In [1]:
```python
#Import Dependencies:
%matplotlib inline
#Start Python Imports:
import math,time,random,datetime
#Data Manipulation:
import numpy as np
import pandas as pd
#Visualization:
import matplotlib.pyplot as plt
import missingno
import seaborn as sns
plt.style.use('seaborn-whitegrid')
#Preprocessing:
from sklearn.preprocessing import OneHotEncoder,LabelEncoder,label_binarize
#Machine Learning:
import catboost
from sklearn.model_selection import train_test_split
from sklearn import model_selection,tree,preprocessing,metrics,linear_model
from sklearn.svm import LinearSVC
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.linear_model import LinearRegression,LogisticRegression,SGDClassifier
from sklearn.tree import DecisionTreeClassifier
from catboost import CatBoostClassifier,Pool,cv
#Let's be rebels and ignore warnings for now:
import warnings
warnings.filterwarnings("ignore")
```

```
C:\Users\Sasik\AppData\Roaming\Python\Python38\site-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
```

In [2]:
```python
df = pd.read_csv("D://HeartData/ VA Long Beach.csv")
```

In [3]:
```python
df['trestbps']=df['trestbps'].str.replace('?','0')
df['fbs']=df['fbs'].str.replace('?','0')
df['chol']=df['chol'].str.replace('?','0')
df['thalach']=df['thalach'].str.replace('?','0')
df['oldpeak']=df['oldpeak'].str.replace('?','0')
df['slope']=df['slope'].str.replace('?','0')
df['ca']=df['ca'].str.replace('?','0')
```

```
df['thal']=df['thal'].str.replace('?','0')
df['exang']=df['exang'].str.replace('?','0')
```

In [4]:
```
df.rename(columns={'num':'target'},inplace=True)
```

In [5]:
```
df['target']=df['target'].replace(2,1)
```

In [6]:
```
df[['trestbps','chol','fbs','thalach','exang','oldpeak','slope','ca','thal']]=df[['trestbps','chol','fbs','thalach','exang','oldpe
```

In [7]:
```
# Split the dataframe into data and labels
X_train = df.drop('trestbps', axis=1) # data
y_train = df.target # labels
```

In [8]:
```
# Function that runs the requested algorithm and returns the accuracy metrics
def fit_ml_algo(algo, X_train, y_train, cv):

    # One Pass
    model = algo.fit(X_train, y_train)
    acc = round(model.score(X_train, y_train) * 100, 2)

    # Cross Validation
    train_pred = model_selection.cross_val_predict(algo,
                                                    X_train,
                                                    y_train,
                                                    cv=cv,
                                                    n_jobs = -1)
    # Cross-validation accuracy metric
    acc_cv = round(metrics.accuracy_score(y_train, train_pred) * 100, 2)

    return train_pred, acc, acc_cv
```

In [9]:
```
# Logistic Regression
start_time = time.time()
train_pred_log, acc_log, acc_cv_log = fit_ml_algo(LogisticRegression(),
                                                   X_train,
                                                   y_train,
                                                   10)

log_time = (time.time() - start_time)
print("Accuracy: %s" % acc_log)
print("Accuracy CV 10-Fold: %s" % acc_cv_log)
print("Running Time: %s" % datetime.timedelta(seconds=log_time))
```

```
Accuracy: 82.91
Accuracy CV 10-Fold: 80.4
Running Time: 0:00:07.081382
```

In [10]:
```python
# k-Nearest Neighbours
start_time = time.time()
train_pred_knn, acc_knn, acc_cv_knn = fit_ml_algo(KNeighborsClassifier(),
                                                  X_train,
                                                  y_train,
                                                  10)
knn_time = (time.time() - start_time)
print("Accuracy: %s" % acc_knn)
print("Accuracy CV 10-Fold: %s" % acc_cv_knn)
print("Running Time: %s" % datetime.timedelta(seconds=knn_time))
```

```
Accuracy: 63.32
Accuracy CV 10-Fold: 43.72
Running Time: 0:00:00.208139
```

In [11]:
```python
# Gaussian Naive Bayes
start_time = time.time()
train_pred_gaussian, acc_gaussian, acc_cv_gaussian = fit_ml_algo(GaussianNB(),
                                                                 X_train,
                                                                 y_train,
                                                                 10)
gaussian_time = (time.time() - start_time)
print("Accuracy: %s" % acc_gaussian)
print("Accuracy CV 10-Fold: %s" % acc_cv_gaussian)
print("Running Time: %s" % datetime.timedelta(seconds=gaussian_time))
```

```
Accuracy: 100.0
Accuracy CV 10-Fold: 100.0
Running Time: 0:00:00.081666
```

In [12]:
```python
# Linear SVC
start_time = time.time()
train_pred_svc, acc_linear_svc, acc_cv_linear_svc = fit_ml_algo(LinearSVC(),
                                                               X_train,
                                                               y_train,
                                                               10)
linear_svc_time = (time.time() - start_time)
print("Accuracy: %s" % acc_linear_svc)
print("Accuracy CV 10-Fold: %s" % acc_cv_linear_svc)
print("Running Time: %s" % datetime.timedelta(seconds=linear_svc_time))
```

```
Accuracy: 57.29
```

```
Accuracy CV 10-Fold: 63.32
Running Time: 0:00:00.489156
```

In [13]:
```python
# Stochastic Gradient Descent
start_time = time.time()
train_pred_sgd, acc_sgd, acc_cv_sgd = fit_ml_algo(SGDClassifier(),
                                                  X_train,
                                                  y_train,
                                                  10)
sgd_time = (time.time() - start_time)
print("Accuracy: %s" % acc_sgd)
print("Accuracy CV 10-Fold: %s" % acc_cv_sgd)
print("Running Time: %s" % datetime.timedelta(seconds=sgd_time))
```

```
Accuracy: 42.21
Accuracy CV 10-Fold: 37.69
Running Time: 0:00:00.141776
```

In [14]:
```python
# Decision Tree Classifier
start_time = time.time()
train_pred_dt, acc_dt, acc_cv_dt = fit_ml_algo(DecisionTreeClassifier(),
                                               X_train,
                                               y_train,
                                               10)
dt_time = (time.time() - start_time)
print("Accuracy: %s" % acc_dt)
print("Accuracy CV 10-Fold: %s" % acc_cv_dt)
print("Running Time: %s" % datetime.timedelta(seconds=dt_time))
```

```
Accuracy: 100.0
Accuracy CV 10-Fold: 100.0
Running Time: 0:00:00.118294
```

In [15]:
```python
# Gradient Boosting Trees
start_time = time.time()
train_pred_gbt, acc_gbt, acc_cv_gbt = fit_ml_algo(GradientBoostingClassifier(),
                                                  X_train,
                                                  y_train,
                                                  10)
gbt_time = (time.time() - start_time)
print("Accuracy: %s" % acc_gbt)
print("Accuracy CV 10-Fold: %s" % acc_cv_gbt)
print("Running Time: %s" % datetime.timedelta(seconds=gbt_time))
```

```
Accuracy: 100.0
Accuracy CV 10-Fold: 100.0
```

```
        Running Time: 0:00:02.496052
```

