 8.3803814 total: 2m 8s remaining: 2m 29s
924: learn: 8.3795896 total: 2m 8s remaining: 2m 29s
925: learn: 8.3782926 total: 2m 8s remaining: 2m 28s
926: learn: 8.3758582 total: 2m 8s remaining: 2m 28s
927: learn: 8.3754793 total: 2m 8s remaining: 2m 28s
928: learn: 8.3740603 total: 2m 8s remaining: 2m 28s
929: learn: 8.3734981 total: 2m 8s remaining: 2m 28s
930: learn: 8.3717243 total: 2m 9s remaining: 2m 28s
931: learn: 8.3712554 total: 2m 9s remaining: 2m 28s
932: learn: 8.3709429 total: 2m 9s remaining: 2m 27s
933: learn: 8.3695553 total: 2m 9s remaining: 2m 27s
934: learn: 8.3693881 total: 2m 9s remaining: 2m 27s
935: learn: 8.3685483 total: 2m 9s remaining: 2m 27s
936: learn: 8.3677170 total: 2m 9s remaining: 2m 27s
937: learn: 8.3677129 total: 2m 9s remaining: 2m 27s
938: learn: 8.3664770 total: 2m 10s remaining: 2m 27s
939: learn: 8.3656731 total: 2m 10s remaining: 2m 26s
940: learn: 8.3647964 total: 2m 10s remaining: 2m 26s
941: learn: 8.3641924 total: 2m 10s remaining: 2m 26s
942: learn: 8.3625977 total: 2m 10s remaining: 2m 26s
943: learn: 8.3625941 total: 2m 10s remaining: 2m 26s
944: learn: 8.3618901 total: 2m 10s remaining: 2m 26s
945: learn: 8.3599157 total: 2m 11s remaining: 2m 26s
946: learn: 8.3599122 total: 2m 11s remaining: 2m 25s
947: learn: 8.3599102 total: 2m 11s remaining: 2m 25s
948: learn: 8.3590898 total: 2m 11s remaining: 2m 25s
949: learn: 8.3588688 total: 2m 11s remaining: 2m 25s
950: learn: 8.3580615 total: 2m 11s remaining: 2m 25s
951: learn: 8.3574167 total: 2m 11s remaining: 2m 25s
952: learn: 8.3565572 total: 2m 11s remaining: 2m 24s
953: learn: 8.3556941 total: 2m 12s remaining: 2m 24s
954: learn: 8.3556909 total: 2m 12s remaining: 2m 24s
955: learn: 8.3543951 total: 2m 12s remaining: 2m 24s
956: learn: 8.3540660 total: 2m 12s remaining: 2m 24s
957: learn: 8.3514644 total: 2m 12s remaining: 2m 24s
958: learn: 8.3497291 total: 2m 12s remaining: 2m 24s
959: learn: 8.3482139 total: 2m 12s remaining: 2m 23s
960: learn: 8.3471341 total: 2m 12s remaining: 2m 23s
961: learn: 8.3461927 total: 2m 13s remaining: 2m 23s
962: learn: 8.3453680 total: 2m 13s remaining: 2m 23s
963: learn: 8.3451464 total: 2m 13s remaining: 2m 23s
964: learn: 8.3432824 total: 2m 13s remaining: 2m 23s
965: learn: 8.3428140 total: 2m 13s remaining: 2m 23s
966: learn: 8.3423512 total: 2m 13s remaining: 2m 22s
967: learn: 8.3417097 total: 2m 13s remaining: 2m 22s
968: learn: 8.3399685 total: 2m 14s remaining: 2m 22s
969: learn: 8.3391349 total: 2m 14s remaining: 2m 22s
970: learn: 8.3380388 total: 2m 14s remaining: 2m 22s
971: learn: 8.3376581 total: 2m 14s remaining: 2m 22s
972: learn: 8.3366451 total: 2m 14s remaining: 2m 22s
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973: learn: 8.3360832 total: 2m 14s remaining: 2m 21s
974: learn: 8.3345330 total: 2m 14s remaining: 2m 21s
975: learn: 8.3344779 total: 2m 15s remaining: 2m 21s
976: learn: 8.3327032 total: 2m 15s remaining: 2m 21s
977: learn: 8.3317891 total: 2m 15s remaining: 2m 21s
978: learn: 8.3314931 total: 2m 15s remaining: 2m 21s
979: learn: 8.3296580 total: 2m 15s remaining: 2m 21s
980: learn: 8.3291614 total: 2m 15s remaining: 2m 20s
981: learn: 8.3280126 total: 2m 15s remaining: 2m 20s
982: learn: 8.3270186 total: 2m 16s remaining: 2m 20s
983: learn: 8.3258026 total: 2m 16s remaining: 2m 20s
984: learn: 8.3247920 total: 2m 16s remaining: 2m 20s
985: learn: 8.3229703 total: 2m 16s remaining: 2m 20s
986: learn: 8.3223144 total: 2m 16s remaining: 2m 20s
987: learn: 8.3221729 total: 2m 16s remaining: 2m 19s
988: learn: 8.3220816 total: 2m 16s remaining: 2m 19s
989: learn: 8.3213393 total: 2m 16s remaining: 2m 19s
990: learn: 8.3202714 total: 2m 17s remaining: 2m 19s
991: learn: 8.3198097 total: 2m 17s remaining: 2m 19s
992: learn: 8.3186609 total: 2m 17s remaining: 2m 19s
993: learn: 8.3181061 total: 2m 17s remaining: 2m 19s
994: learn: 8.3178213 total: 2m 17s remaining: 2m 19s
995: learn: 8.3164398 total: 2m 17s remaining: 2m 18s
996: learn: 8.3164354 total: 2m 17s remaining: 2m 18s
997: learn: 8.3157021 total: 2m 18s remaining: 2m 18s
998: learn: 8.3150773 total: 2m 18s remaining: 2m 18s
999: learn: 8.3140807 total: 2m 18s remaining: 2m 18s
1000: learn: 8.3135774 total: 2m 18s remaining: 2m 18s
1001: learn: 8.3124080 total: 2m 18s remaining: 2m 18s
1002: learn: 8.3118338 total: 2m 18s remaining: 2m 17s
1003: learn: 8.3114074 total: 2m 18s remaining: 2m 17s
1004: learn: 8.3108611 total: 2m 19s remaining: 2m 17s
1005: learn: 8.3107115 total: 2m 19s remaining: 2m 17s
1006: learn: 8.3092633 total: 2m 19s remaining: 2m 17s
1007: learn: 8.3079125 total: 2m 19s remaining: 2m 17s
1008: learn: 8.3074339 total: 2m 19s remaining: 2m 17s
1009: learn: 8.3065273 total: 2m 19s remaining: 2m 16s
1010: learn: 8.3052445 total: 2m 19s remaining: 2m 16s
1011: learn: 8.3046295 total: 2m 19s remaining: 2m 16s
1012: learn: 8.3036590 total: 2m 20s remaining: 2m 16s
1013: learn: 8.3030597 total: 2m 20s remaining: 2m 16s
1014: learn: 8.3026531 total: 2m 20s remaining: 2m 16s
1015: learn: 8.3021106 total: 2m 20s remaining: 2m 16s
1016: learn: 8.2997563 total: 2m 20s remaining: 2m 16s
1017: learn: 8.2985676 total: 2m 20s remaining: 2m 15s
1018: learn: 8.2978280 total: 2m 20s remaining: 2m 15s
1019: learn: 8.2974489 total: 2m 21s remaining: 2m 15s
1020: learn: 8.2972000 total: 2m 21s remaining: 2m 15s
1021: learn: 8.2964464 total: 2m 21s remaining: 2m 15s
1022: learn: 8.2953519 total: 2m 21s remaining: 2m 15s
1023: learn: 8.2951271 total: 2m 21s remaining: 2m 15s
1024: learn: 8.2950310 total: 2m 21s remaining: 2m 14s
1025: learn: 8.2941840 total: 2m 21s remaining: 2m 14s
1026: learn: 8.2935506 total: 2m 22s remaining: 2m 14s
1027: learn: 8.2923401 total: 2m 22s remaining: 2m 14s
1028: learn: 8.2923274 total: 2m 22s remaining: 2m 14s
1029: learn: 8.2916246 total: 2m 22s remaining: 2m 14s
1030: learn: 8.2911731 total: 2m 22s remaining: 2m 14s
1031: learn: 8.2893791 total: 2m 22s remaining: 2m 13s
1032: learn: 8.2886101 total: 2m 22s remaining: 2m 13s
1033: learn: 8.2881375 total: 2m 23s remaining: 2m 13s
1034: learn: 8.2862652 total: 2m 23s remaining: 2m 13s
1035: learn: 8.2862631 total: 2m 23s remaining: 2m 13s
1036: learn: 8.2855188 total: 2m 23s remaining: 2m 13s
1037: learn: 8.2851080 total: 2m 23s remaining: 2m 13s
1038: learn: 8.2833179 total: 2m 23s remaining: 2m 12s
1039: learn: 8.2825561 total: 2m 23s remaining: 2m 12s
1040: learn: 8.2819497 total: 2m 24s remaining: 2m 12s
1041: learn: 8.2798942 total: 2m 24s remaining: 2m 12s
1042: learn: 8.2791963 total: 2m 24s remaining: 2m 12s
1043: learn: 8.2790131 total: 2m 24s remaining: 2m 12s
1044: learn: 8.2779721 total: 2m 24s remaining: 2m 12s
1045: learn: 8.2776467 total: 2m 24s remaining: 2m 12s
1046: learn: 8.2768027 total: 2m 24s remaining: 2m 11s
1047: learn: 8.2755607 total: 2m 25s remaining: 2m 11s
1048: learn: 8.2745419 total: 2m 25s remaining: 2m 11s
1049: learn: 8.2739136 total: 2m 25s remaining: 2m 11s
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1050: learn: 8.2731998 total: 2m 25s remaining: 2m 11s
1051: learn: 8.2729311 total: 2m 25s remaining: 2m 11s
1052: learn: 8.2728168 total: 2m 25s remaining: 2m 11s
1053: learn: 8.2720981 total: 2m 25s remaining: 2m 10s
1054: learn: 8.2716219 total: 2m 25s remaining: 2m 10s
1055: learn: 8.2708400 total: 2m 26s remaining: 2m 10s
1056: learn: 8.2698927 total: 2m 26s remaining: 2m 10s
1057: learn: 8.2683530 total: 2m 26s remaining: 2m 10s
1058: learn: 8.2681228 total: 2m 26s remaining: 2m 10s
1059: learn: 8.2672737 total: 2m 26s remaining: 2m 10s
1060: learn: 8.2658545 total: 2m 26s remaining: 2m 9s
1061: learn: 8.2643485 total: 2m 26s remaining: 2m 9s
1062: learn: 8.2624509 total: 2m 27s remaining: 2m 9s
1063: learn: 8.2623151 total: 2m 27s remaining: 2m 9s
1064: learn: 8.2614232 total: 2m 27s remaining: 2m 9s
1065: learn: 8.2604289 total: 2m 27s remaining: 2m 9s
1066: learn: 8.2598302 total: 2m 27s remaining: 2m 9s
1067: learn: 8.2585955 total: 2m 27s remaining: 2m 8s
1068: learn: 8.2567687 total: 2m 27s remaining: 2m 8s
1069: learn: 8.2550025 total: 2m 28s remaining: 2m 8s
1070: learn: 8.2546023 total: 2m 28s remaining: 2m 8s
1071: learn: 8.2537701 total: 2m 28s remaining: 2m 8s
1072: learn: 8.2523978 total: 2m 28s remaining: 2m 8s
1073: learn: 8.2520586 total: 2m 28s remaining: 2m 8s
1074: learn: 8.2514731 total: 2m 28s remaining: 2m 8s
1075: learn: 8.2511616 total: 2m 28s remaining: 2m 7s
1076: learn: 8.2503976 total: 2m 29s remaining: 2m 7s
1077: learn: 8.2501151 total: 2m 29s remaining: 2m 7s
1078: learn: 8.2493812 total: 2m 29s remaining: 2m 7s
1079: learn: 8.2485099 total: 2m 29s remaining: 2m 7s
1080: learn: 8.2477772 total: 2m 29s remaining: 2m 7s
1081: learn: 8.2474924 total: 2m 29s remaining: 2m 7s
1082: learn: 8.2470583 total: 2m 29s remaining: 2m 6s
1083: learn: 8.2461290 total: 2m 30s remaining: 2m 6s
1084: learn: 8.2457833 total: 2m 30s remaining: 2m 6s
1085: learn: 8.2451106 total: 2m 30s remaining: 2m 6s
1086: learn: 8.2449819 total: 2m 30s remaining: 2m 6s
1087: learn: 8.2438910 total: 2m 30s remaining: 2m 6s
1088: learn: 8.2433388 total: 2m 30s remaining: 2m 6s
1089: learn: 8.2428241 total: 2m 30s remaining: 2m 5s
1090: learn: 8.2422943 total: 2m 31s remaining: 2m 5s
1091: learn: 8.2416377 total: 2m 31s remaining: 2m 5s
1092: learn: 8.2397170 total: 2m 31s remaining: 2m 5s
1093: learn: 8.2391931 total: 2m 31s remaining: 2m 5s
1094: learn: 8.2379658 total: 2m 31s remaining: 2m 5s
1095: learn: 8.2376473 total: 2m 31s remaining: 2m 5s
1096: learn: 8.2361310 total: 2m 31s remaining: 2m 5s
1097: learn: 8.2350469 total: 2m 32s remaining: 2m 4s
1098: learn: 8.2347068 total: 2m 32s remaining: 2m 4s
1099: learn: 8.2327436 total: 2m 32s remaining: 2m 4s
1100: learn: 8.2325115 total: 2m 32s remaining: 2m 4s
1101: learn: 8.2317607 total: 2m 32s remaining: 2m 4s
1102: learn: 8.2317482 total: 2m 32s remaining: 2m 4s
1103: learn: 8.2304158 total: 2m 32s remaining: 2m 4s
1104: learn: 8.2293885 total: 2m 33s remaining: 2m 3s
1105: learn: 8.2286165 total: 2m 33s remaining: 2m 3s
1106: learn: 8.2280309 total: 2m 33s remaining: 2m 3s
1107: learn: 8.2265113 total: 2m 33s remaining: 2m 3s
1108: learn: 8.2261634 total: 2m 33s remaining: 2m 3s
1109: learn: 8.2249430 total: 2m 33s remaining: 2m 3s
1110: learn: 8.2243178 total: 2m 33s remaining: 2m 3s
1111: learn: 8.2231782 total: 2m 34s remaining: 2m 3s
1112: learn: 8.2229228 total: 2m 34s remaining: 2m 2s
1113: learn: 8.2224489 total: 2m 34s remaining: 2m 2s
1114: learn: 8.2204933 total: 2m 34s remaining: 2m 2s
1115: learn: 8.2204145 total: 2m 34s remaining: 2m 2s
1116: learn: 8.2191459 total: 2m 34s remaining: 2m 2s
1117: learn: 8.2186445 total: 2m 34s remaining: 2m 2s
1118: learn: 8.2180525 total: 2m 35s remaining: 2m 2s
1119: learn: 8.2171976 total: 2m 35s remaining: 2m 1s
1120: learn: 8.2157841 total: 2m 35s remaining: 2m 1s
1121: learn: 8.2149435 total: 2m 35s remaining: 2m 1s
1122: learn: 8.2145543 total: 2m 35s remaining: 2m 1s
1123: learn: 8.2140571 total: 2m 35s remaining: 2m 1s
1124: learn: 8.2137471 total: 2m 35s remaining: 2m 1s
1125: learn: 8.2132662 total: 2m 36s remaining: 2m 1s
1126: learn: 8.2129595 total: 2m 36s remaining: 2m 1s
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1127: learn: 8.2115562 total: 2m 36s remaining: 2m
1128: learn: 8.2109703 total: 2m 36s remaining: 2m
1129: learn: 8.2103426 total: 2m 36s remaining: 2m
1130: learn: 8.2100198 total: 2m 36s remaining: 2m
1131: learn: 8.2079485 total: 2m 36s remaining: 2m
1132: learn: 8.2073095 total: 2m 37s remaining: 2m
1133: learn: 8.2058970 total: 2m 37s remaining: 2m
1134: learn: 8.2051676 total: 2m 37s remaining: 1m 59s
1135: learn: 8.2049583 total: 2m 37s remaining: 1m 59s
1136: learn: 8.2024783 total: 2m 37s remaining: 1m 59s
1137: learn: 8.2011186 total: 2m 37s remaining: 1m 59s
1138: learn: 8.2010967 total: 2m 37s remaining: 1m 59s
1139: learn: 8.2006260 total: 2m 38s remaining: 1m 59s
1140: learn: 8.1999346 total: 2m 38s remaining: 1m 59s
1141: learn: 8.1987906 total: 2m 38s remaining: 1m 58s
1142: learn: 8.1965789 total: 2m 38s remaining: 1m 58s
1143: learn: 8.1962680 total: 2m 38s remaining: 1m 58s
1144: learn: 8.1962485 total: 2m 38s remaining: 1m 58s
1145: learn: 8.1957400 total: 2m 38s remaining: 1m 58s
1146: learn: 8.1953629 total: 2m 38s remaining: 1m 58s
1147: learn: 8.1950061 total: 2m 39s remaining: 1m 58s
1148: learn: 8.1938221 total: 2m 39s remaining: 1m 57s
1149: learn: 8.1931194 total: 2m 39s remaining: 1m 57s
1150: learn: 8.1918796 total: 2m 39s remaining: 1m 57s
1151: learn: 8.1910806 total: 2m 39s remaining: 1m 57s
1152: learn: 8.1902536 total: 2m 39s remaining: 1m 57s
1153: learn: 8.1902099 total: 2m 39s remaining: 1m 57s
1154: learn: 8.1888215 total: 2m 40s remaining: 1m 57s
1155: learn: 8.1876595 total: 2m 40s remaining: 1m 56s
1156: learn: 8.1868200 total: 2m 40s remaining: 1m 56s
1157: learn: 8.1858115 total: 2m 40s remaining: 1m 56s
1158: learn: 8.1845757 total: 2m 40s remaining: 1m 56s
1159: learn: 8.1839156 total: 2m 40s remaining: 1m 56s
1160: learn: 8.1826857 total: 2m 40s remaining: 1m 56s
1161: learn: 8.1819309 total: 2m 41s remaining: 1m 56s
1162: learn: 8.1799755 total: 2m 41s remaining: 1m 56s
1163: learn: 8.1799353 total: 2m 41s remaining: 1m 55s
1164: learn: 8.1789441 total: 2m 41s remaining: 1m 55s
1165: learn: 8.1785822 total: 2m 41s remaining: 1m 55s
1166: learn: 8.1781801 total: 2m 41s remaining: 1m 55s
1167: learn: 8.1773325 total: 2m 41s remaining: 1m 55s
1168: learn: 8.1757664 total: 2m 42s remaining: 1m 55s
1169: learn: 8.1741219 total: 2m 42s remaining: 1m 55s
1170: learn: 8.1738493 total: 2m 42s remaining: 1m 54s
1171: learn: 8.1732373 total: 2m 42s remaining: 1m 54s
1172: learn: 8.1723628 total: 2m 42s remaining: 1m 54s
1173: learn: 8.1715915 total: 2m 42s remaining: 1m 54s
1174: learn: 8.1702880 total: 2m 42s remaining: 1m 54s
1175: learn: 8.1694901 total: 2m 43s remaining: 1m 54s
1176: learn: 8.1685910 total: 2m 43s remaining: 1m 54s
1177: learn: 8.1678122 total: 2m 43s remaining: 1m 53s
1178: learn: 8.1675667 total: 2m 43s remaining: 1m 53s
1179: learn: 8.1675259 total: 2m 43s remaining: 1m 53s
1180: learn: 8.1663894 total: 2m 43s remaining: 1m 53s
1181: learn: 8.1659603 total: 2m 43s remaining: 1m 53s
1182: learn: 8.1655668 total: 2m 44s remaining: 1m 53s
1183: learn: 8.1644562 total: 2m 44s remaining: 1m 53s
1184: learn: 8.1636753 total: 2m 44s remaining: 1m 53s
1185: learn: 8.1621543 total: 2m 44s remaining: 1m 52s
1186: learn: 8.1610969 total: 2m 44s remaining: 1m 52s
1187: learn: 8.1601726 total: 2m 44s remaining: 1m 52s
1188: learn: 8.1594091 total: 2m 44s remaining: 1m 52s
1189: learn: 8.1582870 total: 2m 45s remaining: 1m 52s
1190: learn: 8.1577117 total: 2m 45s remaining: 1m 52s
1191: learn: 8.1557410 total: 2m 45s remaining: 1m 52s
1192: learn: 8.1546742 total: 2m 45s remaining: 1m 51s
1193: learn: 8.1531429 total: 2m 45s remaining: 1m 51s
1194: learn: 8.1530603 total: 2m 45s remaining: 1m 51s
1195: learn: 8.1525612 total: 2m 45s remaining: 1m 51s
1196: learn: 8.1510117 total: 2m 46s remaining: 1m 51s
1197: learn: 8.1496078 total: 2m 46s remaining: 1m 51s
1198: learn: 8.1489827 total: 2m 46s remaining: 1m 51s
1199: learn: 8.1483404 total: 2m 46s remaining: 1m 50s
1200: learn: 8.1470748 total: 2m 46s remaining: 1m 50s
1201: learn: 8.1463609 total: 2m 46s remaining: 1m 50s
1202: learn: 8.1456962 total: 2m 46s remaining: 1m 50s
1203: learn: 8.1448858 total: 2m 46s remaining: 1m 50s
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1204: learn: 8.1444749 total: 2m 47s remaining: 1m 50s
1205: learn: 8.1438589 total: 2m 47s remaining: 1m 50s
1206: learn: 8.1432605 total: 2m 47s remaining: 1m 49s
1207: learn: 8.1430013 total: 2m 47s remaining: 1m 49s
1208: learn: 8.1420798 total: 2m 47s remaining: 1m 49s
1209: learn: 8.1406495 total: 2m 47s remaining: 1m 49s
1210: learn: 8.1398967 total: 2m 47s remaining: 1m 49s
1211: learn: 8.1391585 total: 2m 48s remaining: 1m 49s
1212: learn: 8.1390894 total: 2m 48s remaining: 1m 49s
1213: learn: 8.1387097 total: 2m 48s remaining: 1m 49s
1214: learn: 8.1376548 total: 2m 48s remaining: 1m 48s
1215: learn: 8.1371820 total: 2m 48s remaining: 1m 48s
1216: learn: 8.1364501 total: 2m 48s remaining: 1m 48s
1217: learn: 8.1349707 total: 2m 48s remaining: 1m 48s
1218: learn: 8.1344864 total: 2m 49s remaining: 1m 48s
1219: learn: 8.1331814 total: 2m 49s remaining: 1m 48s
1220: learn: 8.1317227 total: 2m 49s remaining: 1m 48s
1221: learn: 8.1311556 total: 2m 49s remaining: 1m 47s
1222: learn: 8.1310986 total: 2m 49s remaining: 1m 47s
1223: learn: 8.1304397 total: 2m 49s remaining: 1m 47s
1224: learn: 8.1292681 total: 2m 49s remaining: 1m 47s
1225: learn: 8.1278374 total: 2m 50s remaining: 1m 47s
1226: learn: 8.1270079 total: 2m 50s remaining: 1m 47s
1227: learn: 8.1253954 total: 2m 50s remaining: 1m 47s
1228: learn: 8.1240410 total: 2m 50s remaining: 1m 46s
1229: learn: 8.1230970 total: 2m 50s remaining: 1m 46s
1230: learn: 8.1226329 total: 2m 50s remaining: 1m 46s
1231: learn: 8.1214033 total: 2m 50s remaining: 1m 46s
1232: learn: 8.1207077 total: 2m 51s remaining: 1m 46s
1233: learn: 8.1197706 total: 2m 51s remaining: 1m 46s
1234: learn: 8.1184388 total: 2m 51s remaining: 1m 46s
1235: learn: 8.1177675 total: 2m 51s remaining: 1m 46s
1236: learn: 8.1163976 total: 2m 51s remaining: 1m 45s
1237: learn: 8.1159040 total: 2m 51s remaining: 1m 45s
1238: learn: 8.1147881 total: 2m 51s remaining: 1m 45s
1239: learn: 8.1137214 total: 2m 52s remaining: 1m 45s
1240: learn: 8.1129930 total: 2m 52s remaining: 1m 45s
1241: learn: 8.1126381 total: 2m 52s remaining: 1m 45s
1242: learn: 8.1114932 total: 2m 52s remaining: 1m 45s
1243: learn: 8.1109503 total: 2m 52s remaining: 1m 44s
1244: learn: 8.1104532 total: 2m 52s remaining: 1m 44s
1245: learn: 8.1089585 total: 2m 52s remaining: 1m 44s
1246: learn: 8.1089433 total: 2m 53s remaining: 1m 44s
1247: learn: 8.1083704 total: 2m 53s remaining: 1m 44s
1248: learn: 8.1067571 total: 2m 53s remaining: 1m 44s
1249: learn: 8.1055464 total: 2m 53s remaining: 1m 44s
1250: learn: 8.1052853 total: 2m 53s remaining: 1m 43s
1251: learn: 8.1037191 total: 2m 53s remaining: 1m 43s
1252: learn: 8.1036868 total: 2m 53s remaining: 1m 43s
1253: learn: 8.1023260 total: 2m 54s remaining: 1m 43s
1254: learn: 8.1019921 total: 2m 54s remaining: 1m 43s
1255: learn: 8.1007846 total: 2m 54s remaining: 1m 43s
1256: learn: 8.1006269 total: 2m 54s remaining: 1m 43s
1257: learn: 8.1006053 total: 2m 54s remaining: 1m 42s
1258: learn: 8.0995563 total: 2m 54s remaining: 1m 42s
1259: learn: 8.0980451 total: 2m 54s remaining: 1m 42s
1260: learn: 8.0974730 total: 2m 54s remaining: 1m 42s
1261: learn: 8.0956901 total: 2m 55s remaining: 1m 42s
1262: learn: 8.0947494 total: 2m 55s remaining: 1m 42s
1263: learn: 8.0933076 total: 2m 55s remaining: 1m 42s
1264: learn: 8.0922906 total: 2m 55s remaining: 1m 41s
1265: learn: 8.0907291 total: 2m 55s remaining: 1m 41s
1266: learn: 8.0896690 total: 2m 55s remaining: 1m 41s
1267: learn: 8.0891613 total: 2m 55s remaining: 1m 41s
1268: learn: 8.0882778 total: 2m 56s remaining: 1m 41s
1269: learn: 8.0871346 total: 2m 56s remaining: 1m 41s
1270: learn: 8.0868771 total: 2m 56s remaining: 1m 41s
1271: learn: 8.0846183 total: 2m 56s remaining: 1m 41s
1272: learn: 8.0841323 total: 2m 56s remaining: 1m 40s
1273: learn: 8.0834192 total: 2m 56s remaining: 1m 40s
1274: learn: 8.0826488 total: 2m 56s remaining: 1m 40s
1275: learn: 8.0820038 total: 2m 57s remaining: 1m 40s
1276: learn: 8.0813166 total: 2m 57s remaining: 1m 40s
1277: learn: 8.0800989 total: 2m 57s remaining: 1m 40s
1278: learn: 8.0790525 total: 2m 57s remaining: 1m 40s
1279: learn: 8.0776609 total: 2m 57s remaining: 1m 39s
1280: learn: 8.0767984 total: 2m 57s remaining: 1m 39s
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1281: learn: 8.0761442 total: 2m 57s remaining: 1m 39s
1282: learn: 8.0752292 total: 2m 58s remaining: 1m 39s
1283: learn: 8.0742883 total: 2m 58s remaining: 1m 39s
1284: learn: 8.0732652 total: 2m 58s remaining: 1m 39s
1285: learn: 8.0730247 total: 2m 58s remaining: 1m 39s
1286: learn: 8.0716721 total: 2m 58s remaining: 1m 38s
1287: learn: 8.0702697 total: 2m 58s remaining: 1m 38s
1288: learn: 8.0694810 total: 2m 58s remaining: 1m 38s
1289: learn: 8.0689030 total: 2m 59s remaining: 1m 38s
1290: learn: 8.0676257 total: 2m 59s remaining: 1m 38s
1291: learn: 8.0671600 total: 2m 59s remaining: 1m 38s
1292: learn: 8.0665345 total: 2m 59s remaining: 1m 38s
1293: learn: 8.0659877 total: 2m 59s remaining: 1m 38s
1294: learn: 8.0658724 total: 2m 59s remaining: 1m 37s
1295: learn: 8.0646389 total: 2m 59s remaining: 1m 37s
1296: learn: 8.0635205 total: 3m remaining: 1m 37s
1297: learn: 8.0624294 total: 3m remaining: 1m 37s
1298: learn: 8.0613262 total: 3m remaining: 1m 37s
1299: learn: 8.0608064 total: 3m remaining: 1m 37s
1300: learn: 8.0599561 total: 3m remaining: 1m 37s
1301: learn: 8.0597509 total: 3m remaining: 1m 36s
1302: learn: 8.0585862 total: 3m remaining: 1m 36s
1303: learn: 8.0577038 total: 3m 1s remaining: 1m 36s
1304: learn: 8.0568403 total: 3m 1s remaining: 1m 36s
1305: learn: 8.0562170 total: 3m 1s remaining: 1m 36s
1306: learn: 8.0551470 total: 3m 1s remaining: 1m 36s
1307: learn: 8.0546792 total: 3m 1s remaining: 1m 36s
1308: learn: 8.0536326 total: 3m 1s remaining: 1m 35s
1309: learn: 8.0529707 total: 3m 1s remaining: 1m 35s
1310: learn: 8.0520220 total: 3m 1s remaining: 1m 35s
1311: learn: 8.0507092 total: 3m 2s remaining: 1m 35s
1312: learn: 8.0497263 total: 3m 2s remaining: 1m 35s
1313: learn: 8.0482543 total: 3m 2s remaining: 1m 35s
1314: learn: 8.0475251 total: 3m 2s remaining: 1m 35s
1315: learn: 8.0451151 total: 3m 2s remaining: 1m 34s
1316: learn: 8.0449088 total: 3m 2s remaining: 1m 34s
1317: learn: 8.0440240 total: 3m 2s remaining: 1m 34s
1318: learn: 8.0435393 total: 3m 3s remaining: 1m 34s
1319: learn: 8.0422493 total: 3m 3s remaining: 1m 34s
1320: learn: 8.0422254 total: 3m 3s remaining: 1m 34s
1321: learn: 8.0416573 total: 3m 3s remaining: 1m 34s
1322: learn: 8.0404958 total: 3m 3s remaining: 1m 33s
1323: learn: 8.0395910 total: 3m 3s remaining: 1m 33s
1324: learn: 8.0380459 total: 3m 3s remaining: 1m 33s
1325: learn: 8.0366357 total: 3m 4s remaining: 1m 33s
1326: learn: 8.0363026 total: 3m 4s remaining: 1m 33s
1327: learn: 8.0355750 total: 3m 4s remaining: 1m 33s
1328: learn: 8.0339731 total: 3m 4s remaining: 1m 33s
1329: learn: 8.0337362 total: 3m 4s remaining: 1m 33s
1330: learn: 8.0329473 total: 3m 4s remaining: 1m 32s
1331: learn: 8.0310246 total: 3m 4s remaining: 1m 32s
1332: learn: 8.0303201 total: 3m 5s remaining: 1m 32s
1333: learn: 8.0298185 total: 3m 5s remaining: 1m 32s
1334: learn: 8.0285688 total: 3m 5s remaining: 1m 32s
1335: learn: 8.0281644 total: 3m 5s remaining: 1m 32s
1336: learn: 8.0280915 total: 3m 5s remaining: 1m 32s
1337: learn: 8.0273531 total: 3m 5s remaining: 1m 31s
1338: learn: 8.0271317 total: 3m 5s remaining: 1m 31s
1339: learn: 8.0266731 total: 3m 6s remaining: 1m 31s
1340: learn: 8.0260678 total: 3m 6s remaining: 1m 31s
1341: learn: 8.0247004 total: 3m 6s remaining: 1m 31s
1342: learn: 8.0237862 total: 3m 6s remaining: 1m 31s
1343: learn: 8.0234731 total: 3m 6s remaining: 1m 31s
1344: learn: 8.0234498 total: 3m 6s remaining: 1m 30s
1345: learn: 8.0229000 total: 3m 6s remaining: 1m 30s
1346: learn: 8.0215437 total: 3m 7s remaining: 1m 30s
1347: learn: 8.0204898 total: 3m 7s remaining: 1m 30s
1348: learn: 8.0202598 total: 3m 7s remaining: 1m 30s
1349: learn: 8.0195163 total: 3m 7s remaining: 1m 30s
1350: learn: 8.0183016 total: 3m 7s remaining: 1m 30s
1351: learn: 8.0182266 total: 3m 7s remaining: 1m 29s
1352: learn: 8.0177452 total: 3m 7s remaining: 1m 29s
1353: learn: 8.0172746 total: 3m 7s remaining: 1m 29s
1354: learn: 8.0169236 total: 3m 8s remaining: 1m 29s
1355: learn: 8.0169051 total: 3m 8s remaining: 1m 29s
1356: learn: 8.0167320 total: 3m 8s remaining: 1m 29s
1357: learn: 8.0167213 total: 3m 8s remaining: 1m 29s
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1358: learn: 8.0158548 total: 3m 8s  remaining: 1m 28s
1359: learn: 8.0148222 total: 3m 8s  remaining: 1m 28s
1360: learn: 8.0138856 total: 3m 8s  remaining: 1m 28s
1361: learn: 8.0138837 total: 3m 9s  remaining: 1m 28s
1362: learn: 8.0131908 total: 3m 9s  remaining: 1m 28s
1363: learn: 8.0117870 total: 3m 9s  remaining: 1m 28s
1364: learn: 8.0106649 total: 3m 9s  remaining: 1m 28s
1365: learn: 8.0097880 total: 3m 9s  remaining: 1m 28s
1366: learn: 8.0095919 total: 3m 9s  remaining: 1m 27s
1367: learn: 8.0081696 total: 3m 9s  remaining: 1m 27s
1368: learn: 8.0076510 total: 3m 10s remaining: 1m 27s
1369: learn: 8.0073379 total: 3m 10s remaining: 1m 27s
1370: learn: 8.0066452 total: 3m 10s remaining: 1m 27s
1371: learn: 8.0051360 total: 3m 10s remaining: 1m 27s
1372: learn: 8.0043723 total: 3m 10s remaining: 1m 27s
1373: learn: 8.0036965 total: 3m 10s remaining: 1m 26s
1374: learn: 8.0026964 total: 3m 10s remaining: 1m 26s
1375: learn: 8.0010319 total: 3m 11s remaining: 1m 26s
1376: learn: 7.9995723 total: 3m 11s remaining: 1m 26s
1377: learn: 7.9993647 total: 3m 11s remaining: 1m 26s
1378: learn: 7.9988404 total: 3m 11s remaining: 1m 26s
1379: learn: 7.9983715 total: 3m 11s remaining: 1m 26s
1380: learn: 7.9966562 total: 3m 11s remaining: 1m 25s
1381: learn: 7.9958805 total: 3m 11s remaining: 1m 25s
1382: learn: 7.9957323 total: 3m 12s remaining: 1m 25s
1383: learn: 7.9945571 total: 3m 12s remaining: 1m 25s
1384: learn: 7.9937976 total: 3m 12s remaining: 1m 25s
1385: learn: 7.9927585 total: 3m 12s remaining: 1m 25s
1386: learn: 7.9925468 total: 3m 12s remaining: 1m 25s
1387: learn: 7.9923453 total: 3m 12s remaining: 1m 24s
1388: learn: 7.9916088 total: 3m 12s remaining: 1m 24s
1389: learn: 7.9901300 total: 3m 12s remaining: 1m 24s
1390: learn: 7.9898509 total: 3m 13s remaining: 1m 24s
1391: learn: 7.9897990 total: 3m 13s remaining: 1m 24s
1392: learn: 7.9884658 total: 3m 13s remaining: 1m 24s
1393: learn: 7.9870555 total: 3m 13s remaining: 1m 24s
1394: learn: 7.9867122 total: 3m 13s remaining: 1m 23s
1395: learn: 7.9853772 total: 3m 13s remaining: 1m 23s
1396: learn: 7.9845500 total: 3m 13s remaining: 1m 23s
1397: learn: 7.9842243 total: 3m 14s remaining: 1m 23s
1398: learn: 7.9841616 total: 3m 14s remaining: 1m 23s
1399: learn: 7.9829619 total: 3m 14s remaining: 1m 23s
1400: learn: 7.9825424 total: 3m 14s remaining: 1m 23s
1401: learn: 7.9821799 total: 3m 14s remaining: 1m 23s
1402: learn: 7.9810928 total: 3m 14s remaining: 1m 22s
1403: learn: 7.9805818 total: 3m 14s remaining: 1m 22s
1404: learn: 7.9800389 total: 3m 15s remaining: 1m 22s
1405: learn: 7.9793289 total: 3m 15s remaining: 1m 22s
1406: learn: 7.9789226 total: 3m 15s remaining: 1m 22s
1407: learn: 7.9775282 total: 3m 15s remaining: 1m 22s
1408: learn: 7.9767181 total: 3m 15s remaining: 1m 22s
1409: learn: 7.9754094 total: 3m 15s remaining: 1m 21s
1410: learn: 7.9751673 total: 3m 15s remaining: 1m 21s
1411: learn: 7.9742452 total: 3m 16s remaining: 1m 21s
1412: learn: 7.9740451 total: 3m 16s remaining: 1m 21s
1413: learn: 7.9732081 total: 3m 16s remaining: 1m 21s
1414: learn: 7.9716312 total: 3m 16s remaining: 1m 21s
1415: learn: 7.9703138 total: 3m 16s remaining: 1m 21s
1416: learn: 7.9698060 total: 3m 16s remaining: 1m 20s
1417: learn: 7.9693884 total: 3m 16s remaining: 1m 20s
1418: learn: 7.9679983 total: 3m 17s remaining: 1m 20s
1419: learn: 7.9672834 total: 3m 17s remaining: 1m 20s
1420: learn: 7.9658209 total: 3m 17s remaining: 1m 20s
1421: learn: 7.9643100 total: 3m 17s remaining: 1m 20s
1422: learn: 7.9641063 total: 3m 17s remaining: 1m 20s
1423: learn: 7.9637087 total: 3m 17s remaining: 1m 20s
1424: learn: 7.9632318 total: 3m 17s remaining: 1m 19s
1425: learn: 7.9629709 total: 3m 18s remaining: 1m 19s
1426: learn: 7.9619666 total: 3m 18s remaining: 1m 19s
1427: learn: 7.9615786 total: 3m 18s remaining: 1m 19s
1428: learn: 7.9610454 total: 3m 18s remaining: 1m 19s
1429: learn: 7.9603182 total: 3m 18s remaining: 1m 19s
1430: learn: 7.9595286 total: 3m 18s remaining: 1m 19s
1431: learn: 7.9579464 total: 3m 18s remaining: 1m 18s
1432: learn: 7.9571174 total: 3m 19s remaining: 1m 18s
1433: learn: 7.9556604 total: 3m 19s remaining: 1m 18s
1434: learn: 7.9549004 total: 3m 19s remaining: 1m 18s
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1435: learn: 7.9530205 total: 3m 19s remaining: 1m 18s
1436: learn: 7.9520016 total: 3m 19s remaining: 1m 18s
1437: learn: 7.9513821 total: 3m 19s remaining: 1m 18s
1438: learn: 7.9510670 total: 3m 19s remaining: 1m 17s
1439: learn: 7.9503447 total: 3m 20s remaining: 1m 17s
1440: learn: 7.9493356 total: 3m 20s remaining: 1m 17s
1441: learn: 7.9491861 total: 3m 20s remaining: 1m 17s
1442: learn: 7.9491822 total: 3m 20s remaining: 1m 17s
1443: learn: 7.9482032 total: 3m 20s remaining: 1m 17s
1444: learn: 7.9469070 total: 3m 20s remaining: 1m 17s
1445: learn: 7.9454085 total: 3m 20s remaining: 1m 16s
1446: learn: 7.9442762 total: 3m 21s remaining: 1m 16s
1447: learn: 7.9429629 total: 3m 21s remaining: 1m 16s
1448: learn: 7.9425031 total: 3m 21s remaining: 1m 16s
1449: learn: 7.9422596 total: 3m 21s remaining: 1m 16s
1450: learn: 7.9418173 total: 3m 21s remaining: 1m 16s
1451: learn: 7.9409889 total: 3m 21s remaining: 1m 16s
1452: learn: 7.9400268 total: 3m 21s remaining: 1m 15s
1453: learn: 7.9392124 total: 3m 22s remaining: 1m 15s
1454: learn: 7.9379953 total: 3m 22s remaining: 1m 15s
1455: learn: 7.9374926 total: 3m 22s remaining: 1m 15s
1456: learn: 7.9372004 total: 3m 22s remaining: 1m 15s
1457: learn: 7.9361892 total: 3m 22s remaining: 1m 15s
1458: learn: 7.9353631 total: 3m 22s remaining: 1m 15s
1459: learn: 7.9346637 total: 3m 22s remaining: 1m 15s
1460: learn: 7.9341642 total: 3m 22s remaining: 1m 14s
1461: learn: 7.9336743 total: 3m 23s remaining: 1m 14s
1462: learn: 7.9325026 total: 3m 23s remaining: 1m 14s
1463: learn: 7.9318883 total: 3m 23s remaining: 1m 14s
1464: learn: 7.9316358 total: 3m 23s remaining: 1m 14s
1465: learn: 7.9304533 total: 3m 23s remaining: 1m 14s
1466: learn: 7.9298629 total: 3m 23s remaining: 1m 14s
1467: learn: 7.9287617 total: 3m 23s remaining: 1m 13s
1468: learn: 7.9282507 total: 3m 24s remaining: 1m 13s
1469: learn: 7.9279416 total: 3m 24s remaining: 1m 13s
1470: learn: 7.9270901 total: 3m 24s remaining: 1m 13s
1471: learn: 7.9270475 total: 3m 24s remaining: 1m 13s
1472: learn: 7.9266234 total: 3m 24s remaining: 1m 13s
1473: learn: 7.9260684 total: 3m 24s remaining: 1m 13s
1474: learn: 7.9249844 total: 3m 24s remaining: 1m 12s
1475: learn: 7.9242969 total: 3m 25s remaining: 1m 12s
1476: learn: 7.9239237 total: 3m 25s remaining: 1m 12s
1477: learn: 7.9232309 total: 3m 25s remaining: 1m 12s
1478: learn: 7.9226356 total: 3m 25s remaining: 1m 12s
1479: learn: 7.9216073 total: 3m 25s remaining: 1m 12s
1480: learn: 7.9211160 total: 3m 25s remaining: 1m 12s
1481: learn: 7.9208119 total: 3m 25s remaining: 1m 11s
1482: learn: 7.9202484 total: 3m 26s remaining: 1m 11s
1483: learn: 7.9197355 total: 3m 26s remaining: 1m 11s
1484: learn: 7.9187908 total: 3m 26s remaining: 1m 11s
1485: learn: 7.9182273 total: 3m 26s remaining: 1m 11s
1486: learn: 7.9176998 total: 3m 26s remaining: 1m 11s
1487: learn: 7.9171725 total: 3m 26s remaining: 1m 11s
1488: learn: 7.9158488 total: 3m 26s remaining: 1m 11s
1489: learn: 7.9150371 total: 3m 27s remaining: 1m 10s
1490: learn: 7.9135280 total: 3m 27s remaining: 1m 10s
1491: learn: 7.9119455 total: 3m 27s remaining: 1m 10s
1492: learn: 7.9113059 total: 3m 27s remaining: 1m 10s
1493: learn: 7.9099178 total: 3m 27s remaining: 1m 10s
1494: learn: 7.9092631 total: 3m 27s remaining: 1m 10s
1495: learn: 7.9083721 total: 3m 27s remaining: 1m 10s
1496: learn: 7.9077539 total: 3m 28s remaining: 1m 9s
1497: learn: 7.9070348 total: 3m 28s remaining: 1m 9s
1498: learn: 7.9055671 total: 3m 28s remaining: 1m 9s
1499: learn: 7.9047248 total: 3m 28s remaining: 1m 9s
1500: learn: 7.9044263 total: 3m 28s remaining: 1m 9s
1501: learn: 7.9031583 total: 3m 28s remaining: 1m 9s
1502: learn: 7.9027008 total: 3m 28s remaining: 1m 9s
1503: learn: 7.9018994 total: 3m 29s remaining: 1m 8s
1504: learn: 7.9017228 total: 3m 29s remaining: 1m 8s
1505: learn: 7.9008370 total: 3m 29s remaining: 1m 8s
1506: learn: 7.8995000 total: 3m 29s remaining: 1m 8s
1507: learn: 7.8991677 total: 3m 29s remaining: 1m 8s
1508: learn: 7.8979093 total: 3m 29s remaining: 1m 8s
1509: learn: 7.8978732 total: 3m 29s remaining: 1m 8s
1510: learn: 7.8967822 total: 3m 30s remaining: 1m 7s
1511: learn: 7.8950936 total: 3m 30s remaining: 1m 7s
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1512: learn: 7.8937825 total: 3m 30s remaining: 1m 7s
1513: learn: 7.8936820 total: 3m 30s remaining: 1m 7s
1514: learn: 7.8930684 total: 3m 30s remaining: 1m 7s
1515: learn: 7.8919417 total: 3m 30s remaining: 1m 7s
1516: learn: 7.8917877 total: 3m 30s remaining: 1m 7s
1517: learn: 7.8910687 total: 3m 31s remaining: 1m 7s
1518: learn: 7.8905362 total: 3m 31s remaining: 1m 6s
1519: learn: 7.8898769 total: 3m 31s remaining: 1m 6s
1520: learn: 7.8886025 total: 3m 31s remaining: 1m 6s
1521: learn: 7.8872009 total: 3m 31s remaining: 1m 6s
1522: learn: 7.8862824 total: 3m 31s remaining: 1m 6s
1523: learn: 7.8860656 total: 3m 31s remaining: 1m 6s
1524: learn: 7.8858018 total: 3m 32s remaining: 1m 6s
1525: learn: 7.8852133 total: 3m 32s remaining: 1m 5s
1526: learn: 7.8844786 total: 3m 32s remaining: 1m 5s
1527: learn: 7.8832375 total: 3m 32s remaining: 1m 5s
1528: learn: 7.8826967 total: 3m 32s remaining: 1m 5s
1529: learn: 7.8818977 total: 3m 32s remaining: 1m 5s
1530: learn: 7.8810345 total: 3m 32s remaining: 1m 5s
1531: learn: 7.8809016 total: 3m 32s remaining: 1m 5s
1532: learn: 7.8800200 total: 3m 33s remaining: 1m 4s
1533: learn: 7.8791305 total: 3m 33s remaining: 1m 4s
1534: learn: 7.8779449 total: 3m 33s remaining: 1m 4s
1535: learn: 7.8776889 total: 3m 33s remaining: 1m 4s
1536: learn: 7.8766402 total: 3m 33s remaining: 1m 4s
1537: learn: 7.8764626 total: 3m 33s remaining: 1m 4s
1538: learn: 7.8760589 total: 3m 33s remaining: 1m 4s
1539: learn: 7.8751103 total: 3m 34s remaining: 1m 3s
1540: learn: 7.8747863 total: 3m 34s remaining: 1m 3s
1541: learn: 7.8741612 total: 3m 34s remaining: 1m 3s
1542: learn: 7.8721971 total: 3m 34s remaining: 1m 3s
1543: learn: 7.8712489 total: 3m 34s remaining: 1m 3s
1544: learn: 7.8705787 total: 3m 34s remaining: 1m 3s
1545: learn: 7.8684959 total: 3m 34s remaining: 1m 3s
1546: learn: 7.8678014 total: 3m 35s remaining: 1m 2s
1547: learn: 7.8674069 total: 3m 35s remaining: 1m 2s
1548: learn: 7.8668726 total: 3m 35s remaining: 1m 2s
1549: learn: 7.8654398 total: 3m 35s remaining: 1m 2s
1550: learn: 7.8638584 total: 3m 35s remaining: 1m 2s
1551: learn: 7.8632817 total: 3m 35s remaining: 1m 2s
1552: learn: 7.8628355 total: 3m 35s remaining: 1m 2s
1553: learn: 7.8624220 total: 3m 36s remaining: 1m 2s
1554: learn: 7.8615237 total: 3m 36s remaining: 1m 1s
1555: learn: 7.8611761 total: 3m 36s remaining: 1m 1s
1556: learn: 7.8596045 total: 3m 36s remaining: 1m 1s
1557: learn: 7.8591871 total: 3m 36s remaining: 1m 1s
1558: learn: 7.8585594 total: 3m 36s remaining: 1m 1s
1559: learn: 7.8578990 total: 3m 36s remaining: 1m 1s
1560: learn: 7.8565310 total: 3m 37s remaining: 1m 1s
1561: learn: 7.8558316 total: 3m 37s remaining: 1m
1562: learn: 7.8553392 total: 3m 37s remaining: 1m
1563: learn: 7.8548773 total: 3m 37s remaining: 1m
1564: learn: 7.8537553 total: 3m 37s remaining: 1m
1565: learn: 7.8519815 total: 3m 37s remaining: 1m
1566: learn: 7.8511851 total: 3m 37s remaining: 1m
1567: learn: 7.8506859 total: 3m 37s remaining: 1m
1568: learn: 7.8500964 total: 3m 38s remaining: 59.9s
1569: learn: 7.8495949 total: 3m 38s remaining: 59.8s
1570: learn: 7.8495842 total: 3m 38s remaining: 59.6s
1571: learn: 7.8490399 total: 3m 38s remaining: 59.5s
1572: learn: 7.8486314 total: 3m 38s remaining: 59.4s
1573: learn: 7.8480055 total: 3m 38s remaining: 59.2s
1574: learn: 7.8475707 total: 3m 38s remaining: 59.1s
1575: learn: 7.8465234 total: 3m 39s remaining: 58.9s
1576: learn: 7.8459730 total: 3m 39s remaining: 58.8s
1577: learn: 7.8454855 total: 3m 39s remaining: 58.7s
1578: learn: 7.8448898 total: 3m 39s remaining: 58.5s
1579: learn: 7.8437840 total: 3m 39s remaining: 58.4s
1580: learn: 7.8434337 total: 3m 39s remaining: 58.2s
1581: learn: 7.8423552 total: 3m 39s remaining: 58.1s
1582: learn: 7.8411307 total: 3m 40s remaining: 58s
1583: learn: 7.8410113 total: 3m 40s remaining: 57.8s
1584: learn: 7.8406256 total: 3m 40s remaining: 57.7s
1585: learn: 7.8393049 total: 3m 40s remaining: 57.6s
1586: learn: 7.8379256 total: 3m 40s remaining: 57.4s
1587: learn: 7.8371918 total: 3m 40s remaining: 57.3s
1588: learn: 7.8360125 total: 3m 40s remaining: 57.1s
```

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1589: learn: 7.8345980 total: 3m 41s remaining: 57s
1590: learn: 7.8345871 total: 3m 41s remaining: 56.9s
1591: learn: 7.8337316 total: 3m 41s remaining: 56.7s
1592: learn: 7.8336775 total: 3m 41s remaining: 56.6s
1593: learn: 7.8329827 total: 3m 41s remaining: 56.4s
1594: learn: 7.8319866 total: 3m 41s remaining: 56.3s
1595: learn: 7.8306988 total: 3m 41s remaining: 56.2s
1596: learn: 7.8306938 total: 3m 42s remaining: 56s
1597: learn: 7.8301440 total: 3m 42s remaining: 55.9s
1598: learn: 7.8291878 total: 3m 42s remaining: 55.7s
1599: learn: 7.8276314 total: 3m 42s remaining: 55.6s
1600: learn: 7.8269999 total: 3m 42s remaining: 55.5s
1601: learn: 7.8261498 total: 3m 42s remaining: 55.3s
1602: learn: 7.8255022 total: 3m 42s remaining: 55.2s
1603: learn: 7.8248380 total: 3m 42s remaining: 55s
1604: learn: 7.8244739 total: 3m 43s remaining: 54.9s
1605: learn: 7.8236110 total: 3m 43s remaining: 54.8s
1606: learn: 7.8229619 total: 3m 43s remaining: 54.6s
1607: learn: 7.8221520 total: 3m 43s remaining: 54.5s
1608: learn: 7.8211946 total: 3m 43s remaining: 54.4s
1609: learn: 7.8208878 total: 3m 43s remaining: 54.2s
1610: learn: 7.8197761 total: 3m 43s remaining: 54.1s
1611: learn: 7.8176828 total: 3m 44s remaining: 53.9s
1612: learn: 7.8176616 total: 3m 44s remaining: 53.8s
1613: learn: 7.8172117 total: 3m 44s remaining: 53.7s
1614: learn: 7.8172087 total: 3m 44s remaining: 53.5s
1615: learn: 7.8170259 total: 3m 44s remaining: 53.4s
1616: learn: 7.8163931 total: 3m 44s remaining: 53.2s
1617: learn: 7.8160530 total: 3m 44s remaining: 53.1s
1618: learn: 7.8156598 total: 3m 45s remaining: 53s
1619: learn: 7.8147147 total: 3m 45s remaining: 52.8s
1620: learn: 7.8140769 total: 3m 45s remaining: 52.7s
1621: learn: 7.8136890 total: 3m 45s remaining: 52.6s
1622: learn: 7.8132271 total: 3m 45s remaining: 52.4s
1623: learn: 7.8123214 total: 3m 45s remaining: 52.3s
1624: learn: 7.8116880 total: 3m 45s remaining: 52.1s
1625: learn: 7.8111076 total: 3m 46s remaining: 52s
1626: learn: 7.8110290 total: 3m 46s remaining: 51.9s
1627: learn: 7.8096801 total: 3m 46s remaining: 51.7s
1628: learn: 7.8089363 total: 3m 46s remaining: 51.6s
1629: learn: 7.8082602 total: 3m 46s remaining: 51.5s
1630: learn: 7.8078084 total: 3m 46s remaining: 51.3s
1631: learn: 7.8064620 total: 3m 46s remaining: 51.2s
1632: learn: 7.8059347 total: 3m 47s remaining: 51s
1633: learn: 7.8051261 total: 3m 47s remaining: 50.9s
1634: learn: 7.8038248 total: 3m 47s remaining: 50.8s
1635: learn: 7.8025363 total: 3m 47s remaining: 50.6s
1636: learn: 7.8017448 total: 3m 47s remaining: 50.5s
1637: learn: 7.8014442 total: 3m 47s remaining: 50.3s
1638: learn: 7.8005365 total: 3m 47s remaining: 50.2s
1639: learn: 7.8002490 total: 3m 48s remaining: 50.1s
1640: learn: 7.7993494 total: 3m 48s remaining: 49.9s
1641: learn: 7.7987027 total: 3m 48s remaining: 49.8s
1642: learn: 7.7980005 total: 3m 48s remaining: 49.6s
1643: learn: 7.7968721 total: 3m 48s remaining: 49.5s
1644: learn: 7.7964537 total: 3m 48s remaining: 49.4s
1645: learn: 7.7963460 total: 3m 48s remaining: 49.2s
1646: learn: 7.7951713 total: 3m 49s remaining: 49.1s
1647: learn: 7.7941532 total: 3m 49s remaining: 48.9s
1648: learn: 7.7939752 total: 3m 49s remaining: 48.8s
1649: learn: 7.7935934 total: 3m 49s remaining: 48.7s
1650: learn: 7.7930786 total: 3m 49s remaining: 48.5s
1651: learn: 7.7916801 total: 3m 49s remaining: 48.4s
1652: learn: 7.7907327 total: 3m 49s remaining: 48.3s
1653: learn: 7.7902221 total: 3m 49s remaining: 48.1s
1654: learn: 7.7893823 total: 3m 50s remaining: 48s
1655: learn: 7.7880957 total: 3m 50s remaining: 47.8s
1656: learn: 7.7880910 total: 3m 50s remaining: 47.7s
1657: learn: 7.7877525 total: 3m 50s remaining: 47.6s
1658: learn: 7.7869920 total: 3m 50s remaining: 47.4s
1659: learn: 7.7865356 total: 3m 50s remaining: 47.3s
1660: learn: 7.7858490 total: 3m 50s remaining: 47.1s
1661: learn: 7.7857917 total: 3m 51s remaining: 47s
1662: learn: 7.7844839 total: 3m 51s remaining: 46.9s
1663: learn: 7.7842190 total: 3m 51s remaining: 46.7s
1664: learn: 7.7836764 total: 3m 51s remaining: 46.6s
1665: learn: 7.7829201 total: 3m 51s remaining: 46.4s
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1665: learn: 7.7029201 total: 3m 51s remaining: 46.4s
1666: learn: 7.7815526 total: 3m 51s remaining: 46.3s
1667: learn: 7.7808797 total: 3m 51s remaining: 46.2s
1668: learn: 7.7793598 total: 3m 52s remaining: 46s
1669: learn: 7.7789764 total: 3m 52s remaining: 45.9s
1670: learn: 7.7781115 total: 3m 52s remaining: 45.8s
1671: learn: 7.7776520 total: 3m 52s remaining: 45.6s
1672: learn: 7.7760831 total: 3m 52s remaining: 45.5s
1673: learn: 7.7752121 total: 3m 52s remaining: 45.3s
1674: learn: 7.7746938 total: 3m 52s remaining: 45.2s
1675: learn: 7.7741478 total: 3m 53s remaining: 45.1s
1676: learn: 7.7732955 total: 3m 53s remaining: 44.9s
1677: learn: 7.7726024 total: 3m 53s remaining: 44.8s
1678: learn: 7.7712305 total: 3m 53s remaining: 44.6s
1679: learn: 7.7705857 total: 3m 53s remaining: 44.5s
1680: learn: 7.7701572 total: 3m 53s remaining: 44.4s
1681: learn: 7.7697980 total: 3m 53s remaining: 44.2s
1682: learn: 7.7690718 total: 3m 54s remaining: 44.1s
1683: learn: 7.7684008 total: 3m 54s remaining: 43.9s
1684: learn: 7.7678802 total: 3m 54s remaining: 43.8s
1685: learn: 7.7671425 total: 3m 54s remaining: 43.7s
1686: learn: 7.7660757 total: 3m 54s remaining: 43.5s
1687: learn: 7.7655334 total: 3m 54s remaining: 43.4s
1688: learn: 7.7646222 total: 3m 54s remaining: 43.3s
1689: learn: 7.7635195 total: 3m 55s remaining: 43.1s
1690: learn: 7.7625202 total: 3m 55s remaining: 43s
1691: learn: 7.7618485 total: 3m 55s remaining: 42.8s
1692: learn: 7.7611430 total: 3m 55s remaining: 42.7s
1693: learn: 7.7598955 total: 3m 55s remaining: 42.6s
1694: learn: 7.7595850 total: 3m 55s remaining: 42.4s
1695: learn: 7.7594764 total: 3m 55s remaining: 42.3s
1696: learn: 7.7589302 total: 3m 56s remaining: 42.1s
1697: learn: 7.7583207 total: 3m 56s remaining: 42s
1698: learn: 7.7577786 total: 3m 56s remaining: 41.9s
1699: learn: 7.7574518 total: 3m 56s remaining: 41.7s
1700: learn: 7.7563734 total: 3m 56s remaining: 41.6s
1701: learn: 7.7561576 total: 3m 56s remaining: 41.4s
1702: learn: 7.7557521 total: 3m 56s remaining: 41.3s
1703: learn: 7.7554334 total: 3m 57s remaining: 41.2s
1704: learn: 7.7549878 total: 3m 57s remaining: 41s
1705: learn: 7.7542378 total: 3m 57s remaining: 40.9s
1706: learn: 7.7537408 total: 3m 57s remaining: 40.8s
1707: learn: 7.7518449 total: 3m 57s remaining: 40.6s
1708: learn: 7.7518029 total: 3m 57s remaining: 40.5s
1709: learn: 7.7511716 total: 3m 57s remaining: 40.3s
1710: learn: 7.7510526 total: 3m 57s remaining: 40.2s
1711: learn: 7.7503881 total: 3m 58s remaining: 40.1s
1712: learn: 7.7499502 total: 3m 58s remaining: 39.9s
1713: learn: 7.7493724 total: 3m 58s remaining: 39.8s
1714: learn: 7.7487246 total: 3m 58s remaining: 39.6s
1715: learn: 7.7481364 total: 3m 58s remaining: 39.5s
1716: learn: 7.7474489 total: 3m 58s remaining: 39.4s
1717: learn: 7.7470988 total: 3m 58s remaining: 39.2s
1718: learn: 7.7460156 total: 3m 59s remaining: 39.1s
1719: learn: 7.7456906 total: 3m 59s remaining: 38.9s
1720: learn: 7.7450521 total: 3m 59s remaining: 38.8s
1721: learn: 7.7443250 total: 3m 59s remaining: 38.7s
1722: learn: 7.7437686 total: 3m 59s remaining: 38.5s
1723: learn: 7.7427075 total: 3m 59s remaining: 38.4s
1724: learn: 7.7419224 total: 3m 59s remaining: 38.3s
1725: learn: 7.7409833 total: 4m remaining: 38.1s
1726: learn: 7.7404098 total: 4m remaining: 38s
1727: learn: 7.7395700 total: 4m remaining: 37.8s
1728: learn: 7.7391052 total: 4m remaining: 37.7s
1729: learn: 7.7383026 total: 4m remaining: 37.6s
1730: learn: 7.7378855 total: 4m remaining: 37.4s
1731: learn: 7.7372044 total: 4m remaining: 37.3s
1732: learn: 7.7365105 total: 4m 1s remaining: 37.1s
1733: learn: 7.7361954 total: 4m 1s remaining: 37s
1734: learn: 7.7358968 total: 4m 1s remaining: 36.9s
1735: learn: 7.7352413 total: 4m 1s remaining: 36.7s
1736: learn: 7.7337726 total: 4m 1s remaining: 36.6s
1737: learn: 7.7331889 total: 4m 1s remaining: 36.4s
1738: learn: 7.7325932 total: 4m 1s remaining: 36.3s
1739: learn: 7.7314303 total: 4m 2s remaining: 36.2s
1740: learn: 7.7313039 total: 4m 2s remaining: 36s
1741: learn: 7.7304158 total: 4m 2s remaining: 35.9s
1742: learn: 7.7299066 total: 4m 2s remaining: 35.7s
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1742: learn: 7.7299000 total: 4m 2s remaining: 35.7s
1743: learn: 7.7287999 total: 4m 2s remaining: 35.6s
1744: learn: 7.7283607 total: 4m 2s remaining: 35.5s
1745: learn: 7.7264352 total: 4m 2s remaining: 35.3s
1746: learn: 7.7250364 total: 4m 3s remaining: 35.2s
1747: learn: 7.7246559 total: 4m 3s remaining: 35.1s
1748: learn: 7.7243056 total: 4m 3s remaining: 34.9s
1749: learn: 7.7242886 total: 4m 3s remaining: 34.8s
1750: learn: 7.7236394 total: 4m 3s remaining: 34.6s
1751: learn: 7.7236059 total: 4m 3s remaining: 34.5s
1752: learn: 7.7226787 total: 4m 3s remaining: 34.4s
1753: learn: 7.7223074 total: 4m 4s remaining: 34.2s
1754: learn: 7.7215962 total: 4m 4s remaining: 34.1s
1755: learn: 7.7209863 total: 4m 4s remaining: 33.9s
1756: learn: 7.7198134 total: 4m 4s remaining: 33.8s
1757: learn: 7.7190906 total: 4m 4s remaining: 33.7s
1758: learn: 7.7182508 total: 4m 4s remaining: 33.5s
1759: learn: 7.7179424 total: 4m 4s remaining: 33.4s
1760: learn: 7.7171467 total: 4m 4s remaining: 33.3s
1761: learn: 7.7167300 total: 4m 5s remaining: 33.1s
1762: learn: 7.7161699 total: 4m 5s remaining: 33s
1763: learn: 7.7156524 total: 4m 5s remaining: 32.8s
1764: learn: 7.7147419 total: 4m 5s remaining: 32.7s
1765: learn: 7.7144466 total: 4m 5s remaining: 32.6s
1766: learn: 7.7138501 total: 4m 5s remaining: 32.4s
1767: learn: 7.7129725 total: 4m 5s remaining: 32.3s
1768: learn: 7.7120650 total: 4m 6s remaining: 32.1s
1769: learn: 7.7116942 total: 4m 6s remaining: 32s
1770: learn: 7.7107647 total: 4m 6s remaining: 31.9s
1771: learn: 7.7103164 total: 4m 6s remaining: 31.7s
1772: learn: 7.7091722 total: 4m 6s remaining: 31.6s
1773: learn: 7.7076808 total: 4m 6s remaining: 31.4s
1774: learn: 7.7074784 total: 4m 6s remaining: 31.3s
1775: learn: 7.7066557 total: 4m 7s remaining: 31.2s
1776: learn: 7.7061968 total: 4m 7s remaining: 31s
1777: learn: 7.7054607 total: 4m 7s remaining: 30.9s
1778: learn: 7.7050854 total: 4m 7s remaining: 30.7s
1779: learn: 7.7046428 total: 4m 7s remaining: 30.6s
1780: learn: 7.7043482 total: 4m 7s remaining: 30.5s
1781: learn: 7.7033198 total: 4m 7s remaining: 30.3s
1782: learn: 7.7024739 total: 4m 8s remaining: 30.2s
1783: learn: 7.7015679 total: 4m 8s remaining: 30.1s
1784: learn: 7.7015668 total: 4m 8s remaining: 29.9s
1785: learn: 7.7004539 total: 4m 8s remaining: 29.8s
1786: learn: 7.6999265 total: 4m 8s remaining: 29.6s
1787: learn: 7.6994285 total: 4m 8s remaining: 29.5s
1788: learn: 7.6982990 total: 4m 8s remaining: 29.4s
1789: learn: 7.6976221 total: 4m 9s remaining: 29.2s
1790: learn: 7.6966853 total: 4m 9s remaining: 29.1s
1791: learn: 7.6957294 total: 4m 9s remaining: 28.9s
1792: learn: 7.6953188 total: 4m 9s remaining: 28.8s
1793: learn: 7.6951341 total: 4m 9s remaining: 28.7s
1794: learn: 7.6947865 total: 4m 9s remaining: 28.5s
1795: learn: 7.6941761 total: 4m 9s remaining: 28.4s
1796: learn: 7.6926194 total: 4m 10s remaining: 28.2s
1797: learn: 7.6911177 total: 4m 10s remaining: 28.1s
1798: learn: 7.6908078 total: 4m 10s remaining: 28s
1799: learn: 7.6900093 total: 4m 10s remaining: 27.8s
1800: learn: 7.6883588 total: 4m 10s remaining: 27.7s
1801: learn: 7.6880336 total: 4m 10s remaining: 27.6s
1802: learn: 7.6875778 total: 4m 10s remaining: 27.4s
1803: learn: 7.6870866 total: 4m 11s remaining: 27.3s
1804: learn: 7.6863724 total: 4m 11s remaining: 27.1s
1805: learn: 7.6852065 total: 4m 11s remaining: 27s
1806: learn: 7.6842358 total: 4m 11s remaining: 26.9s
1807: learn: 7.6840405 total: 4m 11s remaining: 26.7s
1808: learn: 7.6825308 total: 4m 11s remaining: 26.6s
1809: learn: 7.6824413 total: 4m 11s remaining: 26.4s
1810: learn: 7.6814760 total: 4m 12s remaining: 26.3s
1811: learn: 7.6806396 total: 4m 12s remaining: 26.2s
1812: learn: 7.6796485 total: 4m 12s remaining: 26s
1813: learn: 7.6790150 total: 4m 12s remaining: 25.9s
1814: learn: 7.6778703 total: 4m 12s remaining: 25.8s
1815: learn: 7.6764096 total: 4m 12s remaining: 25.6s
1816: learn: 7.6757149 total: 4m 12s remaining: 25.5s
1817: learn: 7.6750578 total: 4m 13s remaining: 25.3s
1818: learn: 7.6741945 total: 4m 13s remaining: 25.2s
1819: learn: 7.6734085 total: 4m 13s remaining: 25.1s
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1819: learn: 7.6754063 total: 4m 13s remaining: 25.1s
1820: learn: 7.6731515 total: 4m 13s remaining: 24.9s
1821: learn: 7.6722196 total: 4m 13s remaining: 24.8s
1822: learn: 7.6712956 total: 4m 13s remaining: 24.6s
1823: learn: 7.6704687 total: 4m 13s remaining: 24.5s
1824: learn: 7.6703690 total: 4m 14s remaining: 24.4s
1825: learn: 7.6701827 total: 4m 14s remaining: 24.2s
1826: learn: 7.6698604 total: 4m 14s remaining: 24.1s
1827: learn: 7.6694320 total: 4m 14s remaining: 23.9s
1828: learn: 7.6692626 total: 4m 14s remaining: 23.8s
1829: learn: 7.6690193 total: 4m 14s remaining: 23.7s
1830: learn: 7.6688376 total: 4m 14s remaining: 23.5s
1831: learn: 7.6678148 total: 4m 15s remaining: 23.4s
1832: learn: 7.6672263 total: 4m 15s remaining: 23.3s
1833: learn: 7.6664202 total: 4m 15s remaining: 23.1s
1834: learn: 7.6652412 total: 4m 15s remaining: 23s
1835: learn: 7.6651177 total: 4m 15s remaining: 22.8s
1836: learn: 7.6643888 total: 4m 15s remaining: 22.7s
1837: learn: 7.6627937 total: 4m 15s remaining: 22.6s
1838: learn: 7.6621562 total: 4m 16s remaining: 22.4s
1839: learn: 7.6613513 total: 4m 16s remaining: 22.3s
1840: learn: 7.6612972 total: 4m 16s remaining: 22.1s
1841: learn: 7.6608282 total: 4m 16s remaining: 22s
1842: learn: 7.6598388 total: 4m 16s remaining: 21.9s
1843: learn: 7.6593963 total: 4m 16s remaining: 21.7s
1844: learn: 7.6591953 total: 4m 16s remaining: 21.6s
1845: learn: 7.6584723 total: 4m 17s remaining: 21.4s
1846: learn: 7.6584700 total: 4m 17s remaining: 21.3s
1847: learn: 7.6582943 total: 4m 17s remaining: 21.2s
1848: learn: 7.6572991 total: 4m 17s remaining: 21s
1849: learn: 7.6567976 total: 4m 17s remaining: 20.9s
1850: learn: 7.6563991 total: 4m 17s remaining: 20.8s
1851: learn: 7.6553294 total: 4m 17s remaining: 20.6s
1852: learn: 7.6543785 total: 4m 18s remaining: 20.5s
1853: learn: 7.6540194 total: 4m 18s remaining: 20.3s
1854: learn: 7.6534653 total: 4m 18s remaining: 20.2s
1855: learn: 7.6531881 total: 4m 18s remaining: 20.1s
1856: learn: 7.6526039 total: 4m 18s remaining: 19.9s
1857: learn: 7.6520804 total: 4m 18s remaining: 19.8s
1858: learn: 7.6515108 total: 4m 18s remaining: 19.6s
1859: learn: 7.6506515 total: 4m 19s remaining: 19.5s
1860: learn: 7.6501562 total: 4m 19s remaining: 19.4s
1861: learn: 7.6486841 total: 4m 19s remaining: 19.2s
1862: learn: 7.6480967 total: 4m 19s remaining: 19.1s
1863: learn: 7.6470570 total: 4m 19s remaining: 18.9s
1864: learn: 7.6457596 total: 4m 19s remaining: 18.8s
1865: learn: 7.6450788 total: 4m 19s remaining: 18.7s
1866: learn: 7.6441961 total: 4m 20s remaining: 18.5s
1867: learn: 7.6429523 total: 4m 20s remaining: 18.4s
1868: learn: 7.6422912 total: 4m 20s remaining: 18.2s
1869: learn: 7.6416563 total: 4m 20s remaining: 18.1s
1870: learn: 7.6408318 total: 4m 20s remaining: 18s
1871: learn: 7.6400006 total: 4m 20s remaining: 17.8s
1872: learn: 7.6397000 total: 4m 20s remaining: 17.7s
1873: learn: 7.6386188 total: 4m 21s remaining: 17.5s
1874: learn: 7.6379533 total: 4m 21s remaining: 17.4s
1875: learn: 7.6371911 total: 4m 21s remaining: 17.3s
1876: learn: 7.6362729 total: 4m 21s remaining: 17.1s
1877: learn: 7.6357285 total: 4m 21s remaining: 17s
1878: learn: 7.6351809 total: 4m 21s remaining: 16.9s
1879: learn: 7.6344081 total: 4m 21s remaining: 16.7s
1880: learn: 7.6334659 total: 4m 22s remaining: 16.6s
1881: learn: 7.6329422 total: 4m 22s remaining: 16.4s
1882: learn: 7.6324453 total: 4m 22s remaining: 16.3s
1883: learn: 7.6320193 total: 4m 22s remaining: 16.2s
1884: learn: 7.6313344 total: 4m 22s remaining: 16s
1885: learn: 7.6307699 total: 4m 22s remaining: 15.9s
1886: learn: 7.6305761 total: 4m 22s remaining: 15.7s
1887: learn: 7.6302804 total: 4m 23s remaining: 15.6s
1888: learn: 7.6293698 total: 4m 23s remaining: 15.5s
1889: learn: 7.6286839 total: 4m 23s remaining: 15.3s
1890: learn: 7.6273725 total: 4m 23s remaining: 15.2s
1891: learn: 7.6264858 total: 4m 23s remaining: 15s
1892: learn: 7.6257049 total: 4m 23s remaining: 14.9s
1893: learn: 7.6253626 total: 4m 23s remaining: 14.8s
1894: learn: 7.6251887 total: 4m 23s remaining: 14.6s
1895: learn: 7.6245680 total: 4m 24s remaining: 14.5s
1896: learn: 7.6240324 total: 4m 24s remaining: 14.3s
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1896: learn: 7.6240324 total: 4m 24s remaining: 14.3s
1897: learn: 7.6235032 total: 4m 24s remaining: 14.2s
1898: learn: 7.6228688 total: 4m 24s remaining: 14.1s
1899: learn: 7.6218264 total: 4m 24s remaining: 13.9s
1900: learn: 7.6215473 total: 4m 24s remaining: 13.8s
1901: learn: 7.6212287 total: 4m 24s remaining: 13.7s
1902: learn: 7.6204589 total: 4m 25s remaining: 13.5s
1903: learn: 7.6203569 total: 4m 25s remaining: 13.4s
1904: learn: 7.6193108 total: 4m 25s remaining: 13.2s
1905: learn: 7.6180870 total: 4m 25s remaining: 13.1s
1906: learn: 7.6177249 total: 4m 25s remaining: 13s
1907: learn: 7.6169889 total: 4m 25s remaining: 12.8s
1908: learn: 7.6161354 total: 4m 25s remaining: 12.7s
1909: learn: 7.6161303 total: 4m 26s remaining: 12.5s
1910: learn: 7.6159382 total: 4m 26s remaining: 12.4s
1911: learn: 7.6143901 total: 4m 26s remaining: 12.3s
1912: learn: 7.6129498 total: 4m 26s remaining: 12.1s
1913: learn: 7.6123409 total: 4m 26s remaining: 12s
1914: learn: 7.6119234 total: 4m 26s remaining: 11.8s
1915: learn: 7.6109598 total: 4m 26s remaining: 11.7s
1916: learn: 7.6105366 total: 4m 27s remaining: 11.6s
1917: learn: 7.6091972 total: 4m 27s remaining: 11.4s
1918: learn: 7.6082109 total: 4m 27s remaining: 11.3s
1919: learn: 7.6078813 total: 4m 27s remaining: 11.1s
1920: learn: 7.6068468 total: 4m 27s remaining: 11s
1921: learn: 7.6057806 total: 4m 27s remaining: 10.9s
1922: learn: 7.6048561 total: 4m 27s remaining: 10.7s
1923: learn: 7.6039126 total: 4m 28s remaining: 10.6s
1924: learn: 7.6039098 total: 4m 28s remaining: 10.5s
1925: learn: 7.6031135 total: 4m 28s remaining: 10.3s
1926: learn: 7.6023904 total: 4m 28s remaining: 10.2s
1927: learn: 7.6014518 total: 4m 28s remaining: 10s
1928: learn: 7.6005766 total: 4m 28s remaining: 9.89s
1929: learn: 7.5998511 total: 4m 28s remaining: 9.75s
1930: learn: 7.5996829 total: 4m 29s remaining: 9.61s
1931: learn: 7.5991838 total: 4m 29s remaining: 9.47s
1932: learn: 7.5986652 total: 4m 29s remaining: 9.34s
1933: learn: 7.5978723 total: 4m 29s remaining: 9.2s
1934: learn: 7.5974783 total: 4m 29s remaining: 9.06s
1935: learn: 7.5971402 total: 4m 29s remaining: 8.92s
1936: learn: 7.5967957 total: 4m 29s remaining: 8.78s
1937: learn: 7.5960569 total: 4m 30s remaining: 8.64s
1938: learn: 7.5953789 total: 4m 30s remaining: 8.5s
1939: learn: 7.5952569 total: 4m 30s remaining: 8.36s
1940: learn: 7.5951439 total: 4m 30s remaining: 8.22s
1941: learn: 7.5940560 total: 4m 30s remaining: 8.08s
1942: learn: 7.5935639 total: 4m 30s remaining: 7.94s
1943: learn: 7.5932644 total: 4m 30s remaining: 7.8s
1944: learn: 7.5930340 total: 4m 31s remaining: 7.67s
1945: learn: 7.5921946 total: 4m 31s remaining: 7.53s
1946: learn: 7.5916339 total: 4m 31s remaining: 7.39s
1947: learn: 7.5911672 total: 4m 31s remaining: 7.25s
1948: learn: 7.5904086 total: 4m 31s remaining: 7.11s
1949: learn: 7.5898144 total: 4m 31s remaining: 6.97s
1950: learn: 7.5891050 total: 4m 31s remaining: 6.83s
1951: learn: 7.5888978 total: 4m 32s remaining: 6.69s
1952: learn: 7.5881066 total: 4m 32s remaining: 6.55s
1953: learn: 7.5876137 total: 4m 32s remaining: 6.41s
1954: learn: 7.5871827 total: 4m 32s remaining: 6.27s
1955: learn: 7.5862864 total: 4m 32s remaining: 6.13s
1956: learn: 7.5845124 total: 4m 32s remaining: 5.99s
1957: learn: 7.5838806 total: 4m 32s remaining: 5.85s
1958: learn: 7.5821094 total: 4m 33s remaining: 5.71s
1959: learn: 7.5818325 total: 4m 33s remaining: 5.58s
1960: learn: 7.5817039 total: 4m 33s remaining: 5.44s
1961: learn: 7.5815154 total: 4m 33s remaining: 5.3s
1962: learn: 7.5807075 total: 4m 33s remaining: 5.16s
1963: learn: 7.5798869 total: 4m 33s remaining: 5.02s
1964: learn: 7.5797370 total: 4m 33s remaining: 4.88s
1965: learn: 7.5791011 total: 4m 34s remaining: 4.74s
1966: learn: 7.5779345 total: 4m 34s remaining: 4.6s
1967: learn: 7.5768477 total: 4m 34s remaining: 4.46s
1968: learn: 7.5762901 total: 4m 34s remaining: 4.32s
1969: learn: 7.5759005 total: 4m 34s remaining: 4.18s
1970: learn: 7.5748481 total: 4m 34s remaining: 4.04s
1971: learn: 7.5736744 total: 4m 34s remaining: 3.9s
1972: learn: 7.5730807 total: 4m 35s remaining: 3.76s
1973: learn: 7.5731041 total: 4m 35s remaining: 3.62s
```

```
1973: learn: 7.5721941 total: 4m 35s remaining: 3.62s
1974: learn: 7.5716214 total: 4m 35s remaining: 3.48s
1975: learn: 7.5711742 total: 4m 35s remaining: 3.35s
1976: learn: 7.5707103 total: 4m 35s remaining: 3.21s
1977: learn: 7.5701837 total: 4m 35s remaining: 3.07s
1978: learn: 7.5692741 total: 4m 35s remaining: 2.93s
1979: learn: 7.5684777 total: 4m 36s remaining: 2.79s
1980: learn: 7.5674226 total: 4m 36s remaining: 2.65s
1981: learn: 7.5669932 total: 4m 36s remaining: 2.51s
1982: learn: 7.5660632 total: 4m 36s remaining: 2.37s
1983: learn: 7.5657894 total: 4m 36s remaining: 2.23s
1984: learn: 7.5653609 total: 4m 36s remaining: 2.09s
1985: learn: 7.5646481 total: 4m 36s remaining: 1.95s
1986: learn: 7.5634580 total: 4m 36s remaining: 1.81s
1987: learn: 7.5630630 total: 4m 37s remaining: 1.67s
1988: learn: 7.5629961 total: 4m 37s remaining: 1.53s
1989: learn: 7.5621846 total: 4m 37s remaining: 1.39s
1990: learn: 7.5619694 total: 4m 37s remaining: 1.25s
1991: learn: 7.5609693 total: 4m 37s remaining: 1.11s
1992: learn: 7.5600796 total: 4m 37s remaining: 976ms
1993: learn: 7.5595445 total: 4m 37s remaining: 836ms
1994: learn: 7.5585922 total: 4m 38s remaining: 697ms
1995: learn: 7.5568883 total: 4m 38s remaining: 558ms
1996: learn: 7.5555866 total: 4m 38s remaining: 418ms
1997: learn: 7.5547908 total: 4m 38s remaining: 279ms
1998: learn: 7.5540419 total: 4m 38s remaining: 139ms
1999: learn: 7.5532613 total: 4m 38s remaining: 0us
```