In [16]:
```python
# Define the categorical features for the CatBoost model
cat_features = np.where(X_train.dtypes != np.float)[0]
cat_features
```

Out[16]: `array([ 0,  1,  2,  3,  4,  5,  6,  7,  9, 10, 11, 12], dtype=int64)`

In [17]:
```python
# Use the CatBoost Pool() function to pool together the training data and categorical feature labels
train_pool = Pool(X_train,
                  y_train,
                  cat_features)
```

In [18]:
```python
catboost_model = CatBoostClassifier(iterations=1000,
                                    custom_loss=['Accuracy'],
                                    loss_function='MultiClass')

# Fit CatBoost model
catboost_model.fit(train_pool,
                   plot=True)

# CatBoost accuracy
acc_catboost = round(catboost_model.score(X_train, y_train) * 100, 2)
```

```
        Learning rate set to 0.072873
        0:      learn: 1.2459500      total: 220ms    remaining: 3m 39s
        1:      learn: 1.1100701      total: 336ms    remaining: 2m 47s
        2:      learn: 1.0072775      total: 530ms    remaining: 2m 56s
        3:      learn: 0.9096720      total: 612ms    remaining: 2m 32s
        4:      learn: 0.8428086      total: 751ms    remaining: 2m 29s
        5:      learn: 0.7749261      total: 869ms    remaining: 2m 23s
        6:      learn: 0.7163162      total: 1.03s    remaining: 2m 25s
        7:      learn: 0.6612385      total: 1.14s    remaining: 2m 21s
        8:      learn: 0.6137628      total: 1.25s    remaining: 2m 17s
        9:      learn: 0.5733635      total: 1.35s    remaining: 2m 13s
        10:     learn: 0.5325904      total: 1.43s    remaining: 2m 8s
        11:     learn: 0.4986110      total: 1.49s    remaining: 2m 2s
        12:     learn: 0.4672627      total: 1.59s    remaining: 2m 1s
        13:     learn: 0.4355328      total: 1.66s    remaining: 1m 56s
        14:     learn: 0.4112722      total: 1.76s    remaining: 1m 55s
        15:     learn: 0.3864410      total: 1.81s    remaining: 1m 51s
        16:     learn: 0.3610563      total: 1.87s    remaining: 1m 48s
        17:     learn: 0.3450179      total: 1.97s    remaining: 1m 47s
        18:     learn: 0.3280223      total: 2.1s     remaining: 1m 48s
```

```
19:     learn: 0.3108740     total: 2.27s     remaining: 1m 51s
20:     learn: 0.2934245     total: 2.43s     remaining: 1m 53s
21:     learn: 0.2778574     total: 2.53s     remaining: 1m 52s
22:     learn: 0.2629643     total: 2.71s     remaining: 1m 55s
23:     learn: 0.2496468     total: 2.84s     remaining: 1m 55s
24:     learn: 0.2383622     total: 2.92s     remaining: 1m 53s
25:     learn: 0.2273535     total: 3.07s     remaining: 1m 54s
26:     learn: 0.2152092     total: 3.19s     remaining: 1m 54s
27:     learn: 0.2031681     total: 3.29s     remaining: 1m 54s
28:     learn: 0.1942172     total: 3.42s     remaining: 1m 54s
29:     learn: 0.1878395     total: 3.55s     remaining: 1m 54s
30:     learn: 0.1803025     total: 3.65s     remaining: 1m 53s
31:     learn: 0.1733419     total: 3.75s     remaining: 1m 53s
32:     learn: 0.1661649     total: 3.89s     remaining: 1m 54s
33:     learn: 0.1592968     total: 4.06s     remaining: 1m 55s
34:     learn: 0.1536248     total: 4.16s     remaining: 1m 54s
35:     learn: 0.1474454     total: 4.28s     remaining: 1m 54s
36:     learn: 0.1425851     total: 4.39s     remaining: 1m 54s
37:     learn: 0.1375129     total: 4.5s      remaining: 1m 53s
38:     learn: 0.1318858     total: 4.61s     remaining: 1m 53s
39:     learn: 0.1268028     total: 4.73s     remaining: 1m 53s
40:     learn: 0.1215693     total: 4.85s     remaining: 1m 53s
41:     learn: 0.1185229     total: 4.96s     remaining: 1m 53s
42:     learn: 0.1157384     total: 5.06s     remaining: 1m 52s
43:     learn: 0.1122908     total: 5.16s     remaining: 1m 52s
44:     learn: 0.1094425     total: 5.26s     remaining: 1m 51s
45:     learn: 0.1057249     total: 5.38s     remaining: 1m 51s
46:     learn: 0.1026882     total: 5.49s     remaining: 1m 51s
47:     learn: 0.1004024     total: 5.63s     remaining: 1m 51s
48:     learn: 0.0974114     total: 5.73s     remaining: 1m 51s
49:     learn: 0.0950083     total: 5.87s     remaining: 1m 51s
50:     learn: 0.0924030     total: 6.05s     remaining: 1m 52s
51:     learn: 0.0912831     total: 6.22s     remaining: 1m 53s
52:     learn: 0.0894149     total: 6.42s     remaining: 1m 54s
53:     learn: 0.0881080     total: 6.6s      remaining: 1m 55s
54:     learn: 0.0863529     total: 6.78s     remaining: 1m 56s
55:     learn: 0.0848866     total: 6.9s      remaining: 1m 56s
56:     learn: 0.0824518     total: 7.04s     remaining: 1m 56s
57:     learn: 0.0810447     total: 7.25s     remaining: 1m 57s
58:     learn: 0.0790412     total: 7.41s     remaining: 1m 58s
59:     learn: 0.0778791     total: 7.61s     remaining: 1m 59s
60:     learn: 0.0763668     total: 7.72s     remaining: 1m 58s
61:     learn: 0.0747217     total: 7.89s     remaining: 1m 59s
62:     learn: 0.0729605     total: 8.08s     remaining: 2m
63:     learn: 0.0710014     total: 8.27s     remaining: 2m
64:     learn: 0.0702417     total: 8.44s     remaining: 2m 1s
65:     learn: 0.0686304     total: 8.61s     remaining: 2m 1s
```

```
66:     learn: 0.0676002     total: 8.81s     remaining: 2m 2s
67:     learn: 0.0668099     total: 8.98s     remaining: 2m 3s
68:     learn: 0.0657056     total: 9.12s     remaining: 2m 3s
69:     learn: 0.0641011     total: 9.27s     remaining: 2m 3s
70:     learn: 0.0630196     total: 9.46s     remaining: 2m 3s
71:     learn: 0.0623652     total: 9.65s     remaining: 2m 4s
72:     learn: 0.0608894     total: 9.79s     remaining: 2m 4s
73:     learn: 0.0596878     total: 9.89s     remaining: 2m 3s
74:     learn: 0.0590467     total: 9.99s     remaining: 2m 3s
75:     learn: 0.0585617     total: 10.1s     remaining: 2m 2s
76:     learn: 0.0576748     total: 10.2s     remaining: 2m 2s
77:     learn: 0.0565414     total: 10.4s     remaining: 2m 2s
78:     learn: 0.0554725     total: 10.6s     remaining: 2m 3s
79:     learn: 0.0545111     total: 10.7s     remaining: 2m 3s
80:     learn: 0.0534695     total: 10.9s     remaining: 2m 3s
81:     learn: 0.0524896     total: 11s       remaining: 2m 3s
82:     learn: 0.0516743     total: 11.2s     remaining: 2m 3s
83:     learn: 0.0508364     total: 11.3s     remaining: 2m 3s
84:     learn: 0.0502034     total: 11.4s     remaining: 2m 2s
85:     learn: 0.0496438     total: 11.5s     remaining: 2m 2s
86:     learn: 0.0485312     total: 11.7s     remaining: 2m 2s
87:     learn: 0.0478438     total: 11.8s     remaining: 2m 2s
88:     learn: 0.0472152     total: 12s       remaining: 2m 2s
89:     learn: 0.0468402     total: 12.1s     remaining: 2m 2s
90:     learn: 0.0461055     total: 12.2s     remaining: 2m 2s
91:     learn: 0.0452818     total: 12.3s     remaining: 2m 1s
92:     learn: 0.0447250     total: 12.5s     remaining: 2m 1s
93:     learn: 0.0443335     total: 12.6s     remaining: 2m 1s
94:     learn: 0.0437418     total: 12.8s     remaining: 2m 1s
95:     learn: 0.0434149     total: 12.9s     remaining: 2m 1s
96:     learn: 0.0426237     total: 13.1s     remaining: 2m 1s
97:     learn: 0.0425216     total: 13.2s     remaining: 2m 1s
98:     learn: 0.0422717     total: 13.3s     remaining: 2m 1s
99:     learn: 0.0416210     total: 13.5s     remaining: 2m 1s
100:    learn: 0.0412575     total: 13.7s     remaining: 2m 1s
101:    learn: 0.0411583     total: 13.8s     remaining: 2m 1s
102:    learn: 0.0410577     total: 13.9s     remaining: 2m 1s
103:    learn: 0.0405538     total: 14.1s     remaining: 2m 1s
104:    learn: 0.0401563     total: 14.3s     remaining: 2m 1s
105:    learn: 0.0396853     total: 14.4s     remaining: 2m 1s
106:    learn: 0.0390164     total: 14.6s     remaining: 2m 1s
107:    learn: 0.0386906     total: 14.7s     remaining: 2m 1s
108:    learn: 0.0383337     total: 14.8s     remaining: 2m
109:    learn: 0.0378068     total: 14.9s     remaining: 2m
110:    learn: 0.0374350     total: 15s       remaining: 2m
111:    learn: 0.0369306     total: 15.1s     remaining: 1m 59s
112:    learn: 0.0364914     total: 15.2s     remaining: 1m 59s
```

```
113:    learn: 0.0362747    total: 15.3s    remaining: 1m 59s
114:    learn: 0.0360695    total: 15.4s    remaining: 1m 58s
115:    learn: 0.0356175    total: 15.5s    remaining: 1m 58s
116:    learn: 0.0355042    total: 15.6s    remaining: 1m 58s
117:    learn: 0.0350472    total: 15.8s    remaining: 1m 57s
118:    learn: 0.0346302    total: 15.9s    remaining: 1m 57s
119:    learn: 0.0343976    total: 15.9s    remaining: 1m 56s
120:    learn: 0.0339893    total: 16s      remaining: 1m 56s
121:    learn: 0.0335022    total: 16.2s    remaining: 1m 56s
122:    learn: 0.0331837    total: 16.3s    remaining: 1m 56s
123:    learn: 0.0331475    total: 16.4s    remaining: 1m 56s
124:    learn: 0.0329578    total: 16.6s    remaining: 1m 56s
125:    learn: 0.0325357    total: 16.7s    remaining: 1m 55s
126:    learn: 0.0321118    total: 16.8s    remaining: 1m 55s
127:    learn: 0.0315734    total: 17s      remaining: 1m 55s
128:    learn: 0.0313528    total: 17.1s    remaining: 1m 55s
129:    learn: 0.0310044    total: 17.2s    remaining: 1m 55s
130:    learn: 0.0307411    total: 17.3s    remaining: 1m 55s
131:    learn: 0.0304905    total: 17.5s    remaining: 1m 54s
132:    learn: 0.0302655    total: 17.6s    remaining: 1m 54s
133:    learn: 0.0300821    total: 17.7s    remaining: 1m 54s
134:    learn: 0.0299600    total: 17.8s    remaining: 1m 54s
135:    learn: 0.0296930    total: 18s      remaining: 1m 54s
136:    learn: 0.0294444    total: 18.1s    remaining: 1m 54s
137:    learn: 0.0292331    total: 18.2s    remaining: 1m 53s
138:    learn: 0.0291783    total: 18.3s    remaining: 1m 53s
139:    learn: 0.0290205    total: 18.4s    remaining: 1m 52s
140:    learn: 0.0287726    total: 18.5s    remaining: 1m 52s
141:    learn: 0.0286118    total: 18.6s    remaining: 1m 52s
142:    learn: 0.0283071    total: 18.8s    remaining: 1m 52s
143:    learn: 0.0281686    total: 18.9s    remaining: 1m 52s
144:    learn: 0.0280377    total: 19s      remaining: 1m 52s
145:    learn: 0.0278904    total: 19.2s    remaining: 1m 52s
146:    learn: 0.0276606    total: 19.3s    remaining: 1m 52s
147:    learn: 0.0273354    total: 19.5s    remaining: 1m 52s
148:    learn: 0.0270862    total: 19.7s    remaining: 1m 52s
149:    learn: 0.0269364    total: 19.8s    remaining: 1m 52s
150:    learn: 0.0268648    total: 19.9s    remaining: 1m 52s
151:    learn: 0.0267218    total: 20s      remaining: 1m 51s
152:    learn: 0.0266072    total: 20.1s    remaining: 1m 51s
153:    learn: 0.0264620    total: 20.3s    remaining: 1m 51s
154:    learn: 0.0262013    total: 20.4s    remaining: 1m 51s
155:    learn: 0.0260790    total: 20.5s    remaining: 1m 50s
156:    learn: 0.0259159    total: 20.6s    remaining: 1m 50s
157:    learn: 0.0256973    total: 20.7s    remaining: 1m 50s
158:    learn: 0.0256088    total: 20.9s    remaining: 1m 50s
159:    learn: 0.0254701    total: 21s      remaining: 1m 50s
```

```
160:    learn: 0.0252376    total: 21.1s    remaining: 1m 49s
161:    learn: 0.0251606    total: 21.2s    remaining: 1m 49s