Out[ ]:

```
{'depth': 10, 'iterations': 2000, 'learning_rate': 0.05}
```

In [ ]:

```python
def plot_important_feature_Cat(Cat):
  important=pd.DataFrame(Cat.feature_importances_,columns=['Importance'],index=train_x.columns)
  imp=important.sort_values(['Importance'],ascending=True)

  imp[:20].plot(kind='barh')
```

In [ ]:

```python
parameters = {    'depth'         : [10],
                  'learning_rate' : [ 0.05],
                  'iterations'    : [2000]
                }
Cat, pred_testy = Catboost(train_x,train_y,test_x,**model_params)


plot_important_feature_Cat(Cat)
rmsle_cat =RMSLE(test_y,pred_testy)
rmsle_cat
```

```
0: learn: 16.4124233 total: 137ms remaining: 4m 33s
1: learn: 15.9832892 total: 282ms remaining: 4m 41s
2: learn: 15.5757375 total: 419ms remaining: 4m 38s
3: learn: 15.2057369 total: 553ms remaining: 4m 35s
4: learn: 14.8593143 total: 696ms remaining: 4m 37s
5: learn: 14.5372049 total: 831ms remaining: 4m 36s
6: learn: 14.2337530 total: 975ms remaining: 4m 37s
7: learn: 13.9493307 total: 1.11s remaining: 4m 36s
8: learn: 13.6836602 total: 1.25s remaining: 4m 37s
9: learn: 13.4404074 total: 1.39s remaining: 4m 36s
10: learn: 13.2132936 total: 1.52s remaining: 4m 35s
11: learn: 13.0015213 total: 1.66s remaining: 4m 34s
12: learn: 12.8032366 total: 1.79s remaining: 4m 33s
13: learn: 12.6240042 total: 1.93s remaining: 4m 34s
14: learn: 12.4552909 total: 2.07s remaining: 4m 33s
15: learn: 12.2970468 total: 2.21s remaining: 4m 33s
16: learn: 12.1546269 total: 2.35s remaining: 4m 34s
17: learn: 12.0215231 total: 2.49s remaining: 4m 33s
18: learn: 11.8973766 total: 2.62s remaining: 4m 33s
19: learn: 11.7834103 total: 2.76s remaining: 4m 33s
20: learn: 11.6763442 total: 2.9s remaining: 4m 32s
21: learn: 11.5831615 total: 3.04s remaining: 4m 33s
```

```
21: learn: 11.5821615 total: 3.04s remaining: 4m 33s
22: learn: 11.4922357 total: 3.19s remaining: 4m 34s
23: learn: 11.4065528 total: 3.34s remaining: 4m 34s
24: learn: 11.3281835 total: 3.48s remaining: 4m 35s
25: learn: 11.2569124 total: 3.62s remaining: 4m 35s
26: learn: 11.1882153 total: 3.77s remaining: 4m 35s
27: learn: 11.1283187 total: 3.91s remaining: 4m 35s
28: learn: 11.0650542 total: 4.07s remaining: 4m 36s
29: learn: 11.0082113 total: 4.22s remaining: 4m 36s
30: learn: 10.9534917 total: 4.37s remaining: 4m 37s
31: learn: 10.9081634 total: 4.51s remaining: 4m 37s
32: learn: 10.8653797 total: 4.65s remaining: 4m 37s
33: learn: 10.8225972 total: 4.79s remaining: 4m 37s
34: learn: 10.7813340 total: 4.93s remaining: 4m 36s
35: learn: 10.7466325 total: 5.08s remaining: 4m 37s
36: learn: 10.7117902 total: 5.22s remaining: 4m 37s
37: learn: 10.6742373 total: 5.37s remaining: 4m 37s
38: learn: 10.6455641 total: 5.51s remaining: 4m 37s
39: learn: 10.6160727 total: 5.66s remaining: 4m 37s
40: learn: 10.5902558 total: 5.8s remaining: 4m 37s
41: learn: 10.5617898 total: 5.94s remaining: 4m 36s
42: learn: 10.5372008 total: 6.09s remaining: 4m 37s
43: learn: 10.5122461 total: 6.23s remaining: 4m 36s
44: learn: 10.4895619 total: 6.38s remaining: 4m 37s
45: learn: 10.4693756 total: 6.53s remaining: 4m 37s
46: learn: 10.4463404 total: 6.67s remaining: 4m 37s
47: learn: 10.4288365 total: 6.81s remaining: 4m 36s
48: learn: 10.4114332 total: 6.95s remaining: 4m 36s
49: learn: 10.3936750 total: 7.1s remaining: 4m 36s
50: learn: 10.3785932 total: 7.25s remaining: 4m 37s
51: learn: 10.3617184 total: 7.39s remaining: 4m 37s
52: learn: 10.3457765 total: 7.54s remaining: 4m 36s
53: learn: 10.3307931 total: 7.67s remaining: 4m 36s
54: learn: 10.3176769 total: 7.82s remaining: 4m 36s
55: learn: 10.3032108 total: 7.96s remaining: 4m 36s
56: learn: 10.2905467 total: 8.11s remaining: 4m 36s
57: learn: 10.2793034 total: 8.25s remaining: 4m 36s
58: learn: 10.2676975 total: 8.4s remaining: 4m 36s
59: learn: 10.2553314 total: 8.54s remaining: 4m 36s
60: learn: 10.2432044 total: 8.69s remaining: 4m 36s
61: learn: 10.2350733 total: 8.83s remaining: 4m 35s
62: learn: 10.2207500 total: 8.97s remaining: 4m 35s
63: learn: 10.2104211 total: 9.12s remaining: 4m 35s
64: learn: 10.2004139 total: 9.27s remaining: 4m 35s
65: learn: 10.1921866 total: 9.41s remaining: 4m 35s
66: learn: 10.1799891 total: 9.56s remaining: 4m 35s
67: learn: 10.1733253 total: 9.7s remaining: 4m 35s
68: learn: 10.1618840 total: 9.85s remaining: 4m 35s
69: learn: 10.1533460 total: 9.99s remaining: 4m 35s
70: learn: 10.1458680 total: 10.1s remaining: 4m 35s
71: learn: 10.1328610 total: 10.3s remaining: 4m 35s
72: learn: 10.1218083 total: 10.4s remaining: 4m 35s
73: learn: 10.1137402 total: 10.6s remaining: 4m 35s
74: learn: 10.1070640 total: 10.7s remaining: 4m 35s
75: learn: 10.0980949 total: 10.9s remaining: 4m 34s
76: learn: 10.0898293 total: 11s remaining: 4m 34s
77: learn: 10.0820661 total: 11.2s remaining: 4m 34s
78: learn: 10.0739792 total: 11.3s remaining: 4m 34s
79: learn: 10.0671801 total: 11.5s remaining: 4m 34s
80: learn: 10.0593742 total: 11.6s remaining: 4m 34s
81: learn: 10.0517957 total: 11.7s remaining: 4m 34s
82: learn: 10.0474248 total: 11.9s remaining: 4m 34s
83: learn: 10.0393367 total: 12s remaining: 4m 34s
84: learn: 10.0344965 total: 12.2s remaining: 4m 34s
85: learn: 10.0276782 total: 12.3s remaining: 4m 34s
86: learn: 10.0212682 total: 12.5s remaining: 4m 34s
87: learn: 10.0155034 total: 12.6s remaining: 4m 34s
88: learn: 10.0094264 total: 12.8s remaining: 4m 34s
89: learn: 10.0031284 total: 12.9s remaining: 4m 33s
90: learn: 9.9984400 total: 13.1s remaining: 4m 33s
91: learn: 9.9951157 total: 13.2s remaining: 4m 33s
92: learn: 9.9884017 total: 13.4s remaining: 4m 33s
93: learn: 9.9824433 total: 13.5s remaining: 4m 33s
94: learn: 9.9771791 total: 13.6s remaining: 4m 33s
95: learn: 9.9715075 total: 13.8s remaining: 4m 33s
96: learn: 9.9674814 total: 13.9s remaining: 4m 33s
97: learn: 9.9597465 total: 14.1s remaining: 4m 33s
98: learn: 9.9554670 total: 14.3s remaining: 4m 33s
```

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98: learn: 9.9554670 total: 14.2s remaining: 4m 33s
99: learn: 9.9506875 total: 14.4s remaining: 4m 32s
100: learn: 9.9475170 total: 14.5s remaining: 4m 32s
101: learn: 9.9429421 total: 14.7s remaining: 4m 32s
102: learn: 9.9374514 total: 14.8s remaining: 4m 32s
103: learn: 9.9340397 total: 15s remaining: 4m 32s
104: learn: 9.9296820 total: 15.1s remaining: 4m 32s
105: learn: 9.9252698 total: 15.3s remaining: 4m 32s
106: learn: 9.9204045 total: 15.4s remaining: 4m 32s
107: learn: 9.9121841 total: 15.6s remaining: 4m 32s
108: learn: 9.9066873 total: 15.7s remaining: 4m 32s
109: learn: 9.8969636 total: 15.8s remaining: 4m 32s
110: learn: 9.8894141 total: 16s remaining: 4m 32s
111: learn: 9.8856686 total: 16.1s remaining: 4m 31s
112: learn: 9.8810747 total: 16.3s remaining: 4m 31s
113: learn: 9.8770594 total: 16.4s remaining: 4m 31s
114: learn: 9.8731583 total: 16.6s remaining: 4m 31s
115: learn: 9.8686916 total: 16.7s remaining: 4m 31s
116: learn: 9.8655410 total: 16.9s remaining: 4m 31s
117: learn: 9.8624003 total: 17s remaining: 4m 31s
118: learn: 9.8566281 total: 17.2s remaining: 4m 31s
119: learn: 9.8527885 total: 17.3s remaining: 4m 31s
120: learn: 9.8475133 total: 17.4s remaining: 4m 30s
121: learn: 9.8442656 total: 17.6s remaining: 4m 30s
122: learn: 9.8427684 total: 17.7s remaining: 4m 30s
123: learn: 9.8372802 total: 17.9s remaining: 4m 30s
124: learn: 9.8343369 total: 18s remaining: 4m 30s
125: learn: 9.8285645 total: 18.2s remaining: 4m 30s
126: learn: 9.8268357 total: 18.3s remaining: 4m 30s
127: learn: 9.8236763 total: 18.5s remaining: 4m 30s
128: learn: 9.8187427 total: 18.6s remaining: 4m 29s
129: learn: 9.8144143 total: 18.8s remaining: 4m 29s
130: learn: 9.8105305 total: 18.9s remaining: 4m 29s
131: learn: 9.8049785 total: 19s remaining: 4m 29s
132: learn: 9.8006399 total: 19.2s remaining: 4m 29s
133: learn: 9.7982847 total: 19.3s remaining: 4m 29s
134: learn: 9.7933932 total: 19.5s remaining: 4m 29s
135: learn: 9.7870928 total: 19.6s remaining: 4m 28s
136: learn: 9.7830414 total: 19.8s remaining: 4m 28s
137: learn: 9.7810368 total: 19.9s remaining: 4m 28s
138: learn: 9.7761924 total: 20.1s remaining: 4m 28s
139: learn: 9.7732159 total: 20.2s remaining: 4m 28s
140: learn: 9.7694268 total: 20.4s remaining: 4m 28s
141: learn: 9.7634061 total: 20.5s remaining: 4m 28s
142: learn: 9.7608845 total: 20.7s remaining: 4m 28s
143: learn: 9.7581143 total: 20.8s remaining: 4m 28s
144: learn: 9.7553989 total: 20.9s remaining: 4m 27s
145: learn: 9.7530562 total: 21.1s remaining: 4m 27s
146: learn: 9.7504358 total: 21.2s remaining: 4m 27s
147: learn: 9.7480509 total: 21.4s remaining: 4m 27s
148: learn: 9.7445896 total: 21.5s remaining: 4m 27s
149: learn: 9.7418198 total: 21.7s remaining: 4m 27s
150: learn: 9.7394828 total: 21.8s remaining: 4m 27s
151: learn: 9.7366986 total: 22s remaining: 4m 26s
152: learn: 9.7329954 total: 22.1s remaining: 4m 26s
153: learn: 9.7299672 total: 22.3s remaining: 4m 26s
154: learn: 9.7285647 total: 22.4s remaining: 4m 26s
155: learn: 9.7267892 total: 22.5s remaining: 4m 26s
156: learn: 9.7222728 total: 22.7s remaining: 4m 26s
157: learn: 9.7163668 total: 22.8s remaining: 4m 26s
158: learn: 9.7147878 total: 23s remaining: 4m 26s
159: learn: 9.7126071 total: 23.1s remaining: 4m 25s
160: learn: 9.7091376 total: 23.3s remaining: 4m 25s
161: learn: 9.7065188 total: 23.4s remaining: 4m 25s
162: learn: 9.7009637 total: 23.5s remaining: 4m 25s
163: learn: 9.6991482 total: 23.7s remaining: 4m 25s
164: learn: 9.6960309 total: 23.8s remaining: 4m 25s
165: learn: 9.6925115 total: 24s remaining: 4m 24s
166: learn: 9.6898445 total: 24.1s remaining: 4m 24s
167: learn: 9.6874092 total: 24.3s remaining: 4m 24s
168: learn: 9.6843602 total: 24.4s remaining: 4m 24s
169: learn: 9.6810232 total: 24.6s remaining: 4m 24s
170: learn: 9.6760844 total: 24.7s remaining: 4m 24s
171: learn: 9.6742090 total: 24.9s remaining: 4m 24s
172: learn: 9.6685787 total: 25s remaining: 4m 23s
173: learn: 9.6629596 total: 25.1s remaining: 4m 23s
174: learn: 9.6571460 total: 25.3s remaining: 4m 23s
175: learn: 9.6553630 total: 25.4s remaining: 4m 23s
```

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175: learn: 9.6553630 total: 25.4s remaining: 4m 23s
176: learn: 9.6522783 total: 25.6s remaining: 4m 23s
177: learn: 9.6500139 total: 25.7s remaining: 4m 23s
178: learn: 9.6486624 total: 25.9s remaining: 4m 23s
179: learn: 9.6450663 total: 26s remaining: 4m 23s
180: learn: 9.6414767 total: 26.2s remaining: 4m 23s
181: learn: 9.6376084 total: 26.3s remaining: 4m 23s
182: learn: 9.6363818 total: 26.5s remaining: 4m 22s
183: learn: 9.6310727 total: 26.6s remaining: 4m 22s
184: learn: 9.6284761 total: 26.8s remaining: 4m 22s
185: learn: 9.6267248 total: 26.9s remaining: 4m 22s
186: learn: 9.6218153 total: 27.1s remaining: 4m 22s
187: learn: 9.6173038 total: 27.2s remaining: 4m 22s
188: learn: 9.6138222 total: 27.4s remaining: 4m 22s
189: learn: 9.6112101 total: 27.5s remaining: 4m 22s
190: learn: 9.6093077 total: 27.7s remaining: 4m 21s
191: learn: 9.6060604 total: 27.8s remaining: 4m 21s
192: learn: 9.6017356 total: 27.9s remaining: 4m 21s
193: learn: 9.5972490 total: 28.1s remaining: 4m 21s
194: learn: 9.5950341 total: 28.2s remaining: 4m 21s
195: learn: 9.5939195 total: 28.4s remaining: 4m 21s
196: learn: 9.5899251 total: 28.5s remaining: 4m 20s
197: learn: 9.5868014 total: 28.7s remaining: 4m 20s
198: learn: 9.5841719 total: 28.8s remaining: 4m 20s
199: learn: 9.5804587 total: 28.9s remaining: 4m 20s
200: learn: 9.5775248 total: 29.1s remaining: 4m 20s
201: learn: 9.5750755 total: 29.2s remaining: 4m 20s
202: learn: 9.5702767 total: 29.4s remaining: 4m 20s
203: learn: 9.5678559 total: 29.5s remaining: 4m 20s
204: learn: 9.5629358 total: 29.7s remaining: 4m 19s
205: learn: 9.5603660 total: 29.8s remaining: 4m 19s
206: learn: 9.5560431 total: 30s remaining: 4m 19s
207: learn: 9.5505554 total: 30.1s remaining: 4m 19s
208: learn: 9.5465258 total: 30.2s remaining: 4m 19s
209: learn: 9.5429526 total: 30.4s remaining: 4m 19s
210: learn: 9.5395828 total: 30.5s remaining: 4m 18s
211: learn: 9.5364921 total: 30.7s remaining: 4m 18s
212: learn: 9.5347599 total: 30.8s remaining: 4m 18s
213: learn: 9.5317667 total: 31s remaining: 4m 18s
214: learn: 9.5284229 total: 31.1s remaining: 4m 18s
215: learn: 9.5242012 total: 31.3s remaining: 4m 18s
216: learn: 9.5207035 total: 31.4s remaining: 4m 18s
217: learn: 9.5166757 total: 31.5s remaining: 4m 17s
218: learn: 9.5149202 total: 31.7s remaining: 4m 17s
219: learn: 9.5121476 total: 31.8s remaining: 4m 17s
220: learn: 9.5077811 total: 32s remaining: 4m 17s
221: learn: 9.5036957 total: 32.1s remaining: 4m 17s
222: learn: 9.5015938 total: 32.3s remaining: 4m 17s
223: learn: 9.4981317 total: 32.4s remaining: 4m 16s
224: learn: 9.4963647 total: 32.6s remaining: 4m 16s
225: learn: 9.4942726 total: 32.7s remaining: 4m 16s
226: learn: 9.4913238 total: 32.8s remaining: 4m 16s
227: learn: 9.4872903 total: 33s remaining: 4m 16s
228: learn: 9.4856717 total: 33.1s remaining: 4m 16s
229: learn: 9.4827373 total: 33.3s remaining: 4m 15s
230: learn: 9.4797744 total: 33.4s remaining: 4m 15s
231: learn: 9.4785514 total: 33.5s remaining: 4m 15s
232: learn: 9.4750803 total: 33.7s remaining: 4m 15s
233: learn: 9.4721299 total: 33.8s remaining: 4m 15s
234: learn: 9.4683857 total: 34s remaining: 4m 15s
235: learn: 9.4659212 total: 34.1s remaining: 4m 14s
236: learn: 9.4633871 total: 34.3s remaining: 4m 14s
237: learn: 9.4595842 total: 34.4s remaining: 4m 14s
238: learn: 9.4574659 total: 34.5s remaining: 4m 14s
239: learn: 9.4538470 total: 34.7s remaining: 4m 14s
240: learn: 9.4515733 total: 34.8s remaining: 4m 14s
241: learn: 9.4485790 total: 35s remaining: 4m 14s
242: learn: 9.4466020 total: 35.1s remaining: 4m 13s
243: learn: 9.4443559 total: 35.2s remaining: 4m 13s
244: learn: 9.4423419 total: 35.4s remaining: 4m 13s
245: learn: 9.4395788 total: 35.5s remaining: 4m 13s
246: learn: 9.4359983 total: 35.7s remaining: 4m 13s
247: learn: 9.4342445 total: 35.8s remaining: 4m 13s
248: learn: 9.4334093 total: 36s remaining: 4m 12s
249: learn: 9.4296609 total: 36.1s remaining: 4m 12s
250: learn: 9.4265699 total: 36.3s remaining: 4m 12s
251: learn: 9.4224343 total: 36.4s remaining: 4m 12s
```