162:    learn: 0.0249855    total: 21.3s    remaining: 1m 49s
163:    learn: 0.0248003    total: 21.4s    remaining: 1m 49s
164:    learn: 0.0246013    total: 21.5s    remaining: 1m 48s
165:    learn: 0.0245602    total: 21.6s    remaining: 1m 48s
166:    learn: 0.0245003    total: 21.7s    remaining: 1m 48s
167:    learn: 0.0244656    total: 21.8s    remaining: 1m 48s
168:    learn: 0.0243272    total: 21.9s    remaining: 1m 47s
169:    learn: 0.0241038    total: 22.1s    remaining: 1m 47s
170:    learn: 0.0240279    total: 22.2s    remaining: 1m 47s
171:    learn: 0.0237632    total: 22.4s    remaining: 1m 47s
172:    learn: 0.0236346    total: 22.5s    remaining: 1m 47s
173:    learn: 0.0235329    total: 22.7s    remaining: 1m 47s
174:    learn: 0.0234985    total: 22.9s    remaining: 1m 47s
175:    learn: 0.0233958    total: 23s      remaining: 1m 47s
176:    learn: 0.0233279    total: 23.1s    remaining: 1m 47s
177:    learn: 0.0233028    total: 23.2s    remaining: 1m 47s
178:    learn: 0.0230348    total: 23.4s    remaining: 1m 47s
179:    learn: 0.0228631    total: 23.5s    remaining: 1m 46s
180:    learn: 0.0227517    total: 23.6s    remaining: 1m 46s
181:    learn: 0.0226968    total: 23.7s    remaining: 1m 46s
182:    learn: 0.0225573    total: 23.9s    remaining: 1m 46s
183:    learn: 0.0225204    total: 24.1s    remaining: 1m 46s
184:    learn: 0.0223492    total: 24.2s    remaining: 1m 46s
185:    learn: 0.0221789    total: 24.3s    remaining: 1m 46s
186:    learn: 0.0220846    total: 24.5s    remaining: 1m 46s
187:    learn: 0.0219775    total: 24.6s    remaining: 1m 46s
188:    learn: 0.0219546    total: 24.7s    remaining: 1m 45s
189:    learn: 0.0219085    total: 24.8s    remaining: 1m 45s
190:    learn: 0.0217480    total: 24.9s    remaining: 1m 45s
191:    learn: 0.0215899    total: 25s      remaining: 1m 45s
192:    learn: 0.0213233    total: 25.1s    remaining: 1m 45s
193:    learn: 0.0212857    total: 25.2s    remaining: 1m 44s
194:    learn: 0.0211028    total: 25.3s    remaining: 1m 44s
195:    learn: 0.0209628    total: 25.5s    remaining: 1m 44s
196:    learn: 0.0207988    total: 25.6s    remaining: 1m 44s
197:    learn: 0.0207629    total: 25.8s    remaining: 1m 44s
198:    learn: 0.0206458    total: 25.9s    remaining: 1m 44s
199:    learn: 0.0205068    total: 26s      remaining: 1m 43s
200:    learn: 0.0204425    total: 26.1s    remaining: 1m 43s
201:    learn: 0.0202589    total: 26.3s    remaining: 1m 43s
202:    learn: 0.0202139    total: 26.3s    remaining: 1m 43s
203:    learn: 0.0201461    total: 26.4s    remaining: 1m 43s
204:    learn: 0.0201129    total: 26.5s    remaining: 1m 42s
205:    learn: 0.0199679    total: 26.6s    remaining: 1m 42s
206:    learn: 0.0198347    total: 26.7s    remaining: 1m 42s
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207:    learn: 0.0196817    total: 26.9s    remaining: 1m 42s
208:    learn: 0.0196281    total: 27s      remaining: 1m 42s
209:    learn: 0.0195001    total: 27.1s    remaining: 1m 42s
210:    learn: 0.0194094    total: 27.2s    remaining: 1m 41s
211:    learn: 0.0192534    total: 27.4s    remaining: 1m 41s
212:    learn: 0.0191553    total: 27.4s    remaining: 1m 41s
213:    learn: 0.0190522    total: 27.5s    remaining: 1m 41s
214:    learn: 0.0189265    total: 27.6s    remaining: 1m 40s
215:    learn: 0.0188849    total: 27.7s    remaining: 1m 40s
216:    learn: 0.0188188    total: 27.8s    remaining: 1m 40s
217:    learn: 0.0187229    total: 27.9s    remaining: 1m 40s
218:    learn: 0.0186887    total: 28.1s    remaining: 1m 40s
219:    learn: 0.0185694    total: 28.2s    remaining: 1m 39s
220:    learn: 0.0184735    total: 28.3s    remaining: 1m 39s
221:    learn: 0.0184203    total: 28.4s    remaining: 1m 39s
222:    learn: 0.0183252    total: 28.5s    remaining: 1m 39s
223:    learn: 0.0181931    total: 28.6s    remaining: 1m 39s
224:    learn: 0.0181278    total: 28.7s    remaining: 1m 38s
225:    learn: 0.0180270    total: 28.9s    remaining: 1m 38s
226:    learn: 0.0179282    total: 29s      remaining: 1m 38s
227:    learn: 0.0178320    total: 29.2s    remaining: 1m 38s
228:    learn: 0.0177611    total: 29.3s    remaining: 1m 38s
229:    learn: 0.0176512    total: 29.4s    remaining: 1m 38s
230:    learn: 0.0175406    total: 29.5s    remaining: 1m 38s
231:    learn: 0.0174894    total: 29.6s    remaining: 1m 38s
232:    learn: 0.0174253    total: 29.8s    remaining: 1m 37s
233:    learn: 0.0173704    total: 29.9s    remaining: 1m 37s
234:    learn: 0.0173108    total: 30.1s    remaining: 1m 37s
235:    learn: 0.0172623    total: 30.2s    remaining: 1m 37s
236:    learn: 0.0171320    total: 30.4s    remaining: 1m 37s
237:    learn: 0.0170829    total: 30.5s    remaining: 1m 37s
238:    learn: 0.0170231    total: 30.7s    remaining: 1m 37s
239:    learn: 0.0169777    total: 30.8s    remaining: 1m 37s
240:    learn: 0.0169556    total: 30.9s    remaining: 1m 37s
241:    learn: 0.0168044    total: 31.1s    remaining: 1m 37s
242:    learn: 0.0167890    total: 31.2s    remaining: 1m 37s
243:    learn: 0.0167651    total: 31.4s    remaining: 1m 37s
244:    learn: 0.0167391    total: 31.5s    remaining: 1m 37s
245:    learn: 0.0167047    total: 31.6s    remaining: 1m 36s
246:    learn: 0.0166447    total: 31.7s    remaining: 1m 36s
247:    learn: 0.0165988    total: 31.8s    remaining: 1m 36s
248:    learn: 0.0165501    total: 31.9s    remaining: 1m 36s
249:    learn: 0.0164502    total: 32s      remaining: 1m 36s
250:    learn: 0.0163623    total: 32.1s    remaining: 1m 35s
251:    learn: 0.0163083    total: 32.3s    remaining: 1m 35s