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252: learn: 9.4203553 total: 36.5s remaining: 4m 12s
253: learn: 9.4171922 total: 36.7s remaining: 4m 12s
254: learn: 9.4137531 total: 36.8s remaining: 4m 12s
255: learn: 9.4102485 total: 37s remaining: 4m 11s
256: learn: 9.4089952 total: 37.1s remaining: 4m 11s
257: learn: 9.4052576 total: 37.2s remaining: 4m 11s
258: learn: 9.4017106 total: 37.4s remaining: 4m 11s
259: learn: 9.3979081 total: 37.5s remaining: 4m 11s
260: learn: 9.3955170 total: 37.7s remaining: 4m 10s
261: learn: 9.3930596 total: 37.8s remaining: 4m 10s
262: learn: 9.3897261 total: 38s remaining: 4m 10s
263: learn: 9.3860388 total: 38.1s remaining: 4m 10s
264: learn: 9.3859219 total: 38.2s remaining: 4m 10s
265: learn: 9.3841904 total: 38.3s remaining: 4m 9s
266: learn: 9.3819994 total: 38.5s remaining: 4m 9s
267: learn: 9.3773690 total: 38.6s remaining: 4m 9s
268: learn: 9.3745206 total: 38.8s remaining: 4m 9s
269: learn: 9.3732699 total: 38.9s remaining: 4m 9s
270: learn: 9.3717250 total: 39s remaining: 4m 9s
271: learn: 9.3690982 total: 39.2s remaining: 4m 8s
272: learn: 9.3649746 total: 39.3s remaining: 4m 8s
273: learn: 9.3625445 total: 39.5s remaining: 4m 8s
274: learn: 9.3614205 total: 39.6s remaining: 4m 8s
275: learn: 9.3586270 total: 39.8s remaining: 4m 8s
276: learn: 9.3564397 total: 39.9s remaining: 4m 8s
277: learn: 9.3550498 total: 40s remaining: 4m 8s
278: learn: 9.3516691 total: 40.2s remaining: 4m 7s
279: learn: 9.3478248 total: 40.3s remaining: 4m 7s
280: learn: 9.3445109 total: 40.5s remaining: 4m 7s
281: learn: 9.3423475 total: 40.6s remaining: 4m 7s
282: learn: 9.3392658 total: 40.7s remaining: 4m 7s
283: learn: 9.3362176 total: 40.9s remaining: 4m 7s
284: learn: 9.3341110 total: 41s remaining: 4m 6s
285: learn: 9.3334172 total: 41.2s remaining: 4m 6s
286: learn: 9.3314640 total: 41.3s remaining: 4m 6s
287: learn: 9.3264823 total: 41.5s remaining: 4m 6s
288: learn: 9.3235476 total: 41.6s remaining: 4m 6s
289: learn: 9.3203670 total: 41.7s remaining: 4m 6s
290: learn: 9.3191898 total: 41.9s remaining: 4m 6s
291: learn: 9.3184078 total: 42s remaining: 4m 5s
292: learn: 9.3160747 total: 42.2s remaining: 4m 5s
293: learn: 9.3145125 total: 42.3s remaining: 4m 5s
294: learn: 9.3120929 total: 42.5s remaining: 4m 5s
295: learn: 9.3112755 total: 42.6s remaining: 4m 5s
296: learn: 9.3098302 total: 42.7s remaining: 4m 4s
297: learn: 9.3088936 total: 42.9s remaining: 4m 4s
298: learn: 9.3063011 total: 43s remaining: 4m 4s
299: learn: 9.3032193 total: 43.2s remaining: 4m 4s
300: learn: 9.3007860 total: 43.3s remaining: 4m 4s
301: learn: 9.2983382 total: 43.4s remaining: 4m 4s
302: learn: 9.2959485 total: 43.6s remaining: 4m 4s
303: learn: 9.2932538 total: 43.7s remaining: 4m 3s
304: learn: 9.2903713 total: 43.9s remaining: 4m 3s
305: learn: 9.2894654 total: 44s remaining: 4m 3s
306: learn: 9.2888179 total: 44.1s remaining: 4m 3s
307: learn: 9.2866372 total: 44.3s remaining: 4m 3s
308: learn: 9.2836071 total: 44.4s remaining: 4m 3s
309: learn: 9.2823886 total: 44.6s remaining: 4m 2s
310: learn: 9.2799781 total: 44.7s remaining: 4m 2s
311: learn: 9.2787125 total: 44.8s remaining: 4m 2s
312: learn: 9.2760129 total: 45s remaining: 4m 2s
313: learn: 9.2716486 total: 45.1s remaining: 4m 2s
314: learn: 9.2691540 total: 45.3s remaining: 4m 2s
315: learn: 9.2661019 total: 45.4s remaining: 4m 2s
316: learn: 9.2631846 total: 45.6s remaining: 4m 1s
317: learn: 9.2606125 total: 45.7s remaining: 4m 1s
318: learn: 9.2584089 total: 45.8s remaining: 4m 1s
319: learn: 9.2567027 total: 46s remaining: 4m 1s
320: learn: 9.2559192 total: 46.1s remaining: 4m 1s
321: learn: 9.2527455 total: 46.3s remaining: 4m 1s
322: learn: 9.2516696 total: 46.4s remaining: 4m
323: learn: 9.2487361 total: 46.5s remaining: 4m
324: learn: 9.2449774 total: 46.7s remaining: 4m
325: learn: 9.2438403 total: 46.8s remaining: 4m
326: learn: 9.2399914 total: 47s remaining: 4m
327: learn: 9.2370356 total: 47.1s remaining: 4m
328: learn: 9.2328575 total: 47.3s remaining: 4m
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329: learn: 9.2299553 total: 47.4s remaining: 4m
330: learn: 9.2271071 total: 47.6s remaining: 3m 59s
331: learn: 9.2245308 total: 47.7s remaining: 3m 59s
332: learn: 9.2231458 total: 47.9s remaining: 3m 59s
333: learn: 9.2216015 total: 48s remaining: 3m 59s
334: learn: 9.2188793 total: 48.2s remaining: 3m 59s
335: learn: 9.2158138 total: 48.3s remaining: 3m 59s
336: learn: 9.2137168 total: 48.5s remaining: 3m 59s
337: learn: 9.2117167 total: 48.6s remaining: 3m 58s
338: learn: 9.2105916 total: 48.7s remaining: 3m 58s
339: learn: 9.2069812 total: 48.9s remaining: 3m 58s
340: learn: 9.2041196 total: 49s remaining: 3m 58s
341: learn: 9.2016979 total: 49.2s remaining: 3m 58s
342: learn: 9.2002657 total: 49.4s remaining: 3m 58s
343: learn: 9.1986908 total: 49.5s remaining: 3m 58s
344: learn: 9.1952035 total: 49.6s remaining: 3m 58s
345: learn: 9.1927053 total: 49.8s remaining: 3m 57s
346: learn: 9.1889263 total: 49.9s remaining: 3m 57s
347: learn: 9.1857794 total: 50.1s remaining: 3m 57s
348: learn: 9.1830984 total: 50.2s remaining: 3m 57s
349: learn: 9.1818413 total: 50.4s remaining: 3m 57s
350: learn: 9.1794253 total: 50.5s remaining: 3m 57s
351: learn: 9.1770415 total: 50.6s remaining: 3m 57s
352: learn: 9.1738681 total: 50.8s remaining: 3m 56s
353: learn: 9.1711643 total: 50.9s remaining: 3m 56s
354: learn: 9.1702059 total: 51.1s remaining: 3m 56s
355: learn: 9.1687011 total: 51.2s remaining: 3m 56s
356: learn: 9.1658768 total: 51.4s remaining: 3m 56s
357: learn: 9.1633944 total: 51.5s remaining: 3m 56s
358: learn: 9.1605844 total: 51.6s remaining: 3m 56s
359: learn: 9.1593238 total: 51.8s remaining: 3m 55s
360: learn: 9.1579034 total: 51.9s remaining: 3m 55s
361: learn: 9.1570207 total: 52.1s remaining: 3m 55s
362: learn: 9.1557071 total: 52.2s remaining: 3m 55s
363: learn: 9.1533219 total: 52.3s remaining: 3m 55s
364: learn: 9.1518753 total: 52.5s remaining: 3m 55s
365: learn: 9.1491153 total: 52.6s remaining: 3m 54s
366: learn: 9.1473686 total: 52.8s remaining: 3m 54s
367: learn: 9.1460388 total: 52.9s remaining: 3m 54s
368: learn: 9.1443689 total: 53.1s remaining: 3m 54s
369: learn: 9.1412085 total: 53.2s remaining: 3m 54s
370: learn: 9.1394191 total: 53.3s remaining: 3m 54s
371: learn: 9.1382351 total: 53.5s remaining: 3m 54s
372: learn: 9.1352933 total: 53.6s remaining: 3m 53s
373: learn: 9.1321335 total: 53.8s remaining: 3m 53s
374: learn: 9.1282154 total: 53.9s remaining: 3m 53s
375: learn: 9.1274629 total: 54.1s remaining: 3m 53s
376: learn: 9.1255929 total: 54.2s remaining: 3m 53s
377: learn: 9.1244443 total: 54.3s remaining: 3m 53s
378: learn: 9.1207412 total: 54.5s remaining: 3m 53s
379: learn: 9.1183807 total: 54.6s remaining: 3m 52s
380: learn: 9.1163376 total: 54.8s remaining: 3m 52s
381: learn: 9.1133718 total: 54.9s remaining: 3m 52s
382: learn: 9.1105244 total: 55.1s remaining: 3m 52s
383: learn: 9.1104389 total: 55.2s remaining: 3m 52s
384: learn: 9.1089197 total: 55.3s remaining: 3m 51s
385: learn: 9.1069046 total: 55.4s remaining: 3m 51s
386: learn: 9.1053794 total: 55.6s remaining: 3m 51s
387: learn: 9.1031435 total: 55.7s remaining: 3m 51s
388: learn: 9.1021124 total: 55.9s remaining: 3m 51s
389: learn: 9.0997988 total: 56s remaining: 3m 51s
390: learn: 9.0982850 total: 56.2s remaining: 3m 51s
391: learn: 9.0976362 total: 56.3s remaining: 3m 50s
392: learn: 9.0970439 total: 56.4s remaining: 3m 50s
393: learn: 9.0945369 total: 56.6s remaining: 3m 50s
394: learn: 9.0931524 total: 56.7s remaining: 3m 50s
395: learn: 9.0910617 total: 56.9s remaining: 3m 50s
396: learn: 9.0896013 total: 57s remaining: 3m 50s
397: learn: 9.0869026 total: 57.2s remaining: 3m 50s
398: learn: 9.0843298 total: 57.3s remaining: 3m 49s
399: learn: 9.0818508 total: 57.4s remaining: 3m 49s
400: learn: 9.0797680 total: 57.6s remaining: 3m 49s
401: learn: 9.0769674 total: 57.7s remaining: 3m 49s
402: learn: 9.0744827 total: 57.9s remaining: 3m 49s
403: learn: 9.0731299 total: 58s remaining: 3m 49s
404: learn: 9.0705201 total: 58.1s remaining: 3m 49s
405: learn: 9.0703848 total: 58.3s remaining: 3m 48s
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406: learn: 9.0692247 total: 58.4s remaining: 3m 48s
407: learn: 9.0691457 total: 58.5s remaining: 3m 48s
408: learn: 9.0667637 total: 58.7s remaining: 3m 48s
409: learn: 9.0664066 total: 58.8s remaining: 3m 48s
410: learn: 9.0646398 total: 59s remaining: 3m 48s
411: learn: 9.0635631 total: 59.1s remaining: 3m 47s
412: learn: 9.0610647 total: 59.3s remaining: 3m 47s
413: learn: 9.0591377 total: 59.4s remaining: 3m 47s
414: learn: 9.0569327 total: 59.6s remaining: 3m 47s
415: learn: 9.0544135 total: 59.7s remaining: 3m 47s
416: learn: 9.0533915 total: 59.8s remaining: 3m 47s
417: learn: 9.0510861 total: 60s remaining: 3m 47s
418: learn: 9.0495138 total: 1m remaining: 3m 46s
419: learn: 9.0482860 total: 1m remaining: 3m 46s
420: learn: 9.0470905 total: 1m remaining: 3m 46s
421: learn: 9.0456954 total: 1m remaining: 3m 46s
422: learn: 9.0437818 total: 1m remaining: 3m 46s
423: learn: 9.0417677 total: 1m remaining: 3m 46s
424: learn: 9.0396214 total: 1m remaining: 3m 45s
425: learn: 9.0395790 total: 1m 1s remaining: 3m 45s
426: learn: 9.0384816 total: 1m 1s remaining: 3m 45s
427: learn: 9.0373460 total: 1m 1s remaining: 3m 45s
428: learn: 9.0372870 total: 1m 1s remaining: 3m 45s
429: learn: 9.0359805 total: 1m 1s remaining: 3m 44s
430: learn: 9.0338176 total: 1m 1s remaining: 3m 44s
431: learn: 9.0333160 total: 1m 1s remaining: 3m 44s
432: learn: 9.0307796 total: 1m 2s remaining: 3m 44s
433: learn: 9.0287009 total: 1m 2s remaining: 3m 44s
434: learn: 9.0248542 total: 1m 2s remaining: 3m 44s
435: learn: 9.0227666 total: 1m 2s remaining: 3m 44s
436: learn: 9.0206686 total: 1m 2s remaining: 3m 43s
437: learn: 9.0194971 total: 1m 2s remaining: 3m 43s
438: learn: 9.0174171 total: 1m 2s remaining: 3m 43s
439: learn: 9.0149791 total: 1m 3s remaining: 3m 43s
440: learn: 9.0131203 total: 1m 3s remaining: 3m 43s
441: learn: 9.0111362 total: 1m 3s remaining: 3m 43s
442: learn: 9.0090482 total: 1m 3s remaining: 3m 42s
443: learn: 9.0073914 total: 1m 3s remaining: 3m 42s
444: learn: 9.0040157 total: 1m 3s remaining: 3m 42s
445: learn: 9.0030024 total: 1m 3s remaining: 3m 42s
446: learn: 9.0019811 total: 1m 3s remaining: 3m 42s
447: learn: 9.0006726 total: 1m 4s remaining: 3m 42s
448: learn: 8.9986353 total: 1m 4s remaining: 3m 42s
449: learn: 8.9984994 total: 1m 4s remaining: 3m 41s
450: learn: 8.9981880 total: 1m 4s remaining: 3m 41s
451: learn: 8.9935031 total: 1m 4s remaining: 3m 41s
452: learn: 8.9925033 total: 1m 4s remaining: 3m 41s
453: learn: 8.9924966 total: 1m 4s remaining: 3m 41s
454: learn: 8.9909098 total: 1m 5s remaining: 3m 40s
455: learn: 8.9909034 total: 1m 5s remaining: 3m 40s
456: learn: 8.9906550 total: 1m 5s remaining: 3m 40s
457: learn: 8.9900885 total: 1m 5s remaining: 3m 40s
458: learn: 8.9878918 total: 1m 5s remaining: 3m 40s
459: learn: 8.9862177 total: 1m 5s remaining: 3m 39s
460: learn: 8.9829382 total: 1m 5s remaining: 3m 39s
461: learn: 8.9792442 total: 1m 5s remaining: 3m 39s
462: learn: 8.9768307 total: 1m 6s remaining: 3m 39s
463: learn: 8.9762292 total: 1m 6s remaining: 3m 39s
464: learn: 8.9750553 total: 1m 6s remaining: 3m 39s
465: learn: 8.9739901 total: 1m 6s remaining: 3m 39s
466: learn: 8.9735386 total: 1m 6s remaining: 3m 38s
467: learn: 8.9718685 total: 1m 6s remaining: 3m 38s
468: learn: 8.9683177 total: 1m 6s remaining: 3m 38s
469: learn: 8.9670647 total: 1m 7s remaining: 3m 38s
470: learn: 8.9659061 total: 1m 7s remaining: 3m 38s
471: learn: 8.9642609 total: 1m 7s remaining: 3m 38s
472: learn: 8.9625267 total: 1m 7s remaining: 3m 38s
473: learn: 8.9598164 total: 1m 7s remaining: 3m 37s
474: learn: 8.9568991 total: 1m 7s remaining: 3m 37s
475: learn: 8.9556074 total: 1m 7s remaining: 3m 37s
476: learn: 8.9525223 total: 1m 8s remaining: 3m 37s
477: learn: 8.9513347 total: 1m 8s remaining: 3m 37s
478: learn: 8.9490810 total: 1m 8s remaining: 3m 37s
479: learn: 8.9471078 total: 1m 8s remaining: 3m 37s
480: learn: 8.9455447 total: 1m 8s remaining: 3m 36s
481: learn: 8.9435840 total: 1m 8s remaining: 3m 36s
482: learn: 8.9409401 total: 1m 8s remaining: 3m 36s
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483: learn: 8.9389487 total: 1m 9s remaining: 3m 36s
484: learn: 8.9359882 total: 1m 9s remaining: 3m 36s
485: learn: 8.9357982 total: 1m 9s remaining: 3m 36s
486: learn: 8.9336631 total: 1m 9s remaining: 3m 36s
487: learn: 8.9323241 total: 1m 9s remaining: 3m 35s
488: learn: 8.9296123 total: 1m 9s remaining: 3m 35s
489: learn: 8.9275624 total: 1m 9s remaining: 3m 35s
490: learn: 8.9259585 total: 1m 10s remaining: 3m 35s
491: learn: 8.9240964 total: 1m 10s remaining: 3m 35s
492: learn: 8.9224102 total: 1m 10s remaining: 3m 35s
493: learn: 8.9199805 total: 1m 10s remaining: 3m 35s
494: learn: 8.9198392 total: 1m 10s remaining: 3m 34s
495: learn: 8.9188545 total: 1m 10s remaining: 3m 34s
496: learn: 8.9188495 total: 1m 10s remaining: 3m 34s
497: learn: 8.9170663 total: 1m 11s remaining: 3m 34s
498: learn: 8.9162762 total: 1m 11s remaining: 3m 34s
499: learn: 8.9139158 total: 1m 11s remaining: 3m 34s
500: learn: 8.9110008 total: 1m 11s remaining: 3m 33s
501: learn: 8.9082762 total: 1m 11s remaining: 3m 33s
502: learn: 8.9058492 total: 1m 11s remaining: 3m 33s
503: learn: 8.9029256 total: 1m 11s remaining: 3m 33s
504: learn: 8.9016650 total: 1m 12s remaining: 3m 33s
505: learn: 8.9000068 total: 1m 12s remaining: 3m 33s
506: learn: 8.8980699 total: 1m 12s remaining: 3m 33s
507: learn: 8.8965283 total: 1m 12s remaining: 3m 32s
508: learn: 8.8964542 total: 1m 12s remaining: 3m 32s
509: learn: 8.8951273 total: 1m 12s remaining: 3m 32s
510: learn: 8.8918301 total: 1m 12s remaining: 3m 32s
511: learn: 8.8906300 total: 1m 13s remaining: 3m 32s
512: learn: 8.8887998 total: 1m 13s remaining: 3m 32s
513: learn: 8.8872247 total: 1m 13s remaining: 3m 31s
514: learn: 8.8849751 total: 1m 13s remaining: 3m 31s
515: learn: 8.8836187 total: 1m 13s remaining: 3m 31s
516: learn: 8.8819280 total: 1m 13s remaining: 3m 31s
517: learn: 8.8798484 total: 1m 13s remaining: 3m 31s
518: learn: 8.8785736 total: 1m 14s remaining: 3m 31s
519: learn: 8.8781732 total: 1m 14s remaining: 3m 31s
520: learn: 8.8756108 total: 1m 14s remaining: 3m 30s
521: learn: 8.8749215 total: 1m 14s remaining: 3m 30s
522: learn: 8.8738194 total: 1m 14s remaining: 3m 30s
523: learn: 8.8711997 total: 1m 14s remaining: 3m 30s
524: learn: 8.8685597 total: 1m 14s remaining: 3m 30s
525: learn: 8.8666107 total: 1m 15s remaining: 3m 30s
526: learn: 8.8648998 total: 1m 15s remaining: 3m 30s
527: learn: 8.8630816 total: 1m 15s remaining: 3m 29s
528: learn: 8.8614258 total: 1m 15s remaining: 3m 29s
529: learn: 8.8602392 total: 1m 15s remaining: 3m 29s
530: learn: 8.8600802 total: 1m 15s remaining: 3m 29s
531: learn: 8.8570969 total: 1m 15s remaining: 3m 29s
532: learn: 8.8556749 total: 1m 16s remaining: 3m 29s
533: learn: 8.8541031 total: 1m 16s remaining: 3m 29s
534: learn: 8.8526621 total: 1m 16s remaining: 3m 28s
535: learn: 8.8490997 total: 1m 16s remaining: 3m 28s
536: learn: 8.8481544 total: 1m 16s remaining: 3m 28s
537: learn: 8.8461601 total: 1m 16s remaining: 3m 28s
538: learn: 8.8443011 total: 1m 16s remaining: 3m 28s
539: learn: 8.8425029 total: 1m 17s remaining: 3m 28s
540: learn: 8.8418954 total: 1m 17s remaining: 3m 28s
541: learn: 8.8404187 total: 1m 17s remaining: 3m 27s
542: learn: 8.8398005 total: 1m 17s remaining: 3m 27s
543: learn: 8.8387514 total: 1m 17s remaining: 3m 27s
544: learn: 8.8371248 total: 1m 17s remaining: 3m 27s
545: learn: 8.8359752 total: 1m 17s remaining: 3m 27s
546: learn: 8.8324078 total: 1m 17s remaining: 3m 27s
547: learn: 8.8312969 total: 1m 18s remaining: 3m 27s
548: learn: 8.8304723 total: 1m 18s remaining: 3m 26s
549: learn: 8.8290868 total: 1m 18s remaining: 3m 26s
550: learn: 8.8272704 total: 1m 18s remaining: 3m 26s
551: learn: 8.8248280 total: 1m 18s remaining: 3m 26s
552: learn: 8.8234597 total: 1m 18s remaining: 3m 26s
553: learn: 8.8215085 total: 1m 18s remaining: 3m 26s
554: learn: 8.8196569 total: 1m 19s remaining: 3m 26s
555: learn: 8.8173495 total: 1m 19s remaining: 3m 25s
556: learn: 8.8171607 total: 1m 19s remaining: 3m 25s
557: learn: 8.8163240 total: 1m 19s remaining: 3m 25s
558: learn: 8.8147236 total: 1m 19s remaining: 3m 25s
559: learn: 8.8143975 total: 1m 19s remaining: 3m 25s
```

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560: learn: 8.8142467 total: 1m 20s remaining: 3m 25s
561: learn: 8.8102891 total: 1m 20s remaining: 3m 25s
562: learn: 8.8089753 total: 1m 20s remaining: 3m 24s
563: learn: 8.8089685 total: 1m 20s remaining: 3m 24s
564: learn: 8.8071829 total: 1m 20s remaining: 3m 24s
565: learn: 8.8058838 total: 1m 20s remaining: 3m 24s
566: learn: 8.8042435 total: 1m 20s remaining: 3m 24s
567: learn: 8.8030078 total: 1m 21s remaining: 3m 24s
568: learn: 8.8017618 total: 1m 21s remaining: 3m 24s
569: learn: 8.7994858 total: 1m 21s remaining: 3m 23s
570: learn: 8.7974436 total: 1m 21s remaining: 3m 23s
571: learn: 8.7967238 total: 1m 21s remaining: 3m 23s
572: learn: 8.7967176 total: 1m 21s remaining: 3m 23s
573: learn: 8.7967112 total: 1m 21s remaining: 3m 23s
574: learn: 8.7966148 total: 1m 22s remaining: 3m 23s
575: learn: 8.7946492 total: 1m 22s remaining: 3m 23s
576: learn: 8.7926184 total: 1m 22s remaining: 3m 22s
577: learn: 8.7911396 total: 1m 22s remaining: 3m 22s
578: learn: 8.7878286 total: 1m 22s remaining: 3m 22s
579: learn: 8.7866212 total: 1m 22s remaining: 3m 22s
580: learn: 8.7854439 total: 1m 22s remaining: 3m 22s
581: learn: 8.7834831 total: 1m 23s remaining: 3m 22s
582: learn: 8.7806740 total: 1m 23s remaining: 3m 22s
583: learn: 8.7791766 total: 1m 23s remaining: 3m 21s
584: learn: 8.7775336 total: 1m 23s remaining: 3m 21s
585: learn: 8.7759960 total: 1m 23s remaining: 3m 21s
586: learn: 8.7759902 total: 1m 23s remaining: 3m 21s
587: learn: 8.7740161 total: 1m 23s remaining: 3m 21s
588: learn: 8.7718862 total: 1m 24s remaining: 3m 21s
589: learn: 8.7706116 total: 1m 24s remaining: 3m 21s
590: learn: 8.7694391 total: 1m 24s remaining: 3m 20s
591: learn: 8.7675825 total: 1m 24s remaining: 3m 20s
592: learn: 8.7664122 total: 1m 24s remaining: 3m 20s
593: learn: 8.7651712 total: 1m 24s remaining: 3m 20s
594: learn: 8.7638242 total: 1m 24s remaining: 3m 20s
595: learn: 8.7621395 total: 1m 25s remaining: 3m 20s
596: learn: 8.7590836 total: 1m 25s remaining: 3m 20s
597: learn: 8.7590779 total: 1m 25s remaining: 3m 19s
598: learn: 8.7572315 total: 1m 25s remaining: 3m 19s
599: learn: 8.7564438 total: 1m 25s remaining: 3m 19s
600: learn: 8.7547692 total: 1m 25s remaining: 3m 19s
601: learn: 8.7539238 total: 1m 25s remaining: 3m 19s
602: learn: 8.7529840 total: 1m 25s remaining: 3m 19s
603: learn: 8.7516056 total: 1m 26s remaining: 3m 19s
604: learn: 8.7503315 total: 1m 26s remaining: 3m 18s
605: learn: 8.7476928 total: 1m 26s remaining: 3m 18s
606: learn: 8.7476874 total: 1m 26s remaining: 3m 18s
607: learn: 8.7444611 total: 1m 26s remaining: 3m 18s
608: learn: 8.7437159 total: 1m 26s remaining: 3m 18s
609: learn: 8.7427552 total: 1m 26s remaining: 3m 18s
610: learn: 8.7407853 total: 1m 27s remaining: 3m 18s
611: learn: 8.7387663 total: 1m 27s remaining: 3m 17s
612: learn: 8.7372500 total: 1m 27s remaining: 3m 17s
613: learn: 8.7361858 total: 1m 27s remaining: 3m 17s
614: learn: 8.7343070 total: 1m 27s remaining: 3m 17s
615: learn: 8.7329639 total: 1m 27s remaining: 3m 17s
616: learn: 8.7319222 total: 1m 27s remaining: 3m 17s
617: learn: 8.7313428 total: 1m 28s remaining: 3m 17s
618: learn: 8.7288231 total: 1m 28s remaining: 3m 16s
619: learn: 8.7277449 total: 1m 28s remaining: 3m 16s
620: learn: 8.7267719 total: 1m 28s remaining: 3m 16s
621: learn: 8.7258112 total: 1m 28s remaining: 3m 16s
622: learn: 8.7252730 total: 1m 28s remaining: 3m 16s
623: learn: 8.7243551 total: 1m 28s remaining: 3m 16s
624: learn: 8.7233304 total: 1m 29s remaining: 3m 16s
625: learn: 8.7222060 total: 1m 29s remaining: 3m 15s
626: learn: 8.7205480 total: 1m 29s remaining: 3m 15s
627: learn: 8.7188735 total: 1m 29s remaining: 3m 15s
628: learn: 8.7173223 total: 1m 29s remaining: 3m 15s
629: learn: 8.7167669 total: 1m 29s remaining: 3m 15s
630: learn: 8.7153538 total: 1m 29s remaining: 3m 15s
631: learn: 8.7135574 total: 1m 30s remaining: 3m 15s
632: learn: 8.7126769 total: 1m 30s remaining: 3m 14s
633: learn: 8.7101709 total: 1m 30s remaining: 3m 14s
634: learn: 8.7088520 total: 1m 30s remaining: 3m 14s
635: learn: 8.7074895 total: 1m 30s remaining: 3m 14s
636: learn: 8.7066683 total: 1m 30s remaining: 3m 14s
```

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637: learn: 8.7042677 total: 1m 30s remaining: 3m 14s
638: learn: 8.7021813 total: 1m 31s remaining: 3m 14s
639: learn: 8.7004263 total: 1m 31s remaining: 3m 14s
640: learn: 8.6994587 total: 1m 31s remaining: 3m 13s
641: learn: 8.6986666 total: 1m 31s remaining: 3m 13s
642: learn: 8.6975534 total: 1m 31s remaining: 3m 13s
643: learn: 8.6952036 total: 1m 31s remaining: 3m 13s
644: learn: 8.6936556 total: 1m 32s remaining: 3m 13s
645: learn: 8.6916432 total: 1m 32s remaining: 3m 13s
646: learn: 8.6909378 total: 1m 32s remaining: 3m 13s
647: learn: 8.6909322 total: 1m 32s remaining: 3m 12s
648: learn: 8.6893213 total: 1m 32s remaining: 3m 12s
649: learn: 8.6885830 total: 1m 32s remaining: 3m 12s
650: learn: 8.6877725 total: 1m 32s remaining: 3m 12s
651: learn: 8.6874792 total: 1m 33s remaining: 3m 12s
652: learn: 8.6872614 total: 1m 33s remaining: 3m 12s
653: learn: 8.6866377 total: 1m 33s remaining: 3m 12s
654: learn: 8.6857078 total: 1m 33s remaining: 3m 11s
655: learn: 8.6839700 total: 1m 33s remaining: 3m 11s
656: learn: 8.6839649 total: 1m 33s remaining: 3m 11s
657: learn: 8.6825764 total: 1m 33s remaining: 3m 11s
658: learn: 8.6821205 total: 1m 34s remaining: 3m 11s
659: learn: 8.6817027 total: 1m 34s remaining: 3m 11s
660: learn: 8.6801828 total: 1m 34s remaining: 3m 11s
661: learn: 8.6796884 total: 1m 34s remaining: 3m 10s
662: learn: 8.6796831 total: 1m 34s remaining: 3m 10s
663: learn: 8.6790738 total: 1m 34s remaining: 3m 10s
664: learn: 8.6777898 total: 1m 34s remaining: 3m 10s
665: learn: 8.6769333 total: 1m 35s remaining: 3m 10s
666: learn: 8.6762465 total: 1m 35s remaining: 3m 10s
667: learn: 8.6749160 total: 1m 35s remaining: 3m 10s
668: learn: 8.6736155 total: 1m 35s remaining: 3m 9s
669: learn: 8.6727655 total: 1m 35s remaining: 3m 9s
670: learn: 8.6718907 total: 1m 35s remaining: 3m 9s
671: learn: 8.6708284 total: 1m 35s remaining: 3m 9s
672: learn: 8.6695269 total: 1m 36s remaining: 3m 9s
673: learn: 8.6682775 total: 1m 36s remaining: 3m 9s
674: learn: 8.6669012 total: 1m 36s remaining: 3m 9s
675: learn: 8.6659851 total: 1m 36s remaining: 3m 8s
676: learn: 8.6647772 total: 1m 36s remaining: 3m 8s
677: learn: 8.6640170 total: 1m 36s remaining: 3m 8s
678: learn: 8.6631746 total: 1m 36s remaining: 3m 8s
679: learn: 8.6626491 total: 1m 37s remaining: 3m 8s
680: learn: 8.6613040 total: 1m 37s remaining: 3m 8s
681: learn: 8.6605823 total: 1m 37s remaining: 3m 8s
682: learn: 8.6605784 total: 1m 37s remaining: 3m 7s
683: learn: 8.6595291 total: 1m 37s remaining: 3m 7s
684: learn: 8.6574713 total: 1m 37s remaining: 3m 7s
685: learn: 8.6565696 total: 1m 37s remaining: 3m 7s
686: learn: 8.6540506 total: 1m 38s remaining: 3m 7s
687: learn: 8.6510683 total: 1m 38s remaining: 3m 7s
688: learn: 8.6496986 total: 1m 38s remaining: 3m 7s
689: learn: 8.6489208 total: 1m 38s remaining: 3m 6s
690: learn: 8.6476875 total: 1m 38s remaining: 3m 6s
691: learn: 8.6453374 total: 1m 38s remaining: 3m 6s
692: learn: 8.6445198 total: 1m 38s remaining: 3m 6s
693: learn: 8.6442263 total: 1m 39s remaining: 3m 6s
694: learn: 8.6427612 total: 1m 39s remaining: 3m 6s
695: learn: 8.6415335 total: 1m 39s remaining: 3m 6s
696: learn: 8.6391342 total: 1m 39s remaining: 3m 5s
697: learn: 8.6383809 total: 1m 39s remaining: 3m 5s
698: learn: 8.6372555 total: 1m 39s remaining: 3m 5s
699: learn: 8.6362588 total: 1m 39s remaining: 3m 5s
700: learn: 8.6349737 total: 1m 40s remaining: 3m 5s
701: learn: 8.6337290 total: 1m 40s remaining: 3m 5s
702: learn: 8.6326026 total: 1m 40s remaining: 3m 5s
703: learn: 8.6318504 total: 1m 40s remaining: 3m 4s
704: learn: 8.6312691 total: 1m 40s remaining: 3m 4s
705: learn: 8.6299781 total: 1m 40s remaining: 3m 4s
706: learn: 8.6293550 total: 1m 40s remaining: 3m 4s
707: learn: 8.6265651 total: 1m 41s remaining: 3m 4s
708: learn: 8.6262921 total: 1m 41s remaining: 3m 4s
709: learn: 8.6258262 total: 1m 41s remaining: 3m 4s
710: learn: 8.6239900 total: 1m 41s remaining: 3m 4s
711: learn: 8.6229447 total: 1m 41s remaining: 3m 3s
712: learn: 8.6212490 total: 1m 41s remaining: 3m 3s
713: learn: 8.6196342 total: 1m 41s remaining: 3m 3s
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714: learn: 8.6177293 total: 1m 42s remaining: 3m 3s
715: learn: 8.6166205 total: 1m 42s remaining: 3m 3s
716: learn: 8.6150779 total: 1m 42s remaining: 3m 3s
717: learn: 8.6145064 total: 1m 42s remaining: 3m 3s
718: learn: 8.6131524 total: 1m 42s remaining: 3m 2s
719: learn: 8.6117118 total: 1m 42s remaining: 3m 2s
720: learn: 8.6099393 total: 1m 42s remaining: 3m 2s
721: learn: 8.6080308 total: 1m 43s remaining: 3m 2s
722: learn: 8.6066870 total: 1m 43s remaining: 3m 2s
723: learn: 8.6058193 total: 1m 43s remaining: 3m 2s
724: learn: 8.6052263 total: 1m 43s remaining: 3m 2s
725: learn: 8.6034183 total: 1m 43s remaining: 3m 1s
726: learn: 8.6012968 total: 1m 43s remaining: 3m 1s
727: learn: 8.5999765 total: 1m 43s remaining: 3m 1s
728: learn: 8.5990156 total: 1m 44s remaining: 3m 1s
729: learn: 8.5979136 total: 1m 44s remaining: 3m 1s
730: learn: 8.5976518 total: 1m 44s remaining: 3m 1s
731: learn: 8.5968268 total: 1m 44s remaining: 3m 1s
732: learn: 8.5945736 total: 1m 44s remaining: 3m
733: learn: 8.5926650 total: 1m 44s remaining: 3m
734: learn: 8.5912136 total: 1m 44s remaining: 3m
735: learn: 8.5879540 total: 1m 45s remaining: 3m
736: learn: 8.5879497 total: 1m 45s remaining: 3m
737: learn: 8.5861819 total: 1m 45s remaining: 3m
738: learn: 8.5835501 total: 1m 45s remaining: 3m
739: learn: 8.5825016 total: 1m 45s remaining: 2m 59s
740: learn: 8.5817973 total: 1m 45s remaining: 2m 59s
741: learn: 8.5806911 total: 1m 45s remaining: 2m 59s
742: learn: 8.5802805 total: 1m 46s remaining: 2m 59s
743: learn: 8.5793006 total: 1m 46s remaining: 2m 59s
744: learn: 8.5781578 total: 1m 46s remaining: 2m 59s
745: learn: 8.5768223 total: 1m 46s remaining: 2m 59s
746: learn: 8.5754325 total: 1m 46s remaining: 2m 58s
747: learn: 8.5743111 total: 1m 46s remaining: 2m 58s
748: learn: 8.5725281 total: 1m 47s remaining: 2m 58s
749: learn: 8.5716250 total: 1m 47s remaining: 2m 58s
750: learn: 8.5704352 total: 1m 47s remaining: 2m 58s
751: learn: 8.5694128 total: 1m 47s remaining: 2m 58s
752: learn: 8.5677932 total: 1m 47s remaining: 2m 58s
753: learn: 8.5669636 total: 1m 47s remaining: 2m 57s
754: learn: 8.5667020 total: 1m 47s remaining: 2m 57s
755: learn: 8.5649971 total: 1m 47s remaining: 2m 57s
756: learn: 8.5642274 total: 1m 48s remaining: 2m 57s
757: learn: 8.5627146 total: 1m 48s remaining: 2m 57s
758: learn: 8.5604105 total: 1m 48s remaining: 2m 57s
759: learn: 8.5583041 total: 1m 48s remaining: 2m 57s
760: learn: 8.5568278 total: 1m 48s remaining: 2m 56s
761: learn: 8.5552405 total: 1m 48s remaining: 2m 56s
762: learn: 8.5538983 total: 1m 49s remaining: 2m 56s
763: learn: 8.5534416 total: 1m 49s remaining: 2m 56s
764: learn: 8.5533994 total: 1m 49s remaining: 2m 56s
765: learn: 8.5513800 total: 1m 49s remaining: 2m 56s
766: learn: 8.5503843 total: 1m 49s remaining: 2m 56s
767: learn: 8.5495543 total: 1m 49s remaining: 2m 56s
768: learn: 8.5485789 total: 1m 49s remaining: 2m 55s
769: learn: 8.5475763 total: 1m 50s remaining: 2m 55s
770: learn: 8.5461459 total: 1m 50s remaining: 2m 55s
771: learn: 8.5457135 total: 1m 50s remaining: 2m 55s
772: learn: 8.5456715 total: 1m 50s remaining: 2m 55s
773: learn: 8.5449197 total: 1m 50s remaining: 2m 55s
774: learn: 8.5434302 total: 1m 50s remaining: 2m 54s
775: learn: 8.5434168 total: 1m 50s remaining: 2m 54s
776: learn: 8.5423060 total: 1m 50s remaining: 2m 54s
777: learn: 8.5411599 total: 1m 51s remaining: 2m 54s
778: learn: 8.5393713 total: 1m 51s remaining: 2m 54s
779: learn: 8.5385780 total: 1m 51s remaining: 2m 54s
780: learn: 8.5374465 total: 1m 51s remaining: 2m 54s
781: learn: 8.5364771 total: 1m 51s remaining: 2m 53s
782: learn: 8.5357709 total: 1m 51s remaining: 2m 53s
783: learn: 8.5339685 total: 1m 51s remaining: 2m 53s
784: learn: 8.5323209 total: 1m 52s remaining: 2m 53s
785: learn: 8.5310244 total: 1m 52s remaining: 2m 53s
786: learn: 8.5299824 total: 1m 52s remaining: 2m 53s
787: learn: 8.5292192 total: 1m 52s remaining: 2m 53s
788: learn: 8.5292012 total: 1m 52s remaining: 2m 52s
789: learn: 8.5280165 total: 1m 52s remaining: 2m 52s
790: learn: 8.5270554 total: 1m 52s remaining: 2m 52s
```

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791: learn: 8.5261693 total: 1m 53s remaining: 2m 52s
792: learn: 8.5248057 total: 1m 53s remaining: 2m 52s
793: learn: 8.5238058 total: 1m 53s remaining: 2m 52s
794: learn: 8.5231404 total: 1m 53s remaining: 2m 51s
795: learn: 8.5231148 total: 1m 53s remaining: 2m 51s
796: learn: 8.5216622 total: 1m 53s remaining: 2m 51s
797: learn: 8.5204974 total: 1m 53s remaining: 2m 51s
798: learn: 8.5193422 total: 1m 54s remaining: 2m 51s
799: learn: 8.5176351 total: 1m 54s remaining: 2m 51s
800: learn: 8.5171466 total: 1m 54s remaining: 2m 51s
801: learn: 8.5161616 total: 1m 54s remaining: 2m 50s
802: learn: 8.5151555 total: 1m 54s remaining: 2m 50s
803: learn: 8.5144863 total: 1m 54s remaining: 2m 50s
804: learn: 8.5131132 total: 1m 54s remaining: 2m 50s
805: learn: 8.5131099 total: 1m 55s remaining: 2m 50s
806: learn: 8.5116212 total: 1m 55s remaining: 2m 50s
807: learn: 8.5116183 total: 1m 55s remaining: 2m 49s
808: learn: 8.5107193 total: 1m 55s remaining: 2m 49s
809: learn: 8.5097443 total: 1m 55s remaining: 2m 49s
810: learn: 8.5075649 total: 1m 55s remaining: 2m 49s
811: learn: 8.5066379 total: 1m 55s remaining: 2m 49s
812: learn: 8.5041678 total: 1m 55s remaining: 2m 49s
813: learn: 8.5027897 total: 1m 56s remaining: 2m 49s
814: learn: 8.5018749 total: 1m 56s remaining: 2m 48s
815: learn: 8.5016174 total: 1m 56s remaining: 2m 48s
816: learn: 8.5010563 total: 1m 56s remaining: 2m 48s
817: learn: 8.4983338 total: 1m 56s remaining: 2m 48s
818: learn: 8.4973680 total: 1m 56s remaining: 2m 48s
819: learn: 8.4960606 total: 1m 56s remaining: 2m 48s
820: learn: 8.4941051 total: 1m 57s remaining: 2m 48s
821: learn: 8.4940350 total: 1m 57s remaining: 2m 47s
822: learn: 8.4936091 total: 1m 57s remaining: 2m 47s
823: learn: 8.4926544 total: 1m 57s remaining: 2m 47s
824: learn: 8.4923259 total: 1m 57s remaining: 2m 47s
825: learn: 8.4918639 total: 1m 57s remaining: 2m 47s
826: learn: 8.4918613 total: 1m 57s remaining: 2m 47s
827: learn: 8.4903199 total: 1m 58s remaining: 2m 47s
828: learn: 8.4892044 total: 1m 58s remaining: 2m 46s
829: learn: 8.4878709 total: 1m 58s remaining: 2m 46s
830: learn: 8.4870383 total: 1m 58s remaining: 2m 46s
831: learn: 8.4861503 total: 1m 58s remaining: 2m 46s
832: learn: 8.4850465 total: 1m 58s remaining: 2m 46s
833: learn: 8.4850274 total: 1m 58s remaining: 2m 46s
834: learn: 8.4838831 total: 1m 59s remaining: 2m 46s
835: learn: 8.4821101 total: 1m 59s remaining: 2m 45s
836: learn: 8.4805720 total: 1m 59s remaining: 2m 45s
837: learn: 8.4796100 total: 1m 59s remaining: 2m 45s
838: learn: 8.4795677 total: 1m 59s remaining: 2m 45s
839: learn: 8.4774826 total: 1m 59s remaining: 2m 45s
840: learn: 8.4760146 total: 1m 59s remaining: 2m 45s
841: learn: 8.4735741 total: 2m remaining: 2m 45s
842: learn: 8.4735413 total: 2m remaining: 2m 44s
843: learn: 8.4735273 total: 2m remaining: 2m 44s
844: learn: 8.4727821 total: 2m remaining: 2m 44s
845: learn: 8.4702559 total: 2m remaining: 2m 44s
846: learn: 8.4692939 total: 2m remaining: 2m 44s
847: learn: 8.4683067 total: 2m remaining: 2m 44s
848: learn: 8.4658929 total: 2m remaining: 2m 44s
849: learn: 8.4653097 total: 2m 1s remaining: 2m 43s
850: learn: 8.4647653 total: 2m 1s remaining: 2m 43s
851: learn: 8.4633024 total: 2m 1s remaining: 2m 43s
852: learn: 8.4620972 total: 2m 1s remaining: 2m 43s
853: learn: 8.4603897 total: 2m 1s remaining: 2m 43s
854: learn: 8.4599087 total: 2m 1s remaining: 2m 43s
855: learn: 8.4589362 total: 2m 1s remaining: 2m 42s
856: learn: 8.4577077 total: 2m 2s remaining: 2m 42s
857: learn: 8.4554290 total: 2m 2s remaining: 2m 42s
858: learn: 8.4541912 total: 2m 2s remaining: 2m 42s
859: learn: 8.4522886 total: 2m 2s remaining: 2m 42s
860: learn: 8.4508182 total: 2m 2s remaining: 2m 42s
861: learn: 8.4504903 total: 2m 2s remaining: 2m 42s
862: learn: 8.4492681 total: 2m 2s remaining: 2m 42s
863: learn: 8.4468652 total: 2m 3s remaining: 2m 41s
864: learn: 8.4461753 total: 2m 3s remaining: 2m 41s
865: learn: 8.4457917 total: 2m 3s remaining: 2m 41s
866: learn: 8.4436475 total: 2m 3s remaining: 2m 41s
867: learn: 8.4423608 total: 2m 3s remaining: 2m 41s
```