252:    learn: 0.0162865    total: 32.4s    remaining: 1m 35s
253:    learn: 0.0162286    total: 32.5s    remaining: 1m 35s
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254:     learn: 0.0161401     total: 32.6s     remaining: 1m 35s
255:     learn: 0.0161158     total: 32.8s     remaining: 1m 35s
256:     learn: 0.0160397     total: 33s       remaining: 1m 35s
257:     learn: 0.0160104     total: 33.1s     remaining: 1m 35s
258:     learn: 0.0159071     total: 33.2s     remaining: 1m 34s
259:     learn: 0.0157706     total: 33.3s     remaining: 1m 34s
260:     learn: 0.0157312     total: 33.5s     remaining: 1m 34s
261:     learn: 0.0157120     total: 33.6s     remaining: 1m 34s
262:     learn: 0.0156938     total: 33.7s     remaining: 1m 34s
263:     learn: 0.0156144     total: 33.8s     remaining: 1m 34s
264:     learn: 0.0155243     total: 33.9s     remaining: 1m 33s
265:     learn: 0.0155170     total: 34s       remaining: 1m 33s
266:     learn: 0.0154678     total: 34.1s     remaining: 1m 33s
267:     learn: 0.0153811     total: 34.2s     remaining: 1m 33s
268:     learn: 0.0153666     total: 34.3s     remaining: 1m 33s
269:     learn: 0.0153274     total: 34.4s     remaining: 1m 33s
270:     learn: 0.0152577     total: 34.6s     remaining: 1m 32s
271:     learn: 0.0151645     total: 34.7s     remaining: 1m 32s
272:     learn: 0.0150807     total: 34.8s     remaining: 1m 32s
273:     learn: 0.0150666     total: 34.9s     remaining: 1m 32s
274:     learn: 0.0150257     total: 35s       remaining: 1m 32s
275:     learn: 0.0149452     total: 35.1s     remaining: 1m 32s
276:     learn: 0.0149295     total: 35.2s     remaining: 1m 31s
277:     learn: 0.0148363     total: 35.4s     remaining: 1m 31s
278:     learn: 0.0147773     total: 35.5s     remaining: 1m 31s
279:     learn: 0.0146857     total: 35.6s     remaining: 1m 31s
280:     learn: 0.0146762     total: 35.8s     remaining: 1m 31s
281:     learn: 0.0146660     total: 35.9s     remaining: 1m 31s
282:     learn: 0.0146222     total: 36s       remaining: 1m 31s
283:     learn: 0.0146036     total: 36.1s     remaining: 1m 30s
284:     learn: 0.0145853     total: 36.2s     remaining: 1m 30s
285:     learn: 0.0145221     total: 36.3s     remaining: 1m 30s
286:     learn: 0.0144729     total: 36.4s     remaining: 1m 30s
287:     learn: 0.0144371     total: 36.5s     remaining: 1m 30s
288:     learn: 0.0144189     total: 36.6s     remaining: 1m 30s
289:     learn: 0.0143146     total: 36.7s     remaining: 1m 29s
290:     learn: 0.0142523     total: 36.8s     remaining: 1m 29s
291:     learn: 0.0141785     total: 36.9s     remaining: 1m 29s
292:     learn: 0.0141721     total: 37s       remaining: 1m 29s
293:     learn: 0.0141385     total: 37.1s     remaining: 1m 29s
294:     learn: 0.0140552     total: 37.2s     remaining: 1m 28s
295:     learn: 0.0140169     total: 37.3s     remaining: 1m 28s
296:     learn: 0.0139504     total: 37.5s     remaining: 1m 28s
297:     learn: 0.0139295     total: 37.6s     remaining: 1m 28s
298:     learn: 0.0138438     total: 37.7s     remaining: 1m 28s
299:     learn: 0.0138097     total: 37.8s     remaining: 1m 28s
300:     learn: 0.0137504     total: 37.9s     remaining: 1m 27s
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301:    learn: 0.0136768    total: 38s      remaining: 1m 27s
302:    learn: 0.0136644    total: 38.2s    remaining: 1m 27s
303:    learn: 0.0135981    total: 38.3s    remaining: 1m 27s
304:    learn: 0.0135126    total: 38.4s    remaining: 1m 27s
305:    learn: 0.0134519    total: 38.6s    remaining: 1m 27s
306:    learn: 0.0134090    total: 38.7s    remaining: 1m 27s
307:    learn: 0.0133613    total: 38.8s    remaining: 1m 27s
308:    learn: 0.0133155    total: 38.9s    remaining: 1m 27s
309:    learn: 0.0132831    total: 39s      remaining: 1m 26s
310:    learn: 0.0132318    total: 39.2s    remaining: 1m 26s
311:    learn: 0.0132038    total: 39.3s    remaining: 1m 26s
312:    learn: 0.0131878    total: 39.5s    remaining: 1m 26s
313:    learn: 0.0131124    total: 39.6s    remaining: 1m 26s
314:    learn: 0.0130496    total: 39.7s    remaining: 1m 26s
315:    learn: 0.0129950    total: 39.8s    remaining: 1m 26s
316:    learn: 0.0129517    total: 39.9s    remaining: 1m 25s
317:    learn: 0.0129329    total: 40.1s    remaining: 1m 25s
318:    learn: 0.0129041    total: 40.2s    remaining: 1m 25s
319:    learn: 0.0128904    total: 40.3s    remaining: 1m 25s
320:    learn: 0.0128266    total: 40.5s    remaining: 1m 25s
321:    learn: 0.0127626    total: 40.6s    remaining: 1m 25s
322:    learn: 0.0127465    total: 40.8s    remaining: 1m 25s
323:    learn: 0.0127385    total: 40.9s    remaining: 1m 25s
324:    learn: 0.0126638    total: 41s      remaining: 1m 25s
325:    learn: 0.0126301    total: 41.2s    remaining: 1m 25s
326:    learn: 0.0125909    total: 41.3s    remaining: 1m 25s
327:    learn: 0.0125006    total: 41.4s    remaining: 1m 24s
328:    learn: 0.0124882    total: 41.5s    remaining: 1m 24s
329:    learn: 0.0124594    total: 41.7s    remaining: 1m 24s
330:    learn: 0.0124176    total: 41.8s    remaining: 1m 24s
331:    learn: 0.0123391    total: 42s      remaining: 1m 24s
332:    learn: 0.0123257    total: 42.1s    remaining: 1m 24s
333:    learn: 0.0122685    total: 42.2s    remaining: 1m 24s
334:    learn: 0.0122439    total: 42.3s    remaining: 1m 23s
335:    learn: 0.0121854    total: 42.4s    remaining: 1m 23s
336:    learn: 0.0120918    total: 42.6s    remaining: 1m 23s
337:    learn: 0.0120570    total: 42.7s    remaining: 1m 23s