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868: learn: 8.4415117 total: 2m 3s remaining: 2m 41s
869: learn: 8.4409075 total: 2m 3s remaining: 2m 41s
870: learn: 8.4400374 total: 2m 4s remaining: 2m 40s
871: learn: 8.4387969 total: 2m 4s remaining: 2m 40s
872: learn: 8.4381730 total: 2m 4s remaining: 2m 40s
873: learn: 8.4357371 total: 2m 4s remaining: 2m 40s
874: learn: 8.4343980 total: 2m 4s remaining: 2m 40s
875: learn: 8.4337610 total: 2m 4s remaining: 2m 40s
876: learn: 8.4331898 total: 2m 4s remaining: 2m 40s
877: learn: 8.4317234 total: 2m 5s remaining: 2m 39s
878: learn: 8.4301581 total: 2m 5s remaining: 2m 39s
879: learn: 8.4288445 total: 2m 5s remaining: 2m 39s
880: learn: 8.4271001 total: 2m 5s remaining: 2m 39s
881: learn: 8.4260803 total: 2m 5s remaining: 2m 39s
882: learn: 8.4247586 total: 2m 5s remaining: 2m 39s
883: learn: 8.4234744 total: 2m 5s remaining: 2m 39s
884: learn: 8.4221491 total: 2m 6s remaining: 2m 38s
885: learn: 8.4214425 total: 2m 6s remaining: 2m 38s
886: learn: 8.4197304 total: 2m 6s remaining: 2m 38s
887: learn: 8.4188853 total: 2m 6s remaining: 2m 38s
888: learn: 8.4179331 total: 2m 6s remaining: 2m 38s
889: learn: 8.4165822 total: 2m 6s remaining: 2m 38s
890: learn: 8.4138226 total: 2m 6s remaining: 2m 37s
891: learn: 8.4135007 total: 2m 7s remaining: 2m 37s
892: learn: 8.4126871 total: 2m 7s remaining: 2m 37s
893: learn: 8.4112993 total: 2m 7s remaining: 2m 37s
894: learn: 8.4102145 total: 2m 7s remaining: 2m 37s
895: learn: 8.4082348 total: 2m 7s remaining: 2m 37s
896: learn: 8.4070856 total: 2m 7s remaining: 2m 37s
897: learn: 8.4062156 total: 2m 7s remaining: 2m 36s
898: learn: 8.4052382 total: 2m 8s remaining: 2m 36s
899: learn: 8.4037548 total: 2m 8s remaining: 2m 36s
900: learn: 8.4028445 total: 2m 8s remaining: 2m 36s
901: learn: 8.4022772 total: 2m 8s remaining: 2m 36s
902: learn: 8.4015550 total: 2m 8s remaining: 2m 36s
903: learn: 8.4007446 total: 2m 8s remaining: 2m 36s
904: learn: 8.3989771 total: 2m 8s remaining: 2m 35s
905: learn: 8.3977568 total: 2m 9s remaining: 2m 35s
906: learn: 8.3970037 total: 2m 9s remaining: 2m 35s
907: learn: 8.3957057 total: 2m 9s remaining: 2m 35s
908: learn: 8.3943629 total: 2m 9s remaining: 2m 35s
909: learn: 8.3938428 total: 2m 9s remaining: 2m 35s
910: learn: 8.3930383 total: 2m 9s remaining: 2m 35s
911: learn: 8.3922264 total: 2m 9s remaining: 2m 34s
912: learn: 8.3917359 total: 2m 10s remaining: 2m 34s
913: learn: 8.3915749 total: 2m 10s remaining: 2m 34s
914: learn: 8.3896349 total: 2m 10s remaining: 2m 34s
915: learn: 8.3890481 total: 2m 10s remaining: 2m 34s
916: learn: 8.3885573 total: 2m 10s remaining: 2m 34s
917: learn: 8.3870940 total: 2m 10s remaining: 2m 34s
918: learn: 8.3857907 total: 2m 10s remaining: 2m 33s
919: learn: 8.3847284 total: 2m 10s remaining: 2m 33s
920: learn: 8.3840486 total: 2m 11s remaining: 2m 33s
921: learn: 8.3828952 total: 2m 11s remaining: 2m 33s
922: learn: 8.3819228 total: 2m 11s remaining: 2m 33s
923: learn: 8.3803814 total: 2m 11s remaining: 2m 33s
924: learn: 8.3795896 total: 2m 11s remaining: 2m 33s
925: learn: 8.3782926 total: 2m 11s remaining: 2m 32s
926: learn: 8.3758582 total: 2m 11s remaining: 2m 32s
927: learn: 8.3754793 total: 2m 12s remaining: 2m 32s
928: learn: 8.3740603 total: 2m 12s remaining: 2m 32s
929: learn: 8.3734981 total: 2m 12s remaining: 2m 32s
930: learn: 8.3717243 total: 2m 12s remaining: 2m 32s
931: learn: 8.3712554 total: 2m 12s remaining: 2m 32s
932: learn: 8.3709429 total: 2m 12s remaining: 2m 31s
933: learn: 8.3695553 total: 2m 12s remaining: 2m 31s
934: learn: 8.3693881 total: 2m 13s remaining: 2m 31s
935: learn: 8.3685483 total: 2m 13s remaining: 2m 31s
936: learn: 8.3677170 total: 2m 13s remaining: 2m 31s
937: learn: 8.3677129 total: 2m 13s remaining: 2m 31s
938: learn: 8.3664770 total: 2m 13s remaining: 2m 30s
939: learn: 8.3656731 total: 2m 13s remaining: 2m 30s
940: learn: 8.3647964 total: 2m 13s remaining: 2m 30s
941: learn: 8.3641924 total: 2m 14s remaining: 2m 30s
942: learn: 8.3625977 total: 2m 14s remaining: 2m 30s
943: learn: 8.3625941 total: 2m 14s remaining: 2m 30s
944: learn: 8.3618901 total: 2m 14s remaining: 2m 30s
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945: learn: 8.3599157 total: 2m 14s remaining: 2m 29s
946: learn: 8.3599122 total: 2m 14s remaining: 2m 29s
947: learn: 8.3599102 total: 2m 14s remaining: 2m 29s
948: learn: 8.3590898 total: 2m 14s remaining: 2m 29s
949: learn: 8.3588688 total: 2m 15s remaining: 2m 29s
950: learn: 8.3580615 total: 2m 15s remaining: 2m 29s
951: learn: 8.3574167 total: 2m 15s remaining: 2m 28s
952: learn: 8.3565572 total: 2m 15s remaining: 2m 28s
953: learn: 8.3556941 total: 2m 15s remaining: 2m 28s
954: learn: 8.3556909 total: 2m 15s remaining: 2m 28s
955: learn: 8.3543951 total: 2m 15s remaining: 2m 28s
956: learn: 8.3540660 total: 2m 15s remaining: 2m 28s
957: learn: 8.3514644 total: 2m 16s remaining: 2m 28s
958: learn: 8.3497291 total: 2m 16s remaining: 2m 27s
959: learn: 8.3482139 total: 2m 16s remaining: 2m 27s
960: learn: 8.3471341 total: 2m 16s remaining: 2m 27s
961: learn: 8.3461927 total: 2m 16s remaining: 2m 27s
962: learn: 8.3453680 total: 2m 16s remaining: 2m 27s
963: learn: 8.3451464 total: 2m 16s remaining: 2m 27s
964: learn: 8.3432824 total: 2m 17s remaining: 2m 27s
965: learn: 8.3428140 total: 2m 17s remaining: 2m 26s
966: learn: 8.3423512 total: 2m 17s remaining: 2m 26s
967: learn: 8.3417097 total: 2m 17s remaining: 2m 26s
968: learn: 8.3399685 total: 2m 17s remaining: 2m 26s
969: learn: 8.3391349 total: 2m 17s remaining: 2m 26s
970: learn: 8.3380388 total: 2m 17s remaining: 2m 26s
971: learn: 8.3376581 total: 2m 18s remaining: 2m 26s
972: learn: 8.3366451 total: 2m 18s remaining: 2m 25s
973: learn: 8.3360832 total: 2m 18s remaining: 2m 25s
974: learn: 8.3345330 total: 2m 18s remaining: 2m 25s
975: learn: 8.3344779 total: 2m 18s remaining: 2m 25s
976: learn: 8.3327032 total: 2m 18s remaining: 2m 25s
977: learn: 8.3317891 total: 2m 18s remaining: 2m 25s
978: learn: 8.3314931 total: 2m 19s remaining: 2m 25s
979: learn: 8.3296580 total: 2m 19s remaining: 2m 24s
980: learn: 8.3291614 total: 2m 19s remaining: 2m 24s
981: learn: 8.3280126 total: 2m 19s remaining: 2m 24s
982: learn: 8.3270186 total: 2m 19s remaining: 2m 24s
983: learn: 8.3258026 total: 2m 19s remaining: 2m 24s
984: learn: 8.3247920 total: 2m 19s remaining: 2m 24s
985: learn: 8.3229703 total: 2m 20s remaining: 2m 24s
986: learn: 8.3223144 total: 2m 20s remaining: 2m 23s
987: learn: 8.3221729 total: 2m 20s remaining: 2m 23s
988: learn: 8.3220816 total: 2m 20s remaining: 2m 23s
989: learn: 8.3213393 total: 2m 20s remaining: 2m 23s
990: learn: 8.3202714 total: 2m 20s remaining: 2m 23s
991: learn: 8.3198097 total: 2m 20s remaining: 2m 23s
992: learn: 8.3186609 total: 2m 21s remaining: 2m 23s
993: learn: 8.3181061 total: 2m 21s remaining: 2m 22s
994: learn: 8.3178213 total: 2m 21s remaining: 2m 22s
995: learn: 8.3164398 total: 2m 21s remaining: 2m 22s
996: learn: 8.3164354 total: 2m 21s remaining: 2m 22s
997: learn: 8.3157021 total: 2m 21s remaining: 2m 22s
998: learn: 8.3150773 total: 2m 21s remaining: 2m 22s
999: learn: 8.3140807 total: 2m 22s remaining: 2m 22s
1000: learn: 8.3135774 total: 2m 22s remaining: 2m 21s
1001: learn: 8.3124080 total: 2m 22s remaining: 2m 21s
1002: learn: 8.3118338 total: 2m 22s remaining: 2m 21s
1003: learn: 8.3114074 total: 2m 22s remaining: 2m 21s
1004: learn: 8.3108611 total: 2m 22s remaining: 2m 21s
1005: learn: 8.3107115 total: 2m 22s remaining: 2m 21s
1006: learn: 8.3092633 total: 2m 23s remaining: 2m 21s
1007: learn: 8.3079125 total: 2m 23s remaining: 2m 20s
1008: learn: 8.3074339 total: 2m 23s remaining: 2m 20s
1009: learn: 8.3065273 total: 2m 23s remaining: 2m 20s
1010: learn: 8.3052445 total: 2m 23s remaining: 2m 20s
1011: learn: 8.3046295 total: 2m 23s remaining: 2m 20s
1012: learn: 8.3036590 total: 2m 23s remaining: 2m 20s
1013: learn: 8.3030597 total: 2m 24s remaining: 2m 20s
1014: learn: 8.3026531 total: 2m 24s remaining: 2m 19s
1015: learn: 8.3021106 total: 2m 24s remaining: 2m 19s
1016: learn: 8.2997563 total: 2m 24s remaining: 2m 19s
1017: learn: 8.2985676 total: 2m 24s remaining: 2m 19s
1018: learn: 8.2978280 total: 2m 24s remaining: 2m 19s
1019: learn: 8.2974489 total: 2m 24s remaining: 2m 19s
1020: learn: 8.2972000 total: 2m 25s remaining: 2m 19s
1021: learn: 8.2964464 total: 2m 25s remaining: 2m 18s
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1021: learn: 8.2954404 total: 2m 25s remaining: 2m 18s
1022: learn: 8.2953519 total: 2m 25s remaining: 2m 18s
1023: learn: 8.2951271 total: 2m 25s remaining: 2m 18s
1024: learn: 8.2950310 total: 2m 25s remaining: 2m 18s
1025: learn: 8.2941840 total: 2m 25s remaining: 2m 18s
1026: learn: 8.2935506 total: 2m 25s remaining: 2m 18s
1027: learn: 8.2923401 total: 2m 26s remaining: 2m 18s
1028: learn: 8.2923274 total: 2m 26s remaining: 2m 17s
1029: learn: 8.2916246 total: 2m 26s remaining: 2m 17s
1030: learn: 8.2911731 total: 2m 26s remaining: 2m 17s
1031: learn: 8.2893791 total: 2m 26s remaining: 2m 17s
1032: learn: 8.2886101 total: 2m 26s remaining: 2m 17s
1033: learn: 8.2881375 total: 2m 26s remaining: 2m 17s
1034: learn: 8.2862652 total: 2m 27s remaining: 2m 17s
1035: learn: 8.2862631 total: 2m 27s remaining: 2m 16s
1036: learn: 8.2855188 total: 2m 27s remaining: 2m 16s
1037: learn: 8.2851080 total: 2m 27s remaining: 2m 16s
1038: learn: 8.2833179 total: 2m 27s remaining: 2m 16s
1039: learn: 8.2825561 total: 2m 27s remaining: 2m 16s
1040: learn: 8.2819497 total: 2m 27s remaining: 2m 16s
1041: learn: 8.2798942 total: 2m 27s remaining: 2m 16s
1042: learn: 8.2791963 total: 2m 28s remaining: 2m 15s
1043: learn: 8.2790131 total: 2m 28s remaining: 2m 15s
1044: learn: 8.2779721 total: 2m 28s remaining: 2m 15s
1045: learn: 8.2776467 total: 2m 28s remaining: 2m 15s
1046: learn: 8.2768027 total: 2m 28s remaining: 2m 15s
1047: learn: 8.2755607 total: 2m 28s remaining: 2m 15s
1048: learn: 8.2745419 total: 2m 28s remaining: 2m 15s
1049: learn: 8.2739136 total: 2m 29s remaining: 2m 14s
1050: learn: 8.2731998 total: 2m 29s remaining: 2m 14s
1051: learn: 8.2729311 total: 2m 29s remaining: 2m 14s
1052: learn: 8.2728168 total: 2m 29s remaining: 2m 14s
1053: learn: 8.2720981 total: 2m 29s remaining: 2m 14s
1054: learn: 8.2716219 total: 2m 29s remaining: 2m 14s
1055: learn: 8.2708400 total: 2m 29s remaining: 2m 14s
1056: learn: 8.2698927 total: 2m 30s remaining: 2m 13s
1057: learn: 8.2683530 total: 2m 30s remaining: 2m 13s
1058: learn: 8.2681228 total: 2m 30s remaining: 2m 13s
1059: learn: 8.2672737 total: 2m 30s remaining: 2m 13s
1060: learn: 8.2658545 total: 2m 30s remaining: 2m 13s
1061: learn: 8.2643485 total: 2m 30s remaining: 2m 13s
1062: learn: 8.2624509 total: 2m 30s remaining: 2m 13s
1063: learn: 8.2623151 total: 2m 31s remaining: 2m 12s
1064: learn: 8.2614232 total: 2m 31s remaining: 2m 12s
1065: learn: 8.2604289 total: 2m 31s remaining: 2m 12s
1066: learn: 8.2598302 total: 2m 31s remaining: 2m 12s
1067: learn: 8.2585955 total: 2m 31s remaining: 2m 12s
1068: learn: 8.2567687 total: 2m 31s remaining: 2m 12s
1069: learn: 8.2550025 total: 2m 31s remaining: 2m 12s
1070: learn: 8.2546023 total: 2m 32s remaining: 2m 11s
1071: learn: 8.2537701 total: 2m 32s remaining: 2m 11s
1072: learn: 8.2523978 total: 2m 32s remaining: 2m 11s
1073: learn: 8.2520586 total: 2m 32s remaining: 2m 11s
1074: learn: 8.2514731 total: 2m 32s remaining: 2m 11s
1075: learn: 8.2511616 total: 2m 32s remaining: 2m 11s
1076: learn: 8.2503976 total: 2m 32s remaining: 2m 11s
1077: learn: 8.2501151 total: 2m 33s remaining: 2m 10s
1078: learn: 8.2493812 total: 2m 33s remaining: 2m 10s
1079: learn: 8.2485099 total: 2m 33s remaining: 2m 10s
1080: learn: 8.2477772 total: 2m 33s remaining: 2m 10s
1081: learn: 8.2474924 total: 2m 33s remaining: 2m 10s
1082: learn: 8.2470583 total: 2m 33s remaining: 2m 10s
1083: learn: 8.2461290 total: 2m 33s remaining: 2m 10s
1084: learn: 8.2457833 total: 2m 34s remaining: 2m 9s
1085: learn: 8.2451106 total: 2m 34s remaining: 2m 9s
1086: learn: 8.2449819 total: 2m 34s remaining: 2m 9s
1087: learn: 8.2438910 total: 2m 34s remaining: 2m 9s
1088: learn: 8.2433388 total: 2m 34s remaining: 2m 9s
1089: learn: 8.2428241 total: 2m 34s remaining: 2m 9s
1090: learn: 8.2422943 total: 2m 34s remaining: 2m 9s
1091: learn: 8.2416377 total: 2m 35s remaining: 2m 8s
1092: learn: 8.2397170 total: 2m 35s remaining: 2m 8s
1093: learn: 8.2391931 total: 2m 35s remaining: 2m 8s
1094: learn: 8.2379658 total: 2m 35s remaining: 2m 8s
1095: learn: 8.2376473 total: 2m 35s remaining: 2m 8s
1096: learn: 8.2361310 total: 2m 35s remaining: 2m 8s
1097: learn: 8.2350469 total: 2m 35s remaining: 2m 8s
1098: learn: 8.2347068 total: 2m 36s remaining: 2m 7s
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1098: learn: 8.2317888 total: 2m 36s remaining: 2m 7s
1099: learn: 8.2327436 total: 2m 36s remaining: 2m 7s
1100: learn: 8.2325115 total: 2m 36s remaining: 2m 7s
1101: learn: 8.2317607 total: 2m 36s remaining: 2m 7s
1102: learn: 8.2317482 total: 2m 36s remaining: 2m 7s
1103: learn: 8.2304158 total: 2m 36s remaining: 2m 7s
1104: learn: 8.2293885 total: 2m 36s remaining: 2m 7s
1105: learn: 8.2286165 total: 2m 37s remaining: 2m 6s
1106: learn: 8.2280309 total: 2m 37s remaining: 2m 6s
1107: learn: 8.2265113 total: 2m 37s remaining: 2m 6s
1108: learn: 8.2261634 total: 2m 37s remaining: 2m 6s
1109: learn: 8.2249430 total: 2m 37s remaining: 2m 6s
1110: learn: 8.2243178 total: 2m 37s remaining: 2m 6s
1111: learn: 8.2231782 total: 2m 37s remaining: 2m 6s
1112: learn: 8.2229228 total: 2m 38s remaining: 2m 5s
1113: learn: 8.2224489 total: 2m 38s remaining: 2m 5s
1114: learn: 8.2204933 total: 2m 38s remaining: 2m 5s
1115: learn: 8.2204145 total: 2m 38s remaining: 2m 5s
1116: learn: 8.2191459 total: 2m 38s remaining: 2m 5s
1117: learn: 8.2186445 total: 2m 38s remaining: 2m 5s
1118: learn: 8.2180525 total: 2m 38s remaining: 2m 5s
1119: learn: 8.2171976 total: 2m 39s remaining: 2m 4s
1120: learn: 8.2157841 total: 2m 39s remaining: 2m 4s
1121: learn: 8.2149435 total: 2m 39s remaining: 2m 4s
1122: learn: 8.2145543 total: 2m 39s remaining: 2m 4s
1123: learn: 8.2140571 total: 2m 39s remaining: 2m 4s
1124: learn: 8.2137471 total: 2m 39s remaining: 2m 4s
1125: learn: 8.2132662 total: 2m 39s remaining: 2m 4s
1126: learn: 8.2129595 total: 2m 40s remaining: 2m 3s
1127: learn: 8.2115562 total: 2m 40s remaining: 2m 3s
1128: learn: 8.2109703 total: 2m 40s remaining: 2m 3s
1129: learn: 8.2103426 total: 2m 40s remaining: 2m 3s
1130: learn: 8.2100198 total: 2m 40s remaining: 2m 3s
1131: learn: 8.2079485 total: 2m 40s remaining: 2m 3s
1132: learn: 8.2073095 total: 2m 40s remaining: 2m 3s
1133: learn: 8.2058970 total: 2m 41s remaining: 2m 2s
1134: learn: 8.2051676 total: 2m 41s remaining: 2m 2s
1135: learn: 8.2049583 total: 2m 41s remaining: 2m 2s
1136: learn: 8.2024783 total: 2m 41s remaining: 2m 2s
1137: learn: 8.2011186 total: 2m 41s remaining: 2m 2s
1138: learn: 8.2010967 total: 2m 41s remaining: 2m 2s
1139: learn: 8.2006260 total: 2m 41s remaining: 2m 2s
1140: learn: 8.1999346 total: 2m 42s remaining: 2m 1s
1141: learn: 8.1987906 total: 2m 42s remaining: 2m 1s
1142: learn: 8.1965789 total: 2m 42s remaining: 2m 1s
1143: learn: 8.1962680 total: 2m 42s remaining: 2m 1s
1144: learn: 8.1962485 total: 2m 42s remaining: 2m 1s
1145: learn: 8.1957400 total: 2m 42s remaining: 2m 1s
1146: learn: 8.1953629 total: 2m 42s remaining: 2m 1s
1147: learn: 8.1950061 total: 2m 42s remaining: 2m
1148: learn: 8.1938221 total: 2m 43s remaining: 2m
1149: learn: 8.1931194 total: 2m 43s remaining: 2m
1150: learn: 8.1918796 total: 2m 43s remaining: 2m
1151: learn: 8.1910806 total: 2m 43s remaining: 2m
1152: learn: 8.1902536 total: 2m 43s remaining: 2m
1153: learn: 8.1902099 total: 2m 43s remaining: 2m
1154: learn: 8.1888215 total: 2m 43s remaining: 1m 59s
1155: learn: 8.1876595 total: 2m 44s remaining: 1m 59s
1156: learn: 8.1868200 total: 2m 44s remaining: 1m 59s
1157: learn: 8.1858115 total: 2m 44s remaining: 1m 59s
1158: learn: 8.1845757 total: 2m 44s remaining: 1m 59s
1159: learn: 8.1839156 total: 2m 44s remaining: 1m 59s
1160: learn: 8.1826857 total: 2m 44s remaining: 1m 59s
1161: learn: 8.1819309 total: 2m 44s remaining: 1m 58s
1162: learn: 8.1799755 total: 2m 45s remaining: 1m 58s
1163: learn: 8.1799353 total: 2m 45s remaining: 1m 58s
1164: learn: 8.1789441 total: 2m 45s remaining: 1m 58s
1165: learn: 8.1785822 total: 2m 45s remaining: 1m 58s
1166: learn: 8.1781801 total: 2m 45s remaining: 1m 58s
1167: learn: 8.1773325 total: 2m 45s remaining: 1m 58s
1168: learn: 8.1757664 total: 2m 45s remaining: 1m 57s
1169: learn: 8.1741219 total: 2m 46s remaining: 1m 57s
1170: learn: 8.1738493 total: 2m 46s remaining: 1m 57s
1171: learn: 8.1732373 total: 2m 46s remaining: 1m 57s
1172: learn: 8.1723628 total: 2m 46s remaining: 1m 57s
1173: learn: 8.1715915 total: 2m 46s remaining: 1m 57s
1174: learn: 8.1702880 total: 2m 46s remaining: 1m 57s
1175: learn: 8.1694901 total: 2m 46s remaining: 1m 56s
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1175: learn: 8.1094901 total: 2m 47s remaining: 1m 56s
1176: learn: 8.1685910 total: 2m 47s remaining: 1m 56s
1177: learn: 8.1678122 total: 2m 47s remaining: 1m 56s
1178: learn: 8.1675667 total: 2m 47s remaining: 1m 56s
1179: learn: 8.1675259 total: 2m 47s remaining: 1m 56s
1180: learn: 8.1663894 total: 2m 47s remaining: 1m 56s
1181: learn: 8.1659603 total: 2m 47s remaining: 1m 56s
1182: learn: 8.1655668 total: 2m 47s remaining: 1m 55s
1183: learn: 8.1644562 total: 2m 48s remaining: 1m 55s
1184: learn: 8.1636753 total: 2m 48s remaining: 1m 55s
1185: learn: 8.1621543 total: 2m 48s remaining: 1m 55s
1186: learn: 8.1610969 total: 2m 48s remaining: 1m 55s
1187: learn: 8.1601726 total: 2m 48s remaining: 1m 55s
1188: learn: 8.1594091 total: 2m 48s remaining: 1m 55s
1189: learn: 8.1582870 total: 2m 48s remaining: 1m 54s
1190: learn: 8.1577117 total: 2m 49s remaining: 1m 54s
1191: learn: 8.1557410 total: 2m 49s remaining: 1m 54s
1192: learn: 8.1546742 total: 2m 49s remaining: 1m 54s
1193: learn: 8.1531429 total: 2m 49s remaining: 1m 54s
1194: learn: 8.1530603 total: 2m 49s remaining: 1m 54s
1195: learn: 8.1525612 total: 2m 49s remaining: 1m 54s
1196: learn: 8.1510117 total: 2m 49s remaining: 1m 53s
1197: learn: 8.1496078 total: 2m 50s remaining: 1m 53s
1198: learn: 8.1489827 total: 2m 50s remaining: 1m 53s
1199: learn: 8.1483404 total: 2m 50s remaining: 1m 53s
1200: learn: 8.1470748 total: 2m 50s remaining: 1m 53s
1201: learn: 8.1463609 total: 2m 50s remaining: 1m 53s
1202: learn: 8.1456962 total: 2m 50s remaining: 1m 53s
1203: learn: 8.1448858 total: 2m 50s remaining: 1m 53s
1204: learn: 8.1444749 total: 2m 51s remaining: 1m 52s
1205: learn: 8.1438589 total: 2m 51s remaining: 1m 52s
1206: learn: 8.1432605 total: 2m 51s remaining: 1m 52s
1207: learn: 8.1430013 total: 2m 51s remaining: 1m 52s
1208: learn: 8.1420798 total: 2m 51s remaining: 1m 52s
1209: learn: 8.1406495 total: 2m 51s remaining: 1m 52s
1210: learn: 8.1398967 total: 2m 51s remaining: 1m 52s
1211: learn: 8.1391585 total: 2m 52s remaining: 1m 51s
1212: learn: 8.1390894 total: 2m 52s remaining: 1m 51s
1213: learn: 8.1387097 total: 2m 52s remaining: 1m 51s
1214: learn: 8.1376548 total: 2m 52s remaining: 1m 51s
1215: learn: 8.1371820 total: 2m 52s remaining: 1m 51s
1216: learn: 8.1364501 total: 2m 52s remaining: 1m 51s
1217: learn: 8.1349707 total: 2m 52s remaining: 1m 51s
1218: learn: 8.1344864 total: 2m 53s remaining: 1m 50s
1219: learn: 8.1331814 total: 2m 53s remaining: 1m 50s
1220: learn: 8.1317227 total: 2m 53s remaining: 1m 50s
1221: learn: 8.1311556 total: 2m 53s remaining: 1m 50s
1222: learn: 8.1310986 total: 2m 53s remaining: 1m 50s
1223: learn: 8.1304397 total: 2m 53s remaining: 1m 50s
1224: learn: 8.1292681 total: 2m 53s remaining: 1m 50s
1225: learn: 8.1278374 total: 2m 54s remaining: 1m 49s
1226: learn: 8.1270079 total: 2m 54s remaining: 1m 49s
1227: learn: 8.1253954 total: 2m 54s remaining: 1m 49s
1228: learn: 8.1240410 total: 2m 54s remaining: 1m 49s
1229: learn: 8.1230970 total: 2m 54s remaining: 1m 49s
1230: learn: 8.1226329 total: 2m 54s remaining: 1m 49s
1231: learn: 8.1214033 total: 2m 54s remaining: 1m 49s
1232: learn: 8.1207077 total: 2m 55s remaining: 1m 48s
1233: learn: 8.1197706 total: 2m 55s remaining: 1m 48s
1234: learn: 8.1184388 total: 2m 55s remaining: 1m 48s
1235: learn: 8.1177675 total: 2m 55s remaining: 1m 48s
1236: learn: 8.1163976 total: 2m 55s remaining: 1m 48s
1237: learn: 8.1159040 total: 2m 55s remaining: 1m 48s
1238: learn: 8.1147881 total: 2m 55s remaining: 1m 48s
1239: learn: 8.1137214 total: 2m 56s remaining: 1m 47s
1240: learn: 8.1129930 total: 2m 56s remaining: 1m 47s
1241: learn: 8.1126381 total: 2m 56s remaining: 1m 47s
1242: learn: 8.1114932 total: 2m 56s remaining: 1m 47s
1243: learn: 8.1109503 total: 2m 56s remaining: 1m 47s
1244: learn: 8.1104532 total: 2m 56s remaining: 1m 47s
1245: learn: 8.1089585 total: 2m 56s remaining: 1m 47s
1246: learn: 8.1089433 total: 2m 57s remaining: 1m 46s
1247: learn: 8.1083704 total: 2m 57s remaining: 1m 46s
1248: learn: 8.1067571 total: 2m 57s remaining: 1m 46s
1249: learn: 8.1055464 total: 2m 57s remaining: 1m 46s
1250: learn: 8.1052853 total: 2m 57s remaining: 1m 46s
1251: learn: 8.1037191 total: 2m 57s remaining: 1m 46s
1252: learn: 8.1036868 total: 2m 57s remaining: 1m 46s
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1252: learn: 8.1036008 total: 2m 57s remaining: 1m 46s
1253: learn: 8.1023260 total: 2m 58s remaining: 1m 45s
1254: learn: 8.1019921 total: 2m 58s remaining: 1m 45s
1255: learn: 8.1007846 total: 2m 58s remaining: 1m 45s
1256: learn: 8.1006269 total: 2m 58s remaining: 1m 45s
1257: learn: 8.1006053 total: 2m 58s remaining: 1m 45s
1258: learn: 8.0995563 total: 2m 58s remaining: 1m 45s
1259: learn: 8.0980451 total: 2m 58s remaining: 1m 45s
1260: learn: 8.0974730 total: 2m 59s remaining: 1m 44s
1261: learn: 8.0956901 total: 2m 59s remaining: 1m 44s
1262: learn: 8.0947494 total: 2m 59s remaining: 1m 44s
1263: learn: 8.0933076 total: 2m 59s remaining: 1m 44s
1264: learn: 8.0922906 total: 2m 59s remaining: 1m 44s
1265: learn: 8.0907291 total: 2m 59s remaining: 1m 44s
1266: learn: 8.0896690 total: 2m 59s remaining: 1m 44s
1267: learn: 8.0891613 total: 3m remaining: 1m 43s
1268: learn: 8.0882778 total: 3m remaining: 1m 43s
1269: learn: 8.0871346 total: 3m remaining: 1m 43s
1270: learn: 8.0868771 total: 3m remaining: 1m 43s
1271: learn: 8.0846183 total: 3m remaining: 1m 43s
1272: learn: 8.0841323 total: 3m remaining: 1m 43s
1273: learn: 8.0834192 total: 3m remaining: 1m 43s
1274: learn: 8.0826488 total: 3m 1s remaining: 1m 42s
1275: learn: 8.0820038 total: 3m 1s remaining: 1m 42s
1276: learn: 8.0813166 total: 3m 1s remaining: 1m 42s
1277: learn: 8.0800989 total: 3m 1s remaining: 1m 42s
1278: learn: 8.0790525 total: 3m 1s remaining: 1m 42s
1279: learn: 8.0776609 total: 3m 1s remaining: 1m 42s
1280: learn: 8.0767984 total: 3m 1s remaining: 1m 42s
1281: learn: 8.0761442 total: 3m 2s remaining: 1m 41s
1282: learn: 8.0752292 total: 3m 2s remaining: 1m 41s
1283: learn: 8.0742883 total: 3m 2s remaining: 1m 41s
1284: learn: 8.0732652 total: 3m 2s remaining: 1m 41s
1285: learn: 8.0730247 total: 3m 2s remaining: 1m 41s
1286: learn: 8.0716721 total: 3m 2s remaining: 1m 41s
1287: learn: 8.0702697 total: 3m 2s remaining: 1m 41s
1288: learn: 8.0694810 total: 3m 3s remaining: 1m 40s
1289: learn: 8.0689030 total: 3m 3s remaining: 1m 40s
1290: learn: 8.0676257 total: 3m 3s remaining: 1m 40s
1291: learn: 8.0671600 total: 3m 3s remaining: 1m 40s
1292: learn: 8.0665345 total: 3m 3s remaining: 1m 40s
1293: learn: 8.0659877 total: 3m 3s remaining: 1m 40s
1294: learn: 8.0658724 total: 3m 3s remaining: 1m 40s
1295: learn: 8.0646389 total: 3m 4s remaining: 1m 39s
1296: learn: 8.0635205 total: 3m 4s remaining: 1m 39s
1297: learn: 8.0624294 total: 3m 4s remaining: 1m 39s
1298: learn: 8.0613262 total: 3m 4s remaining: 1m 39s
1299: learn: 8.0608064 total: 3m 4s remaining: 1m 39s
1300: learn: 8.0599561 total: 3m 4s remaining: 1m 39s
1301: learn: 8.0597509 total: 3m 4s remaining: 1m 39s
1302: learn: 8.0585862 total: 3m 5s remaining: 1m 38s
1303: learn: 8.0577038 total: 3m 5s remaining: 1m 38s
1304: learn: 8.0568403 total: 3m 5s remaining: 1m 38s
1305: learn: 8.0562170 total: 3m 5s remaining: 1m 38s
1306: learn: 8.0551470 total: 3m 5s remaining: 1m 38s
1307: learn: 8.0546792 total: 3m 5s remaining: 1m 38s
1308: learn: 8.0536326 total: 3m 5s remaining: 1m 38s
1309: learn: 8.0529707 total: 3m 6s remaining: 1m 37s
1310: learn: 8.0520220 total: 3m 6s remaining: 1m 37s
1311: learn: 8.0507092 total: 3m 6s remaining: 1m 37s
1312: learn: 8.0497263 total: 3m 6s remaining: 1m 37s
1313: learn: 8.0482543 total: 3m 6s remaining: 1m 37s
1314: learn: 8.0475251 total: 3m 6s remaining: 1m 37s
1315: learn: 8.0451151 total: 3m 6s remaining: 1m 37s
1316: learn: 8.0449088 total: 3m 7s remaining: 1m 37s
1317: learn: 8.0440240 total: 3m 7s remaining: 1m 36s
1318: learn: 8.0435393 total: 3m 7s remaining: 1m 36s
1319: learn: 8.0422493 total: 3m 7s remaining: 1m 36s
1320: learn: 8.0422254 total: 3m 7s remaining: 1m 36s
1321: learn: 8.0416573 total: 3m 7s remaining: 1m 36s
1322: learn: 8.0404958 total: 3m 7s remaining: 1m 36s
1323: learn: 8.0395910 total: 3m 8s remaining: 1m 36s
1324: learn: 8.0380459 total: 3m 8s remaining: 1m 35s
1325: learn: 8.0366357 total: 3m 8s remaining: 1m 35s
1326: learn: 8.0363026 total: 3m 8s remaining: 1m 35s
1327: learn: 8.0355750 total: 3m 8s remaining: 1m 35s
1328: learn: 8.0339731 total: 3m 8s remaining: 1m 35s
1329: learn: 8.0337363 total: 3m 8s remaining: 1m 35s
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1329: learn: 8.0337362 total: 3m 8s remaining: 1m 35s
1330: learn: 8.0329473 total: 3m 9s remaining: 1m 35s
1331: learn: 8.0310246 total: 3m 9s remaining: 1m 34s
1332: learn: 8.0303201 total: 3m 9s remaining: 1m 34s
1333: learn: 8.0298185 total: 3m 9s remaining: 1m 34s
1334: learn: 8.0285688 total: 3m 9s remaining: 1m 34s
1335: learn: 8.0281644 total: 3m 9s remaining: 1m 34s
1336: learn: 8.0280915 total: 3m 9s remaining: 1m 34s
1337: learn: 8.0273531 total: 3m 10s remaining: 1m 34s
1338: learn: 8.0271317 total: 3m 10s remaining: 1m 33s
1339: learn: 8.0266731 total: 3m 10s remaining: 1m 33s
1340: learn: 8.0260678 total: 3m 10s remaining: 1m 33s
1341: learn: 8.0247004 total: 3m 10s remaining: 1m 33s
1342: learn: 8.0237862 total: 3m 10s remaining: 1m 33s
1343: learn: 8.0234731 total: 3m 10s remaining: 1m 33s
1344: learn: 8.0234498 total: 3m 11s remaining: 1m 33s
1345: learn: 8.0229000 total: 3m 11s remaining: 1m 32s
1346: learn: 8.0215437 total: 3m 11s remaining: 1m 32s
1347: learn: 8.0204898 total: 3m 11s remaining: 1m 32s
1348: learn: 8.0202598 total: 3m 11s remaining: 1m 32s
1349: learn: 8.0195163 total: 3m 11s remaining: 1m 32s
1350: learn: 8.0183016 total: 3m 11s remaining: 1m 32s
1351: learn: 8.0182266 total: 3m 11s remaining: 1m 32s
1352: learn: 8.0177452 total: 3m 12s remaining: 1m 31s
1353: learn: 8.0172746 total: 3m 12s remaining: 1m 31s
1354: learn: 8.0169236 total: 3m 12s remaining: 1m 31s
1355: learn: 8.0169051 total: 3m 12s remaining: 1m 31s
1356: learn: 8.0167320 total: 3m 12s remaining: 1m 31s
1357: learn: 8.0167213 total: 3m 12s remaining: 1m 31s
1358: learn: 8.0158548 total: 3m 12s remaining: 1m 30s
1359: learn: 8.0148222 total: 3m 13s remaining: 1m 30s
1360: learn: 8.0138856 total: 3m 13s remaining: 1m 30s
1361: learn: 8.0138837 total: 3m 13s remaining: 1m 30s
1362: learn: 8.0131908 total: 3m 13s remaining: 1m 30s
1363: learn: 8.0117870 total: 3m 13s remaining: 1m 30s
1364: learn: 8.0106649 total: 3m 13s remaining: 1m 30s
1365: learn: 8.0097880 total: 3m 13s remaining: 1m 30s
1366: learn: 8.0095919 total: 3m 14s remaining: 1m 29s
1367: learn: 8.0081696 total: 3m 14s remaining: 1m 29s
1368: learn: 8.0076510 total: 3m 14s remaining: 1m 29s
1369: learn: 8.0073379 total: 3m 14s remaining: 1m 29s
1370: learn: 8.0066452 total: 3m 14s remaining: 1m 29s
1371: learn: 8.0051360 total: 3m 14s remaining: 1m 29s
1372: learn: 8.0043723 total: 3m 14s remaining: 1m 29s
1373: learn: 8.0036965 total: 3m 15s remaining: 1m 28s
1374: learn: 8.0026964 total: 3m 15s remaining: 1m 28s
1375: learn: 8.0010319 total: 3m 15s remaining: 1m 28s
1376: learn: 7.9995723 total: 3m 15s remaining: 1m 28s
1377: learn: 7.9993647 total: 3m 15s remaining: 1m 28s
1378: learn: 7.9988404 total: 3m 15s remaining: 1m 28s
1379: learn: 7.9983715 total: 3m 15s remaining: 1m 28s
1380: learn: 7.9966562 total: 3m 16s remaining: 1m 27s
1381: learn: 7.9958805 total: 3m 16s remaining: 1m 27s
1382: learn: 7.9957323 total: 3m 16s remaining: 1m 27s
1383: learn: 7.9945571 total: 3m 16s remaining: 1m 27s
1384: learn: 7.9937976 total: 3m 16s remaining: 1m 27s
1385: learn: 7.9927585 total: 3m 16s remaining: 1m 27s
1386: learn: 7.9925468 total: 3m 16s remaining: 1m 27s
1387: learn: 7.9923453 total: 3m 17s remaining: 1m 26s
1388: learn: 7.9916088 total: 3m 17s remaining: 1m 26s
1389: learn: 7.9901300 total: 3m 17s remaining: 1m 26s
1390: learn: 7.9898509 total: 3m 17s remaining: 1m 26s
1391: learn: 7.9897990 total: 3m 17s remaining: 1m 26s
1392: learn: 7.9884658 total: 3m 17s remaining: 1m 26s
1393: learn: 7.9870555 total: 3m 17s remaining: 1m 26s
1394: learn: 7.9867122 total: 3m 18s remaining: 1m 25s
1395: learn: 7.9853772 total: 3m 18s remaining: 1m 25s
1396: learn: 7.9845500 total: 3m 18s remaining: 1m 25s
1397: learn: 7.9842243 total: 3m 18s remaining: 1m 25s
1398: learn: 7.9841616 total: 3m 18s remaining: 1m 25s
1399: learn: 7.9829619 total: 3m 18s remaining: 1m 25s
1400: learn: 7.9825424 total: 3m 18s remaining: 1m 25s
1401: learn: 7.9821799 total: 3m 19s remaining: 1m 24s
1402: learn: 7.9810928 total: 3m 19s remaining: 1m 24s
1403: learn: 7.9805818 total: 3m 19s remaining: 1m 24s
1404: learn: 7.9800389 total: 3m 19s remaining: 1m 24s
1405: learn: 7.9793289 total: 3m 19s remaining: 1m 24s
1406: learn: 7.9789926 total: 3m 19s remaining: 1m 24s
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1406: learn: 7.9789226 total: 3m 19s remaining: 1m 24s
1407: learn: 7.9775282 total: 3m 19s remaining: 1m 24s
1408: learn: 7.9767181 total: 3m 20s remaining: 1m 23s
1409: learn: 7.9754094 total: 3m 20s remaining: 1m 23s
1410: learn: 7.9751673 total: 3m 20s remaining: 1m 23s
1411: learn: 7.9742452 total: 3m 20s remaining: 1m 23s
1412: learn: 7.9740451 total: 3m 20s remaining: 1m 23s
1413: learn: 7.9732081 total: 3m 20s remaining: 1m 23s
1414: learn: 7.9716312 total: 3m 20s remaining: 1m 23s
1415: learn: 7.9703138 total: 3m 21s remaining: 1m 22s
1416: learn: 7.9698060 total: 3m 21s remaining: 1m 22s
1417: learn: 7.9693884 total: 3m 21s remaining: 1m 22s
1418: learn: 7.9679983 total: 3m 21s remaining: 1m 22s
1419: learn: 7.9672834 total: 3m 21s remaining: 1m 22s
1420: learn: 7.9658209 total: 3m 21s remaining: 1m 22s
1421: learn: 7.9643100 total: 3m 21s remaining: 1m 22s
1422: learn: 7.9641063 total: 3m 21s remaining: 1m 21s
1423: learn: 7.9637087 total: 3m 22s remaining: 1m 21s
1424: learn: 7.9632318 total: 3m 22s remaining: 1m 21s
1425: learn: 7.9629709 total: 3m 22s remaining: 1m 21s
1426: learn: 7.9619666 total: 3m 22s remaining: 1m 21s
1427: learn: 7.9615786 total: 3m 22s remaining: 1m 21s
1428: learn: 7.9610454 total: 3m 22s remaining: 1m 21s
1429: learn: 7.9603182 total: 3m 22s remaining: 1m 20s
1430: learn: 7.9595286 total: 3m 23s remaining: 1m 20s
1431: learn: 7.9579464 total: 3m 23s remaining: 1m 20s
1432: learn: 7.9571174 total: 3m 23s remaining: 1m 20s
1433: learn: 7.9556604 total: 3m 23s remaining: 1m 20s
1434: learn: 7.9549004 total: 3m 23s remaining: 1m 20s
1435: learn: 7.9530205 total: 3m 23s remaining: 1m 20s
1436: learn: 7.9520016 total: 3m 23s remaining: 1m 19s
1437: learn: 7.9513821 total: 3m 24s remaining: 1m 19s
1438: learn: 7.9510670 total: 3m 24s remaining: 1m 19s
1439: learn: 7.9503447 total: 3m 24s remaining: 1m 19s
1440: learn: 7.9493356 total: 3m 24s remaining: 1m 19s
1441: learn: 7.9491861 total: 3m 24s remaining: 1m 19s
1442: learn: 7.9491822 total: 3m 24s remaining: 1m 19s
1443: learn: 7.9482032 total: 3m 24s remaining: 1m 18s
1444: learn: 7.9469070 total: 3m 25s remaining: 1m 18s
1445: learn: 7.9454085 total: 3m 25s remaining: 1m 18s
1446: learn: 7.9442762 total: 3m 25s remaining: 1m 18s
1447: learn: 7.9429629 total: 3m 25s remaining: 1m 18s
1448: learn: 7.9425031 total: 3m 25s remaining: 1m 18s
1449: learn: 7.9422596 total: 3m 25s remaining: 1m 18s
1450: learn: 7.9418173 total: 3m 25s remaining: 1m 17s
1451: learn: 7.9409889 total: 3m 26s remaining: 1m 17s
1452: learn: 7.9400268 total: 3m 26s remaining: 1m 17s
1453: learn: 7.9392124 total: 3m 26s remaining: 1m 17s
1454: learn: 7.9379953 total: 3m 26s remaining: 1m 17s
1455: learn: 7.9374926 total: 3m 26s remaining: 1m 17s
1456: learn: 7.9372004 total: 3m 26s remaining: 1m 17s
1457: learn: 7.9361892 total: 3m 26s remaining: 1m 16s
1458: learn: 7.9353631 total: 3m 27s remaining: 1m 16s
1459: learn: 7.9346637 total: 3m 27s remaining: 1m 16s
1460: learn: 7.9341642 total: 3m 27s remaining: 1m 16s
1461: learn: 7.9336743 total: 3m 27s remaining: 1m 16s
1462: learn: 7.9325026 total: 3m 27s remaining: 1m 16s
1463: learn: 7.9318883 total: 3m 27s remaining: 1m 16s
1464: learn: 7.9316358 total: 3m 27s remaining: 1m 15s
1465: learn: 7.9304533 total: 3m 28s remaining: 1m 15s
1466: learn: 7.9298629 total: 3m 28s remaining: 1m 15s
1467: learn: 7.9287617 total: 3m 28s remaining: 1m 15s
1468: learn: 7.9282507 total: 3m 28s remaining: 1m 15s
1469: learn: 7.9279416 total: 3m 28s remaining: 1m 15s
1470: learn: 7.9270901 total: 3m 28s remaining: 1m 15s
1471: learn: 7.9270475 total: 3m 28s remaining: 1m 14s
1472: learn: 7.9266234 total: 3m 29s remaining: 1m 14s
1473: learn: 7.9260684 total: 3m 29s remaining: 1m 14s
1474: learn: 7.9249844 total: 3m 29s remaining: 1m 14s
1475: learn: 7.9242969 total: 3m 29s remaining: 1m 14s
1476: learn: 7.9239237 total: 3m 29s remaining: 1m 14s
1477: learn: 7.9232309 total: 3m 29s remaining: 1m 14s
1478: learn: 7.9226356 total: 3m 29s remaining: 1m 13s
1479: learn: 7.9216073 total: 3m 30s remaining: 1m 13s
1480: learn: 7.9211160 total: 3m 30s remaining: 1m 13s
1481: learn: 7.9208119 total: 3m 30s remaining: 1m 13s
1482: learn: 7.9202484 total: 3m 30s remaining: 1m 13s
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1483: learn: 7.9197355 total: 3m 30s remaining: 1m 13s
1484: learn: 7.9187908 total: 3m 30s remaining: 1m 13s
1485: learn: 7.9182273 total: 3m 30s remaining: 1m 12s
1486: learn: 7.9176998 total: 3m 31s remaining: 1m 12s
1487: learn: 7.9171725 total: 3m 31s remaining: 1m 12s
1488: learn: 7.9158488 total: 3m 31s remaining: 1m 12s
1489: learn: 7.9150371 total: 3m 31s remaining: 1m 12s
1490: learn: 7.9135280 total: 3m 31s remaining: 1m 12s
1491: learn: 7.9119455 total: 3m 31s remaining: 1m 12s
1492: learn: 7.9113059 total: 3m 31s remaining: 1m 11s
1493: learn: 7.9099178 total: 3m 32s remaining: 1m 11s
1494: learn: 7.9092631 total: 3m 32s remaining: 1m 11s
1495: learn: 7.9083721 total: 3m 32s remaining: 1m 11s
1496: learn: 7.9077539 total: 3m 32s remaining: 1m 11s
1497: learn: 7.9070348 total: 3m 32s remaining: 1m 11s
1498: learn: 7.9055671 total: 3m 32s remaining: 1m 11s
1499: learn: 7.9047248 total: 3m 32s remaining: 1m 10s
1500: learn: 7.9044263 total: 3m 33s remaining: 1m 10s
1501: learn: 7.9031583 total: 3m 33s remaining: 1m 10s
1502: learn: 7.9027008 total: 3m 33s remaining: 1m 10s
1503: learn: 7.9018994 total: 3m 33s remaining: 1m 10s
1504: learn: 7.9017228 total: 3m 33s remaining: 1m 10s
1505: learn: 7.9008370 total: 3m 33s remaining: 1m 10s
1506: learn: 7.8995000 total: 3m 33s remaining: 1m 9s
1507: learn: 7.8991677 total: 3m 34s remaining: 1m 9s
1508: learn: 7.8979093 total: 3m 34s remaining: 1m 9s
1509: learn: 7.8978732 total: 3m 34s remaining: 1m 9s
1510: learn: 7.8967822 total: 3m 34s remaining: 1m 9s
1511: learn: 7.8950936 total: 3m 34s remaining: 1m 9s
1512: learn: 7.8937825 total: 3m 34s remaining: 1m 9s
1513: learn: 7.8936820 total: 3m 34s remaining: 1m 9s
1514: learn: 7.8930684 total: 3m 35s remaining: 1m 8s
1515: learn: 7.8919417 total: 3m 35s remaining: 1m 8s
1516: learn: 7.8917877 total: 3m 35s remaining: 1m 8s
1517: learn: 7.8910687 total: 3m 35s remaining: 1m 8s
1518: learn: 7.8905362 total: 3m 35s remaining: 1m 8s
1519: learn: 7.8898769 total: 3m 35s remaining: 1m 8s
1520: learn: 7.8886025 total: 3m 35s remaining: 1m 8s
1521: learn: 7.8872009 total: 3m 36s remaining: 1m 7s
1522: learn: 7.8862824 total: 3m 36s remaining: 1m 7s
1523: learn: 7.8860656 total: 3m 36s remaining: 1m 7s
1524: learn: 7.8858018 total: 3m 36s remaining: 1m 7s
1525: learn: 7.8852133 total: 3m 36s remaining: 1m 7s
1526: learn: 7.8844786 total: 3m 36s remaining: 1m 7s
1527: learn: 7.8832375 total: 3m 36s remaining: 1m 7s
1528: learn: 7.8826967 total: 3m 37s remaining: 1m 6s
1529: learn: 7.8818977 total: 3m 37s remaining: 1m 6s
1530: learn: 7.8810345 total: 3m 37s remaining: 1m 6s
1531: learn: 7.8809016 total: 3m 37s remaining: 1m 6s
1532: learn: 7.8800200 total: 3m 37s remaining: 1m 6s
1533: learn: 7.8791305 total: 3m 37s remaining: 1m 6s
1534: learn: 7.8779449 total: 3m 37s remaining: 1m 6s
1535: learn: 7.8776889 total: 3m 38s remaining: 1m 5s
1536: learn: 7.8766402 total: 3m 38s remaining: 1m 5s
1537: learn: 7.8764626 total: 3m 38s remaining: 1m 5s
1538: learn: 7.8760589 total: 3m 38s remaining: 1m 5s
1539: learn: 7.8751103 total: 3m 38s remaining: 1m 5s
1540: learn: 7.8747863 total: 3m 38s remaining: 1m 5s
1541: learn: 7.8741612 total: 3m 38s remaining: 1m 5s
1542: learn: 7.8721971 total: 3m 39s remaining: 1m 4s
1543: learn: 7.8712489 total: 3m 39s remaining: 1m 4s
1544: learn: 7.8705787 total: 3m 39s remaining: 1m 4s
1545: learn: 7.8684959 total: 3m 39s remaining: 1m 4s
1546: learn: 7.8678014 total: 3m 39s remaining: 1m 4s
1547: learn: 7.8674069 total: 3m 39s remaining: 1m 4s
1548: learn: 7.8668726 total: 3m 39s remaining: 1m 4s
1549: learn: 7.8654398 total: 3m 40s remaining: 1m 3s
1550: learn: 7.8638584 total: 3m 40s remaining: 1m 3s
1551: learn: 7.8632817 total: 3m 40s remaining: 1m 3s
1552: learn: 7.8628355 total: 3m 40s remaining: 1m 3s
1553: learn: 7.8624220 total: 3m 40s remaining: 1m 3s
1554: learn: 7.8615237 total: 3m 40s remaining: 1m 3s
1555: learn: 7.8611761 total: 3m 40s remaining: 1m 3s
1556: learn: 7.8596045 total: 3m 41s remaining: 1m 2s
1557: learn: 7.8591871 total: 3m 41s remaining: 1m 2s
1558: learn: 7.8585594 total: 3m 41s remaining: 1m 2s
1559: learn: 7.8578990 total: 3m 41s remaining: 1m 2s
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1560: learn: 7.8565310 total: 3m 41s remaining: 1m 2s
1561: learn: 7.8558316 total: 3m 41s remaining: 1m 2s
1562: learn: 7.8553392 total: 3m 41s remaining: 1m 2s
1563: learn: 7.8548773 total: 3m 42s remaining: 1m 1s
1564: learn: 7.8537553 total: 3m 42s remaining: 1m 1s
1565: learn: 7.8519815 total: 3m 42s remaining: 1m 1s
1566: learn: 7.8511851 total: 3m 42s remaining: 1m 1s
1567: learn: 7.8506859 total: 3m 42s remaining: 1m 1s
1568: learn: 7.8500964 total: 3m 42s remaining: 1m 1s
1569: learn: 7.8495949 total: 3m 42s remaining: 1m 1s
1570: learn: 7.8495842 total: 3m 43s remaining: 1m
1571: learn: 7.8490399 total: 3m 43s remaining: 1m
1572: learn: 7.8486314 total: 3m 43s remaining: 1m
1573: learn: 7.8480055 total: 3m 43s remaining: 1m
1574: learn: 7.8475707 total: 3m 43s remaining: 1m
1575: learn: 7.8465234 total: 3m 43s remaining: 1m
1576: learn: 7.8459730 total: 3m 43s remaining: 1m
1577: learn: 7.8454855 total: 3m 44s remaining: 59.9s
1578: learn: 7.8448898 total: 3m 44s remaining: 59.8s
1579: learn: 7.8437840 total: 3m 44s remaining: 59.6s
1580: learn: 7.8434337 total: 3m 44s remaining: 59.5s
1581: learn: 7.8423552 total: 3m 44s remaining: 59.4s
1582: learn: 7.8411307 total: 3m 44s remaining: 59.2s
1583: learn: 7.8410113 total: 3m 44s remaining: 59.1s
1584: learn: 7.8406256 total: 3m 45s remaining: 58.9s
1585: learn: 7.8393049 total: 3m 45s remaining: 58.8s
1586: learn: 7.8379256 total: 3m 45s remaining: 58.6s
1587: learn: 7.8371918 total: 3m 45s remaining: 58.5s
1588: learn: 7.8360125 total: 3m 45s remaining: 58.4s
1589: learn: 7.8345980 total: 3m 45s remaining: 58.2s
1590: learn: 7.8345871 total: 3m 45s remaining: 58.1s
1591: learn: 7.8337316 total: 3m 46s remaining: 57.9s
1592: learn: 7.8336775 total: 3m 46s remaining: 57.8s
1593: learn: 7.8329827 total: 3m 46s remaining: 57.7s
1594: learn: 7.8319866 total: 3m 46s remaining: 57.5s
1595: learn: 7.8306988 total: 3m 46s remaining: 57.4s
1596: learn: 7.8306938 total: 3m 46s remaining: 57.2s
1597: learn: 7.8301440 total: 3m 46s remaining: 57.1s
1598: learn: 7.8291878 total: 3m 47s remaining: 56.9s
1599: learn: 7.8276314 total: 3m 47s remaining: 56.8s
1600: learn: 7.8269999 total: 3m 47s remaining: 56.7s
1601: learn: 7.8261498 total: 3m 47s remaining: 56.5s
1602: learn: 7.8255022 total: 3m 47s remaining: 56.4s
1603: learn: 7.8248380 total: 3m 47s remaining: 56.2s
1604: learn: 7.8244739 total: 3m 47s remaining: 56.1s
1605: learn: 7.8236110 total: 3m 48s remaining: 55.9s
1606: learn: 7.8229619 total: 3m 48s remaining: 55.8s
1607: learn: 7.8221520 total: 3m 48s remaining: 55.7s
1608: learn: 7.8211946 total: 3m 48s remaining: 55.5s
1609: learn: 7.8208878 total: 3m 48s remaining: 55.4s
1610: learn: 7.8197761 total: 3m 48s remaining: 55.2s
1611: learn: 7.8176828 total: 3m 48s remaining: 55.1s
1612: learn: 7.8176616 total: 3m 49s remaining: 55s
1613: learn: 7.8172117 total: 3m 49s remaining: 54.8s
1614: learn: 7.8172087 total: 3m 49s remaining: 54.7s
1615: learn: 7.8170259 total: 3m 49s remaining: 54.5s
1616: learn: 7.8163931 total: 3m 49s remaining: 54.4s
1617: learn: 7.8160530 total: 3m 49s remaining: 54.2s
1618: learn: 7.8156598 total: 3m 49s remaining: 54.1s
1619: learn: 7.8147147 total: 3m 50s remaining: 54s
1620: learn: 7.8140769 total: 3m 50s remaining: 53.8s
1621: learn: 7.8136890 total: 3m 50s remaining: 53.7s
1622: learn: 7.8132271 total: 3m 50s remaining: 53.5s
1623: learn: 7.8123214 total: 3m 50s remaining: 53.4s
1624: learn: 7.8116880 total: 3m 50s remaining: 53.2s
1625: learn: 7.8111076 total: 3m 50s remaining: 53.1s
1626: learn: 7.8110290 total: 3m 50s remaining: 53s
1627: learn: 7.8096801 total: 3m 51s remaining: 52.8s
1628: learn: 7.8089363 total: 3m 51s remaining: 52.7s
1629: learn: 7.8082602 total: 3m 51s remaining: 52.5s
1630: learn: 7.8078084 total: 3m 51s remaining: 52.4s
1631: learn: 7.8064620 total: 3m 51s remaining: 52.2s
1632: learn: 7.8059347 total: 3m 51s remaining: 52.1s
1633: learn: 7.8051261 total: 3m 51s remaining: 52s
1634: learn: 7.8038248 total: 3m 52s remaining: 51.8s
1635: learn: 7.8025363 total: 3m 52s remaining: 51.7s
1636: learn: 7.8017448 total: 3m 52s remaining: 51.5s
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1637: learn: 7.8014442 total: 3m 52s remaining: 51.4s
1638: learn: 7.8005365 total: 3m 52s remaining: 51.3s
1639: learn: 7.8002490 total: 3m 52s remaining: 51.1s
1640: learn: 7.7993494 total: 3m 53s remaining: 51s
1641: learn: 7.7987027 total: 3m 53s remaining: 50.8s
1642: learn: 7.7980005 total: 3m 53s remaining: 50.7s
1643: learn: 7.7968721 total: 3m 53s remaining: 50.6s
1644: learn: 7.7964537 total: 3m 53s remaining: 50.4s
1645: learn: 7.7963460 total: 3m 53s remaining: 50.3s
1646: learn: 7.7951713 total: 3m 53s remaining: 50.1s
1647: learn: 7.7941532 total: 3m 54s remaining: 50s
1648: learn: 7.7939752 total: 3m 54s remaining: 49.9s
1649: learn: 7.7935934 total: 3m 54s remaining: 49.7s
1650: learn: 7.7930786 total: 3m 54s remaining: 49.6s
1651: learn: 7.7916801 total: 3m 54s remaining: 49.4s
1652: learn: 7.7907327 total: 3m 54s remaining: 49.3s
1653: learn: 7.7902221 total: 3m 54s remaining: 49.1s
1654: learn: 7.7893823 total: 3m 55s remaining: 49s
1655: learn: 7.7880957 total: 3m 55s remaining: 48.9s
1656: learn: 7.7880910 total: 3m 55s remaining: 48.7s
1657: learn: 7.7877525 total: 3m 55s remaining: 48.6s
1658: learn: 7.7869920 total: 3m 55s remaining: 48.4s
1659: learn: 7.7865356 total: 3m 55s remaining: 48.3s
1660: learn: 7.7858490 total: 3m 55s remaining: 48.1s
1661: learn: 7.7857917 total: 3m 56s remaining: 48s
1662: learn: 7.7844839 total: 3m 56s remaining: 47.9s
1663: learn: 7.7842190 total: 3m 56s remaining: 47.7s
1664: learn: 7.7836764 total: 3m 56s remaining: 47.6s
1665: learn: 7.7829201 total: 3m 56s remaining: 47.4s
1666: learn: 7.7815526 total: 3m 56s remaining: 47.3s
1667: learn: 7.7808797 total: 3m 56s remaining: 47.1s
1668: learn: 7.7793598 total: 3m 57s remaining: 47s
1669: learn: 7.7789764 total: 3m 57s remaining: 46.9s
1670: learn: 7.7781115 total: 3m 57s remaining: 46.7s
1671: learn: 7.7776520 total: 3m 57s remaining: 46.6s
1672: learn: 7.7760831 total: 3m 57s remaining: 46.4s
1673: learn: 7.7752121 total: 3m 57s remaining: 46.3s
1674: learn: 7.7746938 total: 3m 57s remaining: 46.2s
1675: learn: 7.7741478 total: 3m 58s remaining: 46s
1676: learn: 7.7732955 total: 3m 58s remaining: 45.9s
1677: learn: 7.7726024 total: 3m 58s remaining: 45.7s
1678: learn: 7.7712305 total: 3m 58s remaining: 45.6s
1679: learn: 7.7705857 total: 3m 58s remaining: 45.4s
1680: learn: 7.7701572 total: 3m 58s remaining: 45.3s
1681: learn: 7.7697980 total: 3m 58s remaining: 45.2s
1682: learn: 7.7690718 total: 3m 59s remaining: 45s
1683: learn: 7.7684008 total: 3m 59s remaining: 44.9s
1684: learn: 7.7678802 total: 3m 59s remaining: 44.7s
1685: learn: 7.7671425 total: 3m 59s remaining: 44.6s
1686: learn: 7.7660757 total: 3m 59s remaining: 44.5s
1687: learn: 7.7655334 total: 3m 59s remaining: 44.3s
1688: learn: 7.7646222 total: 3m 59s remaining: 44.2s
1689: learn: 7.7635195 total: 4m remaining: 44s
1690: learn: 7.7625202 total: 4m remaining: 43.9s
1691: learn: 7.7618485 total: 4m remaining: 43.7s
1692: learn: 7.7611430 total: 4m remaining: 43.6s
1693: learn: 7.7598955 total: 4m remaining: 43.5s
1694: learn: 7.7595850 total: 4m remaining: 43.3s
1695: learn: 7.7594764 total: 4m remaining: 43.2s
1696: learn: 7.7589302 total: 4m 1s remaining: 43s
1697: learn: 7.7583207 total: 4m 1s remaining: 42.9s
1698: learn: 7.7577786 total: 4m 1s remaining: 42.7s
1699: learn: 7.7574518 total: 4m 1s remaining: 42.6s
1700: learn: 7.7563734 total: 4m 1s remaining: 42.5s
1701: learn: 7.7561576 total: 4m 1s remaining: 42.3s
1702: learn: 7.7557521 total: 4m 1s remaining: 42.2s
1703: learn: 7.7554334 total: 4m 2s remaining: 42s
1704: learn: 7.7549878 total: 4m 2s remaining: 41.9s
1705: learn: 7.7542378 total: 4m 2s remaining: 41.8s
1706: learn: 7.7537408 total: 4m 2s remaining: 41.6s
1707: learn: 7.7518449 total: 4m 2s remaining: 41.5s
1708: learn: 7.7518029 total: 4m 2s remaining: 41.3s
1709: learn: 7.7511716 total: 4m 2s remaining: 41.2s
1710: learn: 7.7510526 total: 4m 3s remaining: 41s
1711: learn: 7.7503881 total: 4m 3s remaining: 40.9s
1712: learn: 7.7499502 total: 4m 3s remaining: 40.8s
1713: learn: 7.7493724 total: 4m 3s remaining: 40.6s
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1714: learn: 7.7487246 total: 4m 3s remaining: 40.5s
1715: learn: 7.7481364 total: 4m 3s remaining: 40.3s
1716: learn: 7.7474489 total: 4m 3s remaining: 40.2s
1717: learn: 7.7470988 total: 4m 4s remaining: 40.1s
1718: learn: 7.7460156 total: 4m 4s remaining: 39.9s
1719: learn: 7.7456906 total: 4m 4s remaining: 39.8s
1720: learn: 7.7450521 total: 4m 4s remaining: 39.6s
1721: learn: 7.7443250 total: 4m 4s remaining: 39.5s
1722: learn: 7.7437686 total: 4m 4s remaining: 39.3s
1723: learn: 7.7427075 total: 4m 4s remaining: 39.2s
1724: learn: 7.7419224 total: 4m 5s remaining: 39.1s
1725: learn: 7.7409833 total: 4m 5s remaining: 38.9s
1726: learn: 7.7404098 total: 4m 5s remaining: 38.8s
1727: learn: 7.7395700 total: 4m 5s remaining: 38.6s
1728: learn: 7.7391052 total: 4m 5s remaining: 38.5s
1729: learn: 7.7383026 total: 4m 5s remaining: 38.3s
1730: learn: 7.7378855 total: 4m 5s remaining: 38.2s
1731: learn: 7.7372044 total: 4m 5s remaining: 38.1s
1732: learn: 7.7365105 total: 4m 6s remaining: 37.9s
1733: learn: 7.7361954 total: 4m 6s remaining: 37.8s
1734: learn: 7.7358968 total: 4m 6s remaining: 37.6s
1735: learn: 7.7352413 total: 4m 6s remaining: 37.5s
1736: learn: 7.7337726 total: 4m 6s remaining: 37.4s
1737: learn: 7.7331889 total: 4m 6s remaining: 37.2s
1738: learn: 7.7325932 total: 4m 6s remaining: 37.1s
1739: learn: 7.7314303 total: 4m 7s remaining: 36.9s
1740: learn: 7.7313039 total: 4m 7s remaining: 36.8s
1741: learn: 7.7304158 total: 4m 7s remaining: 36.6s
1742: learn: 7.7299066 total: 4m 7s remaining: 36.5s
1743: learn: 7.7287999 total: 4m 7s remaining: 36.4s
1744: learn: 7.7283607 total: 4m 7s remaining: 36.2s
1745: learn: 7.7264352 total: 4m 7s remaining: 36.1s
1746: learn: 7.7250364 total: 4m 8s remaining: 35.9s
1747: learn: 7.7246559 total: 4m 8s remaining: 35.8s
1748: learn: 7.7243056 total: 4m 8s remaining: 35.6s
1749: learn: 7.7242886 total: 4m 8s remaining: 35.5s
1750: learn: 7.7236394 total: 4m 8s remaining: 35.4s
1751: learn: 7.7236059 total: 4m 8s remaining: 35.2s
1752: learn: 7.7226787 total: 4m 8s remaining: 35.1s
1753: learn: 7.7223074 total: 4m 9s remaining: 34.9s
1754: learn: 7.7215962 total: 4m 9s remaining: 34.8s
1755: learn: 7.7209863 total: 4m 9s remaining: 34.7s
1756: learn: 7.7198134 total: 4m 9s remaining: 34.5s
1757: learn: 7.7190906 total: 4m 9s remaining: 34.4s
1758: learn: 7.7182508 total: 4m 9s remaining: 34.2s
1759: learn: 7.7179424 total: 4m 9s remaining: 34.1s
1760: learn: 7.7171467 total: 4m 10s remaining: 33.9s
1761: learn: 7.7167300 total: 4m 10s remaining: 33.8s
1762: learn: 7.7161699 total: 4m 10s remaining: 33.7s
1763: learn: 7.7156524 total: 4m 10s remaining: 33.5s
1764: learn: 7.7147419 total: 4m 10s remaining: 33.4s
1765: learn: 7.7144466 total: 4m 10s remaining: 33.2s
1766: learn: 7.7138501 total: 4m 10s remaining: 33.1s
1767: learn: 7.7129725 total: 4m 11s remaining: 32.9s
1768: learn: 7.7120650 total: 4m 11s remaining: 32.8s
1769: learn: 7.7116942 total: 4m 11s remaining: 32.7s
1770: learn: 7.7107647 total: 4m 11s remaining: 32.5s
1771: learn: 7.7103164 total: 4m 11s remaining: 32.4s
1772: learn: 7.7091722 total: 4m 11s remaining: 32.2s
1773: learn: 7.7076808 total: 4m 11s remaining: 32.1s
1774: learn: 7.7074784 total: 4m 12s remaining: 31.9s
1775: learn: 7.7066557 total: 4m 12s remaining: 31.8s
1776: learn: 7.7061968 total: 4m 12s remaining: 31.7s
1777: learn: 7.7054607 total: 4m 12s remaining: 31.5s
1778: learn: 7.7050854 total: 4m 12s remaining: 31.4s
1779: learn: 7.7046428 total: 4m 12s remaining: 31.2s
1780: learn: 7.7043482 total: 4m 12s remaining: 31.1s
1781: learn: 7.7033198 total: 4m 13s remaining: 31s
1782: learn: 7.7024739 total: 4m 13s remaining: 30.8s
1783: learn: 7.7015679 total: 4m 13s remaining: 30.7s
1784: learn: 7.7015668 total: 4m 13s remaining: 30.5s
1785: learn: 7.7004539 total: 4m 13s remaining: 30.4s
1786: learn: 7.6999265 total: 4m 13s remaining: 30.2s
1787: learn: 7.6994285 total: 4m 13s remaining: 30.1s
1788: learn: 7.6982990 total: 4m 14s remaining: 30s
1789: learn: 7.6976221 total: 4m 14s remaining: 29.8s
1790: learn: 7.6966853 total: 4m 14s remaining: 29.7s
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1791: learn: 7.6957294 total: 4m 14s remaining: 29.5s
1792: learn: 7.6953188 total: 4m 14s remaining: 29.4s
1793: learn: 7.6951341 total: 4m 14s remaining: 29.3s
1794: learn: 7.6947865 total: 4m 14s remaining: 29.1s
1795: learn: 7.6941761 total: 4m 15s remaining: 29s
1796: learn: 7.6926194 total: 4m 15s remaining: 28.8s
1797: learn: 7.6911177 total: 4m 15s remaining: 28.7s
1798: learn: 7.6908078 total: 4m 15s remaining: 28.5s
1799: learn: 7.6900093 total: 4m 15s remaining: 28.4s
1800: learn: 7.6883588 total: 4m 15s remaining: 28.3s
1801: learn: 7.6880336 total: 4m 15s remaining: 28.1s
1802: learn: 7.6875778 total: 4m 16s remaining: 28s
1803: learn: 7.6870866 total: 4m 16s remaining: 27.8s
1804: learn: 7.6863724 total: 4m 16s remaining: 27.7s
1805: learn: 7.6852065 total: 4m 16s remaining: 27.6s
1806: learn: 7.6842358 total: 4m 16s remaining: 27.4s
1807: learn: 7.6840405 total: 4m 16s remaining: 27.3s
1808: learn: 7.6825308 total: 4m 16s remaining: 27.1s
1809: learn: 7.6824413 total: 4m 17s remaining: 27s
1810: learn: 7.6814760 total: 4m 17s remaining: 26.8s
1811: learn: 7.6806396 total: 4m 17s remaining: 26.7s
1812: learn: 7.6796485 total: 4m 17s remaining: 26.6s
1813: learn: 7.6790150 total: 4m 17s remaining: 26.4s
1814: learn: 7.6778703 total: 4m 17s remaining: 26.3s
1815: learn: 7.6764096 total: 4m 17s remaining: 26.1s
1816: learn: 7.6757149 total: 4m 18s remaining: 26s
1817: learn: 7.6750578 total: 4m 18s remaining: 25.8s
1818: learn: 7.6741945 total: 4m 18s remaining: 25.7s
1819: learn: 7.6734085 total: 4m 18s remaining: 25.6s
1820: learn: 7.6731515 total: 4m 18s remaining: 25.4s
1821: learn: 7.6722196 total: 4m 18s remaining: 25.3s
1822: learn: 7.6712956 total: 4m 18s remaining: 25.1s
1823: learn: 7.6704687 total: 4m 19s remaining: 25s
1824: learn: 7.6703690 total: 4m 19s remaining: 24.9s
1825: learn: 7.6701827 total: 4m 19s remaining: 24.7s
1826: learn: 7.6698604 total: 4m 19s remaining: 24.6s
1827: learn: 7.6694320 total: 4m 19s remaining: 24.4s
1828: learn: 7.6692626 total: 4m 19s remaining: 24.3s
1829: learn: 7.6690193 total: 4m 19s remaining: 24.1s
1830: learn: 7.6688376 total: 4m 20s remaining: 24s
1831: learn: 7.6678148 total: 4m 20s remaining: 23.9s
1832: learn: 7.6672263 total: 4m 20s remaining: 23.7s
1833: learn: 7.6664202 total: 4m 20s remaining: 23.6s
1834: learn: 7.6652412 total: 4m 20s remaining: 23.4s
1835: learn: 7.6651177 total: 4m 20s remaining: 23.3s
1836: learn: 7.6643888 total: 4m 20s remaining: 23.1s
1837: learn: 7.6627937 total: 4m 21s remaining: 23s
1838: learn: 7.6621562 total: 4m 21s remaining: 22.9s
1839: learn: 7.6613513 total: 4m 21s remaining: 22.7s
1840: learn: 7.6612972 total: 4m 21s remaining: 22.6s
1841: learn: 7.6608282 total: 4m 21s remaining: 22.4s
1842: learn: 7.6598388 total: 4m 21s remaining: 22.3s
1843: learn: 7.6593963 total: 4m 21s remaining: 22.2s
1844: learn: 7.6591953 total: 4m 22s remaining: 22s
1845: learn: 7.6584723 total: 4m 22s remaining: 21.9s
1846: learn: 7.6584700 total: 4m 22s remaining: 21.7s
1847: learn: 7.6582943 total: 4m 22s remaining: 21.6s
1848: learn: 7.6572991 total: 4m 22s remaining: 21.4s
1849: learn: 7.6567976 total: 4m 22s remaining: 21.3s
1850: learn: 7.6563991 total: 4m 22s remaining: 21.2s
1851: learn: 7.6553294 total: 4m 22s remaining: 21s
1852: learn: 7.6543785 total: 4m 23s remaining: 20.9s
1853: learn: 7.6540194 total: 4m 23s remaining: 20.7s
1854: learn: 7.6534653 total: 4m 23s remaining: 20.6s
1855: learn: 7.6531881 total: 4m 23s remaining: 20.4s
1856: learn: 7.6526039 total: 4m 23s remaining: 20.3s
1857: learn: 7.6520804 total: 4m 23s remaining: 20.2s
1858: learn: 7.6515108 total: 4m 23s remaining: 20s
1859: learn: 7.6506515 total: 4m 24s remaining: 19.9s
1860: learn: 7.6501562 total: 4m 24s remaining: 19.7s
1861: learn: 7.6486841 total: 4m 24s remaining: 19.6s
1862: learn: 7.6480967 total: 4m 24s remaining: 19.5s
1863: learn: 7.6470570 total: 4m 24s remaining: 19.3s
1864: learn: 7.6457596 total: 4m 24s remaining: 19.2s
1865: learn: 7.6450788 total: 4m 24s remaining: 19s
1866: learn: 7.6441961 total: 4m 25s remaining: 18.9s
1867: learn: 7.6429523 total: 4m 25s remaining: 18.7s
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1868: learn: 7.6422912 total: 4m 25s remaining: 18.6s
1869: learn: 7.6416563 total: 4m 25s remaining: 18.5s
1870: learn: 7.6408318 total: 4m 25s remaining: 18.3s
1871: learn: 7.6400006 total: 4m 25s remaining: 18.2s
1872: learn: 7.6397000 total: 4m 25s remaining: 18s
1873: learn: 7.6386188 total: 4m 26s remaining: 17.9s
1874: learn: 7.6379533 total: 4m 26s remaining: 17.8s
1875: learn: 7.6371911 total: 4m 26s remaining: 17.6s
1876: learn: 7.6362729 total: 4m 26s remaining: 17.5s
1877: learn: 7.6357285 total: 4m 26s remaining: 17.3s
1878: learn: 7.6351809 total: 4m 26s remaining: 17.2s
1879: learn: 7.6344081 total: 4m 26s remaining: 17s
1880: learn: 7.6334659 total: 4m 27s remaining: 16.9s
1881: learn: 7.6329422 total: 4m 27s remaining: 16.8s
1882: learn: 7.6324453 total: 4m 27s remaining: 16.6s
1883: learn: 7.6320193 total: 4m 27s remaining: 16.5s
1884: learn: 7.6313344 total: 4m 27s remaining: 16.3s
1885: learn: 7.6307699 total: 4m 27s remaining: 16.2s
1886: learn: 7.6305761 total: 4m 27s remaining: 16s
1887: learn: 7.6302804 total: 4m 28s remaining: 15.9s
1888: learn: 7.6293698 total: 4m 28s remaining: 15.8s
1889: learn: 7.6286839 total: 4m 28s remaining: 15.6s
1890: learn: 7.6273725 total: 4m 28s remaining: 15.5s
1891: learn: 7.6264858 total: 4m 28s remaining: 15.3s
1892: learn: 7.6257049 total: 4m 28s remaining: 15.2s
1893: learn: 7.6253626 total: 4m 28s remaining: 15.1s
1894: learn: 7.6251887 total: 4m 29s remaining: 14.9s
1895: learn: 7.6245680 total: 4m 29s remaining: 14.8s
1896: learn: 7.6240324 total: 4m 29s remaining: 14.6s
1897: learn: 7.6235032 total: 4m 29s remaining: 14.5s
1898: learn: 7.6228688 total: 4m 29s remaining: 14.3s
1899: learn: 7.6218264 total: 4m 29s remaining: 14.2s
1900: learn: 7.6215473 total: 4m 29s remaining: 14.1s
1901: learn: 7.6212287 total: 4m 30s remaining: 13.9s
1902: learn: 7.6204589 total: 4m 30s remaining: 13.8s
1903: learn: 7.6203569 total: 4m 30s remaining: 13.6s
1904: learn: 7.6193108 total: 4m 30s remaining: 13.5s
1905: learn: 7.6180870 total: 4m 30s remaining: 13.3s
1906: learn: 7.6177249 total: 4m 30s remaining: 13.2s
1907: learn: 7.6169889 total: 4m 30s remaining: 13.1s
1908: learn: 7.6161354 total: 4m 31s remaining: 12.9s
1909: learn: 7.6161303 total: 4m 31s remaining: 12.8s
1910: learn: 7.6159382 total: 4m 31s remaining: 12.6s
1911: learn: 7.6143901 total: 4m 31s remaining: 12.5s
1912: learn: 7.6129498 total: 4m 31s remaining: 12.4s
1913: learn: 7.6123409 total: 4m 31s remaining: 12.2s
1914: learn: 7.6119234 total: 4m 31s remaining: 12.1s
1915: learn: 7.6109598 total: 4m 32s remaining: 11.9s
1916: learn: 7.6105366 total: 4m 32s remaining: 11.8s
1917: learn: 7.6091972 total: 4m 32s remaining: 11.6s
1918: learn: 7.6082109 total: 4m 32s remaining: 11.5s
1919: learn: 7.6078813 total: 4m 32s remaining: 11.4s
1920: learn: 7.6068468 total: 4m 32s remaining: 11.2s
1921: learn: 7.6057806 total: 4m 32s remaining: 11.1s
1922: learn: 7.6048561 total: 4m 33s remaining: 10.9s
1923: learn: 7.6039126 total: 4m 33s remaining: 10.8s
1924: learn: 7.6039098 total: 4m 33s remaining: 10.7s
1925: learn: 7.6031135 total: 4m 33s remaining: 10.5s
1926: learn: 7.6023904 total: 4m 33s remaining: 10.4s
1927: learn: 7.6014518 total: 4m 33s remaining: 10.2s
1928: learn: 7.6005766 total: 4m 33s remaining: 10.1s
1929: learn: 7.5998511 total: 4m 34s remaining: 9.94s
1930: learn: 7.5996829 total: 4m 34s remaining: 9.8s
1931: learn: 7.5991838 total: 4m 34s remaining: 9.66s
1932: learn: 7.5986652 total: 4m 34s remaining: 9.51s
1933: learn: 7.5978723 total: 4m 34s remaining: 9.37s
1934: learn: 7.5974783 total: 4m 34s remaining: 9.23s
1935: learn: 7.5971402 total: 4m 34s remaining: 9.09s
1936: learn: 7.5967957 total: 4m 35s remaining: 8.95s
1937: learn: 7.5960569 total: 4m 35s remaining: 8.8s
1938: learn: 7.5953789 total: 4m 35s remaining: 8.66s
1939: learn: 7.5952569 total: 4m 35s remaining: 8.52s
1940: learn: 7.5951439 total: 4m 35s remaining: 8.38s
1941: learn: 7.5940560 total: 4m 35s remaining: 8.24s
1942: learn: 7.5935639 total: 4m 35s remaining: 8.09s
1943: learn: 7.5932644 total: 4m 36s remaining: 7.95s
1944: learn: 7.5930340 total: 4m 36s remaining: 7.81s
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1945: learn: 7.5921946 total: 4m 36s remaining: 7.67s
1946: learn: 7.5916339 total: 4m 36s remaining: 7.53s
1947: learn: 7.5911672 total: 4m 36s remaining: 7.38s
1948: learn: 7.5904086 total: 4m 36s remaining: 7.24s
1949: learn: 7.5898144 total: 4m 36s remaining: 7.1s
1950: learn: 7.5891050 total: 4m 37s remaining: 6.96s
1951: learn: 7.5888978 total: 4m 37s remaining: 6.82s
1952: learn: 7.5881066 total: 4m 37s remaining: 6.67s
1953: learn: 7.5876137 total: 4m 37s remaining: 6.53s
1954: learn: 7.5871827 total: 4m 37s remaining: 6.39s
1955: learn: 7.5862864 total: 4m 37s remaining: 6.25s
1956: learn: 7.5845124 total: 4m 37s remaining: 6.11s
1957: learn: 7.5838806 total: 4m 38s remaining: 5.96s
1958: learn: 7.5821094 total: 4m 38s remaining: 5.82s
1959: learn: 7.5818325 total: 4m 38s remaining: 5.68s
1960: learn: 7.5817039 total: 4m 38s remaining: 5.54s
1961: learn: 7.5815154 total: 4m 38s remaining: 5.4s
1962: learn: 7.5807075 total: 4m 38s remaining: 5.25s
1963: learn: 7.5798869 total: 4m 38s remaining: 5.11s
1964: learn: 7.5797370 total: 4m 39s remaining: 4.97s
1965: learn: 7.5791011 total: 4m 39s remaining: 4.83s
1966: learn: 7.5779345 total: 4m 39s remaining: 4.69s
1967: learn: 7.5768477 total: 4m 39s remaining: 4.54s
1968: learn: 7.5762901 total: 4m 39s remaining: 4.4s
1969: learn: 7.5759005 total: 4m 39s remaining: 4.26s
1970: learn: 7.5748481 total: 4m 39s remaining: 4.12s
1971: learn: 7.5736744 total: 4m 40s remaining: 3.98s
1972: learn: 7.5730807 total: 4m 40s remaining: 3.83s
1973: learn: 7.5721941 total: 4m 40s remaining: 3.69s
1974: learn: 7.5716214 total: 4m 40s remaining: 3.55s
1975: learn: 7.5711742 total: 4m 40s remaining: 3.41s
1976: learn: 7.5707103 total: 4m 40s remaining: 3.27s
1977: learn: 7.5701837 total: 4m 40s remaining: 3.12s
1978: learn: 7.5692741 total: 4m 41s remaining: 2.98s
1979: learn: 7.5684777 total: 4m 41s remaining: 2.84s
1980: learn: 7.5674226 total: 4m 41s remaining: 2.7s
1981: learn: 7.5669932 total: 4m 41s remaining: 2.56s
1982: learn: 7.5660632 total: 4m 41s remaining: 2.41s
1983: learn: 7.5657894 total: 4m 41s remaining: 2.27s
1984: learn: 7.5653609 total: 4m 41s remaining: 2.13s
1985: learn: 7.5646481 total: 4m 42s remaining: 1.99s
1986: learn: 7.5634580 total: 4m 42s remaining: 1.85s
1987: learn: 7.5630630 total: 4m 42s remaining: 1.7s
1988: learn: 7.5629961 total: 4m 42s remaining: 1.56s
1989: learn: 7.5621846 total: 4m 42s remaining: 1.42s
1990: learn: 7.5619694 total: 4m 42s remaining: 1.28s
1991: learn: 7.5609693 total: 4m 42s remaining: 1.14s
1992: learn: 7.5600796 total: 4m 43s remaining: 994ms
1993: learn: 7.5595445 total: 4m 43s remaining: 852ms
1994: learn: 7.5585922 total: 4m 43s remaining: 710ms
1995: learn: 7.5568883 total: 4m 43s remaining: 568ms
1996: learn: 7.5555866 total: 4m 43s remaining: 426ms
1997: learn: 7.5547908 total: 4m 43s remaining: 284ms
1998: learn: 7.5540419 total: 4m 43s remaining: 142ms
1999: learn: 7.5532613 total: 4m 44s remaining: 0us
```

Out[ ]:

0.5024847558893116
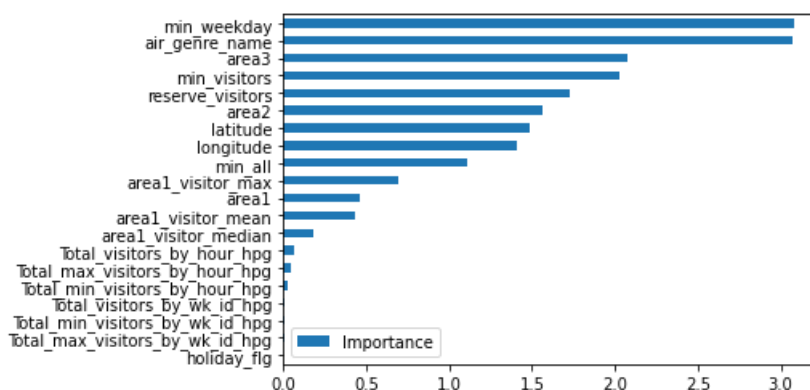
```
predicted_data.head(2)
```

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	17	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	21	0	2017	4	24

```python
Cat, pred_y = Catboost(Xtrain,Ytrain,Xtest,**model_params)
predicted_data["visitors"] = pred_y
predicted_data["visitors"] = predicted_data["visitors"].apply(lambda x: 0 if x<0 else int(x))
predicted_data
```

```
0: learn: 16.2917443 total: 173ms remaining: 5m 46s
1: learn: 15.8616214 total: 345ms remaining: 5m 44s
2: learn: 15.4587834 total: 514ms remaining: 5m 41s
3: learn: 15.0863809 total: 685ms remaining: 5m 41s
4: learn: 14.7353612 total: 859ms remaining: 5m 42s
5: learn: 14.4172205 total: 1.02s remaining: 5m 40s
6: learn: 14.1169970 total: 1.19s remaining: 5m 38s
7: learn: 13.8344838 total: 1.37s remaining: 5m 40s
8: learn: 13.5798570 total: 1.53s remaining: 5m 39s
9: learn: 13.3382424 total: 1.7s remaining: 5m 38s
10: learn: 13.1149895 total: 1.88s remaining: 5m 39s
11: learn: 12.9109874 total: 2.04s remaining: 5m 38s
12: learn: 12.7171320 total: 2.21s remaining: 5m 38s
13: learn: 12.5377549 total: 2.38s remaining: 5m 38s
14: learn: 12.3746691 total: 2.55s remaining: 5m 37s
15: learn: 12.2206362 total: 2.72s remaining: 5m 37s
16: learn: 12.0779626 total: 2.9s remaining: 5m 38s
17: learn: 11.9474035 total: 3.07s remaining: 5m 38s
18: learn: 11.8276122 total: 3.24s remaining: 5m 37s
19: learn: 11.7169971 total: 3.42s remaining: 5m 38s
20: learn: 11.6124613 total: 3.59s remaining: 5m 38s
21: learn: 11.5182017 total: 3.79s remaining: 5m 40s
22: learn: 11.4302061 total: 3.96s remaining: 5m 40s
23: learn: 11.3485619 total: 4.13s remaining: 5m 40s
24: learn: 11.2729548 total: 4.31s remaining: 5m 40s
25: learn: 11.2026288 total: 4.49s remaining: 5m 40s
26: learn: 11.1358748 total: 4.66s remaining: 5m 40s
27: learn: 11.0760486 total: 4.83s remaining: 5m 40s
28: learn: 11.0169824 total: 5.01s remaining: 5m 40s
29: learn: 10.9642029 total: 5.18s remaining: 5m 40s
30: learn: 10.9127301 total: 5.36s remaining: 5m 40s
31: learn: 10.8647973 total: 5.54s remaining: 5m 40s
32: learn: 10.8212576 total: 5.71s remaining: 5m 40s
33: learn: 10.7806254 total: 5.89s remaining: 5m 40s
34: learn: 10.7447696 total: 6.1s remaining: 5m 42s
35: learn: 10.7091972 total: 6.27s remaining: 5m 42s
36: learn: 10.6769601 total: 6.46s remaining: 5m 42s
37: learn: 10.6430248 total: 6.64s remaining: 5m 43s
38: learn: 10.6110335 total: 6.81s remaining: 5m 42s
39: learn: 10.5842618 total: 6.99s remaining: 5m 42s
40: learn: 10.5597384 total: 7.16s remaining: 5m 42s
41: learn: 10.5334423 total: 7.32s remaining: 5m 41s
42: learn: 10.5090895 total: 7.5s remaining: 5m 41s
43: learn: 10.4863037 total: 7.67s remaining: 5m 40s
44: learn: 10.4677511 total: 7.84s remaining: 5m 40s
45: learn: 10.4478803 total: 8.02s remaining: 5m 40s
46: learn: 10.4286892 total: 8.19s remaining: 5m 40s
47: learn: 10.4147336 total: 8.35s remaining: 5m 39s
48: learn: 10.3978453 total: 8.54s remaining: 5m 40s
49: learn: 10.3814029 total: 8.71s remaining: 5m 39s
50: learn: 10.3639286 total: 8.89s remaining: 5m 39s
51: learn: 10.3463082 total: 9.06s remaining: 5m 39s
52: learn: 10.3353050 total: 9.23s remaining: 5m 39s
53: learn: 10.3209846 total: 9.41s remaining: 5m 39s
54: learn: 10.3074625 total: 9.58s remaining: 5m 38s
55: learn: 10.3040008 total: 9.75s remaining: 5m 38s
```

```
55: learn: 10.2949008 total: 9.75s remaining: 5m 38s
56: learn: 10.2831166 total: 9.93s remaining: 5m 38s
57: learn: 10.2712224 total: 10.1s remaining: 5m 38s
58: learn: 10.2608453 total: 10.3s remaining: 5m 37s
59: learn: 10.2493715 total: 10.4s remaining: 5m 37s
60: learn: 10.2368429 total: 10.6s remaining: 5m 37s
61: learn: 10.2257932 total: 10.8s remaining: 5m 37s
62: learn: 10.2167119 total: 11s remaining: 5m 36s
63: learn: 10.2100451 total: 11.1s remaining: 5m 36s
64: learn: 10.2015378 total: 11.3s remaining: 5m 36s
65: learn: 10.1914598 total: 11.5s remaining: 5m 36s
66: learn: 10.1804180 total: 11.6s remaining: 5m 35s
67: learn: 10.1718377 total: 11.8s remaining: 5m 35s
68: learn: 10.1615645 total: 12s remaining: 5m 35s
69: learn: 10.1518515 total: 12.2s remaining: 5m 35s
70: learn: 10.1454353 total: 12.3s remaining: 5m 34s
71: learn: 10.1369871 total: 12.5s remaining: 5m 34s
72: learn: 10.1289169 total: 12.7s remaining: 5m 34s
73: learn: 10.1210917 total: 12.9s remaining: 5m 34s
74: learn: 10.1124646 total: 13s remaining: 5m 34s
75: learn: 10.1052631 total: 13.2s remaining: 5m 34s
76: learn: 10.0941179 total: 13.4s remaining: 5m 33s
77: learn: 10.0879804 total: 13.6s remaining: 5m 33s
78: learn: 10.0826763 total: 13.7s remaining: 5m 33s
79: learn: 10.0759682 total: 13.9s remaining: 5m 33s
80: learn: 10.0675929 total: 14.1s remaining: 5m 33s
81: learn: 10.0626841 total: 14.3s remaining: 5m 33s
82: learn: 10.0532382 total: 14.4s remaining: 5m 33s
83: learn: 10.0438951 total: 14.6s remaining: 5m 33s
84: learn: 10.0393147 total: 14.8s remaining: 5m 33s
85: learn: 10.0328945 total: 15s remaining: 5m 33s
86: learn: 10.0264775 total: 15.2s remaining: 5m 33s
87: learn: 10.0203148 total: 15.3s remaining: 5m 32s
88: learn: 10.0147517 total: 15.5s remaining: 5m 32s
89: learn: 10.0070011 total: 15.7s remaining: 5m 32s
90: learn: 10.0016600 total: 15.8s remaining: 5m 32s
91: learn: 9.9980349 total: 16s remaining: 5m 32s
92: learn: 9.9909770 total: 16.2s remaining: 5m 32s
93: learn: 9.9848324 total: 16.4s remaining: 5m 31s
94: learn: 9.9788826 total: 16.5s remaining: 5m 31s
95: learn: 9.9717845 total: 16.7s remaining: 5m 31s
96: learn: 9.9637825 total: 16.9s remaining: 5m 31s
97: learn: 9.9584029 total: 17.1s remaining: 5m 31s
98: learn: 9.9534873 total: 17.2s remaining: 5m 30s
99: learn: 9.9500856 total: 17.4s remaining: 5m 30s
100: learn: 9.9437839 total: 17.6s remaining: 5m 30s
101: learn: 9.9408622 total: 17.8s remaining: 5m 30s
102: learn: 9.9352248 total: 17.9s remaining: 5m 30s
103: learn: 9.9303145 total: 18.1s remaining: 5m 30s
104: learn: 9.9251841 total: 18.3s remaining: 5m 30s
105: learn: 9.9202399 total: 18.5s remaining: 5m 29s
106: learn: 9.9120445 total: 18.6s remaining: 5m 29s
107: learn: 9.9072360 total: 18.8s remaining: 5m 29s
108: learn: 9.9026449 total: 19s remaining: 5m 29s
109: learn: 9.8982016 total: 19.2s remaining: 5m 29s
110: learn: 9.8920564 total: 19.3s remaining: 5m 29s
111: learn: 9.8899971 total: 19.5s remaining: 5m 29s
112: learn: 9.8868786 total: 19.7s remaining: 5m 29s
113: learn: 9.8828493 total: 19.9s remaining: 5m 28s
114: learn: 9.8785715 total: 20.1s remaining: 5m 28s
115: learn: 9.8758173 total: 20.2s remaining: 5m 28s
116: learn: 9.8696806 total: 20.4s remaining: 5m 28s
117: learn: 9.8658620 total: 20.6s remaining: 5m 28s
118: learn: 9.8618247 total: 20.8s remaining: 5m 28s
119: learn: 9.8595999 total: 20.9s remaining: 5m 27s
120: learn: 9.8566117 total: 21.1s remaining: 5m 27s
121: learn: 9.8536951 total: 21.3s remaining: 5m 27s
122: learn: 9.8527783 total: 21.4s remaining: 5m 27s
123: learn: 9.8474855 total: 21.6s remaining: 5m 27s
124: learn: 9.8426160 total: 21.8s remaining: 5m 26s
125: learn: 9.8399892 total: 22s remaining: 5m 26s
126: learn: 9.8328553 total: 22.1s remaining: 5m 26s
127: learn: 9.8300552 total: 22.3s remaining: 5m 26s
128: learn: 9.8261870 total: 22.5s remaining: 5m 26s
129: learn: 9.8232264 total: 22.7s remaining: 5m 25s
130: learn: 9.8191153 total: 22.8s remaining: 5m 25s
131: learn: 9.8144919 total: 23s remaining: 5m 25s
```

```
132: learn: 9.8099304 total: 23.2s remaining: 5m 25s
133: learn: 9.8063728 total: 23.4s remaining: 5m 25s
134: learn: 9.8040828 total: 23.6s remaining: 5m 25s
135: learn: 9.7989514 total: 23.7s remaining: 5m 25s
136: learn: 9.7971220 total: 23.9s remaining: 5m 25s
137: learn: 9.7949416 total: 24.1s remaining: 5m 24s
138: learn: 9.7908164 total: 24.3s remaining: 5m 24s
139: learn: 9.7860965 total: 24.4s remaining: 5m 24s
140: learn: 9.7818050 total: 24.6s remaining: 5m 24s
141: learn: 9.7768802 total: 24.8s remaining: 5m 24s
142: learn: 9.7722753 total: 25s remaining: 5m 24s
143: learn: 9.7695090 total: 25.1s remaining: 5m 24s
144: learn: 9.7656191 total: 25.3s remaining: 5m 24s
145: learn: 9.7617288 total: 25.5s remaining: 5m 23s
146: learn: 9.7559999 total: 25.7s remaining: 5m 23s
147: learn: 9.7540844 total: 25.9s remaining: 5m 23s
148: learn: 9.7519929 total: 26s remaining: 5m 23s
149: learn: 9.7466401 total: 26.2s remaining: 5m 23s
150: learn: 9.7424985 total: 26.4s remaining: 5m 23s
151: learn: 9.7410192 total: 26.6s remaining: 5m 23s
152: learn: 9.7378549 total: 26.7s remaining: 5m 22s
153: learn: 9.7328415 total: 26.9s remaining: 5m 22s
154: learn: 9.7296295 total: 27.1s remaining: 5m 22s
155: learn: 9.7257097 total: 27.3s remaining: 5m 22s
156: learn: 9.7241388 total: 27.5s remaining: 5m 22s
157: learn: 9.7217933 total: 27.6s remaining: 5m 21s
158: learn: 9.7173193 total: 27.8s remaining: 5m 21s
159: learn: 9.7138550 total: 28s remaining: 5m 21s
160: learn: 9.7110620 total: 28.1s remaining: 5m 21s
161: learn: 9.7083348 total: 28.3s remaining: 5m 21s
162: learn: 9.7042897 total: 28.5s remaining: 5m 21s
163: learn: 9.7018183 total: 28.7s remaining: 5m 20s
164: learn: 9.6987520 total: 28.8s remaining: 5m 20s
165: learn: 9.6944649 total: 29s remaining: 5m 20s
166: learn: 9.6920741 total: 29.2s remaining: 5m 20s
167: learn: 9.6901481 total: 29.4s remaining: 5m 20s
168: learn: 9.6860217 total: 29.5s remaining: 5m 20s
169: learn: 9.6828666 total: 29.7s remaining: 5m 19s
170: learn: 9.6803456 total: 29.9s remaining: 5m 19s
171: learn: 9.6775114 total: 30.1s remaining: 5m 19s
172: learn: 9.6728057 total: 30.2s remaining: 5m 19s
173: learn: 9.6703484 total: 30.4s remaining: 5m 19s
174: learn: 9.6666313 total: 30.6s remaining: 5m 19s
175: learn: 9.6644386 total: 30.8s remaining: 5m 18s
176: learn: 9.6622204 total: 30.9s remaining: 5m 18s
177: learn: 9.6606090 total: 31.1s remaining: 5m 18s
178: learn: 9.6587222 total: 31.3s remaining: 5m 18s
179: learn: 9.6551346 total: 31.5s remaining: 5m 18s
180: learn: 9.6496179 total: 31.7s remaining: 5m 18s
181: learn: 9.6479716 total: 31.8s remaining: 5m 17s
182: learn: 9.6468213 total: 32s remaining: 5m 17s
183: learn: 9.6431085 total: 32.2s remaining: 5m 17s
184: learn: 9.6398744 total: 32.4s remaining: 5m 17s
185: learn: 9.6377356 total: 32.5s remaining: 5m 17s
186: learn: 9.6363804 total: 32.7s remaining: 5m 17s
187: learn: 9.6321304 total: 32.9s remaining: 5m 17s
188: learn: 9.6301923 total: 33.1s remaining: 5m 16s
189: learn: 9.6279187 total: 33.3s remaining: 5m 16s
190: learn: 9.6256511 total: 33.4s remaining: 5m 16s
191: learn: 9.6236033 total: 33.6s remaining: 5m 16s
192: learn: 9.6203476 total: 33.8s remaining: 5m 16s
193: learn: 9.6186698 total: 34s remaining: 5m 16s
194: learn: 9.6161243 total: 34.1s remaining: 5m 16s
195: learn: 9.6124636 total: 34.3s remaining: 5m 15s
196: learn: 9.6074918 total: 34.5s remaining: 5m 15s
197: learn: 9.6065860 total: 34.7s remaining: 5m 15s
198: learn: 9.6025753 total: 34.8s remaining: 5m 15s
199: learn: 9.6006599 total: 35s remaining: 5m 15s
200: learn: 9.5960968 total: 35.2s remaining: 5m 14s
201: learn: 9.5927624 total: 35.4s remaining: 5m 14s
202: learn: 9.5872432 total: 35.5s remaining: 5m 14s
203: learn: 9.5848210 total: 35.7s remaining: 5m 14s
204: learn: 9.5804731 total: 35.9s remaining: 5m 14s
205: learn: 9.5755617 total: 36.1s remaining: 5m 14s
206: learn: 9.5723973 total: 36.2s remaining: 5m 13s
207: learn: 9.5705340 total: 36.4s remaining: 5m 13s
208: learn: 9.5653501 total: 36.6s remaining: 5m 13s
```

```
209: learn: 9.5633482 total: 36.8s remaining: 5m 13s
210: learn: 9.5610514 total: 36.9s remaining: 5m 13s
211: learn: 9.5578539 total: 37.1s remaining: 5m 12s
212: learn: 9.5560514 total: 37.3s remaining: 5m 12s
213: learn: 9.5542547 total: 37.5s remaining: 5m 12s
214: learn: 9.5508081 total: 37.6s remaining: 5m 12s
215: learn: 9.5494398 total: 37.8s remaining: 5m 12s
216: learn: 9.5468741 total: 38s remaining: 5m 12s
217: learn: 9.5432645 total: 38.2s remaining: 5m 11s
218: learn: 9.5415810 total: 38.4s remaining: 5m 11s
219: learn: 9.5394926 total: 38.5s remaining: 5m 11s
220: learn: 9.5377830 total: 38.7s remaining: 5m 11s
221: learn: 9.5342448 total: 38.9s remaining: 5m 11s
222: learn: 9.5312147 total: 39.1s remaining: 5m 11s
223: learn: 9.5287439 total: 39.2s remaining: 5m 10s
224: learn: 9.5265811 total: 39.4s remaining: 5m 10s
225: learn: 9.5252856 total: 39.6s remaining: 5m 10s
226: learn: 9.5210449 total: 39.7s remaining: 5m 10s
227: learn: 9.5178725 total: 39.9s remaining: 5m 10s
228: learn: 9.5156320 total: 40.1s remaining: 5m 10s
229: learn: 9.5132581 total: 40.3s remaining: 5m 9s
230: learn: 9.5110273 total: 40.4s remaining: 5m 9s
231: learn: 9.5095506 total: 40.6s remaining: 5m 9s
232: learn: 9.5055422 total: 40.8s remaining: 5m 9s
233: learn: 9.5035699 total: 41s remaining: 5m 9s
234: learn: 9.5022939 total: 41.1s remaining: 5m 9s
235: learn: 9.5009456 total: 41.3s remaining: 5m 8s
236: learn: 9.4979245 total: 41.5s remaining: 5m 8s
237: learn: 9.4938265 total: 41.7s remaining: 5m 8s
238: learn: 9.4907097 total: 41.8s remaining: 5m 8s
239: learn: 9.4883422 total: 42s remaining: 5m 8s
240: learn: 9.4866062 total: 42.2s remaining: 5m 7s
241: learn: 9.4851068 total: 42.4s remaining: 5m 7s
242: learn: 9.4826782 total: 42.5s remaining: 5m 7s
243: learn: 9.4806393 total: 42.7s remaining: 5m 7s
244: learn: 9.4776209 total: 42.9s remaining: 5m 7s
245: learn: 9.4762615 total: 43.1s remaining: 5m 7s
246: learn: 9.4735854 total: 43.3s remaining: 5m 6s
247: learn: 9.4714860 total: 43.4s remaining: 5m 6s
248: learn: 9.4689928 total: 43.6s remaining: 5m 6s
249: learn: 9.4662220 total: 43.8s remaining: 5m 6s
250: learn: 9.4640796 total: 44s remaining: 5m 6s
251: learn: 9.4613648 total: 44.1s remaining: 5m 6s
252: learn: 9.4581629 total: 44.3s remaining: 5m 5s
253: learn: 9.4575599 total: 44.5s remaining: 5m 5s
254: learn: 9.4528190 total: 44.6s remaining: 5m 5s
255: learn: 9.4508351 total: 44.8s remaining: 5m 5s
256: learn: 9.4492825 total: 45s remaining: 5m 5s
257: learn: 9.4456581 total: 45.2s remaining: 5m 4s
258: learn: 9.4408193 total: 45.3s remaining: 5m 4s
259: learn: 9.4380399 total: 45.5s remaining: 5m 4s
260: learn: 9.4361123 total: 45.7s remaining: 5m 4s
261: learn: 9.4321012 total: 45.9s remaining: 5m 4s
262: learn: 9.4296792 total: 46s remaining: 5m 4s
263: learn: 9.4254883 total: 46.2s remaining: 5m 3s
264: learn: 9.4222076 total: 46.4s remaining: 5m 3s
265: learn: 9.4208186 total: 46.6s remaining: 5m 3s
266: learn: 9.4188059 total: 46.8s remaining: 5m 3s
267: learn: 9.4161796 total: 46.9s remaining: 5m 3s
268: learn: 9.4147692 total: 47.1s remaining: 5m 3s
269: learn: 9.4109602 total: 47.3s remaining: 5m 2s
270: learn: 9.4097270 total: 47.5s remaining: 5m 2s
271: learn: 9.4068852 total: 47.6s remaining: 5m 2s
272: learn: 9.4038587 total: 47.8s remaining: 5m 2s
273: learn: 9.4021202 total: 48s remaining: 5m 2s
274: learn: 9.4016480 total: 48.2s remaining: 5m 2s
275: learn: 9.3993443 total: 48.3s remaining: 5m 1s
276: learn: 9.3984390 total: 48.5s remaining: 5m 1s
277: learn: 9.3960027 total: 48.7s remaining: 5m 1s
278: learn: 9.3932236 total: 48.9s remaining: 5m 1s
279: learn: 9.3921466 total: 49s remaining: 5m 1s
280: learn: 9.3905639 total: 49.2s remaining: 5m 1s
281: learn: 9.3884735 total: 49.4s remaining: 5m
282: learn: 9.3856656 total: 49.6s remaining: 5m
283: learn: 9.3838988 total: 49.7s remaining: 5m
284: learn: 9.3816947 total: 49.9s remaining: 5m
285: learn: 9.3800114 total: 50.1s remaining: 5m
```