338:    learn: 0.0119962    total: 42.8s    remaining: 1m 23s
339:    learn: 0.0119898    total: 42.9s    remaining: 1m 23s
340:    learn: 0.0119438    total: 43s      remaining: 1m 23s
341:    learn: 0.0119057    total: 43.2s    remaining: 1m 23s
342:    learn: 0.0118752    total: 43.3s    remaining: 1m 22s
343:    learn: 0.0118584    total: 43.4s    remaining: 1m 22s
344:    learn: 0.0118029    total: 43.5s    remaining: 1m 22s
345:    learn: 0.0117524    total: 43.6s    remaining: 1m 22s
346:    learn: 0.0117301    total: 43.8s    remaining: 1m 22s
347:    learn: 0.0117050    total: 43.9s    remaining: 1m 22s
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348:    learn: 0.0116441    total: 44s      remaining: 1m 22s
349:    learn: 0.0116049    total: 44.2s    remaining: 1m 22s
350:    learn: 0.0115543    total: 44.3s    remaining: 1m 21s
351:    learn: 0.0115388    total: 44.4s    remaining: 1m 21s
352:    learn: 0.0114989    total: 44.5s    remaining: 1m 21s
353:    learn: 0.0114782    total: 44.6s    remaining: 1m 21s
354:    learn: 0.0114508    total: 44.8s    remaining: 1m 21s
355:    learn: 0.0113972    total: 44.9s    remaining: 1m 21s
356:    learn: 0.0113826    total: 45s      remaining: 1m 21s
357:    learn: 0.0113495    total: 45.1s    remaining: 1m 20s
358:    learn: 0.0112994    total: 45.2s    remaining: 1m 20s
359:    learn: 0.0112424    total: 45.4s    remaining: 1m 20s
360:    learn: 0.0112328    total: 45.5s    remaining: 1m 20s
361:    learn: 0.0112049    total: 45.6s    remaining: 1m 20s
362:    learn: 0.0111942    total: 45.7s    remaining: 1m 20s
363:    learn: 0.0111711    total: 45.8s    remaining: 1m 20s
364:    learn: 0.0111589    total: 45.9s    remaining: 1m 19s
365:    learn: 0.0111123    total: 46.2s    remaining: 1m 20s
366:    learn: 0.0111031    total: 46.3s    remaining: 1m 19s
367:    learn: 0.0110821    total: 46.5s    remaining: 1m 19s
368:    learn: 0.0110089    total: 46.6s    remaining: 1m 19s
369:    learn: 0.0109977    total: 46.7s    remaining: 1m 19s
370:    learn: 0.0109460    total: 46.8s    remaining: 1m 19s
371:    learn: 0.0109162    total: 46.9s    remaining: 1m 19s
372:    learn: 0.0108907    total: 47s      remaining: 1m 19s
373:    learn: 0.0108501    total: 47.1s    remaining: 1m 18s
374:    learn: 0.0108183    total: 47.2s    remaining: 1m 18s
375:    learn: 0.0107868    total: 47.3s    remaining: 1m 18s
376:    learn: 0.0107365    total: 47.4s    remaining: 1m 18s
377:    learn: 0.0107302    total: 47.5s    remaining: 1m 18s
378:    learn: 0.0106744    total: 47.6s    remaining: 1m 17s
379:    learn: 0.0106556    total: 47.7s    remaining: 1m 17s
380:    learn: 0.0106232    total: 47.8s    remaining: 1m 17s
381:    learn: 0.0106131    total: 47.9s    remaining: 1m 17s
382:    learn: 0.0105973    total: 48s      remaining: 1m 17s
383:    learn: 0.0105887    total: 48.2s    remaining: 1m 17s
384:    learn: 0.0105780    total: 48.4s    remaining: 1m 17s
385:    learn: 0.0105587    total: 48.5s    remaining: 1m 17s
386:    learn: 0.0105093    total: 48.7s    remaining: 1m 17s
387:    learn: 0.0104463    total: 48.9s    remaining: 1m 17s
388:    learn: 0.0104259    total: 49s      remaining: 1m 17s
389:    learn: 0.0104161    total: 49.2s    remaining: 1m 16s
390:    learn: 0.0104009    total: 49.3s    remaining: 1m 16s
391:    learn: 0.0103557    total: 49.4s    remaining: 1m 16s
392:    learn: 0.0103211    total: 49.6s    remaining: 1m 16s
393:    learn: 0.0102830    total: 49.7s    remaining: 1m 16s
394:    learn: 0.0102629    total: 49.8s    remaining: 1m 16s
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395:    learn: 0.0102263    total: 49.9s    remaining: 1m 16s
396:    learn: 0.0101861    total: 50s      remaining: 1m 15s
397:    learn: 0.0101680    total: 50.1s    remaining: 1m 15s
398:    learn: 0.0101148    total: 50.2s    remaining: 1m 15s
399:    learn: 0.0100908    total: 50.4s    remaining: 1m 15s
400:    learn: 0.0100707    total: 50.6s    remaining: 1m 15s
401:    learn: 0.0100603    total: 50.7s    remaining: 1m 15s
402:    learn: 0.0100498    total: 50.8s    remaining: 1m 15s
403:    learn: 0.0099958    total: 51s      remaining: 1m 15s
404:    learn: 0.0099723    total: 51.1s    remaining: 1m 15s
405:    learn: 0.0099293    total: 51.2s    remaining: 1m 14s
406:    learn: 0.0099009    total: 51.3s    remaining: 1m 14s
407:    learn: 0.0098575    total: 51.4s    remaining: 1m 14s
408:    learn: 0.0098323    total: 51.6s    remaining: 1m 14s
409:    learn: 0.0098021    total: 51.7s    remaining: 1m 14s
410:    learn: 0.0097839    total: 51.9s    remaining: 1m 14s
411:    learn: 0.0097511    total: 52s      remaining: 1m 14s
412:    learn: 0.0097492    total: 52.1s    remaining: 1m 14s
413:    learn: 0.0097202    total: 52.2s    remaining: 1m 13s
414:    learn: 0.0097054    total: 52.3s    remaining: 1m 13s
415:    learn: 0.0096710    total: 52.5s    remaining: 1m 13s
416:    learn: 0.0096383    total: 52.5s    remaining: 1m 13s
417:    learn: 0.0095961    total: 52.7s    remaining: 1m 13s
418:    learn: 0.0095342    total: 52.9s    remaining: 1m 13s
419:    learn: 0.0095265    total: 53.1s    remaining: 1m 13s
420:    learn: 0.0095197    total: 53.2s    remaining: 1m 13s
421:    learn: 0.0094705    total: 53.4s    remaining: 1m 13s
422:    learn: 0.0094421    total: 53.5s    remaining: 1m 12s
423:    learn: 0.0094344    total: 53.6s    remaining: 1m 12s
424:    learn: 0.0094053    total: 53.7s    remaining: 1m 12s
425:    learn: 0.0093885    total: 53.9s    remaining: 1m 12s
426:    learn: 0.0093858    total: 54s      remaining: 1m 12s
427:    learn: 0.0093606    total: 54.1s    remaining: 1m 12s
428:    learn: 0.0093038    total: 54.2s    remaining: 1m 12s
429:    learn: 0.0092539    total: 54.3s    remaining: 1m 11s
430:    learn: 0.0092278    total: 54.4s    remaining: 1m 11s
431:    learn: 0.0092199    total: 54.5s    remaining: 1m 11s
432:    learn: 0.0092165    total: 54.6s    remaining: 1m 11s
433:    learn: 0.0092119    total: 54.7s    remaining: 1m 11s
434:    learn: 0.0091944    total: 54.8s    remaining: 1m 11s
435:    learn: 0.0091731    total: 55s      remaining: 1m 11s
436:    learn: 0.0091643    total: 55.2s    remaining: 1m 11s
437:    learn: 0.0091590    total: 55.4s    remaining: 1m 11s
438:    learn: 0.0091545    total: 55.5s    remaining: 1m 10s
439:    learn: 0.0091481    total: 55.7s    remaining: 1m 10s
440:    learn: 0.0091254    total: 55.8s    remaining: 1m 10s
441:    learn: 0.0091012    total: 56s      remaining: 1m 10s
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442:    learn: 0.0090607     total: 56.2s     remaining: 1m 10s
443:    learn: 0.0090543     total: 56.4s     remaining: 1m 10s
444:    learn: 0.0090255     total: 56.5s     remaining: 1m 10s
445:    learn: 0.0090228     total: 56.6s     remaining: 1m 10s
446:    learn: 0.0089988     total: 56.7s     remaining: 1m 10s
447:    learn: 0.0089830     total: 56.9s     remaining: 1m 10s
448:    learn: 0.0089744     total: 57s       remaining: 1m 9s
449:    learn: 0.0089510     total: 57.1s     remaining: 1m 9s
450:    learn: 0.0089240     total: 57.2s     remaining: 1m 9s
451:    learn: 0.0089221     total: 57.3s     remaining: 1m 9s
452:    learn: 0.0089151     total: 57.4s     remaining: 1m 9s
453:    learn: 0.0088813     total: 57.6s     remaining: 1m 9s
454:    learn: 0.0088432     total: 57.7s     remaining: 1m 9s
455:    learn: 0.0088283     total: 57.9s     remaining: 1m 9s
456:    learn: 0.0088167     total: 58.1s     remaining: 1m 8s
457:    learn: 0.0088068     total: 58.2s     remaining: 1m 8s
458:    learn: 0.0087865     total: 58.3s     remaining: 1m 8s
459:    learn: 0.0087558     total: 58.5s     remaining: 1m 8s
460:    learn: 0.0087395     total: 58.6s     remaining: 1m 8s
461:    learn: 0.0087316     total: 58.7s     remaining: 1m 8s
462:    learn: 0.0087274     total: 58.8s     remaining: 1m 8s
463:    learn: 0.0087139     total: 58.9s     remaining: 1m 8s
464:    learn: 0.0086865     total: 59.1s     remaining: 1m 7s
465:    learn: 0.0086805     total: 59.3s     remaining: 1m 7s
466:    learn: 0.0086498     total: 59.4s     remaining: 1m 7s
467:    learn: 0.0086175     total: 59.5s     remaining: 1m 7s
468:    learn: 0.0085839     total: 59.7s     remaining: 1m 7s
469:    learn: 0.0085523     total: 59.8s     remaining: 1m 7s
470:    learn: 0.0085456     total: 59.9s     remaining: 1m 7s
471:    learn: 0.0085324     total: 1m        remaining: 1m 7s
472:    learn: 0.0085152     total: 1m        remaining: 1m 6s
473:    learn: 0.0085063     total: 1m        remaining: 1m 6s
474:    learn: 0.0084867     total: 1m        remaining: 1m 6s
475:    learn: 0.0084731     total: 1m        remaining: 1m 6s
476:    learn: 0.0084535     total: 1m        remaining: 1m 6s
477:    learn: 0.0084226     total: 1m        remaining: 1m 6s
478:    learn: 0.0084162     total: 1m        remaining: 1m 6s
479:    learn: 0.0084015     total: 1m        remaining: 1m 6s
480:    learn: 0.0083893     total: 1m 1s     remaining: 1m 5s
481:    learn: 0.0083658     total: 1m 1s     remaining: 1m 5s
482:    learn: 0.0083390     total: 1m 1s     remaining: 1m 5s
483:    learn: 0.0083130     total: 1m 1s     remaining: 1m 5s
484:    learn: 0.0083065     total: 1m 1s     remaining: 1m 5s
485:    learn: 0.0082961     total: 1m 1s     remaining: 1m 5s
486:    learn: 0.0082722     total: 1m 1s     remaining: 1m 4s
487:    learn: 0.0082536     total: 1m 1s     remaining: 1m 4s
488:    learn: 0.0082231     total: 1m 1s     remaining: 1m 4s
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489:    learn: 0.0082145    total: 1m 1s    remaining: 1m 4s
490:    learn: 0.0081847    total: 1m 2s    remaining: 1m 4s
491:    learn: 0.0081751    total: 1m 2s    remaining: 1m 4s
492:    learn: 0.0081550    total: 1m 2s    remaining: 1m 4s
493:    learn: 0.0081182    total: 1m 2s    remaining: 1m 3s
494:    learn: 0.0080731    total: 1m 2s    remaining: 1m 3s
495:    learn: 0.0080577    total: 1m 2s    remaining: 1m 3s
496:    learn: 0.0080313    total: 1m 2s    remaining: 1m 3s
497:    learn: 0.0080158    total: 1m 2s    remaining: 1m 3s
498:    learn: 0.0079918    total: 1m 2s    remaining: 1m 3s
499:    learn: 0.0079636    total: 1m 3s    remaining: 1m 3s
500:    learn: 0.0079409    total: 1m 3s    remaining: 1m 2s
501:    learn: 0.0079269    total: 1m 3s    remaining: 1m 2s
502:    learn: 0.0079004    total: 1m 3s    remaining: 1m 2s
503:    learn: 0.0078667    total: 1m 3s    remaining: 1m 2s
504:    learn: 0.0078613    total: 1m 3s    remaining: 1m 2s
505:    learn: 0.0078543    total: 1m 3s    remaining: 1m 2s
506:    learn: 0.0078104    total: 1m 3s    remaining: 1m 2s
507:    learn: 0.0077872    total: 1m 3s    remaining: 1m 1s
508:    learn: 0.0077544    total: 1m 4s    remaining: 1m 1s
509:    learn: 0.0077469    total: 1m 4s    remaining: 1m 1s
510:    learn: 0.0077426    total: 1m 4s    remaining: 1m 1s
511:    learn: 0.0077399    total: 1m 4s    remaining: 1m 1s
512:    learn: 0.0077126    total: 1m 4s    remaining: 1m 1s
513:    learn: 0.0076889    total: 1m 4s    remaining: 1m 1s
514:    learn: 0.0076819    total: 1m 4s    remaining: 1m
515:    learn: 0.0076675    total: 1m 4s    remaining: 1m