```
286: learn: 9.3776481 total: 50.3s remaining: 5m
287: learn: 9.3765925 total: 50.4s remaining: 4m 59s
288: learn: 9.3751924 total: 50.6s remaining: 4m 59s
289: learn: 9.3708885 total: 50.8s remaining: 4m 59s
290: learn: 9.3684466 total: 51s remaining: 4m 59s
291: learn: 9.3674186 total: 51.1s remaining: 4m 59s
292: learn: 9.3641489 total: 51.3s remaining: 4m 59s
293: learn: 9.3614025 total: 51.5s remaining: 4m 58s
294: learn: 9.3582850 total: 51.7s remaining: 4m 58s
295: learn: 9.3565734 total: 51.8s remaining: 4m 58s
296: learn: 9.3534855 total: 52s remaining: 4m 58s
297: learn: 9.3504395 total: 52.2s remaining: 4m 58s
298: learn: 9.3481926 total: 52.4s remaining: 4m 57s
299: learn: 9.3460667 total: 52.5s remaining: 4m 57s
300: learn: 9.3432263 total: 52.7s remaining: 4m 57s
301: learn: 9.3419304 total: 52.9s remaining: 4m 57s
302: learn: 9.3374366 total: 53.1s remaining: 4m 57s
303: learn: 9.3347127 total: 53.3s remaining: 4m 57s
304: learn: 9.3316005 total: 53.4s remaining: 4m 56s
305: learn: 9.3286155 total: 53.6s remaining: 4m 56s
306: learn: 9.3278002 total: 53.8s remaining: 4m 56s
307: learn: 9.3255746 total: 54s remaining: 4m 56s
308: learn: 9.3228616 total: 54.1s remaining: 4m 56s
309: learn: 9.3204388 total: 54.3s remaining: 4m 56s
310: learn: 9.3164769 total: 54.5s remaining: 4m 55s
311: learn: 9.3135899 total: 54.6s remaining: 4m 55s
312: learn: 9.3124472 total: 54.8s remaining: 4m 55s
313: learn: 9.3100833 total: 55s remaining: 4m 55s
314: learn: 9.3077545 total: 55.2s remaining: 4m 55s
315: learn: 9.3045575 total: 55.3s remaining: 4m 54s
316: learn: 9.3015871 total: 55.5s remaining: 4m 54s
317: learn: 9.2991759 total: 55.7s remaining: 4m 54s
318: learn: 9.2967975 total: 55.9s remaining: 4m 54s
319: learn: 9.2944471 total: 56s remaining: 4m 54s
320: learn: 9.2919171 total: 56.2s remaining: 4m 54s
321: learn: 9.2893622 total: 56.4s remaining: 4m 53s
322: learn: 9.2864098 total: 56.6s remaining: 4m 53s
323: learn: 9.2855054 total: 56.7s remaining: 4m 53s
324: learn: 9.2833115 total: 56.9s remaining: 4m 53s
325: learn: 9.2816543 total: 57.1s remaining: 4m 53s
326: learn: 9.2807038 total: 57.3s remaining: 4m 53s
327: learn: 9.2777929 total: 57.4s remaining: 4m 52s
328: learn: 9.2765553 total: 57.6s remaining: 4m 52s
329: learn: 9.2747116 total: 57.8s remaining: 4m 52s
330: learn: 9.2723378 total: 58s remaining: 4m 52s
331: learn: 9.2714197 total: 58.2s remaining: 4m 52s
332: learn: 9.2690632 total: 58.4s remaining: 4m 52s
333: learn: 9.2667264 total: 58.5s remaining: 4m 51s
334: learn: 9.2654674 total: 58.7s remaining: 4m 51s
335: learn: 9.2638237 total: 58.9s remaining: 4m 51s
336: learn: 9.2612097 total: 59.1s remaining: 4m 51s
337: learn: 9.2602357 total: 59.2s remaining: 4m 51s
338: learn: 9.2580655 total: 59.4s remaining: 4m 51s
339: learn: 9.2567935 total: 59.6s remaining: 4m 50s
340: learn: 9.2552581 total: 59.8s remaining: 4m 50s
341: learn: 9.2533068 total: 59.9s remaining: 4m 50s
342: learn: 9.2518734 total: 1m remaining: 4m 50s
343: learn: 9.2490532 total: 1m remaining: 4m 50s
344: learn: 9.2478642 total: 1m remaining: 4m 50s
345: learn: 9.2450938 total: 1m remaining: 4m 49s
346: learn: 9.2429628 total: 1m remaining: 4m 49s
347: learn: 9.2400293 total: 1m 1s remaining: 4m 49s
348: learn: 9.2368808 total: 1m 1s remaining: 4m 49s
349: learn: 9.2346369 total: 1m 1s remaining: 4m 49s
350: learn: 9.2315368 total: 1m 1s remaining: 4m 49s
351: learn: 9.2306257 total: 1m 1s remaining: 4m 48s
352: learn: 9.2283626 total: 1m 1s remaining: 4m 48s
353: learn: 9.2252817 total: 1m 2s remaining: 4m 48s
354: learn: 9.2242215 total: 1m 2s remaining: 4m 48s
355: learn: 9.2222656 total: 1m 2s remaining: 4m 48s
356: learn: 9.2201794 total: 1m 2s remaining: 4m 48s
357: learn: 9.2190591 total: 1m 2s remaining: 4m 47s
358: learn: 9.2168518 total: 1m 2s remaining: 4m 47s
359: learn: 9.2146667 total: 1m 3s remaining: 4m 47s
360: learn: 9.2140554 total: 1m 3s remaining: 4m 47s
361: learn: 9.2090287 total: 1m 3s remaining: 4m 47s
362: learn: 9.2057006 total: 1m 3s remaining: 4m 47s
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363: learn: 9.2036862 total: 1m 3s remaining: 4m 47s
364: learn: 9.2008450 total: 1m 4s remaining: 4m 46s
365: learn: 9.1986817 total: 1m 4s remaining: 4m 46s
366: learn: 9.1959986 total: 1m 4s remaining: 4m 46s
367: learn: 9.1929555 total: 1m 4s remaining: 4m 46s
368: learn: 9.1897033 total: 1m 4s remaining: 4m 46s
369: learn: 9.1886088 total: 1m 4s remaining: 4m 45s
370: learn: 9.1869182 total: 1m 5s remaining: 4m 45s
371: learn: 9.1847839 total: 1m 5s remaining: 4m 45s
372: learn: 9.1838015 total: 1m 5s remaining: 4m 45s
373: learn: 9.1790612 total: 1m 5s remaining: 4m 45s
374: learn: 9.1774443 total: 1m 5s remaining: 4m 45s
375: learn: 9.1754349 total: 1m 6s remaining: 4m 45s
376: learn: 9.1733775 total: 1m 6s remaining: 4m 44s
377: learn: 9.1722335 total: 1m 6s remaining: 4m 45s
378: learn: 9.1708799 total: 1m 6s remaining: 4m 44s
379: learn: 9.1689968 total: 1m 6s remaining: 4m 44s
380: learn: 9.1670876 total: 1m 6s remaining: 4m 44s
381: learn: 9.1651687 total: 1m 7s remaining: 4m 44s
382: learn: 9.1643592 total: 1m 7s remaining: 4m 44s
383: learn: 9.1624446 total: 1m 7s remaining: 4m 44s
384: learn: 9.1612421 total: 1m 7s remaining: 4m 43s
385: learn: 9.1606054 total: 1m 7s remaining: 4m 43s
386: learn: 9.1591651 total: 1m 8s remaining: 4m 43s
387: learn: 9.1579032 total: 1m 8s remaining: 4m 43s
388: learn: 9.1556001 total: 1m 8s remaining: 4m 43s
389: learn: 9.1541815 total: 1m 8s remaining: 4m 43s
390: learn: 9.1523302 total: 1m 8s remaining: 4m 42s
391: learn: 9.1507404 total: 1m 8s remaining: 4m 42s
392: learn: 9.1496464 total: 1m 9s remaining: 4m 42s
393: learn: 9.1482138 total: 1m 9s remaining: 4m 42s
394: learn: 9.1470324 total: 1m 9s remaining: 4m 42s
395: learn: 9.1447428 total: 1m 9s remaining: 4m 42s
396: learn: 9.1423847 total: 1m 9s remaining: 4m 41s
397: learn: 9.1376979 total: 1m 9s remaining: 4m 41s
398: learn: 9.1348077 total: 1m 10s remaining: 4m 41s
399: learn: 9.1330299 total: 1m 10s remaining: 4m 41s
400: learn: 9.1325209 total: 1m 10s remaining: 4m 41s
401: learn: 9.1297535 total: 1m 10s remaining: 4m 40s
402: learn: 9.1280402 total: 1m 10s remaining: 4m 40s
403: learn: 9.1264917 total: 1m 11s remaining: 4m 40s
404: learn: 9.1249490 total: 1m 11s remaining: 4m 40s
405: learn: 9.1207257 total: 1m 11s remaining: 4m 40s
406: learn: 9.1186029 total: 1m 11s remaining: 4m 40s
407: learn: 9.1167457 total: 1m 11s remaining: 4m 39s
408: learn: 9.1155945 total: 1m 11s remaining: 4m 39s
409: learn: 9.1128759 total: 1m 12s remaining: 4m 39s
410: learn: 9.1115904 total: 1m 12s remaining: 4m 39s
411: learn: 9.1086225 total: 1m 12s remaining: 4m 39s
412: learn: 9.1077210 total: 1m 12s remaining: 4m 39s
413: learn: 9.1067229 total: 1m 12s remaining: 4m 38s
414: learn: 9.1051560 total: 1m 12s remaining: 4m 38s
415: learn: 9.1011319 total: 1m 13s remaining: 4m 38s
416: learn: 9.0994997 total: 1m 13s remaining: 4m 38s
417: learn: 9.0967367 total: 1m 13s remaining: 4m 38s
418: learn: 9.0962264 total: 1m 13s remaining: 4m 38s
419: learn: 9.0940230 total: 1m 13s remaining: 4m 37s
420: learn: 9.0932945 total: 1m 14s remaining: 4m 37s
421: learn: 9.0918942 total: 1m 14s remaining: 4m 37s
422: learn: 9.0904047 total: 1m 14s remaining: 4m 37s
423: learn: 9.0881944 total: 1m 14s remaining: 4m 37s
424: learn: 9.0864648 total: 1m 14s remaining: 4m 37s
425: learn: 9.0851385 total: 1m 14s remaining: 4m 36s
426: learn: 9.0829341 total: 1m 15s remaining: 4m 36s
427: learn: 9.0804371 total: 1m 15s remaining: 4m 36s
428: learn: 9.0784724 total: 1m 15s remaining: 4m 36s
429: learn: 9.0777852 total: 1m 15s remaining: 4m 36s
430: learn: 9.0773774 total: 1m 15s remaining: 4m 35s
431: learn: 9.0753786 total: 1m 15s remaining: 4m 35s
432: learn: 9.0737500 total: 1m 16s remaining: 4m 35s
433: learn: 9.0725114 total: 1m 16s remaining: 4m 35s
434: learn: 9.0701081 total: 1m 16s remaining: 4m 35s
435: learn: 9.0689369 total: 1m 16s remaining: 4m 35s
436: learn: 9.0666741 total: 1m 16s remaining: 4m 34s
437: learn: 9.0656595 total: 1m 17s remaining: 4m 34s
438: learn: 9.0632797 total: 1m 17s remaining: 4m 34s
439: learn: 9.0610067 total: 1m 17s remaining: 4m 34s
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440: learn: 9.0587495 total: 1m 17s remaining: 4m 34s
441: learn: 9.0565759 total: 1m 17s remaining: 4m 34s
442: learn: 9.0551016 total: 1m 17s remaining: 4m 33s
443: learn: 9.0522855 total: 1m 18s remaining: 4m 33s
444: learn: 9.0517093 total: 1m 18s remaining: 4m 33s
445: learn: 9.0506123 total: 1m 18s remaining: 4m 33s
446: learn: 9.0494778 total: 1m 18s remaining: 4m 33s
447: learn: 9.0473271 total: 1m 18s remaining: 4m 32s
448: learn: 9.0439069 total: 1m 18s remaining: 4m 32s
449: learn: 9.0413256 total: 1m 19s remaining: 4m 32s
450: learn: 9.0394249 total: 1m 19s remaining: 4m 32s
451: learn: 9.0368855 total: 1m 19s remaining: 4m 32s
452: learn: 9.0345810 total: 1m 19s remaining: 4m 32s
453: learn: 9.0334008 total: 1m 19s remaining: 4m 32s
454: learn: 9.0306309 total: 1m 20s remaining: 4m 31s
455: learn: 9.0300420 total: 1m 20s remaining: 4m 31s
456: learn: 9.0284572 total: 1m 20s remaining: 4m 31s
457: learn: 9.0270792 total: 1m 20s remaining: 4m 31s
458: learn: 9.0261668 total: 1m 20s remaining: 4m 31s
459: learn: 9.0233445 total: 1m 20s remaining: 4m 30s
460: learn: 9.0228043 total: 1m 21s remaining: 4m 30s
461: learn: 9.0207028 total: 1m 21s remaining: 4m 30s
462: learn: 9.0198171 total: 1m 21s remaining: 4m 30s
463: learn: 9.0189334 total: 1m 21s remaining: 4m 30s
464: learn: 9.0184181 total: 1m 21s remaining: 4m 30s
465: learn: 9.0177020 total: 1m 21s remaining: 4m 29s
466: learn: 9.0146091 total: 1m 22s remaining: 4m 29s
467: learn: 9.0143141 total: 1m 22s remaining: 4m 29s
468: learn: 9.0131198 total: 1m 22s remaining: 4m 29s
469: learn: 9.0103581 total: 1m 22s remaining: 4m 29s
470: learn: 9.0087514 total: 1m 22s remaining: 4m 29s
471: learn: 9.0071622 total: 1m 23s remaining: 4m 28s
472: learn: 9.0053914 total: 1m 23s remaining: 4m 28s
473: learn: 9.0029460 total: 1m 23s remaining: 4m 28s
474: learn: 9.0010250 total: 1m 23s remaining: 4m 28s
475: learn: 8.9990374 total: 1m 23s remaining: 4m 28s
476: learn: 8.9970972 total: 1m 23s remaining: 4m 28s
477: learn: 8.9954534 total: 1m 24s remaining: 4m 27s
478: learn: 8.9935758 total: 1m 24s remaining: 4m 27s
479: learn: 8.9927054 total: 1m 24s remaining: 4m 27s
480: learn: 8.9918667 total: 1m 24s remaining: 4m 27s
481: learn: 8.9900740 total: 1m 24s remaining: 4m 27s
482: learn: 8.9888134 total: 1m 25s remaining: 4m 27s
483: learn: 8.9862719 total: 1m 25s remaining: 4m 26s
484: learn: 8.9837493 total: 1m 25s remaining: 4m 26s
485: learn: 8.9810380 total: 1m 25s remaining: 4m 26s
486: learn: 8.9801983 total: 1m 25s remaining: 4m 26s
487: learn: 8.9787809 total: 1m 25s remaining: 4m 26s
488: learn: 8.9769165 total: 1m 26s remaining: 4m 26s
489: learn: 8.9763886 total: 1m 26s remaining: 4m 25s
490: learn: 8.9744077 total: 1m 26s remaining: 4m 25s
491: learn: 8.9735898 total: 1m 26s remaining: 4m 25s
492: learn: 8.9731015 total: 1m 26s remaining: 4m 25s
493: learn: 8.9717132 total: 1m 27s remaining: 4m 25s
494: learn: 8.9709631 total: 1m 27s remaining: 4m 25s
495: learn: 8.9694949 total: 1m 27s remaining: 4m 25s
496: learn: 8.9682040 total: 1m 27s remaining: 4m 24s
497: learn: 8.9671171 total: 1m 27s remaining: 4m 24s
498: learn: 8.9663504 total: 1m 27s remaining: 4m 24s
499: learn: 8.9646793 total: 1m 28s remaining: 4m 24s
500: learn: 8.9632146 total: 1m 28s remaining: 4m 24s
501: learn: 8.9631933 total: 1m 28s remaining: 4m 24s
502: learn: 8.9626226 total: 1m 28s remaining: 4m 23s
503: learn: 8.9600174 total: 1m 28s remaining: 4m 23s
504: learn: 8.9577934 total: 1m 29s remaining: 4m 23s
505: learn: 8.9548520 total: 1m 29s remaining: 4m 23s
506: learn: 8.9538439 total: 1m 29s remaining: 4m 23s
507: learn: 8.9513733 total: 1m 29s remaining: 4m 23s
508: learn: 8.9500331 total: 1m 29s remaining: 4m 23s
509: learn: 8.9486390 total: 1m 29s remaining: 4m 22s
510: learn: 8.9474540 total: 1m 30s remaining: 4m 22s
511: learn: 8.9452541 total: 1m 30s remaining: 4m 22s
512: learn: 8.9430105 total: 1m 30s remaining: 4m 22s
513: learn: 8.9403184 total: 1m 30s remaining: 4m 22s
514: learn: 8.9386941 total: 1m 30s remaining: 4m 22s
515: learn: 8.9366709 total: 1m 31s remaining: 4m 21s
516: learn: 8.9345352 total: 1m 31s remaining: 4m 21s
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517: learn: 8.9326069 total: 1m 31s remaining: 4m 21s
518: learn: 8.9302318 total: 1m 31s remaining: 4m 21s
519: learn: 8.9292766 total: 1m 31s remaining: 4m 21s
520: learn: 8.9262809 total: 1m 31s remaining: 4m 21s
521: learn: 8.9243293 total: 1m 32s remaining: 4m 20s
522: learn: 8.9220456 total: 1m 32s remaining: 4m 20s
523: learn: 8.9213609 total: 1m 32s remaining: 4m 20s
524: learn: 8.9201921 total: 1m 32s remaining: 4m 20s
525: learn: 8.9185878 total: 1m 32s remaining: 4m 20s
526: learn: 8.9171280 total: 1m 33s remaining: 4m 20s
527: learn: 8.9149270 total: 1m 33s remaining: 4m 19s
528: learn: 8.9130908 total: 1m 33s remaining: 4m 19s
529: learn: 8.9118287 total: 1m 33s remaining: 4m 19s
530: learn: 8.9102303 total: 1m 33s remaining: 4m 19s
531: learn: 8.9088800 total: 1m 33s remaining: 4m 19s
532: learn: 8.9077394 total: 1m 34s remaining: 4m 19s
533: learn: 8.9055595 total: 1m 34s remaining: 4m 18s
534: learn: 8.9043134 total: 1m 34s remaining: 4m 18s
535: learn: 8.9020471 total: 1m 34s remaining: 4m 18s
536: learn: 8.8996067 total: 1m 34s remaining: 4m 18s
537: learn: 8.8975066 total: 1m 35s remaining: 4m 18s
538: learn: 8.8969405 total: 1m 35s remaining: 4m 18s
539: learn: 8.8951181 total: 1m 35s remaining: 4m 17s
540: learn: 8.8944732 total: 1m 35s remaining: 4m 17s
541: learn: 8.8924232 total: 1m 35s remaining: 4m 17s
542: learn: 8.8919304 total: 1m 35s remaining: 4m 17s
543: learn: 8.8913237 total: 1m 36s remaining: 4m 17s
544: learn: 8.8900315 total: 1m 36s remaining: 4m 17s
545: learn: 8.8889473 total: 1m 36s remaining: 4m 16s
546: learn: 8.8880465 total: 1m 36s remaining: 4m 16s
547: learn: 8.8873554 total: 1m 36s remaining: 4m 16s
548: learn: 8.8852057 total: 1m 37s remaining: 4m 16s
549: learn: 8.8843730 total: 1m 37s remaining: 4m 16s
550: learn: 8.8826430 total: 1m 37s remaining: 4m 16s
551: learn: 8.8816021 total: 1m 37s remaining: 4m 15s
552: learn: 8.8808018 total: 1m 37s remaining: 4m 15s
553: learn: 8.8801951 total: 1m 37s remaining: 4m 15s
554: learn: 8.8784383 total: 1m 38s remaining: 4m 15s
555: learn: 8.8769766 total: 1m 38s remaining: 4m 15s
556: learn: 8.8749400 total: 1m 38s remaining: 4m 15s
557: learn: 8.8728843 total: 1m 38s remaining: 4m 14s
558: learn: 8.8721705 total: 1m 38s remaining: 4m 14s
559: learn: 8.8698901 total: 1m 39s remaining: 4m 14s
560: learn: 8.8692435 total: 1m 39s remaining: 4m 14s
561: learn: 8.8682144 total: 1m 39s remaining: 4m 14s
562: learn: 8.8655246 total: 1m 39s remaining: 4m 14s
563: learn: 8.8645660 total: 1m 39s remaining: 4m 13s
564: learn: 8.8641851 total: 1m 39s remaining: 4m 13s
565: learn: 8.8613561 total: 1m 40s remaining: 4m 13s
566: learn: 8.8611313 total: 1m 40s remaining: 4m 13s
567: learn: 8.8589251 total: 1m 40s remaining: 4m 13s
568: learn: 8.8583427 total: 1m 40s remaining: 4m 13s
569: learn: 8.8576695 total: 1m 40s remaining: 4m 12s
570: learn: 8.8564149 total: 1m 41s remaining: 4m 12s
571: learn: 8.8555572 total: 1m 41s remaining: 4m 12s
572: learn: 8.8538762 total: 1m 41s remaining: 4m 12s
573: learn: 8.8528137 total: 1m 41s remaining: 4m 12s
574: learn: 8.8510270 total: 1m 41s remaining: 4m 12s
575: learn: 8.8491850 total: 1m 41s remaining: 4m 11s
576: learn: 8.8479973 total: 1m 42s remaining: 4m 11s
577: learn: 8.8474519 total: 1m 42s remaining: 4m 11s
578: learn: 8.8458139 total: 1m 42s remaining: 4m 11s
579: learn: 8.8428631 total: 1m 42s remaining: 4m 11s
580: learn: 8.8411129 total: 1m 42s remaining: 4m 11s
581: learn: 8.8393860 total: 1m 42s remaining: 4m 10s
582: learn: 8.8388823 total: 1m 43s remaining: 4m 10s
583: learn: 8.8372767 total: 1m 43s remaining: 4m 10s
584: learn: 8.8369036 total: 1m 43s remaining: 4m 10s
585: learn: 8.8349479 total: 1m 43s remaining: 4m 10s
586: learn: 8.8336233 total: 1m 43s remaining: 4m 9s
587: learn: 8.8325492 total: 1m 44s remaining: 4m 9s
588: learn: 8.8311092 total: 1m 44s remaining: 4m 9s
589: learn: 8.8301755 total: 1m 44s remaining: 4m 9s
590: learn: 8.8291450 total: 1m 44s remaining: 4m 9s
591: learn: 8.8279744 total: 1m 44s remaining: 4m 9s
592: learn: 8.8273744 total: 1m 44s remaining: 4m 8s
593: learn: 8.8254643 total: 1m 45s remaining: 4m 8s
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594: learn: 8.8253423 total: 1m 45s remaining: 4m 8s
595: learn: 8.8247249 total: 1m 45s remaining: 4m 8s
596: learn: 8.8235261 total: 1m 45s remaining: 4m 8s
597: learn: 8.8229105 total: 1m 45s remaining: 4m 8s
598: learn: 8.8214553 total: 1m 45s remaining: 4m 7s
599: learn: 8.8210619 total: 1m 46s remaining: 4m 7s
600: learn: 8.8200530 total: 1m 46s remaining: 4m 7s
601: learn: 8.8194220 total: 1m 46s remaining: 4m 7s
602: learn: 8.8174201 total: 1m 46s remaining: 4m 7s
603: learn: 8.8151663 total: 1m 46s remaining: 4m 7s
604: learn: 8.8138747 total: 1m 47s remaining: 4m 6s
605: learn: 8.8118930 total: 1m 47s remaining: 4m 6s
606: learn: 8.8097376 total: 1m 47s remaining: 4m 6s
607: learn: 8.8088779 total: 1m 47s remaining: 4m 6s
608: learn: 8.8074574 total: 1m 47s remaining: 4m 6s
609: learn: 8.8064941 total: 1m 47s remaining: 4m 5s
610: learn: 8.8057263 total: 1m 48s remaining: 4m 5s
611: learn: 8.8048462 total: 1m 48s remaining: 4m 5s
612: learn: 8.8042829 total: 1m 48s remaining: 4m 5s
613: learn: 8.8017127 total: 1m 48s remaining: 4m 5s
614: learn: 8.8001661 total: 1m 48s remaining: 4m 5s
615: learn: 8.7984771 total: 1m 49s remaining: 4m 4s
616: learn: 8.7971474 total: 1m 49s remaining: 4m 4s
617: learn: 8.7957904 total: 1m 49s remaining: 4m 4s
618: learn: 8.7944572 total: 1m 49s remaining: 4m 4s
619: learn: 8.7934587 total: 1m 49s remaining: 4m 4s
620: learn: 8.7916389 total: 1m 49s remaining: 4m 4s
621: learn: 8.7898387 total: 1m 50s remaining: 4m 3s
622: learn: 8.7879064 total: 1m 50s remaining: 4m 3s
623: learn: 8.7864872 total: 1m 50s remaining: 4m 3s
624: learn: 8.7851747 total: 1m 50s remaining: 4m 3s
625: learn: 8.7839166 total: 1m 50s remaining: 4m 3s
626: learn: 8.7829888 total: 1m 50s remaining: 4m 2s
627: learn: 8.7818465 total: 1m 51s remaining: 4m 2s
628: learn: 8.7799124 total: 1m 51s remaining: 4m 2s
629: learn: 8.7792406 total: 1m 51s remaining: 4m 2s
630: learn: 8.7772607 total: 1m 51s remaining: 4m 2s
631: learn: 8.7761221 total: 1m 51s remaining: 4m 2s
632: learn: 8.7758155 total: 1m 52s remaining: 4m 1s
633: learn: 8.7746211 total: 1m 52s remaining: 4m 1s
634: learn: 8.7739618 total: 1m 52s remaining: 4m 1s
635: learn: 8.7708841 total: 1m 52s remaining: 4m 1s
636: learn: 8.7696981 total: 1m 52s remaining: 4m 1s
637: learn: 8.7689633 total: 1m 52s remaining: 4m 1s
638: learn: 8.7682265 total: 1m 53s remaining: 4m
639: learn: 8.7663817 total: 1m 53s remaining: 4m
640: learn: 8.7656147 total: 1m 53s remaining: 4m
641: learn: 8.7640090 total: 1m 53s remaining: 4m
642: learn: 8.7618950 total: 1m 53s remaining: 4m
643: learn: 8.7605686 total: 1m 54s remaining: 4m
644: learn: 8.7596246 total: 1m 54s remaining: 3m 59s
645: learn: 8.7584405 total: 1m 54s remaining: 3m 59s
646: learn: 8.7583131 total: 1m 54s remaining: 3m 59s
647: learn: 8.7573226 total: 1m 54s remaining: 3m 59s
648: learn: 8.7561191 total: 1m 54s remaining: 3m 59s
649: learn: 8.7532392 total: 1m 55s remaining: 3m 58s
650: learn: 8.7510060 total: 1m 55s remaining: 3m 58s
651: learn: 8.7492087 total: 1m 55s remaining: 3m 58s
652: learn: 8.7482570 total: 1m 55s remaining: 3m 58s
653: learn: 8.7469826 total: 1m 55s remaining: 3m 58s
654: learn: 8.7458477 total: 1m 55s remaining: 3m 58s
655: learn: 8.7445642 total: 1m 56s remaining: 3m 57s
656: learn: 8.7437467 total: 1m 56s remaining: 3m 57s
657: learn: 8.7430476 total: 1m 56s remaining: 3m 57s
658: learn: 8.7426604 total: 1m 56s remaining: 3m 57s
659: learn: 8.7407305 total: 1m 56s remaining: 3m 57s
660: learn: 8.7387344 total: 1m 57s remaining: 3m 57s
661: learn: 8.7376030 total: 1m 57s remaining: 3m 56s
662: learn: 8.7363434 total: 1m 57s remaining: 3m 56s
663: learn: 8.7354098 total: 1m 57s remaining: 3m 56s
664: learn: 8.7343366 total: 1m 57s remaining: 3m 56s
665: learn: 8.7334564 total: 1m 57s remaining: 3m 56s
666: learn: 8.7329580 total: 1m 58s remaining: 3m 55s
667: learn: 8.7317014 total: 1m 58s remaining: 3m 55s
668: learn: 8.7309650 total: 1m 58s remaining: 3m 55s
669: learn: 8.7304739 total: 1m 58s remaining: 3m 55s
670: learn: 8.7295382 total: 1m 58s remaining: 3m 55s
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671: learn: 8.7281339 total: 1m 58s remaining: 3m 55s
672: learn: 8.7268280 total: 1m 59s remaining: 3m 54s
673: learn: 8.7255222 total: 1m 59s remaining: 3m 54s
674: learn: 8.7228471 total: 1m 59s remaining: 3m 54s
675: learn: 8.7213769 total: 1m 59s remaining: 3m 54s
676: learn: 8.7195529 total: 1m 59s remaining: 3m 54s
677: learn: 8.7189238 total: 2m remaining: 3m 54s
678: learn: 8.7184695 total: 2m remaining: 3m 53s
679: learn: 8.7171069 total: 2m remaining: 3m 53s
680: learn: 8.7156461 total: 2m remaining: 3m 53s
681: learn: 8.7144952 total: 2m remaining: 3m 53s
682: learn: 8.7138227 total: 2m remaining: 3m 53s
683: learn: 8.7128932 total: 2m 1s remaining: 3m 53s
684: learn: 8.7116961 total: 2m 1s remaining: 3m 52s
685: learn: 8.7104701 total: 2m 1s remaining: 3m 52s
686: learn: 8.7090733 total: 2m 1s remaining: 3m 52s
687: learn: 8.7083817 total: 2m 1s remaining: 3m 52s
688: learn: 8.7074328 total: 2m 2s remaining: 3m 52s
689: learn: 8.7062188 total: 2m 2s remaining: 3m 51s
690: learn: 8.7057261 total: 2m 2s remaining: 3m 51s
691: learn: 8.7044924 total: 2m 2s remaining: 3m 51s
692: learn: 8.7027917 total: 2m 2s remaining: 3m 51s
693: learn: 8.7002880 total: 2m 2s remaining: 3m 51s
694: learn: 8.6986684 total: 2m 3s remaining: 3m 51s
695: learn: 8.6979861 total: 2m 3s remaining: 3m 51s
696: learn: 8.6972371 total: 2m 3s remaining: 3m 50s
697: learn: 8.6969024 total: 2m 3s remaining: 3m 50s
698: learn: 8.6954993 total: 2m 3s remaining: 3m 50s
699: learn: 8.6942952 total: 2m 4s remaining: 3m 50s
700: learn: 8.6927449 total: 2m 4s remaining: 3m 50s
701: learn: 8.6924313 total: 2m 4s remaining: 3m 49s
702: learn: 8.6916943 total: 2m 4s remaining: 3m 49s
703: learn: 8.6900298 total: 2m 4s remaining: 3m 49s
704: learn: 8.6878307 total: 2m 4s remaining: 3m 49s
705: learn: 8.6869176 total: 2m 5s remaining: 3m 49s
706: learn: 8.6862617 total: 2m 5s remaining: 3m 49s
707: learn: 8.6857026 total: 2m 5s remaining: 3m 48s
708: learn: 8.6849557 total: 2m 5s remaining: 3m 48s
709: learn: 8.6834150 total: 2m 5s remaining: 3m 48s
710: learn: 8.6814440 total: 2m 5s remaining: 3m 48s
711: learn: 8.6802731 total: 2m 6s remaining: 3m 48s
712: learn: 8.6785567 total: 2m 6s remaining: 3m 47s
713: learn: 8.6774661 total: 2m 6s remaining: 3m 47s
714: learn: 8.6765266 total: 2m 6s remaining: 3m 47s
715: learn: 8.6761456 total: 2m 6s remaining: 3m 47s
716: learn: 8.6754845 total: 2m 7s remaining: 3m 47s
717: learn: 8.6744089 total: 2m 7s remaining: 3m 47s
718: learn: 8.6737190 total: 2m 7s remaining: 3m 46s
719: learn: 8.6732642 total: 2m 7s remaining: 3m 46s
720: learn: 8.6724684 total: 2m 7s remaining: 3m 46s
721: learn: 8.6714693 total: 2m 7s remaining: 3m 46s
722: learn: 8.6694889 total: 2m 8s remaining: 3m 46s
723: learn: 8.6687448 total: 2m 8s remaining: 3m 46s
724: learn: 8.6679195 total: 2m 8s remaining: 3m 45s
725: learn: 8.6673719 total: 2m 8s remaining: 3m 45s
726: learn: 8.6659854 total: 2m 8s remaining: 3m 45s
727: learn: 8.6656799 total: 2m 9s remaining: 3m 45s
728: learn: 8.6641306 total: 2m 9s remaining: 3m 45s
729: learn: 8.6632101 total: 2m 9s remaining: 3m 45s
730: learn: 8.6614491 total: 2m 9s remaining: 3m 44s
731: learn: 8.6610221 total: 2m 9s remaining: 3m 44s
732: learn: 8.6605095 total: 2m 9s remaining: 3m 44s
733: learn: 8.6596747 total: 2m 10s remaining: 3m 44s
734: learn: 8.6588748 total: 2m 10s remaining: 3m 44s
735: learn: 8.6581786 total: 2m 10s remaining: 3m 43s
736: learn: 8.6567008 total: 2m 10s remaining: 3m 43s
737: learn: 8.6556981 total: 2m 10s remaining: 3m 43s
738: learn: 8.6550723 total: 2m 10s remaining: 3m 43s
739: learn: 8.6544051 total: 2m 11s remaining: 3m 43s
740: learn: 8.6527555 total: 2m 11s remaining: 3m 43s
741: learn: 8.6516383 total: 2m 11s remaining: 3m 42s
742: learn: 8.6505632 total: 2m 11s remaining: 3m 42s
743: learn: 8.6501447 total: 2m 11s remaining: 3m 42s
744: learn: 8.6490966 total: 2m 11s remaining: 3m 42s
745: learn: 8.6481276 total: 2m 12s remaining: 3m 42s
746: learn: 8.6460520 total: 2m 12s remaining: 3m 41s
747: learn: 8.6457999 total: 2m 12s remaining: 3m 41s
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748: learn: 8.6444520 total: 2m 12s remaining: 3m 41s
749: learn: 8.6436203 total: 2m 12s remaining: 3m 41s
750: learn: 8.6431636 total: 2m 13s remaining: 3m 41s
751: learn: 8.6411062 total: 2m 13s remaining: 3m 41s
752: learn: 8.6405318 total: 2m 13s remaining: 3m 40s
753: learn: 8.6403283 total: 2m 13s remaining: 3m 40s
754: learn: 8.6390627 total: 2m 13s remaining: 3m 40s
755: learn: 8.6386054 total: 2m 13s remaining: 3m 40s
756: learn: 8.6373948 total: 2m 14s remaining: 3m 40s
757: learn: 8.6355852 total: 2m 14s remaining: 3m 39s
758: learn: 8.6353993 total: 2m 14s remaining: 3m 39s
759: learn: 8.6349118 total: 2m 14s remaining: 3m 39s
760: learn: 8.6331846 total: 2m 14s remaining: 3m 39s
761: learn: 8.6324311 total: 2m 14s remaining: 3m 39s
762: learn: 8.6307710 total: 2m 15s remaining: 3m 39s
763: learn: 8.6295120 total: 2m 15s remaining: 3m 38s
764: learn: 8.6288015 total: 2m 15s remaining: 3m 38s
765: learn: 8.6282592 total: 2m 15s remaining: 3m 38s
766: learn: 8.6270455 total: 2m 15s remaining: 3m 38s
767: learn: 8.6257326 total: 2m 16s remaining: 3m 38s
768: learn: 8.6252314 total: 2m 16s remaining: 3m 38s
769: learn: 8.6241989 total: 2m 16s remaining: 3m 37s
770: learn: 8.6229729 total: 2m 16s remaining: 3m 37s
771: learn: 8.6222564 total: 2m 16s remaining: 3m 37s
772: learn: 8.6219557 total: 2m 16s remaining: 3m 37s
773: learn: 8.6207506 total: 2m 17s remaining: 3m 37s
774: learn: 8.6195305 total: 2m 17s remaining: 3m 36s
775: learn: 8.6176663 total: 2m 17s remaining: 3m 36s
776: learn: 8.6173510 total: 2m 17s remaining: 3m 36s
777: learn: 8.6166322 total: 2m 17s remaining: 3m 36s
778: learn: 8.6160447 total: 2m 17s remaining: 3m 36s
779: learn: 8.6148572 total: 2m 18s remaining: 3m 36s
780: learn: 8.6140710 total: 2m 18s remaining: 3m 35s
781: learn: 8.6136523 total: 2m 18s remaining: 3m 35s
782: learn: 8.6132321 total: 2m 18s remaining: 3m 35s
783: learn: 8.6123555 total: 2m 18s remaining: 3m 35s
784: learn: 8.6116721 total: 2m 19s remaining: 3m 35s
785: learn: 8.6110571 total: 2m 19s remaining: 3m 35s
786: learn: 8.6104373 total: 2m 19s remaining: 3m 34s
787: learn: 8.6087531 total: 2m 19s remaining: 3m 34s
788: learn: 8.6065132 total: 2m 19s remaining: 3m 34s
789: learn: 8.6054812 total: 2m 19s remaining: 3m 34s
790: learn: 8.6048450 total: 2m 20s remaining: 3m 34s
791: learn: 8.6046644 total: 2m 20s remaining: 3m 33s
792: learn: 8.6037311 total: 2m 20s remaining: 3m 33s
793: learn: 8.6020943 total: 2m 20s remaining: 3m 33s
794: learn: 8.6008928 total: 2m 20s remaining: 3m 33s
795: learn: 8.6003778 total: 2m 20s remaining: 3m 33s
796: learn: 8.5990506 total: 2m 21s remaining: 3m 33s
797: learn: 8.5976055 total: 2m 21s remaining: 3m 32s
798: learn: 8.5957145 total: 2m 21s remaining: 3m 32s
799: learn: 8.5944384 total: 2m 21s remaining: 3m 32s
800: learn: 8.5936917 total: 2m 21s remaining: 3m 32s
801: learn: 8.5932370 total: 2m 22s remaining: 3m 32s
802: learn: 8.5926756 total: 2m 22s remaining: 3m 31s
803: learn: 8.5918136 total: 2m 22s remaining: 3m 31s
804: learn: 8.5904544 total: 2m 22s remaining: 3m 31s
805: learn: 8.5900578 total: 2m 22s remaining: 3m 31s
806: learn: 8.5887105 total: 2m 22s remaining: 3m 31s
807: learn: 8.5882992 total: 2m 23s remaining: 3m 31s
808: learn: 8.5872412 total: 2m 23s remaining: 3m 30s
809: learn: 8.5859752 total: 2m 23s remaining: 3m 30s
810: learn: 8.5855065 total: 2m 23s remaining: 3m 30s
811: learn: 8.5852924 total: 2m 23s remaining: 3m 30s
812: learn: 8.5850025 total: 2m 23s remaining: 3m 30s
813: learn: 8.5844075 total: 2m 24s remaining: 3m 30s
814: learn: 8.5835758 total: 2m 24s remaining: 3m 29s
815: learn: 8.5822258 total: 2m 24s remaining: 3m 29s
816: learn: 8.5814694 total: 2m 24s remaining: 3m 29s
817: learn: 8.5808389 total: 2m 24s remaining: 3m 29s
818: learn: 8.5801438 total: 2m 25s remaining: 3m 29s
819: learn: 8.5800180 total: 2m 25s remaining: 3m 28s
820: learn: 8.5792217 total: 2m 25s remaining: 3m 28s
821: learn: 8.5783919 total: 2m 25s remaining: 3m 28s
822: learn: 8.5777914 total: 2m 25s remaining: 3m 28s
823: learn: 8.5775025 total: 2m 25s remaining: 3m 28s
824: learn: 8.5759773 total: 2m 26s remaining: 3m 28s
```

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825: learn: 8.5753478 total: 2m 26s remaining: 3m 27s
826: learn: 8.5733869 total: 2m 26s remaining: 3m 27s
827: learn: 8.5730187 total: 2m 26s remaining: 3m 27s
828: learn: 8.5718058 total: 2m 26s remaining: 3m 27s
829: learn: 8.5713555 total: 2m 26s remaining: 3m 27s
830: learn: 8.5710944 total: 2m 27s remaining: 3m 27s
831: learn: 8.5701143 total: 2m 27s remaining: 3m 26s
832: learn: 8.5694898 total: 2m 27s remaining: 3m 26s
833: learn: 8.5680417 total: 2m 27s remaining: 3m 26s
834: learn: 8.5672163 total: 2m 27s remaining: 3m 26s
835: learn: 8.5662141 total: 2m 28s remaining: 3m 26s
836: learn: 8.5647710 total: 2m 28s remaining: 3m 25s
837: learn: 8.5635191 total: 2m 28s remaining: 3m 25s
838: learn: 8.5620290 total: 2m 28s remaining: 3m 25s
839: learn: 8.5610040 total: 2m 28s remaining: 3m 25s
840: learn: 8.5594183 total: 2m 28s remaining: 3m 25s
841: learn: 8.5583113 total: 2m 29s remaining: 3m 25s
842: learn: 8.5575167 total: 2m 29s remaining: 3m 24s
843: learn: 8.5565838 total: 2m 29s remaining: 3m 24s
844: learn: 8.5557696 total: 2m 29s remaining: 3m 24s
845: learn: 8.5549598 total: 2m 29s remaining: 3m 24s
846: learn: 8.5543079 total: 2m 29s remaining: 3m 24s
847: learn: 8.5539776 total: 2m 30s remaining: 3m 23s
848: learn: 8.5538226 total: 2m 30s remaining: 3m 23s
849: learn: 8.5531377 total: 2m 30s remaining: 3m 23s
850: learn: 8.5521851 total: 2m 30s remaining: 3m 23s
851: learn: 8.5507005 total: 2m 30s remaining: 3m 23s
852: learn: 8.5499886 total: 2m 31s remaining: 3m 23s
853: learn: 8.5489661 total: 2m 31s remaining: 3m 22s
854: learn: 8.5475308 total: 2m 31s remaining: 3m 22s
855: learn: 8.5466415 total: 2m 31s remaining: 3m 22s
856: learn: 8.5454108 total: 2m 31s remaining: 3m 22s
857: learn: 8.5448673 total: 2m 31s remaining: 3m 22s
858: learn: 8.5439067 total: 2m 32s remaining: 3m 22s
859: learn: 8.5423098 total: 2m 32s remaining: 3m 21s
860: learn: 8.5409876 total: 2m 32s remaining: 3m 21s
861: learn: 8.5401324 total: 2m 32s remaining: 3m 21s
862: learn: 8.5396110 total: 2m 32s remaining: 3m 21s
863: learn: 8.5387629 total: 2m 32s remaining: 3m 21s
864: learn: 8.5384965 total: 2m 33s remaining: 3m 20s
865: learn: 8.5377847 total: 2m 33s remaining: 3m 20s
866: learn: 8.5360503 total: 2m 33s remaining: 3m 20s
867: learn: 8.5347321 total: 2m 33s remaining: 3m 20s
868: learn: 8.5339501 total: 2m 33s remaining: 3m 20s
869: learn: 8.5327558 total: 2m 34s remaining: 3m 20s
870: learn: 8.5323609 total: 2m 34s remaining: 3m 19s
871: learn: 8.5312895 total: 2m 34s remaining: 3m 19s
872: learn: 8.5304172 total: 2m 34s remaining: 3m 19s
873: learn: 8.5297778 total: 2m 34s remaining: 3m 19s
874: learn: 8.5294383 total: 2m 34s remaining: 3m 19s
875: learn: 8.5288314 total: 2m 35s remaining: 3m 18s
876: learn: 8.5274547 total: 2m 35s remaining: 3m 18s
877: learn: 8.5256771 total: 2m 35s remaining: 3m 18s
878: learn: 8.5254237 total: 2m 35s remaining: 3m 18s
879: learn: 8.5242212 total: 2m 35s remaining: 3m 18s
880: learn: 8.5231794 total: 2m 36s remaining: 3m 18s
881: learn: 8.5225517 total: 2m 36s remaining: 3m 17s
882: learn: 8.5215763 total: 2m 36s remaining: 3m 17s
883: learn: 8.5201732 total: 2m 36s remaining: 3m 17s
884: learn: 8.5188898 total: 2m 36s remaining: 3m 17s
885: learn: 8.5183191 total: 2m 36s remaining: 3m 17s
886: learn: 8.5173703 total: 2m 37s remaining: 3m 17s
887: learn: 8.5161037 total: 2m 37s remaining: 3m 16s
888: learn: 8.5157750 total: 2m 37s remaining: 3m 16s
889: learn: 8.5140012 total: 2m 37s remaining: 3m 16s
890: learn: 8.5118628 total: 2m 37s remaining: 3m 16s
891: learn: 8.5103089 total: 2m 37s remaining: 3m 16s
892: learn: 8.5096761 total: 2m 38s remaining: 3m 15s
893: learn: 8.5092726 total: 2m 38s remaining: 3m 15s
894: learn: 8.5086380 total: 2m 38s remaining: 3m 15s
895: learn: 8.5070040 total: 2m 38s remaining: 3m 15s
896: learn: 8.5061916 total: 2m 38s remaining: 3m 15s
897: learn: 8.5049823 total: 2m 38s remaining: 3m 15s
898: learn: 8.5046463 total: 2m 39s remaining: 3m 14s
899: learn: 8.5038884 total: 2m 39s remaining: 3m 14s
900: learn: 8.5034397 total: 2m 39s remaining: 3m 14s
901: learn: 8.5027436 total: 2m 39s remaining: 3m 14s
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902: learn: 8.5022552 total: 2m 39s remaining: 3m 14s
903: learn: 8.5010263 total: 2m 40s remaining: 3m 14s
904: learn: 8.4998587 total: 2m 40s remaining: 3m 13s
905: learn: 8.4994711 total: 2m 40s remaining: 3m 13s
906: learn: 8.4985989 total: 2m 40s remaining: 3m 13s
907: learn: 8.4979300 total: 2m 40s remaining: 3m 13s
908: learn: 8.4958545 total: 2m 40s remaining: 3m 13s
909: learn: 8.4950410 total: 2m 41s remaining: 3m 12s
910: learn: 8.4938337 total: 2m 41s remaining: 3m 12s
911: learn: 8.4927236 total: 2m 41s remaining: 3m 12s
912: learn: 8.4923219 total: 2m 41s remaining: 3m 12s
913: learn: 8.4910805 total: 2m 41s remaining: 3m 12s
914: learn: 8.4896539 total: 2m 41s remaining: 3m 12s
915: learn: 8.4881126 total: 2m 42s remaining: 3m 11s
916: learn: 8.4872924 total: 2m 42s remaining: 3m 11s
917: learn: 8.4863719 total: 2m 42s remaining: 3m 11s
918: learn: 8.4849482 total: 2m 42s remaining: 3m 11s
919: learn: 8.4839876 total: 2m 42s remaining: 3m 11s
920: learn: 8.4834265 total: 2m 43s remaining: 3m 11s
921: learn: 8.4829628 total: 2m 43s remaining: 3m 10s
922: learn: 8.4816733 total: 2m 43s remaining: 3m 10s
923: learn: 8.4813201 total: 2m 43s remaining: 3m 10s
924: learn: 8.4799253 total: 2m 43s remaining: 3m 10s
925: learn: 8.4798114 total: 2m 43s remaining: 3m 10s
926: learn: 8.4786139 total: 2m 44s remaining: 3m 9s
927: learn: 8.4775552 total: 2m 44s remaining: 3m 9s
928: learn: 8.4760340 total: 2m 44s remaining: 3m 9s
929: learn: 8.4751330 total: 2m 44s remaining: 3m 9s
930: learn: 8.4734718 total: 2m 44s remaining: 3m 9s
931: learn: 8.4729973 total: 2m 45s remaining: 3m 9s
932: learn: 8.4725201 total: 2m 45s remaining: 3m 8s
933: learn: 8.4721161 total: 2m 45s remaining: 3m 8s
934: learn: 8.4712191 total: 2m 45s remaining: 3m 8s
935: learn: 8.4700053 total: 2m 45s remaining: 3m 8s
936: learn: 8.4687769 total: 2m 45s remaining: 3m 8s
937: learn: 8.4681887 total: 2m 46s remaining: 3m 8s
938: learn: 8.4670501 total: 2m 46s remaining: 3m 7s
939: learn: 8.4652252 total: 2m 46s remaining: 3m 7s
940: learn: 8.4635012 total: 2m 46s remaining: 3m 7s
941: learn: 8.4631303 total: 2m 46s remaining: 3m 7s
942: learn: 8.4629602 total: 2m 46s remaining: 3m 7s
943: learn: 8.4622291 total: 2m 47s remaining: 3m 6s
944: learn: 8.4618568 total: 2m 47s remaining: 3m 6s
945: learn: 8.4602486 total: 2m 47s remaining: 3m 6s
946: learn: 8.4595221 total: 2m 47s remaining: 3m 6s
947: learn: 8.4586868 total: 2m 47s remaining: 3m 6s
948: learn: 8.4577178 total: 2m 48s remaining: 3m 6s
949: learn: 8.4573721 total: 2m 48s remaining: 3m 5s
950: learn: 8.4567314 total: 2m 48s remaining: 3m 5s
951: learn: 8.4559052 total: 2m 48s remaining: 3m 5s
952: learn: 8.4554411 total: 2m 48s remaining: 3m 5s
953: learn: 8.4544639 total: 2m 48s remaining: 3m 5s
954: learn: 8.4529502 total: 2m 49s remaining: 3m 5s
955: learn: 8.4523745 total: 2m 49s remaining: 3m 4s
956: learn: 8.4511960 total: 2m 49s remaining: 3m 4s
957: learn: 8.4505580 total: 2m 49s remaining: 3m 4s
958: learn: 8.4489438 total: 2m 49s remaining: 3m 4s
959: learn: 8.4476145 total: 2m 50s remaining: 3m 4s
960: learn: 8.4470639 total: 2m 50s remaining: 3m 3s
961: learn: 8.4466431 total: 2m 50s remaining: 3m 3s
962: learn: 8.4455122 total: 2m 50s remaining: 3m 3s
963: learn: 8.4449302 total: 2m 50s remaining: 3m 3s
964: learn: 8.4446714 total: 2m 50s remaining: 3m 3s
965: learn: 8.4431087 total: 2m 51s remaining: 3m 3s
966: learn: 8.4422945 total: 2m 51s remaining: 3m 2s
967: learn: 8.4411412 total: 2m 51s remaining: 3m 2s
968: learn: 8.4400384 total: 2m 51s remaining: 3m 2s
969: learn: 8.4391604 total: 2m 51s remaining: 3m 2s
970: learn: 8.4385946 total: 2m 51s remaining: 3m 2s
971: learn: 8.4371730 total: 2m 52s remaining: 3m 2s
972: learn: 8.4359919 total: 2m 52s remaining: 3m 1s
973: learn: 8.4350594 total: 2m 52s remaining: 3m 1s
974: learn: 8.4341025 total: 2m 52s remaining: 3m 1s
975: learn: 8.4333915 total: 2m 52s remaining: 3m 1s
976: learn: 8.4329981 total: 2m 53s remaining: 3m 1s
977: learn: 8.4316578 total: 2m 53s remaining: 3m
978: learn: 8.4310670 total: 2m 53s remaining: 3m
```

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979: learn: 8.4299834 total: 2m 53s remaining: 3m
980: learn: 8.4291487 total: 2m 53s remaining: 3m
981: learn: 8.4286858 total: 2m 53s remaining: 3m
982: learn: 8.4263658 total: 2m 54s remaining: 3m
983: learn: 8.4259045 total: 2m 54s remaining: 2m 59s
984: learn: 8.4249557 total: 2m 54s remaining: 2m 59s
985: learn: 8.4238158 total: 2m 54s remaining: 2m 59s
986: learn: 8.4231156 total: 2m 54s remaining: 2m 59s
987: learn: 8.4214681 total: 2m 54s remaining: 2m 59s
988: learn: 8.4203725 total: 2m 55s remaining: 2m 59s
989: learn: 8.4195715 total: 2m 55s remaining: 2m 58s
990: learn: 8.4177540 total: 2m 55s remaining: 2m 58s
991: learn: 8.4158145 total: 2m 55s remaining: 2m 58s
992: learn: 8.4152833 total: 2m 55s remaining: 2m 58s
993: learn: 8.4148239 total: 2m 56s remaining: 2m 58s
994: learn: 8.4139826 total: 2m 56s remaining: 2m 57s
995: learn: 8.4136392 total: 2m 56s remaining: 2m 57s
996: learn: 8.4124563 total: 2m 56s remaining: 2m 57s
997: learn: 8.4118103 total: 2m 56s remaining: 2m 57s
998: learn: 8.4113861 total: 2m 56s remaining: 2m 57s
999: learn: 8.4099915 total: 2m 57s remaining: 2m 57s
1000: learn: 8.4087871 total: 2m 57s remaining: 2m 56s
1001: learn: 8.4082071 total: 2m 57s remaining: 2m 56s
1002: learn: 8.4076992 total: 2m 57s remaining: 2m 56s
1003: learn: 8.4074107 total: 2m 57s remaining: 2m 56s
1004: learn: 8.4067282 total: 2m 57s remaining: 2m 56s
1005: learn: 8.4060167 total: 2m 58s remaining: 2m 56s
1006: learn: 8.4050189 total: 2m 58s remaining: 2m 55s
1007: learn: 8.4040679 total: 2m 58s remaining: 2m 55s
1008: learn: 8.4034804 total: 2m 58s remaining: 2m 55s
1009: learn: 8.4025805 total: 2m 58s remaining: 2m 55s
1010: learn: 8.4015467 total: 2m 59s remaining: 2m 55s
1011: learn: 8.3996788 total: 2m 59s remaining: 2m 54s
1012: learn: 8.3988949 total: 2m 59s remaining: 2m 54s
1013: learn: 8.3986137 total: 2m 59s remaining: 2m 54s
1014: learn: 8.3977015 total: 2m 59s remaining: 2m 54s
1015: learn: 8.3974936 total: 2m 59s remaining: 2m 54s
1016: learn: 8.3971122 total: 3m remaining: 2m 54s
1017: learn: 8.3959811 total: 3m remaining: 2m 53s
1018: learn: 8.3958089 total: 3m remaining: 2m 53s
1019: learn: 8.3945785 total: 3m remaining: 2m 53s
1020: learn: 8.3942598 total: 3m remaining: 2m 53s
1021: learn: 8.3922557 total: 3m remaining: 2m 53s
1022: learn: 8.3916281 total: 3m 1s remaining: 2m 52s
1023: learn: 8.3910503 total: 3m 1s remaining: 2m 52s
1024: learn: 8.3904224 total: 3m 1s remaining: 2m 52s
1025: learn: 8.3899602 total: 3m 1s remaining: 2m 52s
1026: learn: 8.3890587 total: 3m 1s remaining: 2m 52s
1027: learn: 8.3884856 total: 3m 1s remaining: 2m 52s
1028: learn: 8.3879245 total: 3m 2s remaining: 2m 51s
1029: learn: 8.3875222 total: 3m 2s remaining: 2m 51s
1030: learn: 8.3867008 total: 3m 2s remaining: 2m 51s
1031: learn: 8.3846607 total: 3m 2s remaining: 2m 51s
1032: learn: 8.3836527 total: 3m 2s remaining: 2m 51s
1033: learn: 8.3827101 total: 3m 3s remaining: 2m 50s
1034: learn: 8.3814173 total: 3m 3s remaining: 2m 50s
1035: learn: 8.3803043 total: 3m 3s remaining: 2m 50s
1036: learn: 8.3790425 total: 3m 3s remaining: 2m 50s
1037: learn: 8.3778325 total: 3m 3s remaining: 2m 50s
1038: learn: 8.3770105 total: 3m 3s remaining: 2m 50s
1039: learn: 8.3765792 total: 3m 4s remaining: 2m 49s
1040: learn: 8.3750745 total: 3m 4s remaining: 2m 49s
1041: learn: 8.3739851 total: 3m 4s remaining: 2m 49s
1042: learn: 8.3733575 total: 3m 4s remaining: 2m 49s
1043: learn: 8.3721719 total: 3m 4s remaining: 2m 49s
1044: learn: 8.3715947 total: 3m 4s remaining: 2m 49s
1045: learn: 8.3708130 total: 3m 5s remaining: 2m 48s
1046: learn: 8.3697644 total: 3m 5s remaining: 2m 48s
1047: learn: 8.3692715 total: 3m 5s remaining: 2m 48s
1048: learn: 8.3683417 total: 3m 5s remaining: 2m 48s
1049: learn: 8.3680427 total: 3m 5s remaining: 2m 48s
1050: learn: 8.3672482 total: 3m 6s remaining: 2m 47s
1051: learn: 8.3655490 total: 3m 6s remaining: 2m 47s
1052: learn: 8.3647469 total: 3m 6s remaining: 2m 47s
1053: learn: 8.3644910 total: 3m 6s remaining: 2m 47s
1054: learn: 8.3635288 total: 3m 6s remaining: 2m 47s
1055: learn: 8.3627958 total: 3m 6s remaining: 2m 47s
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1056: learn: 8.3624286 total: 3m 7s remaining: 2m 46s
1057: learn: 8.3618298 total: 3m 7s remaining: 2m 46s
1058: learn: 8.3611951 total: 3m 7s remaining: 2m 46s
1059: learn: 8.3596148 total: 3m 7s remaining: 2m 46s
1060: learn: 8.3591482 total: 3m 7s remaining: 2m 46s
1061: learn: 8.3581537 total: 3m 8s remaining: 2m 46s
1062: learn: 8.3569946 total: 3m 8s remaining: 2m 45s
1063: learn: 8.3564632 total: 3m 8s remaining: 2m 45s
1064: learn: 8.3545333 total: 3m 8s remaining: 2m 45s
1065: learn: 8.3540996 total: 3m 8s remaining: 2m 45s
1066: learn: 8.3524692 total: 3m 9s remaining: 2m 45s
1067: learn: 8.3521520 total: 3m 9s remaining: 2m 45s
1068: learn: 8.3517294 total: 3m 9s remaining: 2m 44s
1069: learn: 8.3513265 total: 3m 9s remaining: 2m 44s
1070: learn: 8.3505683 total: 3m 9s remaining: 2m 44s
1071: learn: 8.3500875 total: 3m 9s remaining: 2m 44s
1072: learn: 8.3491751 total: 3m 10s remaining: 2m 44s
1073: learn: 8.3486629 total: 3m 10s remaining: 2m 44s
1074: learn: 8.3478603 total: 3m 10s remaining: 2m 43s
1075: learn: 8.3475704 total: 3m 10s remaining: 2m 43s
1076: learn: 8.3466839 total: 3m 10s remaining: 2m 43s
1077: learn: 8.3455937 total: 3m 11s remaining: 2m 43s
1078: learn: 8.3447472 total: 3m 11s remaining: 2m 43s
1079: learn: 8.3437139 total: 3m 11s remaining: 2m 43s
1080: learn: 8.3429920 total: 3m 11s remaining: 2m 42s
1081: learn: 8.3421397 total: 3m 11s remaining: 2m 42s
1082: learn: 8.3410457 total: 3m 11s remaining: 2m 42s
1083: learn: 8.3405643 total: 3m 12s remaining: 2m 42s
1084: learn: 8.3397435 total: 3m 12s remaining: 2m 42s
1085: learn: 8.3381705 total: 3m 12s remaining: 2m 41s
1086: learn: 8.3374833 total: 3m 12s remaining: 2m 41s
1087: learn: 8.3367281 total: 3m 12s remaining: 2m 41s
1088: learn: 8.3360510 total: 3m 13s remaining: 2m 41s
1089: learn: 8.3358944 total: 3m 13s remaining: 2m 41s
1090: learn: 8.3343433 total: 3m 13s remaining: 2m 41s
1091: learn: 8.3338594 total: 3m 13s remaining: 2m 40s
1092: learn: 8.3328501 total: 3m 13s remaining: 2m 40s
1093: learn: 8.3321712 total: 3m 13s remaining: 2m 40s
1094: learn: 8.3314624 total: 3m 14s remaining: 2m 40s
1095: learn: 8.3313228 total: 3m 14s remaining: 2m 40s
1096: learn: 8.3309409 total: 3m 14s remaining: 2m 40s
1097: learn: 8.3303547 total: 3m 14s remaining: 2m 39s
1098: learn: 8.3296459 total: 3m 14s remaining: 2m 39s
1099: learn: 8.3291406 total: 3m 14s remaining: 2m 39s
1100: learn: 8.3278868 total: 3m 15s remaining: 2m 39s
1101: learn: 8.3266901 total: 3m 15s remaining: 2m 39s
1102: learn: 8.3260611 total: 3m 15s remaining: 2m 39s
1103: learn: 8.3248463 total: 3m 15s remaining: 2m 38s
1104: learn: 8.3233163 total: 3m 15s remaining: 2m 38s
1105: learn: 8.3227304 total: 3m 16s remaining: 2m 38s
1106: learn: 8.3218870 total: 3m 16s remaining: 2m 38s
1107: learn: 8.3208161 total: 3m 16s remaining: 2m 38s
1108: learn: 8.3199481 total: 3m 16s remaining: 2m 37s
1109: learn: 8.3188166 total: 3m 16s remaining: 2m 37s
1110: learn: 8.3179242 total: 3m 16s remaining: 2m 37s
1111: learn: 8.3173364 total: 3m 17s remaining: 2m 37s
1112: learn: 8.3169633 total: 3m 17s remaining: 2m 37s
1113: learn: 8.3157939 total: 3m 17s remaining: 2m 37s
1114: learn: 8.3146758 total: 3m 17s remaining: 2m 36s
1115: learn: 8.3143859 total: 3m 17s remaining: 2m 36s
1116: learn: 8.3139568 total: 3m 18s remaining: 2m 36s
1117: learn: 8.3129438 total: 3m 18s remaining: 2m 36s
1118: learn: 8.3127344 total: 3m 18s remaining: 2m 36s
1119: learn: 8.3118799 total: 3m 18s remaining: 2m 36s
1120: learn: 8.3104034 total: 3m 18s remaining: 2m 35s
1121: learn: 8.3094705 total: 3m 18s remaining: 2m 35s
1122: learn: 8.3089268 total: 3m 19s remaining: 2m 35s
1123: learn: 8.3080148 total: 3m 19s remaining: 2m 35s
1124: learn: 8.3077715 total: 3m 19s remaining: 2m 35s
1125: learn: 8.3073675 total: 3m 19s remaining: 2m 34s
1126: learn: 8.3065254 total: 3m 19s remaining: 2m 34s
1127: learn: 8.3043225 total: 3m 20s remaining: 2m 34s
1128: learn: 8.3041543 total: 3m 20s remaining: 2m 34s
1129: learn: 8.3031935 total: 3m 20s remaining: 2m 34s
1130: learn: 8.3029681 total: 3m 20s remaining: 2m 34s
1131: learn: 8.3024911 total: 3m 20s remaining: 2m 33s
1132: learn: 8.3011452 total: 3m 20s remaining: 2m 33s
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1132: learn: 8.3011492 total: 3m 20s remaining: 2m 33s
1133: learn: 8.3005108 total: 3m 21s remaining: 2m 33s
1134: learn: 8.3000471 total: 3m 21s remaining: 2m 33s
1135: learn: 8.2997012 total: 3m 21s remaining: 2m 33s
1136: learn: 8.2980835 total: 3m 21s remaining: 2m 33s
1137: learn: 8.2971154 total: 3m 21s remaining: 2m 32s
1138: learn: 8.2963653 total: 3m 21s remaining: 2m 32s
1139: learn: 8.2951856 total: 3m 22s remaining: 2m 32s
1140: learn: 8.2942303 total: 3m 22s remaining: 2m 32s
1141: learn: 8.2937732 total: 3m 22s remaining: 2m 32s
1142: learn: 8.2933319 total: 3m 22s remaining: 2m 31s
1143: learn: 8.2927331 total: 3m 22s remaining: 2m 31s
1144: learn: 8.2919741 total: 3m 23s remaining: 2m 31s
1145: learn: 8.2914546 total: 3m 23s remaining: 2m 31s
1146: learn: 8.2904432 total: 3m 23s remaining: 2m 31s
1147: learn: 8.2896823 total: 3m 23s remaining: 2m 31s
1148: learn: 8.2894465 total: 3m 23s remaining: 2m 30s
1149: learn: 8.2877901 total: 3m 23s remaining: 2m 30s
1150: learn: 8.2873293 total: 3m 24s remaining: 2m 30s
1151: learn: 8.2867804 total: 3m 24s remaining: 2m 30s
1152: learn: 8.2861017 total: 3m 24s remaining: 2m 30s
1153: learn: 8.2852768 total: 3m 24s remaining: 2m 30s
1154: learn: 8.2843910 total: 3m 24s remaining: 2m 29s
1155: learn: 8.2827522 total: 3m 25s remaining: 2m 29s
1156: learn: 8.2821968 total: 3m 25s remaining: 2m 29s
1157: learn: 8.2812110 total: 3m 25s remaining: 2m 29s
1158: learn: 8.2801927 total: 3m 25s remaining: 2m 29s
1159: learn: 8.2791665 total: 3m 25s remaining: 2m 28s
1160: learn: 8.2786951 total: 3m 25s remaining: 2m 28s
1161: learn: 8.2780811 total: 3m 26s remaining: 2m 28s
1162: learn: 8.2765794 total: 3m 26s remaining: 2m 28s
1163: learn: 8.2750579 total: 3m 26s remaining: 2m 28s
1164: learn: 8.2746516 total: 3m 26s remaining: 2m 28s
1165: learn: 8.2738399 total: 3m 26s remaining: 2m 27s
1166: learn: 8.2721123 total: 3m 27s remaining: 2m 27s
1167: learn: 8.2712718 total: 3m 27s remaining: 2m 27s
1168: learn: 8.2705039 total: 3m 27s remaining: 2m 27s
1169: learn: 8.2698687 total: 3m 27s remaining: 2m 27s
1170: learn: 8.2691123 total: 3m 27s remaining: 2m 27s
1171: learn: 8.2683277 total: 3m 27s remaining: 2m 26s
1172: learn: 8.2674610 total: 3m 28s remaining: 2m 26s
1173: learn: 8.2667719 total: 3m 28s remaining: 2m 26s
1174: learn: 8.2657904 total: 3m 28s remaining: 2m 26s
1175: learn: 8.2650070 total: 3m 28s remaining: 2m 26s
1176: learn: 8.2644756 total: 3m 28s remaining: 2m 26s
1177: learn: 8.2638889 total: 3m 28s remaining: 2m 25s
1178: learn: 8.2624813 total: 3m 29s remaining: 2m 25s
1179: learn: 8.2622504 total: 3m 29s remaining: 2m 25s
1180: learn: 8.2604961 total: 3m 29s remaining: 2m 25s
1181: learn: 8.2602742 total: 3m 29s remaining: 2m 25s
1182: learn: 8.2597555 total: 3m 29s remaining: 2m 24s
1183: learn: 8.2589954 total: 3m 30s remaining: 2m 24s
1184: learn: 8.2582623 total: 3m 30s remaining: 2m 24s
1185: learn: 8.2579467 total: 3m 30s remaining: 2m 24s
1186: learn: 8.2576671 total: 3m 30s remaining: 2m 24s
1187: learn: 8.2563477 total: 3m 30s remaining: 2m 24s
1188: learn: 8.2556682 total: 3m 30s remaining: 2m 23s
1189: learn: 8.2542545 total: 3m 31s remaining: 2m 23s
1190: learn: 8.2533926 total: 3m 31s remaining: 2m 23s
1191: learn: 8.2522816 total: 3m 31s remaining: 2m 23s
1192: learn: 8.2508377 total: 3m 31s remaining: 2m 23s
1193: learn: 8.2488119 total: 3m 31s remaining: 2m 22s
1194: learn: 8.2479838 total: 3m 31s remaining: 2m 22s
1195: learn: 8.2471700 total: 3m 32s remaining: 2m 22s
1196: learn: 8.2463132 total: 3m 32s remaining: 2m 22s
1197: learn: 8.2452416 total: 3m 32s remaining: 2m 22s
1198: learn: 8.2437797 total: 3m 32s remaining: 2m 22s
1199: learn: 8.2427464 total: 3m 32s remaining: 2m 21s
1200: learn: 8.2423295 total: 3m 33s remaining: 2m 21s
1201: learn: 8.2413275 total: 3m 33s remaining: 2m 21s
1202: learn: 8.2404111 total: 3m 33s remaining: 2m 21s
1203: learn: 8.2400509 total: 3m 33s remaining: 2m 21s
1204: learn: 8.2387533 total: 3m 33s remaining: 2m 21s
1205: learn: 8.2381418 total: 3m 33s remaining: 2m 20s
1206: learn: 8.2365886 total: 3m 34s remaining: 2m 20s
1207: learn: 8.2355749 total: 3m 34s remaining: 2m 20s
1208: learn: 8.2343348 total: 3m 34s remaining: 2m 20s
1209: learn: 8.2328102 total: 3m 34s remaining: 2m 20s
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1209: learn: 8.2326102 total: 3m 34s remaining: 2m 20s
1210: learn: 8.2323970 total: 3m 34s remaining: 2m 19s
1211: learn: 8.2318616 total: 3m 35s remaining: 2m 19s
1212: learn: 8.2311659 total: 3m 35s remaining: 2m 19s
1213: learn: 8.2303292 total: 3m 35s remaining: 2m 19s
1214: learn: 8.2290999 total: 3m 35s remaining: 2m 19s
1215: learn: 8.2278646 total: 3m 35s remaining: 2m 19s
1216: learn: 8.2271132 total: 3m 35s remaining: 2m 18s
1217: learn: 8.2261842 total: 3m 36s remaining: 2m 18s
1218: learn: 8.2252132 total: 3m 36s remaining: 2m 18s
1219: learn: 8.2246356 total: 3m 36s remaining: 2m 18s
1220: learn: 8.2239356 total: 3m 36s remaining: 2m 18s
1221: learn: 8.2237095 total: 3m 36s remaining: 2m 18s
1222: learn: 8.2232865 total: 3m 36s remaining: 2m 17s
1223: learn: 8.2228748 total: 3m 37s remaining: 2m 17s
1224: learn: 8.2222127 total: 3m 37s remaining: 2m 17s
1225: learn: 8.2212184 total: 3m 37s remaining: 2m 17s
1226: learn: 8.2202251 total: 3m 37s remaining: 2m 17s
1227: learn: 8.2192431 total: 3m 37s remaining: 2m 16s
1228: learn: 8.2188550 total: 3m 38s remaining: 2m 16s
1229: learn: 8.2186772 total: 3m 38s remaining: 2m 16s
1230: learn: 8.2175947 total: 3m 38s remaining: 2m 16s
1231: learn: 8.2164434 total: 3m 38s remaining: 2m 16s
1232: learn: 8.2152838 total: 3m 38s remaining: 2m 16s
1233: learn: 8.2146392 total: 3m 38s remaining: 2m 15s
1234: learn: 8.2135602 total: 3m 39s remaining: 2m 15s
1235: learn: 8.2125176 total: 3m 39s remaining: 2m 15s
1236: learn: 8.2120959 total: 3m 39s remaining: 2m 15s
1237: learn: 8.2113445 total: 3m 39s remaining: 2m 15s
1238: learn: 8.2103651 total: 3m 39s remaining: 2m 15s
1239: learn: 8.2095465 total: 3m 40s remaining: 2m 14s
1240: learn: 8.2085462 total: 3m 40s remaining: 2m 14s
1241: learn: 8.2082595 total: 3m 40s remaining: 2m 14s
1242: learn: 8.2071275 total: 3m 40s remaining: 2m 14s
1243: learn: 8.2059277 total: 3m 40s remaining: 2m 14s
1244: learn: 8.2056377 total: 3m 41s remaining: 2m 14s
1245: learn: 8.2052515 total: 3m 41s remaining: 2m 13s
1246: learn: 8.2047734 total: 3m 41s remaining: 2m 13s
1247: learn: 8.2039995 total: 3m 41s remaining: 2m 13s
1248: learn: 8.2033137 total: 3m 41s remaining: 2m 13s
1249: learn: 8.2022235 total: 3m 41s remaining: 2m 13s
1250: learn: 8.2016115 total: 3m 42s remaining: 2m 12s
1251: learn: 8.2007323 total: 3m 42s remaining: 2m 12s
1252: learn: 8.1997403 total: 3m 42s remaining: 2m 12s
1253: learn: 8.1984330 total: 3m 42s remaining: 2m 12s
1254: learn: 8.1975151 total: 3m 42s remaining: 2m 12s
1255: learn: 8.1968637 total: 3m 42s remaining: 2m 12s
1256: learn: 8.1953468 total: 3m 43s remaining: 2m 11s
1257: learn: 8.1947615 total: 3m 43s remaining: 2m 11s
1258: learn: 8.1934705 total: 3m 43s remaining: 2m 11s
1259: learn: 8.1922659 total: 3m 43s remaining: 2m 11s
1260: learn: 8.1911351 total: 3m 43s remaining: 2m 11s
1261: learn: 8.1901339 total: 3m 43s remaining: 2m 10s
1262: learn: 8.1886653 total: 3m 44s remaining: 2m 10s
1263: learn: 8.1881987 total: 3m 44s remaining: 2m 10s
1264: learn: 8.1871330 total: 3m 44s remaining: 2m 10s
1265: learn: 8.1865892 total: 3m 44s remaining: 2m 10s
1266: learn: 8.1859742 total: 3m 44s remaining: 2m 10s
1267: learn: 8.1851948 total: 3m 45s remaining: 2m 9s
1268: learn: 8.1849678 total: 3m 45s remaining: 2m 9s
1269: learn: 8.1836121 total: 3m 45s remaining: 2m 9s
1270: learn: 8.1831604 total: 3m 45s remaining: 2m 9s
1271: learn: 8.1825259 total: 3m 45s remaining: 2m 9s
1272: learn: 8.1816492 total: 3m 45s remaining: 2m 9s
1273: learn: 8.1811499 total: 3m 46s remaining: 2m 8s
1274: learn: 8.1805481 total: 3m 46s remaining: 2m 8s
1275: learn: 8.1797162 total: 3m 46s remaining: 2m 8s
1276: learn: 8.1785529 total: 3m 46s remaining: 2m 8s
1277: learn: 8.1779163 total: 3m 46s remaining: 2m 8s
1278: learn: 8.1770385 total: 3m 47s remaining: 2m 7s
1279: learn: 8.1757503 total: 3m 47s remaining: 2m 7s
1280: learn: 8.1750569 total: 3m 47s remaining: 2m 7s
1281: learn: 8.1740720 total: 3m 47s remaining: 2m 7s
1282: learn: 8.1727327 total: 3m 47s remaining: 2m 7s
1283: learn: 8.1718697 total: 3m 47s remaining: 2m 7s
1284: learn: 8.1712003 total: 3m 48s remaining: 2m 6s
1285: learn: 8.1701306 total: 3m 48s remaining: 2m 6s
1286: learn: 8.1698435 total: 3m 48s remaining: 2m 6s
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1286: learn: 8.1698435 total: 3m 48s remaining: 2m 6s
1287: learn: 8.1693611 total: 3m 48s remaining: 2m 6s
1288: learn: 8.1688484 total: 3m 48s remaining: 2m 6s
1289: learn: 8.1680905 total: 3m 48s remaining: 2m 6s
1290: learn: 8.1673265 total: 3m 49s remaining: 2m 5s
1291: learn: 8.1665648 total: 3m 49s remaining: 2m 5s
1292: learn: 8.1654366 total: 3m 49s remaining: 2m 5s
1293: learn: 8.1648210 total: 3m 49s remaining: 2m 5s
1294: learn: 8.1641898 total: 3m 49s remaining: 2m 5s
1295: learn: 8.1636509 total: 3m 50s remaining: 2m 4s
1296: learn: 8.1624931 total: 3m 50s remaining: 2m 4s
1297: learn: 8.1620622 total: 3m 50s remaining: 2m 4s
1298: learn: 8.1612013 total: 3m 50s remaining: 2m 4s
1299: learn: 8.1602132 total: 3m 50s remaining: 2m 4s
1300: learn: 8.1595081 total: 3m 50s remaining: 2m 4s
1301: learn: 8.1584526 total: 3m 51s remaining: 2m 3s
1302: learn: 8.1579996 total: 3m 51s remaining: 2m 3s
1303: learn: 8.1566903 total: 3m 51s remaining: 2m 3s
1304: learn: 8.1551613 total: 3m 51s remaining: 2m 3s
1305: learn: 8.1547911 total: 3m 51s remaining: 2m 3s
1306: learn: 8.1539462 total: 3m 52s remaining: 2m 3s
1307: learn: 8.1534366 total: 3m 52s remaining: 2m 2s
1308: learn: 8.1527448 total: 3m 52s remaining: 2m 2s
1309: learn: 8.1519867 total: 3m 52s remaining: 2m 2s
1310: learn: 8.1512397 total: 3m 52s remaining: 2m 2s
1311: learn: 8.1499262 total: 3m 52s remaining: 2m 2s
1312: learn: 8.1496372 total: 3m 53s remaining: 2m 1s
1313: learn: 8.1489022 total: 3m 53s remaining: 2m 1s
1314: learn: 8.1482857 total: 3m 53s remaining: 2m 1s
1315: learn: 8.1478971 total: 3m 53s remaining: 2m 1s
1316: learn: 8.1471171 total: 3m 53s remaining: 2m 1s
1317: learn: 8.1466520 total: 3m 53s remaining: 2m 1s
1318: learn: 8.1455988 total: 3m 54s remaining: 2m
1319: learn: 8.1449314 total: 3m 54s remaining: 2m
1320: learn: 8.1440689 total: 3m 54s remaining: 2m
1321: learn: 8.1430926 total: 3m 54s remaining: 2m
1322: learn: 8.1426670 total: 3m 54s remaining: 2m
1323: learn: 8.1422716 total: 3m 54s remaining: 1m 59s
1324: learn: 8.1420214 total: 3m 55s remaining: 1m 59s
1325: learn: 8.1415921 total: 3m 55s remaining: 1m 59s
1326: learn: 8.1405995 total: 3m 55s remaining: 1m 59s
1327: learn: 8.1396489 total: 3m 55s remaining: 1m 59s
1328: learn: 8.1388636 total: 3m 55s remaining: 1m 59s
1329: learn: 8.1377496 total: 3m 56s remaining: 1m 58s
1330: learn: 8.1371486 total: 3m 56s remaining: 1m 58s
1331: learn: 8.1362672 total: 3m 56s remaining: 1m 58s
1332: learn: 8.1360106 total: 3m 56s remaining: 1m 58s
1333: learn: 8.1352258 total: 3m 56s remaining: 1m 58s
1334: learn: 8.1344605 total: 3m 56s remaining: 1m 58s
1335: learn: 8.1339150 total: 3m 57s remaining: 1m 57s
1336: learn: 8.1332105 total: 3m 57s remaining: 1m 57s
1337: learn: 8.1327916 total: 3m 57s remaining: 1m 57s
1338: learn: 8.1323597 total: 3m 57s remaining: 1m 57s
1339: learn: 8.1319816 total: 3m 57s remaining: 1m 57s
1340: learn: 8.1313410 total: 3m 57s remaining: 1m 56s
1341: learn: 8.1302595 total: 3m 58s remaining: 1m 56s
1342: learn: 8.1289065 total: 3m 58s remaining: 1m 56s
1343: learn: 8.1270406 total: 3m 58s remaining: 1m 56s
1344: learn: 8.1266481 total: 3m 58s remaining: 1m 56s
1345: learn: 8.1260011 total: 3m 58s remaining: 1m 56s
1346: learn: 8.1247654 total: 3m 59s remaining: 1m 55s
1347: learn: 8.1239991 total: 3m 59s remaining: 1m 55s
1348: learn: 8.1236568 total: 3m 59s remaining: 1m 55s
1349: learn: 8.1230868 total: 3m 59s remaining: 1m 55s
1350: learn: 8.1221475 total: 3m 59s remaining: 1m 55s
1351: learn: 8.1219068 total: 3m 59s remaining: 1m 54s
1352: learn: 8.1216671 total: 4m remaining: 1m 54s
1353: learn: 8.1207953 total: 4m remaining: 1m 54s
1354: learn: 8.1203447 total: 4m remaining: 1m 54s
1355: learn: 8.1200589 total: 4m remaining: 1m 54s
1356: learn: 8.1198799 total: 4m remaining: 1m 54s
1357: learn: 8.1188863 total: 4m remaining: 1m 53s
1358: learn: 8.1182229 total: 4m 1s remaining: 1m 53s
1359: learn: 8.1175681 total: 4m 1s remaining: 1m 53s
1360: learn: 8.1169270 total: 4m 1s remaining: 1m 53s
1361: learn: 8.1160119 total: 4m 1s remaining: 1m 53s
1362: learn: 8.1155755 total: 4m 1s remaining: 1m 53s
1363: learn: 8.1146487 total: 4m 2s remaining: 1m 53s
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1363: learn: 8.1146487 total: 4m 2s remaining: 1m 52s
1364: learn: 8.1143068 total: 4m 2s remaining: 1m 52s
1365: learn: 8.1136989 total: 4m 2s remaining: 1m 52s
1366: learn: 8.1133052 total: 4m 2s remaining: 1m 52s
1367: learn: 8.1118003 total: 4m 2s remaining: 1m 52s
1368: learn: 8.1107399 total: 4m 2s remaining: 1m 51s
1369: learn: 8.1099252 total: 4m 3s remaining: 1m 51s
1370: learn: 8.1098582 total: 4m 3s remaining: 1m 51s
1371: learn: 8.1088795 total: 4m 3s remaining: 1m 51s
1372: learn: 8.1081310 total: 4m 3s remaining: 1m 51s
1373: learn: 8.1074547 total: 4m 3s remaining: 1m 51s
1374: learn: 8.1068425 total: 4m 3s remaining: 1m 50s
1375: learn: 8.1063365 total: 4m 4s remaining: 1m 50s
1376: learn: 8.1061524 total: 4m 4s remaining: 1m 50s
1377: learn: 8.1059164 total: 4m 4s remaining: 1m 50s
1378: learn: 8.1049770 total: 4m 4s remaining: 1m 50s
1379: learn: 8.1045218 total: 4m 4s remaining: 1m 50s
1380: learn: 8.1036052 total: 4m 5s remaining: 1m 49s
1381: learn: 8.1030400 total: 4m 5s remaining: 1m 49s
1382: learn: 8.1025341 total: 4m 5s remaining: 1m 49s
1383: learn: 8.1021385 total: 4m 5s remaining: 1m 49s
1384: learn: 8.1015521 total: 4m 5s remaining: 1m 49s
1385: learn: 8.1011715 total: 4m 5s remaining: 1m 48s
1386: learn: 8.1010579 total: 4m 6s remaining: 1m 48s
1387: learn: 8.1001849 total: 4m 6s remaining: 1m 48s
1388: learn: 8.0998635 total: 4m 6s remaining: 1m 48s
1389: learn: 8.0991564 total: 4m 6s remaining: 1m 48s
1390: learn: 8.0982592 total: 4m 6s remaining: 1m 48s
1391: learn: 8.0976648 total: 4m 6s remaining: 1m 47s
1392: learn: 8.0967442 total: 4m 7s remaining: 1m 47s
1393: learn: 8.0962426 total: 4m 7s remaining: 1m 47s
1394: learn: 8.0958614 total: 4m 7s remaining: 1m 47s
1395: learn: 8.0949135 total: 4m 7s remaining: 1m 47s
1396: learn: 8.0945397 total: 4m 7s remaining: 1m 46s
1397: learn: 8.0943242 total: 4m 8s remaining: 1m 46s
1398: learn: 8.0941424 total: 4m 8s remaining: 1m 46s
1399: learn: 8.0931358 total: 4m 8s remaining: 1m 46s
1400: learn: 8.0923191 total: 4m 8s remaining: 1m 46s
1401: learn: 8.0918079 total: 4m 8s remaining: 1m 46s
1402: learn: 8.0910365 total: 4m 8s remaining: 1m 45s
1403: learn: 8.0898249 total: 4m 9s remaining: 1m 45s
1404: learn: 8.0893148 total: 4m 9s remaining: 1m 45s
1405: learn: 8.0891646 total: 4m 9s remaining: 1m 45s
1406: learn: 8.0890568 total: 4m 9s remaining: 1m 45s
1407: learn: 8.0889216 total: 4m 9s remaining: 1m 45s
1408: learn: 8.0874794 total: 4m 10s remaining: 1m 44s
1409: learn: 8.0869039 total: 4m 10s remaining: 1m 44s
1410: learn: 8.0863219 total: 4m 10s remaining: 1m 44s
1411: learn: 8.0851789 total: 4m 10s remaining: 1m 44s
1412: learn: 8.0847784 total: 4m 10s remaining: 1m 44s
1413: learn: 8.0832181 total: 4m 10s remaining: 1m 43s
1414: learn: 8.0825646 total: 4m 11s remaining: 1m 43s
1415: learn: 8.0821902 total: 4m 11s remaining: 1m 43s
1416: learn: 8.0815240 total: 4m 11s remaining: 1m 43s
1417: learn: 8.0804655 total: 4m 11s remaining: 1m 43s
1418: learn: 8.0795689 total: 4m 11s remaining: 1m 43s
1419: learn: 8.0785267 total: 4m 11s remaining: 1m 42s
1420: learn: 8.0781557 total: 4m 12s remaining: 1m 42s
1421: learn: 8.0771495 total: 4m 12s remaining: 1m 42s
1422: learn: 8.0767492 total: 4m 12s remaining: 1m 42s
1423: learn: 8.0757638 total: 4m 12s remaining: 1m 42s
1424: learn: 8.0745199 total: 4m 12s remaining: 1m 42s
1425: learn: 8.0737568 total: 4m 13s remaining: 1m 41s
1426: learn: 8.0736241 total: 4m 13s remaining: 1m 41s
1427: learn: 8.0732258 total: 4m 13s remaining: 1m 41s
1428: learn: 8.0722907 total: 4m 13s remaining: 1m 41s
1429: learn: 8.0713503 total: 4m 13s remaining: 1m 41s
1430: learn: 8.0709260 total: 4m 13s remaining: 1m 40s
1431: learn: 8.0701441 total: 4m 14s remaining: 1m 40s
1432: learn: 8.0695845 total: 4m 14s remaining: 1m 40s
1433: learn: 8.0690465 total: 4m 14s remaining: 1m 40s
1434: learn: 8.0686668 total: 4m 14s remaining: 1m 40s
1435: learn: 8.0681490 total: 4m 14s remaining: 1m 40s
1436: learn: 8.0678523 total: 4m 15s remaining: 1m 39s
1437: learn: 8.0672237 total: 4m 15s remaining: 1m 39s
1438: learn: 8.0659683 total: 4m 15s remaining: 1m 39s
1439: learn: 8.0650806 total: 4m 15s remaining: 1m 39s
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1440: learn: 8.0643829 total: 4m 15s remaining: 1m 39s
1441: learn: 8.0638257 total: 4m 15s remaining: 1m 39s
1442: learn: 8.0627037 total: 4m 16s remaining: 1m 38s
1443: learn: 8.0618229 total: 4m 16s remaining: 1m 38s
1444: learn: 8.0606560 total: 4m 16s remaining: 1m 38s
1445: learn: 8.0602598 total: 4m 16s remaining: 1m 38s
1446: learn: 8.0594325 total: 4m 16s remaining: 1m 38s
1447: learn: 8.0589447 total: 4m 16s remaining: 1m 37s
1448: learn: 8.0584746 total: 4m 17s remaining: 1m 37s
1449: learn: 8.0584716 total: 4m 17s remaining: 1m 37s
1450: learn: 8.0583555 total: 4m 17s remaining: 1m 37s
1451: learn: 8.0574068 total: 4m 17s remaining: 1m 37s
1452: learn: 8.0568906 total: 4m 17s remaining: 1m 37s
1453: learn: 8.0559560 total: 4m 17s remaining: 1m 36s
1454: learn: 8.0551002 total: 4m 18s remaining: 1m 36s
1455: learn: 8.0541776 total: 4m 18s remaining: 1m 36s
1456: learn: 8.0529378 total: 4m 18s remaining: 1m 36s
1457: learn: 8.0510572 total: 4m 18s remaining: 1m 36s
1458: learn: 8.0502620 total: 4m 18s remaining: 1m 35s
1459: learn: 8.0499341 total: 4m 19s remaining: 1m 35s
1460: learn: 8.0495473 total: 4m 19s remaining: 1m 35s
1461: learn: 8.0492432 total: 4m 19s remaining: 1m 35s
1462: learn: 8.0487049 total: 4m 19s remaining: 1m 35s
1463: learn: 8.0481234 total: 4m 19s remaining: 1m 35s
1464: learn: 8.0471425 total: 4m 19s remaining: 1m 34s
1465: learn: 8.0461064 total: 4m 20s remaining: 1m 34s
1466: learn: 8.0457805 total: 4m 20s remaining: 1m 34s
1467: learn: 8.0455256 total: 4m 20s remaining: 1m 34s
1468: learn: 8.0448015 total: 4m 20s remaining: 1m 34s
1469: learn: 8.0443047 total: 4m 20s remaining: 1m 34s
1470: learn: 8.0433758 total: 4m 20s remaining: 1m 33s
1471: learn: 8.0429127 total: 4m 21s remaining: 1m 33s
1472: learn: 8.0409492 total: 4m 21s remaining: 1m 33s
1473: learn: 8.0400746 total: 4m 21s remaining: 1m 33s
1474: learn: 8.0397269 total: 4m 21s remaining: 1m 33s
1475: learn: 8.0392456 total: 4m 21s remaining: 1m 32s
1476: learn: 8.0389123 total: 4m 22s remaining: 1m 32s
1477: learn: 8.0385115 total: 4m 22s remaining: 1m 32s
1478: learn: 8.0379167 total: 4m 22s remaining: 1m 32s
1479: learn: 8.0372873 total: 4m 22s remaining: 1m 32s
1480: learn: 8.0368171 total: 4m 22s remaining: 1m 32s
1481: learn: 8.0364340 total: 4m 22s remaining: 1m 31s
1482: learn: 8.0352725 total: 4m 23s remaining: 1m 31s
1483: learn: 8.0348093 total: 4m 23s remaining: 1m 31s
1484: learn: 8.0343301 total: 4m 23s remaining: 1m 31s
1485: learn: 8.0334561 total: 4m 23s remaining: 1m 31s
1486: learn: 8.0330964 total: 4m 23s remaining: 1m 31s
1487: learn: 8.0325871 total: 4m 24s remaining: 1m 30s
1488: learn: 8.0313385 total: 4m 24s remaining: 1m 30s
1489: learn: 8.0304105 total: 4m 24s remaining: 1m 30s
1490: learn: 8.0298034 total: 4m 24s remaining: 1m 30s
1491: learn: 8.0288951 total: 4m 24s remaining: 1m 30s
1492: learn: 8.0280044 total: 4m 24s remaining: 1m 29s
1493: learn: 8.0276349 total: 4m 25s remaining: 1m 29s
1494: learn: 8.0264431 total: 4m 25s remaining: 1m 29s
1495: learn: 8.0259850 total: 4m 25s remaining: 1m 29s
1496: learn: 8.0251540 total: 4m 25s remaining: 1m 29s
1497: learn: 8.0238659 total: 4m 25s remaining: 1m 29s
1498: learn: 8.0233608 total: 4m 25s remaining: 1m 28s
1499: learn: 8.0225479 total: 4m 26s remaining: 1m 28s
1500: learn: 8.0218103 total: 4m 26s remaining: 1m 28s
1501: learn: 8.0206924 total: 4m 26s remaining: 1m 28s
1502: learn: 8.0200932 total: 4m 26s remaining: 1m 28s
1503: learn: 8.0191429 total: 4m 26s remaining: 1m 28s
1504: learn: 8.0180956 total: 4m 27s remaining: 1m 27s
1505: learn: 8.0175156 total: 4m 27s remaining: 1m 27s
1506: learn: 8.0170071 total: 4m 27s remaining: 1m 27s
1507: learn: 8.0167633 total: 4m 27s remaining: 1m 27s
1508: learn: 8.0157639 total: 4m 27s remaining: 1m 27s
1509: learn: 8.0152619 total: 4m 27s remaining: 1m 26s
1510: learn: 8.0145284 total: 4m 28s remaining: 1m 26s
1511: learn: 8.0140400 total: 4m 28s remaining: 1m 26s
1512: learn: 8.0126140 total: 4m 28s remaining: 1m 26s
1513: learn: 8.0121371 total: 4m 28s remaining: 1m 26s
1514: learn: 8.0119045 total: 4m 28s remaining: 1m 26s
1515: learn: 8.0114317 total: 4m 28s remaining: 1m 25s
1516: learn: 8.0106941 total: 4m 29s remaining: 1m 25s
1517: learn: 8.0104619 total: 4m 29s remaining: 1m 25s
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1517: learn: 8.0104618 total: 4m 29s remaining: 1m 25s
1518: learn: 8.0098702 total: 4m 29s remaining: 1m 25s
1519: learn: 8.0088261 total: 4m 29s remaining: 1m 25s
1520: learn: 8.0080370 total: 4m 29s remaining: 1m 24s
1521: learn: 8.0076340 total: 4m 30s remaining: 1m 24s
1522: learn: 8.0069756 total: 4m 30s remaining: 1m 24s
1523: learn: 8.0062059 total: 4m 30s remaining: 1m 24s
1524: learn: 8.0049653 total: 4m 30s remaining: 1m 24s
1525: learn: 8.0042744 total: 4m 30s remaining: 1m 24s
1526: learn: 8.0040706 total: 4m 30s remaining: 1m 23s
1527: learn: 8.0038030 total: 4m 31s remaining: 1m 23s
1528: learn: 8.0024017 total: 4m 31s remaining: 1m 23s
1529: learn: 8.0018329 total: 4m 31s remaining: 1m 23s
1530: learn: 8.0013934 total: 4m 31s remaining: 1m 23s
1531: learn: 8.0009413 total: 4m 31s remaining: 1m 23s
1532: learn: 7.9996669 total: 4m 32s remaining: 1m 22s
1533: learn: 7.9987196 total: 4m 32s remaining: 1m 22s
1534: learn: 7.9977901 total: 4m 32s remaining: 1m 22s
1535: learn: 7.9972471 total: 4m 32s remaining: 1m 22s
1536: learn: 7.9967829 total: 4m 32s remaining: 1m 22s
1537: learn: 7.9961894 total: 4m 32s remaining: 1m 21s
1538: learn: 7.9956955 total: 4m 33s remaining: 1m 21s
1539: learn: 7.9949578 total: 4m 33s remaining: 1m 21s
1540: learn: 7.9941463 total: 4m 33s remaining: 1m 21s
1541: learn: 7.9933981 total: 4m 33s remaining: 1m 21s
1542: learn: 7.9931744 total: 4m 33s remaining: 1m 21s
1543: learn: 7.9929311 total: 4m 34s remaining: 1m 20s
1544: learn: 7.9923606 total: 4m 34s remaining: 1m 20s
1545: learn: 7.9918280 total: 4m 34s remaining: 1m 20s
1546: learn: 7.9907831 total: 4m 34s remaining: 1m 20s
1547: learn: 7.9902859 total: 4m 34s remaining: 1m 20s
1548: learn: 7.9896278 total: 4m 34s remaining: 1m 20s
1549: learn: 7.9893919 total: 4m 35s remaining: 1m 19s
1550: learn: 7.9885518 total: 4m 35s remaining: 1m 19s
1551: learn: 7.9879857 total: 4m 35s remaining: 1m 19s
1552: learn: 7.9879843 total: 4m 35s remaining: 1m 19s
1553: learn: 7.9876091 total: 4m 35s remaining: 1m 19s
1554: learn: 7.9869408 total: 4m 35s remaining: 1m 18s
1555: learn: 7.9867942 total: 4m 36s remaining: 1m 18s
1556: learn: 7.9863566 total: 4m 36s remaining: 1m 18s
1557: learn: 7.9854842 total: 4m 36s remaining: 1m 18s
1558: learn: 7.9846906 total: 4m 36s remaining: 1m 18s
1559: learn: 7.9831234 total: 4m 36s remaining: 1m 18s
1560: learn: 7.9819846 total: 4m 36s remaining: 1m 17s
1561: learn: 7.9812937 total: 4m 37s remaining: 1m 17s
1562: learn: 7.9807440 total: 4m 37s remaining: 1m 17s
1563: learn: 7.9802349 total: 4m 37s remaining: 1m 17s
1564: learn: 7.9798773 total: 4m 37s remaining: 1m 17s
1565: learn: 7.9798758 total: 4m 37s remaining: 1m 16s
1566: learn: 7.9787792 total: 4m 37s remaining: 1m 16s
1567: learn: 7.9783258 total: 4m 38s remaining: 1m 16s
1568: learn: 7.9780078 total: 4m 38s remaining: 1m 16s
1569: learn: 7.9772582 total: 4m 38s remaining: 1m 16s
1570: learn: 7.9767724 total: 4m 38s remaining: 1m 16s
1571: learn: 7.9761785 total: 4m 38s remaining: 1m 15s
1572: learn: 7.9754800 total: 4m 38s remaining: 1m 15s
1573: learn: 7.9752149 total: 4m 39s remaining: 1m 15s
1574: learn: 7.9745287 total: 4m 39s remaining: 1m 15s
1575: learn: 7.9741496 total: 4m 39s remaining: 1m 15s
1576: learn: 7.9725333 total: 4m 39s remaining: 1m 15s
1577: learn: 7.9713454 total: 4m 39s remaining: 1m 14s
1578: learn: 7.9708041 total: 4m 40s remaining: 1m 14s
1579: learn: 7.9703963 total: 4m 40s remaining: 1m 14s
1580: learn: 7.9691360 total: 4m 40s remaining: 1m 14s
1581: learn: 7.9686333 total: 4m 40s remaining: 1m 14s
1582: learn: 7.9681682 total: 4m 40s remaining: 1m 13s
1583: learn: 7.9674227 total: 4m 40s remaining: 1m 13s
1584: learn: 7.9668420 total: 4m 41s remaining: 1m 13s
1585: learn: 7.9663155 total: 4m 41s remaining: 1m 13s
1586: learn: 7.9653747 total: 4m 41s remaining: 1m 13s
1587: learn: 7.9650045 total: 4m 41s remaining: 1m 13s
1588: learn: 7.9645606 total: 4m 41s remaining: 1m 12s
1589: learn: 7.9636579 total: 4m 42s remaining: 1m 12s
1590: learn: 7.9633899 total: 4m 42s remaining: 1m 12s
1591: learn: 7.9626515 total: 4m 42s remaining: 1m 12s
1592: learn: 7.9622242 total: 4m 42s remaining: 1m 12s
1593: learn: 7.9617218 total: 4m 42s remaining: 1m 12s
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1594: learn: 7.9614073 total: 4m 42s remaining: 1m 11s
1595: learn: 7.9608864 total: 4m 43s remaining: 1m 11s
1596: learn: 7.9606142 total: 4m 43s remaining: 1m 11s
1597: learn: 7.9597319 total: 4m 43s remaining: 1m 11s
1598: learn: 7.9586546 total: 4m 43s remaining: 1m 11s
1599: learn: 7.9582906 total: 4m 43s remaining: 1m 10s
1600: learn: 7.9580108 total: 4m 44s remaining: 1m 10s
1601: learn: 7.9572768 total: 4m 44s remaining: 1m 10s
1602: learn: 7.9566169 total: 4m 44s remaining: 1m 10s
1603: learn: 7.9558999 total: 4m 44s remaining: 1m 10s
1604: learn: 7.9555910 total: 4m 44s remaining: 1m 10s
1605: learn: 7.9553568 total: 4m 44s remaining: 1m 9s
1606: learn: 7.9551590 total: 4m 45s remaining: 1m 9s
1607: learn: 7.9544828 total: 4m 45s remaining: 1m 9s
1608: learn: 7.9542521 total: 4m 45s remaining: 1m 9s
1609: learn: 7.9532706 total: 4m 45s remaining: 1m 9s
1610: learn: 7.9524151 total: 4m 45s remaining: 1m 9s
1611: learn: 7.9522522 total: 4m 46s remaining: 1m 8s
1612: learn: 7.9513971 total: 4m 46s remaining: 1m 8s
1613: learn: 7.9505592 total: 4m 46s remaining: 1m 8s
1614: learn: 7.9498427 total: 4m 46s remaining: 1m 8s
1615: learn: 7.9491999 total: 4m 46s remaining: 1m 8s
1616: learn: 7.9476259 total: 4m 46s remaining: 1m 7s
1617: learn: 7.9470059 total: 4m 47s remaining: 1m 7s
1618: learn: 7.9464234 total: 4m 47s remaining: 1m 7s
1619: learn: 7.9458268 total: 4m 47s remaining: 1m 7s
1620: learn: 7.9449985 total: 4m 47s remaining: 1m 7s
1621: learn: 7.9447704 total: 4m 47s remaining: 1m 7s
1622: learn: 7.9443454 total: 4m 47s remaining: 1m 6s
1623: learn: 7.9440080 total: 4m 48s remaining: 1m 6s
1624: learn: 7.9431039 total: 4m 48s remaining: 1m 6s
1625: learn: 7.9424071 total: 4m 48s remaining: 1m 6s
1626: learn: 7.9418625 total: 4m 48s remaining: 1m 6s
1627: learn: 7.9413374 total: 4m 48s remaining: 1m 6s
1628: learn: 7.9408573 total: 4m 49s remaining: 1m 5s
1629: learn: 7.9401358 total: 4m 49s remaining: 1m 5s
1630: learn: 7.9397449 total: 4m 49s remaining: 1m 5s
1631: learn: 7.9397435 total: 4m 49s remaining: 1m 5s
1632: learn: 7.9388646 total: 4m 49s remaining: 1m 5s
1633: learn: 7.9382181 total: 4m 49s remaining: 1m 4s
1634: learn: 7.9377315 total: 4m 50s remaining: 1m 4s
1635: learn: 7.9367752 total: 4m 50s remaining: 1m 4s
1636: learn: 7.9361126 total: 4m 50s remaining: 1m 4s
1637: learn: 7.9360144 total: 4m 50s remaining: 1m 4s
1638: learn: 7.9353507 total: 4m 50s remaining: 1m 4s
1639: learn: 7.9345078 total: 4m 51s remaining: 1m 3s
1640: learn: 7.9336354 total: 4m 51s remaining: 1m 3s
1641: learn: 7.9325981 total: 4m 51s remaining: 1m 3s
1642: learn: 7.9310944 total: 4m 51s remaining: 1m 3s
1643: learn: 7.9304162 total: 4m 51s remaining: 1m 3s
1644: learn: 7.9300878 total: 4m 51s remaining: 1m 2s
1645: learn: 7.9286722 total: 4m 52s remaining: 1m 2s
1646: learn: 7.9276795 total: 4m 52s remaining: 1m 2s
1647: learn: 7.9265035 total: 4m 52s remaining: 1m 2s
1648: learn: 7.9261565 total: 4m 52s remaining: 1m 2s
1649: learn: 7.9258677 total: 4m 52s remaining: 1m 2s
1650: learn: 7.9255560 total: 4m 52s remaining: 1m 1s
1651: learn: 7.9255545 total: 4m 53s remaining: 1m 1s
1652: learn: 7.9249490 total: 4m 53s remaining: 1m 1s
1653: learn: 7.9247628 total: 4m 53s remaining: 1m 1s
1654: learn: 7.9243693 total: 4m 53s remaining: 1m 1s
1655: learn: 7.9234798 total: 4m 53s remaining: 1m 1s
1656: learn: 7.9229371 total: 4m 54s remaining: 1m
1657: learn: 7.9224070 total: 4m 54s remaining: 1m
1658: learn: 7.9211771 total: 4m 54s remaining: 1m
1659: learn: 7.9209654 total: 4m 54s remaining: 1m
1660: learn: 7.9198691 total: 4m 54s remaining: 1m
1661: learn: 7.9197546 total: 4m 54s remaining: 60s
1662: learn: 7.9192273 total: 4m 55s remaining: 59.8s
1663: learn: 7.9190498 total: 4m 55s remaining: 59.6s
1664: learn: 7.9185496 total: 4m 55s remaining: 59.5s
1665: learn: 7.9181473 total: 4m 55s remaining: 59.3s
1666: learn: 7.9172638 total: 4m 55s remaining: 59.1s
1667: learn: 7.9167650 total: 4m 56s remaining: 58.9s
1668: learn: 7.9165631 total: 4m 56s remaining: 58.7s
1669: learn: 7.9161404 total: 4m 56s remaining: 58.6s
1670: learn: 7.9155207 total: 4m 56s remaining: 58.4s
```

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1671: learn: 7.9150125 total: 4m 56s remaining: 58.2s
1672: learn: 7.9143593 total: 4m 56s remaining: 58s
1673: learn: 7.9136428 total: 4m 57s remaining: 57.9s
1674: learn: 7.9130735 total: 4m 57s remaining: 57.7s
1675: learn: 7.9122095 total: 4m 57s remaining: 57.5s
1676: learn: 7.9120986 total: 4m 57s remaining: 57.3s
1677: learn: 7.9119078 total: 4m 57s remaining: 57.2s
1678: learn: 7.9115561 total: 4m 58s remaining: 57s
1679: learn: 7.9109901 total: 4m 58s remaining: 56.8s
1680: learn: 7.9096243 total: 4m 58s remaining: 56.6s
1681: learn: 7.9094812 total: 4m 58s remaining: 56.4s
1682: learn: 7.9085665 total: 4m 58s remaining: 56.3s
1683: learn: 7.9077384 total: 4m 58s remaining: 56.1s
1684: learn: 7.9074935 total: 4m 59s remaining: 55.9s
1685: learn: 7.9066867 total: 4m 59s remaining: 55.7s
1686: learn: 7.9059210 total: 4m 59s remaining: 55.6s
1687: learn: 7.9053297 total: 4m 59s remaining: 55.4s
1688: learn: 7.9051732 total: 4m 59s remaining: 55.2s
1689: learn: 7.9049384 total: 4m 59s remaining: 55s
1690: learn: 7.9046304 total: 5m remaining: 54.8s
1691: learn: 7.9033750 total: 5m remaining: 54.7s
1692: learn: 7.9030413 total: 5m remaining: 54.5s
1693: learn: 7.9017669 total: 5m remaining: 54.3s
1694: learn: 7.9015546 total: 5m remaining: 54.1s
1695: learn: 7.9009817 total: 5m 1s remaining: 54s
1696: learn: 7.9008335 total: 5m 1s remaining: 53.8s
1697: learn: 7.9005101 total: 5m 1s remaining: 53.6s
1698: learn: 7.8996559 total: 5m 1s remaining: 53.4s
1699: learn: 7.8989414 total: 5m 1s remaining: 53.2s
1700: learn: 7.8985927 total: 5m 1s remaining: 53.1s
1701: learn: 7.8982479 total: 5m 2s remaining: 52.9s
1702: learn: 7.8979563 total: 5m 2s remaining: 52.7s
1703: learn: 7.8970936 total: 5m 2s remaining: 52.5s
1704: learn: 7.8967948 total: 5m 2s remaining: 52.4s
1705: learn: 7.8958969 total: 5m 2s remaining: 52.2s
1706: learn: 7.8949765 total: 5m 2s remaining: 52s
1707: learn: 7.8940524 total: 5m 3s remaining: 51.8s
1708: learn: 7.8932861 total: 5m 3s remaining: 51.6s
1709: learn: 7.8924683 total: 5m 3s remaining: 51.5s
1710: learn: 7.8914631 total: 5m 3s remaining: 51.3s
1711: learn: 7.8902209 total: 5m 3s remaining: 51.1s
1712: learn: 7.8895821 total: 5m 4s remaining: 50.9s
1713: learn: 7.8891884 total: 5m 4s remaining: 50.8s
1714: learn: 7.8887920 total: 5m 4s remaining: 50.6s
1715: learn: 7.8876397 total: 5m 4s remaining: 50.4s
1716: learn: 7.8864852 total: 5m 4s remaining: 50.2s
1717: learn: 7.8858553 total: 5m 4s remaining: 50s
1718: learn: 7.8855175 total: 5m 5s remaining: 49.9s
1719: learn: 7.8850186 total: 5m 5s remaining: 49.7s
1720: learn: 7.8837761 total: 5m 5s remaining: 49.5s
1721: learn: 7.8825958 total: 5m 5s remaining: 49.3s
1722: learn: 7.8822375 total: 5m 5s remaining: 49.2s
1723: learn: 7.8816394 total: 5m 5s remaining: 49s
1724: learn: 7.8813203 total: 5m 6s remaining: 48.8s
1725: learn: 7.8810182 total: 5m 6s remaining: 48.6s
1726: learn: 7.8804544 total: 5m 6s remaining: 48.5s
1727: learn: 7.8793566 total: 5m 6s remaining: 48.3s
1728: learn: 7.8789586 total: 5m 6s remaining: 48.1s
1729: learn: 7.8785149 total: 5m 7s remaining: 47.9s
1730: learn: 7.8778192 total: 5m 7s remaining: 47.7s
1731: learn: 7.8773887 total: 5m 7s remaining: 47.6s
1732: learn: 7.8771882 total: 5m 7s remaining: 47.4s
1733: learn: 7.8768882 total: 5m 7s remaining: 47.2s
1734: learn: 7.8763056 total: 5m 7s remaining: 47s
1735: learn: 7.8759392 total: 5m 8s remaining: 46.9s
1736: learn: 7.8757179 total: 5m 8s remaining: 46.7s
1737: learn: 7.8749772 total: 5m 8s remaining: 46.5s
1738: learn: 7.8740922 total: 5m 8s remaining: 46.3s
1739: learn: 7.8732036 total: 5m 8s remaining: 46.1s
1740: learn: 7.8728325 total: 5m 9s remaining: 46s
1741: learn: 7.8726737 total: 5m 9s remaining: 45.8s
1742: learn: 7.8711331 total: 5m 9s remaining: 45.6s
1743: learn: 7.8709862 total: 5m 9s remaining: 45.4s
1744: learn: 7.8701233 total: 5m 9s remaining: 45.3s
1745: learn: 7.8694129 total: 5m 9s remaining: 45.1s
1746: learn: 7.8690200 total: 5m 10s remaining: 44.9s
1747: learn: 7.8685051 total: 5m 10s remaining: 44.7s
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1748: learn: 7.8682309 total: 5m 10s remaining: 44.6s
1749: learn: 7.8675291 total: 5m 10s remaining: 44.4s
1750: learn: 7.8669967 total: 5m 10s remaining: 44.2s
1751: learn: 7.8664863 total: 5m 11s remaining: 44s
1752: learn: 7.8654900 total: 5m 11s remaining: 43.8s
1753: learn: 7.8653802 total: 5m 11s remaining: 43.7s
1754: learn: 7.8644742 total: 5m 11s remaining: 43.5s
1755: learn: 7.8634994 total: 5m 11s remaining: 43.3s
1756: learn: 7.8629521 total: 5m 11s remaining: 43.1s
1757: learn: 7.8625911 total: 5m 12s remaining: 43s
1758: learn: 7.8621473 total: 5m 12s remaining: 42.8s
1759: learn: 7.8616561 total: 5m 12s remaining: 42.6s
1760: learn: 7.8609782 total: 5m 12s remaining: 42.4s
1761: learn: 7.8606393 total: 5m 12s remaining: 42.2s
1762: learn: 7.8602927 total: 5m 12s remaining: 42.1s
1763: learn: 7.8598339 total: 5m 13s remaining: 41.9s
1764: learn: 7.8594921 total: 5m 13s remaining: 41.7s
1765: learn: 7.8581362 total: 5m 13s remaining: 41.5s
1766: learn: 7.8564731 total: 5m 13s remaining: 41.4s
1767: learn: 7.8562870 total: 5m 13s remaining: 41.2s
1768: learn: 7.8558416 total: 5m 14s remaining: 41s
1769: learn: 7.8548273 total: 5m 14s remaining: 40.8s
1770: learn: 7.8539514 total: 5m 14s remaining: 40.7s
1771: learn: 7.8529259 total: 5m 14s remaining: 40.5s
1772: learn: 7.8523434 total: 5m 14s remaining: 40.3s
1773: learn: 7.8512038 total: 5m 14s remaining: 40.1s
1774: learn: 7.8504832 total: 5m 15s remaining: 39.9s
1775: learn: 7.8495998 total: 5m 15s remaining: 39.8s
1776: learn: 7.8487658 total: 5m 15s remaining: 39.6s
1777: learn: 7.8479817 total: 5m 15s remaining: 39.4s
1778: learn: 7.8477477 total: 5m 15s remaining: 39.2s
1779: learn: 7.8475885 total: 5m 16s remaining: 39.1s
1780: learn: 7.8470953 total: 5m 16s remaining: 38.9s
1781: learn: 7.8461541 total: 5m 16s remaining: 38.7s
1782: learn: 7.8460298 total: 5m 16s remaining: 38.5s
1783: learn: 7.8451292 total: 5m 16s remaining: 38.4s
1784: learn: 7.8442598 total: 5m 16s remaining: 38.2s
1785: learn: 7.8437074 total: 5m 17s remaining: 38s
1786: learn: 7.8424897 total: 5m 17s remaining: 37.8s
1787: learn: 7.8416513 total: 5m 17s remaining: 37.6s
1788: learn: 7.8415130 total: 5m 17s remaining: 37.5s
1789: learn: 7.8412761 total: 5m 17s remaining: 37.3s
1790: learn: 7.8406985 total: 5m 18s remaining: 37.1s
1791: learn: 7.8405562 total: 5m 18s remaining: 36.9s
1792: learn: 7.8398481 total: 5m 18s remaining: 36.8s
1793: learn: 7.8391712 total: 5m 18s remaining: 36.6s
1794: learn: 7.8386908 total: 5m 18s remaining: 36.4s
1795: learn: 7.8383940 total: 5m 18s remaining: 36.2s
1796: learn: 7.8377563 total: 5m 19s remaining: 36s
1797: learn: 7.8374109 total: 5m 19s remaining: 35.9s
1798: learn: 7.8371057 total: 5m 19s remaining: 35.7s
1799: learn: 7.8367352 total: 5m 19s remaining: 35.5s
1800: learn: 7.8360286 total: 5m 19s remaining: 35.3s
1801: learn: 7.8351536 total: 5m 19s remaining: 35.2s
1802: learn: 7.8345509 total: 5m 20s remaining: 35s
1803: learn: 7.8335829 total: 5m 20s remaining: 34.8s
1804: learn: 7.8333205 total: 5m 20s remaining: 34.6s
1805: learn: 7.8325038 total: 5m 20s remaining: 34.4s
1806: learn: 7.8323223 total: 5m 20s remaining: 34.3s
1807: learn: 7.8315120 total: 5m 20s remaining: 34.1s
1808: learn: 7.8311854 total: 5m 21s remaining: 33.9s
1809: learn: 7.8306518 total: 5m 21s remaining: 33.7s
1810: learn: 7.8300573 total: 5m 21s remaining: 33.6s
1811: learn: 7.8291675 total: 5m 21s remaining: 33.4s
1812: learn: 7.8280132 total: 5m 21s remaining: 33.2s
1813: learn: 7.8278288 total: 5m 22s remaining: 33s
1814: learn: 7.8275243 total: 5m 22s remaining: 32.8s
1815: learn: 7.8263759 total: 5m 22s remaining: 32.7s
1816: learn: 7.8261039 total: 5m 22s remaining: 32.5s
1817: learn: 7.8252493 total: 5m 22s remaining: 32.3s
1818: learn: 7.8246478 total: 5m 22s remaining: 32.1s
1819: learn: 7.8244822 total: 5m 23s remaining: 32s
1820: learn: 7.8230974 total: 5m 23s remaining: 31.8s
1821: learn: 7.8228052 total: 5m 23s remaining: 31.6s
1822: learn: 7.8215175 total: 5m 23s remaining: 31.4s
1823: learn: 7.8209379 total: 5m 23s remaining: 31.2s
1824: learn: 7.8199649 total: 5m 23s remaining: 31.1s
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1825: learn: 7.8196856 total: 5m 24s remaining: 30.9s
1826: learn: 7.8186162 total: 5m 24s remaining: 30.7s
1827: learn: 7.8182869 total: 5m 24s remaining: 30.5s
1828: learn: 7.8180831 total: 5m 24s remaining: 30.3s
1829: learn: 7.8175766 total: 5m 24s remaining: 30.2s
1830: learn: 7.8172688 total: 5m 24s remaining: 30s
1831: learn: 7.8161605 total: 5m 25s remaining: 29.8s
1832: learn: 7.8154171 total: 5m 25s remaining: 29.6s
1833: learn: 7.8146814 total: 5m 25s remaining: 29.5s
1834: learn: 7.8143982 total: 5m 25s remaining: 29.3s
1835: learn: 7.8140961 total: 5m 25s remaining: 29.1s
1836: learn: 7.8133986 total: 5m 26s remaining: 28.9s
1837: learn: 7.8128845 total: 5m 26s remaining: 28.7s
1838: learn: 7.8122188 total: 5m 26s remaining: 28.6s
1839: learn: 7.8109374 total: 5m 26s remaining: 28.4s
1840: learn: 7.8102751 total: 5m 26s remaining: 28.2s
1841: learn: 7.8099726 total: 5m 26s remaining: 28s
1842: learn: 7.8091639 total: 5m 27s remaining: 27.9s
1843: learn: 7.8082021 total: 5m 27s remaining: 27.7s
1844: learn: 7.8080081 total: 5m 27s remaining: 27.5s
1845: learn: 7.8079435 total: 5m 27s remaining: 27.3s
1846: learn: 7.8068373 total: 5m 27s remaining: 27.1s
1847: learn: 7.8060603 total: 5m 27s remaining: 27s
1848: learn: 7.8046699 total: 5m 28s remaining: 26.8s
1849: learn: 7.8042212 total: 5m 28s remaining: 26.6s
1850: learn: 7.8035573 total: 5m 28s remaining: 26.4s
1851: learn: 7.8032184 total: 5m 28s remaining: 26.3s
1852: learn: 7.8021716 total: 5m 28s remaining: 26.1s
1853: learn: 7.8016790 total: 5m 28s remaining: 25.9s
1854: learn: 7.8009577 total: 5m 29s remaining: 25.7s
1855: learn: 7.8006108 total: 5m 29s remaining: 25.5s
1856: learn: 7.8004157 total: 5m 29s remaining: 25.4s
1857: learn: 7.8001673 total: 5m 29s remaining: 25.2s
1858: learn: 7.7998672 total: 5m 29s remaining: 25s
1859: learn: 7.7990768 total: 5m 29s remaining: 24.8s
1860: learn: 7.7978562 total: 5m 30s remaining: 24.7s
1861: learn: 7.7970890 total: 5m 30s remaining: 24.5s
1862: learn: 7.7966314 total: 5m 30s remaining: 24.3s
1863: learn: 7.7964737 total: 5m 30s remaining: 24.1s
1864: learn: 7.7958845 total: 5m 30s remaining: 23.9s
1865: learn: 7.7953066 total: 5m 31s remaining: 23.8s
1866: learn: 7.7949733 total: 5m 31s remaining: 23.6s
1867: learn: 7.7947251 total: 5m 31s remaining: 23.4s
1868: learn: 7.7938578 total: 5m 31s remaining: 23.2s
1869: learn: 7.7936669 total: 5m 31s remaining: 23.1s
1870: learn: 7.7930416 total: 5m 31s remaining: 22.9s
1871: learn: 7.7926559 total: 5m 32s remaining: 22.7s
1872: learn: 7.7922413 total: 5m 32s remaining: 22.5s
1873: learn: 7.7916271 total: 5m 32s remaining: 22.4s
1874: learn: 7.7915226 total: 5m 32s remaining: 22.2s
1875: learn: 7.7908718 total: 5m 32s remaining: 22s
1876: learn: 7.7902267 total: 5m 32s remaining: 21.8s
1877: learn: 7.7899266 total: 5m 33s remaining: 21.6s
1878: learn: 7.7892131 total: 5m 33s remaining: 21.5s
1879: learn: 7.7887348 total: 5m 33s remaining: 21.3s
1880: learn: 7.7879022 total: 5m 33s remaining: 21.1s
1881: learn: 7.7873907 total: 5m 33s remaining: 20.9s
1882: learn: 7.7869349 total: 5m 33s remaining: 20.8s
1883: learn: 7.7864402 total: 5m 34s remaining: 20.6s
1884: learn: 7.7860880 total: 5m 34s remaining: 20.4s
1885: learn: 7.7856831 total: 5m 34s remaining: 20.2s
1886: learn: 7.7852239 total: 5m 34s remaining: 20s
1887: learn: 7.7843699 total: 5m 34s remaining: 19.9s
1888: learn: 7.7837154 total: 5m 35s remaining: 19.7s
1889: learn: 7.7825794 total: 5m 35s remaining: 19.5s
1890: learn: 7.7821257 total: 5m 35s remaining: 19.3s
1891: learn: 7.7816703 total: 5m 35s remaining: 19.2s
1892: learn: 7.7807897 total: 5m 35s remaining: 19s
1893: learn: 7.7799982 total: 5m 35s remaining: 18.8s
1894: learn: 7.7798663 total: 5m 36s remaining: 18.6s
1895: learn: 7.7792282 total: 5m 36s remaining: 18.4s
1896: learn: 7.7789992 total: 5m 36s remaining: 18.3s
1897: learn: 7.7784164 total: 5m 36s remaining: 18.1s
1898: learn: 7.7780872 total: 5m 36s remaining: 17.9s
1899: learn: 7.7779056 total: 5m 36s remaining: 17.7s
1900: learn: 7.7777936 total: 5m 37s remaining: 17.6s
1901: learn: 7.7772236 total: 5m 37s remaining: 17.4s
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1902: learn: 7.7769953 total: 5m 37s remaining: 17.2s
1903: learn: 7.7760835 total: 5m 37s remaining: 17s
1904: learn: 7.7758738 total: 5m 37s remaining: 16.8s
1905: learn: 7.7756890 total: 5m 38s remaining: 16.7s
1906: learn: 7.7746486 total: 5m 38s remaining: 16.5s
1907: learn: 7.7740139 total: 5m 38s remaining: 16.3s
1908: learn: 7.7737643 total: 5m 38s remaining: 16.1s
1909: learn: 7.7725244 total: 5m 38s remaining: 16s
1910: learn: 7.7717403 total: 5m 38s remaining: 15.8s
1911: learn: 7.7712567 total: 5m 39s remaining: 15.6s
1912: learn: 7.7706904 total: 5m 39s remaining: 15.4s
1913: learn: 7.7703518 total: 5m 39s remaining: 15.3s
1914: learn: 7.7700900 total: 5m 39s remaining: 15.1s
1915: learn: 7.7699584 total: 5m 39s remaining: 14.9s
1916: learn: 7.7695068 total: 5m 39s remaining: 14.7s
1917: learn: 7.7687319 total: 5m 40s remaining: 14.5s
1918: learn: 7.7680100 total: 5m 40s remaining: 14.4s
1919: learn: 7.7678595 total: 5m 40s remaining: 14.2s
1920: learn: 7.7672086 total: 5m 40s remaining: 14s
1921: learn: 7.7661818 total: 5m 40s remaining: 13.8s
1922: learn: 7.7658501 total: 5m 41s remaining: 13.7s
1923: learn: 7.7652740 total: 5m 41s remaining: 13.5s
1924: learn: 7.7644534 total: 5m 41s remaining: 13.3s
1925: learn: 7.7638763 total: 5m 41s remaining: 13.1s
1926: learn: 7.7632858 total: 5m 41s remaining: 12.9s
1927: learn: 7.7630337 total: 5m 41s remaining: 12.8s
1928: learn: 7.7620436 total: 5m 42s remaining: 12.6s
1929: learn: 7.7617546 total: 5m 42s remaining: 12.4s
1930: learn: 7.7615784 total: 5m 42s remaining: 12.2s
1931: learn: 7.7611831 total: 5m 42s remaining: 12.1s
1932: learn: 7.7603194 total: 5m 42s remaining: 11.9s
1933: learn: 7.7602375 total: 5m 42s remaining: 11.7s
1934: learn: 7.7597209 total: 5m 43s remaining: 11.5s
1935: learn: 7.7596548 total: 5m 43s remaining: 11.3s
1936: learn: 7.7594778 total: 5m 43s remaining: 11.2s
1937: learn: 7.7594763 total: 5m 43s remaining: 11s
1938: learn: 7.7591643 total: 5m 43s remaining: 10.8s
1939: learn: 7.7588945 total: 5m 44s remaining: 10.6s
1940: learn: 7.7577157 total: 5m 44s remaining: 10.5s
1941: learn: 7.7573597 total: 5m 44s remaining: 10.3s
1942: learn: 7.7568507 total: 5m 44s remaining: 10.1s
1943: learn: 7.7564415 total: 5m 44s remaining: 9.93s
1944: learn: 7.7559750 total: 5m 44s remaining: 9.75s
1945: learn: 7.7547913 total: 5m 45s remaining: 9.58s
1946: learn: 7.7539960 total: 5m 45s remaining: 9.4s
1947: learn: 7.7536712 total: 5m 45s remaining: 9.22s
1948: learn: 7.7526527 total: 5m 45s remaining: 9.04s
1949: learn: 7.7523256 total: 5m 45s remaining: 8.87s
1950: learn: 7.7519913 total: 5m 45s remaining: 8.69s
1951: learn: 7.7513610 total: 5m 46s remaining: 8.51s
1952: learn: 7.7511460 total: 5m 46s remaining: 8.34s
1953: learn: 7.7510145 total: 5m 46s remaining: 8.16s
1954: learn: 7.7506670 total: 5m 46s remaining: 7.98s
1955: learn: 7.7505124 total: 5m 46s remaining: 7.8s
1956: learn: 7.7500787 total: 5m 47s remaining: 7.63s
1957: learn: 7.7494589 total: 5m 47s remaining: 7.45s
1958: learn: 7.7488697 total: 5m 47s remaining: 7.27s
1959: learn: 7.7478696 total: 5m 47s remaining: 7.09s
1960: learn: 7.7478121 total: 5m 47s remaining: 6.92s
1961: learn: 7.7469537 total: 5m 47s remaining: 6.74s
1962: learn: 7.7469511 total: 5m 48s remaining: 6.56s
1963: learn: 7.7467636 total: 5m 48s remaining: 6.38s
1964: learn: 7.7461568 total: 5m 48s remaining: 6.21s
1965: learn: 7.7458993 total: 5m 48s remaining: 6.03s
1966: learn: 7.7458672 total: 5m 48s remaining: 5.85s
1967: learn: 7.7457602 total: 5m 49s remaining: 5.67s
1968: learn: 7.7454357 total: 5m 49s remaining: 5.5s
1969: learn: 7.7448972 total: 5m 49s remaining: 5.32s
1970: learn: 7.7444043 total: 5m 49s remaining: 5.14s
1971: learn: 7.7439333 total: 5m 49s remaining: 4.97s
1972: learn: 7.7430796 total: 5m 49s remaining: 4.79s
1973: learn: 7.7430277 total: 5m 50s remaining: 4.61s
1974: learn: 7.7430267 total: 5m 50s remaining: 4.43s
1975: learn: 7.7426178 total: 5m 50s remaining: 4.26s
1976: learn: 7.7426170 total: 5m 50s remaining: 4.08s
1977: learn: 7.7422737 total: 5m 50s remaining: 3.9s
1978: learn: 7.7420605 total: 5m 50s remaining: 3.72s
```

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1979: learn: 7.7420204 total: 5m 51s remaining: 3.55s
1980: learn: 7.7414099 total: 5m 51s remaining: 3.37s
1981: learn: 7.7413145 total: 5m 51s remaining: 3.19s
1982: learn: 7.7404421 total: 5m 51s remaining: 3.02s
1983: learn: 7.7400023 total: 5m 51s remaining: 2.84s
1984: learn: 7.7396778 total: 5m 52s remaining: 2.66s
1985: learn: 7.7391258 total: 5m 52s remaining: 2.48s
1986: learn: 7.7383978 total: 5m 52s remaining: 2.31s
1987: learn: 7.7382573 total: 5m 52s remaining: 2.13s
1988: learn: 7.7375171 total: 5m 52s remaining: 1.95s
1989: learn: 7.7374717 total: 5m 52s remaining: 1.77s
1990: learn: 7.7366873 total: 5m 53s remaining: 1.6s
1991: learn: 7.7360904 total: 5m 53s remaining: 1.42s
1992: learn: 7.7360895 total: 5m 53s remaining: 1.24s
1993: learn: 7.7357636 total: 5m 53s remaining: 1.06s
1994: learn: 7.7356291 total: 5m 53s remaining: 887ms
1995: learn: 7.7356277 total: 5m 53s remaining: 709ms
1996: learn: 7.7345855 total: 5m 54s remaining: 532ms
1997: learn: 7.7337985 total: 5m 54s remaining: 355ms
1998: learn: 7.7322444 total: 5m 54s remaining: 177ms
1999: learn: 7.7311031 total: 5m 54s remaining: 0us
```

Out[ ]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	0	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	1	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	0	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	0	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	0	3	2017	4	27
...	...	...	...	...	...	...	...	...
32014	air_fff68b929994bfbd_2017-05-27	air_fff68b929994bfbd	2017-05-27	0	5	2017	5	27
32015	air_fff68b929994bfbd_2017-05-28	air_fff68b929994bfbd	2017-05-28	0	6	2017	5	28
32016	air_fff68b929994bfbd_2017-05-29	air_fff68b929994bfbd	2017-05-29	0	0	2017	5	29
32017	air_fff68b929994bfbd_2017-05-30	air_fff68b929994bfbd	2017-05-30	0	1	2017	5	30
32018	air_fff68b929994bfbd_2017-05-31	air_fff68b929994bfbd	2017-05-31	0	2	2017	5	31

32019 rows × 8 columns

In [ ]:

In [ ]:

Out[ ]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
125	air_0328696196e46f18_2017-05-01	air_0328696196e46f18	2017-05-01	4	0	2017	5	1
127	air_0328696196e46f18_2017-05-03	air_0328696196e46f18	2017-05-03	4	2	2017	5	3
128	air_0328696196e46f18_2017-05-04	air_0328696196e46f18	2017-05-04	5	3	2017	5	4
164	air_034a3d5b40d5b1b1_2017-05-01	air_034a3d5b40d5b1b1	2017-05-01	6	0	2017	5	1
165	air_034a3d5b40d5b1b1_2017-05-02	air_034a3d5b40d5b1b1	2017-05-02	6	1	2017	5	2
...	...	...	...	...	...	...	...	...
31367	air_fab092c35776a9b1_2017-05-04	air_fab092c35776a9b1	2017-05-04	4	3	2017	5	4
31717	air_fdcfef8bd859f650_2017-05-03	air_fdcfef8bd859f650	2017-05-03	4	2	2017	5	3
31718	air_fdcfef8bd859f650_2017-05-04	air_fdcfef8bd859f650	2017-05-04	4	3	2017	5	4
31834	air_fea5dc9594450608_2017-05-03	air_fea5dc9594450608	2017-05-03	4	2	2017	5	3
31835	air_fea5dc9594450608_2017-05-04	air_fea5dc9594450608	2017-05-04	4	3	2017	5	4

	31033	air_iea3uc993443000_2017-03-04	air_iea3uc993443000	2017-03-04	4	5	2017	3	4
		id	air_store_id	visit_date	visitors	weekday	year	month	day

634 rows × 8 columns

```
cat_model=predicted_data.to_csv('/content/drive/My Drive/Dataset/Cat_model_prediction.csv')
```

Deep Learning Model

In [266]:

```python
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler().fit(train_x)
train_x = scaler.transform(train_x)
test_x = scaler.transform(test_x)
```

In [267]:

```python
np.random.seed(0)
from keras.preprocessing import sequence
from keras.models import Sequential,Model
from keras.layers import Dropout,Dense,TimeDistributed,Conv1D,MaxPooling1D,Flatten,LSTM,Embedding,
Activation,Input
from keras.callbacks import EarlyStopping,ModelCheckpoint
from keras.optimizers import Adam
import h5py
from keras import backend
import tensorflow
tensorflow.random.set_seed(99)
```

In [268]:

```python
adam=Adam(learning_rate=0.001, beta_1=0.9, beta_2=0.999,epsilon=1e-05)
```

In [276]:

```python
filepath = 'best_wt_recruit_new.hdf5'
```

In [279]:

```python
callbacks=[EarlyStopping(monitor='val_loss',patience=30,verbose=0),ModelCheckpoint(filepath=filepat
h,monitor='val_loss',save_best_only=True,mode='min')]
```

In [270]:

```python
dropout=0.25
model=Sequential()
model.add(Dense(250, activation='relu',input_shape=(train_x.shape[1],)))
model.add(Dropout(dropout))
model.add(Dense(30, activation='relu'))
model.add(Dropout(dropout))
model.add(Dense(1,activation='relu'))
model.summary()
```

```
Model: "sequential"
_____
Layer (type)                 Output Shape              Param #
=================================================================
dense (Dense)                (None, 250)               8000
_____
dropout (Dropout)            (None, 250)               0
_____
dense_1 (Dense)              (None, 30)                7530
_____
dropout_1 (Dropout)          (None, 30)                0
_____
dense_2 (Dense)              (None, 1)                 31
```

```
dense_2 (Dense)              (None, 1)                 31
=================================================================
Total params: 15,561
Trainable params: 15,561
Non-trainable params: 0
_____
```

```python
model.compile(loss='mse',optimizer=adam)
```

```python
model.fit(np.array(train_x), np.array(train_y), epochs=150, batch_size=10, validation_data=(np.arra
y(test_x), np.array(test_y)),

          verbose=2, callbacks=callbacks, shuffle=False)
```

```
Epoch 1/150
20169/20169 - 39s - loss: 136.3401 - val_loss: 105.3542
Epoch 2/150
20169/20169 - 40s - loss: 126.8631 - val_loss: 103.2728
Epoch 3/150
20169/20169 - 39s - loss: 122.8211 - val_loss: 102.6413
Epoch 4/150
20169/20169 - 40s - loss: 121.2148 - val_loss: 101.1880
Epoch 5/150
20169/20169 - 40s - loss: 117.6239 - val_loss: 101.7195
Epoch 6/150
20169/20169 - 40s - loss: 117.6352 - val_loss: 100.8431
Epoch 7/150
20169/20169 - 41s - loss: 116.0467 - val_loss: 100.5681
Epoch 8/150
20169/20169 - 40s - loss: 118.4292 - val_loss: 101.1046
Epoch 9/150
20169/20169 - 40s - loss: 116.7374 - val_loss: 100.2301
Epoch 10/150
20169/20169 - 40s - loss: 116.3372 - val_loss: 100.0910
Epoch 11/150
20169/20169 - 39s - loss: 114.1757 - val_loss: 99.2963
Epoch 12/150
20169/20169 - 40s - loss: 114.7507 - val_loss: 99.8845
Epoch 13/150
20169/20169 - 40s - loss: 116.1105 - val_loss: 98.9311
Epoch 14/150
20169/20169 - 40s - loss: 117.4531 - val_loss: 100.7069
Epoch 15/150
20169/20169 - 41s - loss: 113.5899 - val_loss: 99.8304
Epoch 16/150
20169/20169 - 40s - loss: 110.9234 - val_loss: 99.0700
Epoch 17/150
20169/20169 - 39s - loss: 110.4072 - val_loss: 98.7619
Epoch 18/150
20169/20169 - 39s - loss: 110.9474 - val_loss: 98.5264
Epoch 19/150
20169/20169 - 40s - loss: 114.1163 - val_loss: 99.0766
Epoch 20/150
20169/20169 - 39s - loss: 111.0643 - val_loss: 98.0875
Epoch 21/150
20169/20169 - 40s - loss: 110.7122 - val_loss: 98.0926
Epoch 22/150
20169/20169 - 40s - loss: 112.2329 - val_loss: 97.7736
Epoch 23/150
20169/20169 - 40s - loss: 110.7028 - val_loss: 98.1469
Epoch 24/150
20169/20169 - 40s - loss: 112.5231 - val_loss: 97.6344
Epoch 25/150
20169/20169 - 40s - loss: 114.6941 - val_loss: 97.5066
Epoch 26/150
20169/20169 - 39s - loss: 109.8941 - val_loss: 97.8615
Epoch 27/150
20169/20169 - 39s - loss: 115.0423 - val_loss: 98.8553
Epoch 28/150
20169/20169 - 39s - loss: 110.0134 - val_loss: 98.5306
```

```
Epoch 29/150
20169/20169 - 39s - loss: 110.6218 - val_loss: 97.3153
Epoch 30/150
20169/20169 - 41s - loss: 112.6827 - val_loss: 98.2819
Epoch 31/150
20169/20169 - 40s - loss: 114.2452 - val_loss: 96.9141
Epoch 32/150
20169/20169 - 40s - loss: 112.0679 - val_loss: 98.7378
Epoch 33/150
20169/20169 - 39s - loss: 109.0584 - val_loss: 97.7608
Epoch 34/150
20169/20169 - 40s - loss: 108.8596 - val_loss: 96.9832
Epoch 35/150
20169/20169 - 40s - loss: 110.0353 - val_loss: 97.3306
Epoch 36/150
20169/20169 - 40s - loss: 107.5925 - val_loss: 97.4288
Epoch 37/150
20169/20169 - 39s - loss: 115.3632 - val_loss: 96.9557
Epoch 38/150
20169/20169 - 41s - loss: 110.8922 - val_loss: 97.0436
Epoch 39/150
20169/20169 - 40s - loss: 108.3410 - val_loss: 96.5883
Epoch 40/150
20169/20169 - 40s - loss: 112.5741 - val_loss: 97.3346
Epoch 41/150
20169/20169 - 40s - loss: 109.5053 - val_loss: 97.1414
Epoch 42/150
20169/20169 - 40s - loss: 106.8581 - val_loss: 96.8966
Epoch 43/150
20169/20169 - 40s - loss: 106.3976 - val_loss: 97.3502
Epoch 44/150
20169/20169 - 39s - loss: 109.2265 - val_loss: 97.1660
Epoch 45/150
20169/20169 - 40s - loss: 109.5345 - val_loss: 96.7018
Epoch 46/150
20169/20169 - 41s - loss: 106.4464 - val_loss: 97.4486
Epoch 47/150
20169/20169 - 40s - loss: 108.7014 - val_loss: 96.1677
Epoch 48/150
20169/20169 - 40s - loss: 110.4396 - val_loss: 96.9276
Epoch 49/150
20169/20169 - 40s - loss: 110.3240 - val_loss: 97.3326
Epoch 50/150
20169/20169 - 39s - loss: 108.3414 - val_loss: 96.5700
Epoch 51/150
20169/20169 - 40s - loss: 103.9822 - val_loss: 96.7851
Epoch 52/150
20169/20169 - 40s - loss: 106.2528 - val_loss: 96.6655
Epoch 53/150
20169/20169 - 40s - loss: 113.9768 - val_loss: 95.9403
Epoch 54/150
20169/20169 - 41s - loss: 108.4334 - val_loss: 96.5397
Epoch 55/150
20169/20169 - 41s - loss: 116.0329 - val_loss: 95.9709
Epoch 56/150
20169/20169 - 41s - loss: 109.1213 - val_loss: 96.4385
Epoch 57/150
20169/20169 - 40s - loss: 106.8283 - val_loss: 96.3430
Epoch 58/150
20169/20169 - 41s - loss: 106.8243 - val_loss: 96.5013
Epoch 59/150
20169/20169 - 39s - loss: 106.2309 - val_loss: 96.3314
Epoch 60/150
20169/20169 - 40s - loss: 114.4373 - val_loss: 96.0144
Epoch 61/150
20169/20169 - 40s - loss: 115.7767 - val_loss: 95.8328
Epoch 62/150
20169/20169 - 41s - loss: 107.0342 - val_loss: 96.3712
Epoch 63/150
20169/20169 - 40s - loss: 108.1090 - val_loss: 96.4590
Epoch 64/150
20169/20169 - 40s - loss: 106.7640 - val_loss: 95.8013
Epoch 65/150
20169/20169 - 39s - loss: 110.0329 - val_loss: 96.9518
Epoch 66/150
20169/20169 - 39s - loss: 108.6705 - val_loss: 96.8376
Epoch 67/150
```

20169/20169 - 39s - loss: 107.0411 - val_loss: 95.5774
Epoch 68/150
20169/20169 - 40s - loss: 107.5604 - val_loss: 95.6773
Epoch 69/150
20169/20169 - 40s - loss: 111.1586 - val_loss: 96.0528
Epoch 70/150
20169/20169 - 40s - loss: 110.5186 - val_loss: 96.5530
Epoch 71/150
20169/20169 - 39s - loss: 109.5879 - val_loss: 95.6457
Epoch 72/150
20169/20169 - 39s - loss: 106.1088 - val_loss: 96.4983
Epoch 73/150
20169/20169 - 39s - loss: 113.7270 - val_loss: 96.7382
Epoch 74/150
20169/20169 - 39s - loss: 109.4294 - val_loss: 95.7590
Epoch 75/150
20169/20169 - 39s - loss: 111.8604 - val_loss: 95.9982
Epoch 76/150
20169/20169 - 40s - loss: 106.8542 - val_loss: 95.2753
Epoch 77/150
20169/20169 - 41s - loss: 119.6796 - val_loss: 95.8669
Epoch 78/150
20169/20169 - 39s - loss: 111.1094 - val_loss: 96.3313
Epoch 79/150
20169/20169 - 39s - loss: 104.0932 - val_loss: 95.5138
Epoch 80/150
20169/20169 - 39s - loss: 105.2531 - val_loss: 95.5727
Epoch 81/150
20169/20169 - 39s - loss: 109.5580 - val_loss: 96.3753
Epoch 82/150
20169/20169 - 40s - loss: 106.6332 - val_loss: 96.2148
Epoch 83/150
20169/20169 - 39s - loss: 106.7414 - val_loss: 95.5131
Epoch 84/150
20169/20169 - 39s - loss: 106.4067 - val_loss: 95.8315
Epoch 85/150
20169/20169 - 40s - loss: 107.6603 - val_loss: 95.7756
Epoch 86/150
20169/20169 - 39s - loss: 107.8073 - val_loss: 95.4886
Epoch 87/150
20169/20169 - 39s - loss: 118.7458 - val_loss: 96.3907
Epoch 88/150
20169/20169 - 39s - loss: 107.1802 - val_loss: 95.8362
Epoch 89/150
20169/20169 - 39s - loss: 107.0116 - val_loss: 94.8470
Epoch 90/150
20169/20169 - 39s - loss: 108.6106 - val_loss: 95.6634
Epoch 91/150
20169/20169 - 39s - loss: 110.9764 - val_loss: 94.8124
Epoch 92/150
20169/20169 - 40s - loss: 106.5014 - val_loss: 95.8442
Epoch 93/150
20169/20169 - 40s - loss: 109.7466 - val_loss: 95.8653
Epoch 94/150
20169/20169 - 39s - loss: 108.6654 - val_loss: 95.7766
Epoch 95/150
20169/20169 - 39s - loss: 103.9503 - val_loss: 95.3471
Epoch 96/150
20169/20169 - 39s - loss: 112.7961 - val_loss: 95.8633
Epoch 97/150
20169/20169 - 40s - loss: 106.9529 - val_loss: 95.1201
Epoch 98/150
20169/20169 - 39s - loss: 109.7573 - val_loss: 95.7529
Epoch 99/150
20169/20169 - 40s - loss: 107.5511 - val_loss: 96.3396
Epoch 100/150
20169/20169 - 39s - loss: 110.7838 - val_loss: 96.3109
Epoch 101/150
20169/20169 - 40s - loss: 106.8571 - val_loss: 95.4510
Epoch 102/150
20169/20169 - 39s - loss: 102.3730 - val_loss: 95.4115
Epoch 103/150
20169/20169 - 40s - loss: 105.0302 - val_loss: 95.5648
Epoch 104/150
20169/20169 - 39s - loss: 103.6826 - val_loss: 95.7906
Epoch 105/150
20169/20169 - 40s - loss: 107.7236 - val_loss: 95.1647

```
20169/20169 - 40s - loss: 107.7230 - val_loss: 95.1017
Epoch 106/150
20169/20169 - 40s - loss: 103.8498 - val_loss: 95.2501
Epoch 107/150
20169/20169 - 40s - loss: 107.3130 - val_loss: 95.4398
Epoch 108/150
20169/20169 - 40s - loss: 104.2267 - val_loss: 95.9198
Epoch 109/150
20169/20169 - 41s - loss: 108.8990 - val_loss: 95.0666
Epoch 110/150
20169/20169 - 39s - loss: 109.6555 - val_loss: 95.7695
Epoch 111/150
20169/20169 - 39s - loss: 105.6544 - val_loss: 95.0862
Epoch 112/150
20169/20169 - 39s - loss: 103.2168 - val_loss: 95.2216
Epoch 113/150
20169/20169 - 39s - loss: 104.7814 - val_loss: 95.9640
Epoch 114/150
20169/20169 - 40s - loss: 108.6937 - val_loss: 95.7238
Epoch 115/150
20169/20169 - 39s - loss: 108.5210 - val_loss: 95.9475
Epoch 116/150
20169/20169 - 39s - loss: 106.6552 - val_loss: 95.4669
Epoch 117/150
20169/20169 - 40s - loss: 104.2332 - val_loss: 95.4528
Epoch 118/150
20169/20169 - 39s - loss: 103.8155 - val_loss: 94.5210
Epoch 119/150
20169/20169 - 39s - loss: 113.1825 - val_loss: 95.6811
Epoch 120/150
20169/20169 - 39s - loss: 105.7762 - val_loss: 96.0241
Epoch 121/150
20169/20169 - 40s - loss: 107.1205 - val_loss: 96.2660
Epoch 122/150
20169/20169 - 40s - loss: 109.5490 - val_loss: 96.0268
Epoch 123/150
20169/20169 - 39s - loss: 103.2684 - val_loss: 94.7943
Epoch 124/150
20169/20169 - 40s - loss: 107.6078 - val_loss: 96.1223
Epoch 125/150
20169/20169 - 40s - loss: 103.8148 - val_loss: 94.9364
Epoch 126/150
20169/20169 - 40s - loss: 105.4853 - val_loss: 95.4094
Epoch 127/150
20169/20169 - 39s - loss: 109.1395 - val_loss: 95.4938
Epoch 128/150
20169/20169 - 39s - loss: 109.6133 - val_loss: 96.0110
Epoch 129/150
20169/20169 - 40s - loss: 107.6425 - val_loss: 95.3440
Epoch 130/150
20169/20169 - 40s - loss: 112.9386 - val_loss: 95.5712
Epoch 131/150
20169/20169 - 39s - loss: 105.9087 - val_loss: 95.1906
Epoch 132/150
20169/20169 - 40s - loss: 104.4052 - val_loss: 96.1005
Epoch 133/150
20169/20169 - 40s - loss: 110.7612 - val_loss: 95.9567
Epoch 134/150
20169/20169 - 39s - loss: 107.8724 - val_loss: 95.5902
Epoch 135/150
20169/20169 - 40s - loss: 110.5358 - val_loss: 96.5086
Epoch 136/150
20169/20169 - 39s - loss: 104.5308 - val_loss: 94.8696
Epoch 137/150
20169/20169 - 39s - loss: 103.5946 - val_loss: 95.4343
Epoch 138/150
20169/20169 - 40s - loss: 107.1730 - val_loss: 95.6694
Epoch 139/150
20169/20169 - 39s - loss: 104.8852 - val_loss: 95.6483
Epoch 140/150
20169/20169 - 41s - loss: 107.8789 - val_loss: 95.7124
Epoch 141/150
20169/20169 - 40s - loss: 106.1260 - val_loss: 95.1153
Epoch 142/150
20169/20169 - 40s - loss: 105.9938 - val_loss: 95.0140
Epoch 143/150
20169/20169 - 40s - loss: 106.4207 - val_loss: 96.1264
Epoch 144/150
```

```
Epoch 144/150
20169/20169 - 39s - loss: 102.8627 - val_loss: 96.3032
Epoch 145/150
20169/20169 - 40s - loss: 103.0287 - val_loss: 96.4945
Epoch 146/150
20169/20169 - 39s - loss: 105.9074 - val_loss: 94.3029
Epoch 147/150
20169/20169 - 39s - loss: 110.2927 - val_loss: 96.2736
Epoch 148/150
20169/20169 - 40s - loss: 104.8064 - val_loss: 94.5973
Epoch 149/150
20169/20169 - 39s - loss: 102.3935 - val_loss: 94.3824
Epoch 150/150
20169/20169 - 40s - loss: 107.1181 - val_loss: 94.5553
```

Out[274]:

```
<tensorflow.python.keras.callbacks.History at 0x7f3afb17cf98>
```

In [275]:

```python
model.load_weights('best_wt_recruit_new.hdf5')
```

In [276]:

```python
import sklearn.metrics as metrics
def RMSLE(y, pred):
    return metrics.mean_squared_error(y, pred)**0.5
```

In [288]:

```python
pred = model.predict(test_x)
print('RMSE NeuralNetwork: ', RMSLE(np.log1p(test_y), pred))
```

```
RMSE NeuralNetwork:  21.368792194789144
```

In [289]:

```python
p1=pd.DataFrame(pred)
```

In [290]:

```python
predicted_data['visitors']=p1
```

In [291]:

```python
predicted_data.head()
```

Out[291]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	16.459770	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	21.429665	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	18.260101	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	26.079201	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	7.357246	3	2017	4	27

In [ ]:

LSTM Archietecture

In [267]:

```
train_x=np.reshape(train_x,(train_x.shape[0],1, train_x.shape[1]))
test_x=np.reshape(test_x,(test_x.shape[0],1,test_x.shape[1]))
```

In [268]:

```
model1=Sequential()
model1.add(LSTM(4,input_shape=(1, 31),return_sequences=True))
model1.add(Dense(1))
model1.summary()
```

```
Model: "sequential"
_____
Layer (type)                 Output Shape              Param #
=================================================================
lstm (LSTM)                  (None, 1, 4)              576
_____
dense (Dense)                (None, 1, 1)              5
=================================================================
Total params: 581
Trainable params: 581
Non-trainable params: 0
_____
```

In [269]:

```
filepath = 'best_wt_recruit_new1.hdf5'
```

In [270]:

```
callbacks=[EarlyStopping(monitor='loss',patience=30,verbose=0),ModelCheckpoint(filepath=filepath,mo
nitor='loss',save_best_only=True,mode='min')]
```

In [271]:

```
model1.compile(loss='mean_squared_error',optimizer='adam')
```

In [271]:

In [272]:

```
model1.fit(train_x, train_y, epochs=100, batch_size=20,callbacks=callbacks, verbose=2)
```

```
Epoch 1/100
10085/10085 - 38s - loss: 298.1845
Epoch 2/100
10085/10085 - 38s - loss: 143.0569
Epoch 3/100
10085/10085 - 38s - loss: 129.2930
Epoch 4/100
10085/10085 - 38s - loss: 125.5193
Epoch 5/100
10085/10085 - 39s - loss: 123.4770
Epoch 6/100
10085/10085 - 38s - loss: 122.3035
Epoch 7/100
10085/10085 - 37s - loss: 121.4844
Epoch 8/100
10085/10085 - 38s - loss: 120.8117
Epoch 9/100
10085/10085 - 37s - loss: 120.3961
Epoch 10/100
10085/10085 - 38s - loss: 119.9868
Epoch 11/100
10085/10085 - 38s - loss: 119.5180
Epoch 12/100
10085/10085 - 38s - loss: 119.1698
Epoch 13/100
```

```
Epoch 13/100
10085/10085 - 38s - loss: 118.8527
Epoch 14/100
10085/10085 - 37s - loss: 118.6987
Epoch 15/100
10085/10085 - 37s - loss: 118.3128
Epoch 16/100
10085/10085 - 37s - loss: 118.1619
Epoch 17/100
10085/10085 - 37s - loss: 117.9409
Epoch 18/100
10085/10085 - 37s - loss: 117.8207
Epoch 19/100
10085/10085 - 37s - loss: 117.6420
Epoch 20/100
10085/10085 - 37s - loss: 117.5067
Epoch 21/100
10085/10085 - 38s - loss: 117.3287
Epoch 22/100
10085/10085 - 37s - loss: 117.1148
Epoch 23/100
10085/10085 - 37s - loss: 117.0743
Epoch 24/100
10085/10085 - 37s - loss: 116.8504
Epoch 25/100
10085/10085 - 37s - loss: 116.8615
Epoch 26/100
10085/10085 - 37s - loss: 116.7373
Epoch 27/100
10085/10085 - 37s - loss: 116.6551
Epoch 28/100
10085/10085 - 37s - loss: 116.5895
Epoch 29/100
10085/10085 - 37s - loss: 116.4804
Epoch 30/100
10085/10085 - 37s - loss: 116.3178
Epoch 31/100
10085/10085 - 37s - loss: 116.2555
Epoch 32/100
10085/10085 - 37s - loss: 116.1815
Epoch 33/100
10085/10085 - 37s - loss: 116.1807
Epoch 34/100
10085/10085 - 37s - loss: 116.0461
Epoch 35/100
10085/10085 - 37s - loss: 116.1798
Epoch 36/100
10085/10085 - 38s - loss: 115.9536
Epoch 37/100
10085/10085 - 38s - loss: 115.9336
Epoch 38/100
10085/10085 - 38s - loss: 115.7414
Epoch 39/100
10085/10085 - 38s - loss: 115.7648
Epoch 40/100
10085/10085 - 37s - loss: 115.7160
Epoch 41/100
10085/10085 - 38s - loss: 115.6027
Epoch 42/100
10085/10085 - 38s - loss: 115.4431
Epoch 43/100
10085/10085 - 38s - loss: 115.4341
Epoch 44/100
10085/10085 - 37s - loss: 115.4106
Epoch 45/100
10085/10085 - 38s - loss: 115.3509
Epoch 46/100
10085/10085 - 38s - loss: 115.2845
Epoch 47/100
10085/10085 - 38s - loss: 115.1556
Epoch 48/100
10085/10085 - 38s - loss: 115.1158
Epoch 49/100
10085/10085 - 37s - loss: 114.9973
Epoch 50/100
10085/10085 - 37s - loss: 114.9662
Epoch 51/100
10085/10085 - 37s - loss: 114.9404
```

```
10085/10085 - 37s - loss: 114.9404
Epoch 52/100
10085/10085 - 37s - loss: 114.8614
Epoch 53/100
10085/10085 - 38s - loss: 114.8265
Epoch 54/100
10085/10085 - 38s - loss: 114.5751
Epoch 55/100
10085/10085 - 37s - loss: 114.6360
Epoch 56/100
10085/10085 - 37s - loss: 114.5054
Epoch 57/100
10085/10085 - 37s - loss: 114.4629
Epoch 58/100
10085/10085 - 37s - loss: 114.4431
Epoch 59/100
10085/10085 - 37s - loss: 114.2086
Epoch 60/100
10085/10085 - 37s - loss: 114.0554
Epoch 61/100
10085/10085 - 37s - loss: 114.1121
Epoch 62/100
10085/10085 - 37s - loss: 113.9786
Epoch 63/100
10085/10085 - 38s - loss: 114.0233
Epoch 64/100
10085/10085 - 37s - loss: 113.7460
Epoch 65/100
10085/10085 - 37s - loss: 113.7638
Epoch 66/100
10085/10085 - 37s - loss: 113.5109
Epoch 67/100
10085/10085 - 37s - loss: 113.5655
Epoch 68/100
10085/10085 - 37s - loss: 113.4526
Epoch 69/100
10085/10085 - 38s - loss: 113.3577
Epoch 70/100
10085/10085 - 38s - loss: 113.2543
Epoch 71/100
10085/10085 - 38s - loss: 113.2991
Epoch 72/100
10085/10085 - 37s - loss: 113.1877
Epoch 73/100
10085/10085 - 37s - loss: 113.1771
Epoch 74/100
10085/10085 - 37s - loss: 113.0277
Epoch 75/100
10085/10085 - 37s - loss: 113.0966
Epoch 76/100
10085/10085 - 37s - loss: 112.9854
Epoch 77/100
10085/10085 - 37s - loss: 112.8572
Epoch 78/100
10085/10085 - 37s - loss: 112.9976
Epoch 79/100
10085/10085 - 38s - loss: 112.8293
Epoch 80/100
10085/10085 - 38s - loss: 112.8003
Epoch 81/100
10085/10085 - 38s - loss: 112.7129
Epoch 82/100
10085/10085 - 37s - loss: 112.6958
Epoch 83/100
10085/10085 - 37s - loss: 112.5926
Epoch 84/100
10085/10085 - 37s - loss: 112.5667
Epoch 85/100
10085/10085 - 37s - loss: 112.5001
Epoch 86/100
10085/10085 - 37s - loss: 112.4496
Epoch 87/100
10085/10085 - 37s - loss: 112.3807
Epoch 88/100
10085/10085 - 38s - loss: 112.3742
Epoch 89/100
10085/10085 - 37s - loss: 112.2694
Epoch 90/100
```

```
Epoch 90/100
10085/10085 - 37s - loss: 112.1611
Epoch 91/100
10085/10085 - 37s - loss: 112.2121
Epoch 92/100
10085/10085 - 37s - loss: 112.1566
Epoch 93/100
10085/10085 - 37s - loss: 112.0373
Epoch 94/100
10085/10085 - 37s - loss: 112.0323
Epoch 95/100
10085/10085 - 37s - loss: 111.9113
Epoch 96/100
10085/10085 - 38s - loss: 112.0416
Epoch 97/100
10085/10085 - 37s - loss: 112.0130
Epoch 98/100
10085/10085 - 37s - loss: 111.8177
Epoch 99/100
10085/10085 - 37s - loss: 111.8134
Epoch 100/100
10085/10085 - 37s - loss: 111.8530
```

Out[272]:

```
<tensorflow.python.keras.callbacks.History at 0x7f87746ea2e8>
```

In [273]:

```python
model1.load_weights('best_wt_recruit_new1.hdf5')
```

In [274]:

```python
pred = model1.predict(test_x)
```

In [284]:

```python
pred
```

Out[284]:

```
array([[[16.417847]],

       [[22.895866]],

       [[14.52632 ]],

       ...,

       [[25.301025]],

       [[17.96586 ]],

       [[10.521961]]], dtype=float32)
```

In [289]:

```python
p2=np.array(list(i[0] for i in pred)).reshape(-1,1)
```

In [291]:

```python
p3=pd.DataFrame(p2)
```

In [292]:

```python
predicted_data['visitors']=p3
```

In [293]:

```python
predicted_data.head()
```

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	16.417847	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	22.895866	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	14.526320	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	24.384165	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	7.511191	3	2017	4	27

In [298]:

```python
pred = model1.predict(test_x)
print('RMSE NeuralNetwork: ', RMSLE(np.log1p(test_y), p2))
```

RMSE NeuralNetwork: 21.898571980939955

CNN Architecture

In [269]:

```python
filepath = 'best_wt_recruit_new2.hdf5'
```

In [270]:

```python
callbacks=[EarlyStopping(monitor='loss',patience=30,verbose=0),ModelCheckpoint(filepath=filepath,monitor='loss',save_best_only=True,mode='min')]
```

In [271]:

```python
train_x = train_x.reshape(train_x.shape[0], 31, 1)
test_x = test_x.reshape(test_x.shape[0], 31, 1)
```

In [289]:

```python
model3=Sequential()
model3.add(Conv1D(16,16,  activation='relu', input_shape=(train_x.shape[1],1)))
model3.add(Dropout(0.5))
model3.add(MaxPooling1D(pool_size=2))
model3.add(Flatten())
model3.add(Dense(1, activation='relu'))
```

In [290]:

```python
model3.summary()
```

```
Model: "sequential_1"
_____
Layer (type)                 Output Shape              Param #
=================================================================
conv1d_1 (Conv1D)            (None, 16, 16)            272
_____
dropout_1 (Dropout)          (None, 16, 16)            0
_____
max_pooling1d_1 (MaxPooling1 (None, 8, 16)             0
_____
flatten_1 (Flatten)          (None, 128)               0
_____
dense_1 (Dense)              (None, 1)                 129
=================================================================
Total params: 401
Trainable params: 401
Non-trainable params: 0
_____
```

```
model3.compile(loss='mean_squared_error',optimizer=adam)
```

```
model3.fit(train_x, train_y, epochs=100, batch_size=10,callbacks=callbacks, verbose=2)
```

```
Epoch 1/100
20169/20169 - 39s - loss: 130.8525
Epoch 2/100
20169/20169 - 38s - loss: 125.6407
Epoch 3/100
20169/20169 - 37s - loss: 124.3735
Epoch 4/100
20169/20169 - 38s - loss: 124.9814
Epoch 5/100
20169/20169 - 37s - loss: 124.4861
Epoch 6/100
20169/20169 - 37s - loss: 123.0714
Epoch 7/100
20169/20169 - 37s - loss: 122.8576
Epoch 8/100
20169/20169 - 37s - loss: 122.2208
Epoch 9/100
20169/20169 - 37s - loss: 122.2135
Epoch 10/100
20169/20169 - 36s - loss: 122.1881
Epoch 11/100
20169/20169 - 37s - loss: 122.0982
Epoch 12/100
20169/20169 - 37s - loss: 122.4237
Epoch 13/100
20169/20169 - 36s - loss: 121.6504
Epoch 14/100
20169/20169 - 36s - loss: 120.8539
Epoch 15/100
20169/20169 - 36s - loss: 121.1103
Epoch 16/100
20169/20169 - 36s - loss: 121.0974
Epoch 17/100
20169/20169 - 36s - loss: 120.4574
Epoch 18/100
20169/20169 - 36s - loss: 121.5724
Epoch 19/100
20169/20169 - 36s - loss: 121.2108
Epoch 20/100
20169/20169 - 37s - loss: 121.5073
Epoch 21/100
20169/20169 - 37s - loss: 121.1886
Epoch 22/100
20169/20169 - 36s - loss: 120.6340
Epoch 23/100
20169/20169 - 36s - loss: 121.1764
Epoch 24/100
20169/20169 - 36s - loss: 121.1237
Epoch 25/100
20169/20169 - 36s - loss: 120.6766
Epoch 26/100
20169/20169 - 36s - loss: 120.9084
Epoch 27/100
20169/20169 - 36s - loss: 120.8147
Epoch 28/100
20169/20169 - 36s - loss: 119.8507
Epoch 29/100
20169/20169 - 37s - loss: 120.8018
Epoch 30/100
20169/20169 - 36s - loss: 120.3639
Epoch 31/100
20169/20169 - 36s - loss: 120.6758
Epoch 32/100
20169/20169 - 36s - loss: 120.0174
Epoch 33/100
20169/20169 - 36s - loss: 120.8942
```

```
Epoch 34/100
20169/20169 - 36s - loss: 120.5698
Epoch 35/100
20169/20169 - 36s - loss: 120.6295
Epoch 36/100
20169/20169 - 36s - loss: 121.0253
Epoch 37/100
20169/20169 - 36s - loss: 120.7553
Epoch 38/100
20169/20169 - 37s - loss: 120.7440
Epoch 39/100
20169/20169 - 36s - loss: 120.3517
Epoch 40/100
20169/20169 - 36s - loss: 120.9598
Epoch 41/100
20169/20169 - 36s - loss: 120.3073
Epoch 42/100
20169/20169 - 36s - loss: 120.5752
Epoch 43/100
20169/20169 - 36s - loss: 120.5850
Epoch 44/100
20169/20169 - 36s - loss: 119.8503
Epoch 45/100
20169/20169 - 36s - loss: 120.1269
Epoch 46/100
20169/20169 - 37s - loss: 120.5346
Epoch 47/100
20169/20169 - 36s - loss: 118.8414
Epoch 48/100
20169/20169 - 36s - loss: 120.2059
Epoch 49/100
20169/20169 - 36s - loss: 120.7288
Epoch 50/100
20169/20169 - 36s - loss: 120.5009
Epoch 51/100
20169/20169 - 36s - loss: 120.0615
Epoch 52/100
20169/20169 - 36s - loss: 120.2175
Epoch 53/100
20169/20169 - 36s - loss: 119.6890
Epoch 54/100
20169/20169 - 36s - loss: 120.3436
Epoch 55/100
20169/20169 - 37s - loss: 119.5376
Epoch 56/100
20169/20169 - 36s - loss: 120.3728
Epoch 57/100
20169/20169 - 36s - loss: 119.3617
Epoch 58/100
20169/20169 - 36s - loss: 119.5828
Epoch 59/100
20169/20169 - 36s - loss: 119.6904
Epoch 60/100
20169/20169 - 36s - loss: 119.8934
Epoch 61/100
20169/20169 - 36s - loss: 120.3422
Epoch 62/100
20169/20169 - 36s - loss: 119.6071
Epoch 63/100
20169/20169 - 37s - loss: 119.3248
Epoch 64/100
20169/20169 - 36s - loss: 118.9637
Epoch 65/100
20169/20169 - 36s - loss: 120.9239
Epoch 66/100
20169/20169 - 36s - loss: 119.9255
Epoch 67/100
20169/20169 - 36s - loss: 119.8680
Epoch 68/100
20169/20169 - 36s - loss: 119.8872
Epoch 69/100
20169/20169 - 36s - loss: 119.6612
Epoch 70/100
20169/20169 - 36s - loss: 119.4591
Epoch 71/100
20169/20169 - 36s - loss: 119.3166
Epoch 72/100
```

```
20169/20169 - 37s - loss: 119.7487
Epoch 73/100
20169/20169 - 36s - loss: 119.2753
Epoch 74/100
20169/20169 - 36s - loss: 119.5220
Epoch 75/100
20169/20169 - 36s - loss: 119.4067
Epoch 76/100
20169/20169 - 36s - loss: 119.8309
Epoch 77/100
20169/20169 - 37s - loss: 120.0070
```

Out[292]:

```
<tensorflow.python.keras.callbacks.History at 0x7f8df525d470>
```

In [293]:

```python
pred=model3.predict(test_x)
```

In [294]:

```python
p3=pd.DataFrame(pred)
```

In [295]:

```python
predicted_data['visitors']=p3
```

In [296]:

```python
predicted_data.head()
```

Out[296]:

	id	air_store_id	visit_date	visitors	weekday	year	month	day
0	air_00a91d42b08b08d9_2017-04-23	air_00a91d42b08b08d9	2017-04-23	24.859257	6	2017	4	23
1	air_00a91d42b08b08d9_2017-04-24	air_00a91d42b08b08d9	2017-04-24	20.091806	0	2017	4	24
2	air_00a91d42b08b08d9_2017-04-25	air_00a91d42b08b08d9	2017-04-25	13.736443	1	2017	4	25
3	air_00a91d42b08b08d9_2017-04-26	air_00a91d42b08b08d9	2017-04-26	26.124790	2	2017	4	26
4	air_00a91d42b08b08d9_2017-04-27	air_00a91d42b08b08d9	2017-04-27	11.153193	3	2017	4	27

In [297]:

```python
print('RMSE NeuralNetwork: ', RMSLE(np.log1p(test_y), p3))
```

```
RMSE NeuralNetwork:  19.98952523030952
```