516:    learn: 0.0076522    total: 1m 4s    remaining: 1m
517:    learn: 0.0076373    total: 1m 4s    remaining: 1m
518:    learn: 0.0076241    total: 1m 5s    remaining: 1m
519:    learn: 0.0076027    total: 1m 5s    remaining: 1m
520:    learn: 0.0075823    total: 1m 5s    remaining: 60s
521:    learn: 0.0075702    total: 1m 5s    remaining: 59.8s
522:    learn: 0.0075654    total: 1m 5s    remaining: 59.7s
523:    learn: 0.0075608    total: 1m 5s    remaining: 59.5s
524:    learn: 0.0075435    total: 1m 5s    remaining: 59.3s
525:    learn: 0.0075361    total: 1m 5s    remaining: 59.2s
526:    learn: 0.0075216    total: 1m 5s    remaining: 59.1s
527:    learn: 0.0075113    total: 1m 5s    remaining: 58.9s
528:    learn: 0.0075012    total: 1m 6s    remaining: 58.8s
529:    learn: 0.0074938    total: 1m 6s    remaining: 58.6s
530:    learn: 0.0074694    total: 1m 6s    remaining: 58.5s
531:    learn: 0.0074469    total: 1m 6s    remaining: 58.3s
532:    learn: 0.0074463    total: 1m 6s    remaining: 58.2s
533:    learn: 0.0074288    total: 1m 6s    remaining: 58s
534:    learn: 0.0074041    total: 1m 6s    remaining: 57.9s
535:    learn: 0.0073909    total: 1m 6s    remaining: 57.8s
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536:    learn: 0.0073803    total: 1m 6s     remaining: 57.6s
537:    learn: 0.0073714    total: 1m 6s     remaining: 57.5s
538:    learn: 0.0073619    total: 1m 7s     remaining: 57.4s
539:    learn: 0.0073535    total: 1m 7s     remaining: 57.2s
540:    learn: 0.0073435    total: 1m 7s     remaining: 57.1s
541:    learn: 0.0073327    total: 1m 7s     remaining: 56.9s
542:    learn: 0.0073276    total: 1m 7s     remaining: 56.8s
543:    learn: 0.0073214    total: 1m 7s     remaining: 56.6s
544:    learn: 0.0073149    total: 1m 7s     remaining: 56.5s
545:    learn: 0.0073006    total: 1m 7s     remaining: 56.3s
546:    learn: 0.0072795    total: 1m 7s     remaining: 56.2s
547:    learn: 0.0072566    total: 1m 7s     remaining: 56s
548:    learn: 0.0072464    total: 1m 8s     remaining: 55.9s
549:    learn: 0.0072268    total: 1m 8s     remaining: 55.8s
550:    learn: 0.0072058    total: 1m 8s     remaining: 55.6s
551:    learn: 0.0072015    total: 1m 8s     remaining: 55.5s
552:    learn: 0.0071998    total: 1m 8s     remaining: 55.3s
553:    learn: 0.0071794    total: 1m 8s     remaining: 55.1s
554:    learn: 0.0071755    total: 1m 8s     remaining: 55s
555:    learn: 0.0071478    total: 1m 8s     remaining: 54.8s
556:    learn: 0.0071275    total: 1m 8s     remaining: 54.7s
557:    learn: 0.0071098    total: 1m 8s     remaining: 54.6s
558:    learn: 0.0071028    total: 1m 9s     remaining: 54.5s
559:    learn: 0.0070957    total: 1m 9s     remaining: 54.3s
560:    learn: 0.0070880    total: 1m 9s     remaining: 54.2s
561:    learn: 0.0070866    total: 1m 9s     remaining: 54s
562:    learn: 0.0070715    total: 1m 9s     remaining: 53.9s
563:    learn: 0.0070510    total: 1m 9s     remaining: 53.8s
564:    learn: 0.0070438    total: 1m 9s     remaining: 53.7s
565:    learn: 0.0070325    total: 1m 9s     remaining: 53.5s
566:    learn: 0.0070168    total: 1m 9s     remaining: 53.4s
567:    learn: 0.0070058    total: 1m 10s    remaining: 53.3s
568:    learn: 0.0069979    total: 1m 10s    remaining: 53.1s
569:    learn: 0.0069931    total: 1m 10s    remaining: 53s
570:    learn: 0.0069744    total: 1m 10s    remaining: 52.9s
571:    learn: 0.0069551    total: 1m 10s    remaining: 52.7s
572:    learn: 0.0069407    total: 1m 10s    remaining: 52.6s
573:    learn: 0.0069360    total: 1m 10s    remaining: 52.4s
574:    learn: 0.0069300    total: 1m 10s    remaining: 52.3s
575:    learn: 0.0069140    total: 1m 10s    remaining: 52.2s
576:    learn: 0.0068918    total: 1m 11s    remaining: 52.1s
577:    learn: 0.0068692    total: 1m 11s    remaining: 51.9s
578:    learn: 0.0068651    total: 1m 11s    remaining: 51.8s
579:    learn: 0.0068616    total: 1m 11s    remaining: 51.7s
580:    learn: 0.0068470    total: 1m 11s    remaining: 51.5s
581:    learn: 0.0068300    total: 1m 11s    remaining: 51.4s
582:    learn: 0.0068160    total: 1m 11s    remaining: 51.3s
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583:     learn: 0.0067986     total: 1m 11s     remaining: 51.1s
584:     learn: 0.0067854     total: 1m 11s     remaining: 51s
585:     learn: 0.0067715     total: 1m 11s     remaining: 50.8s
586:     learn: 0.0067631     total: 1m 12s     remaining: 50.7s
587:     learn: 0.0067595     total: 1m 12s     remaining: 50.6s
588:     learn: 0.0067526     total: 1m 12s     remaining: 50.4s
589:     learn: 0.0067407     total: 1m 12s     remaining: 50.3s
590:     learn: 0.0067323     total: 1m 12s     remaining: 50.1s
591:     learn: 0.0067159     total: 1m 12s     remaining: 50s
592:     learn: 0.0066947     total: 1m 12s     remaining: 49.9s
593:     learn: 0.0066904     total: 1m 12s     remaining: 49.7s
594:     learn: 0.0066778     total: 1m 12s     remaining: 49.6s
595:     learn: 0.0066707     total: 1m 12s     remaining: 49.4s
596:     learn: 0.0066676     total: 1m 13s     remaining: 49.3s
597:     learn: 0.0066557     total: 1m 13s     remaining: 49.2s
598:     learn: 0.0066485     total: 1m 13s     remaining: 49s
599:     learn: 0.0066427     total: 1m 13s     remaining: 48.9s
600:     learn: 0.0066207     total: 1m 13s     remaining: 48.8s
601:     learn: 0.0066001     total: 1m 13s     remaining: 48.6s
602:     learn: 0.0065944     total: 1m 13s     remaining: 48.5s
603:     learn: 0.0065761     total: 1m 13s     remaining: 48.4s
604:     learn: 0.0065702     total: 1m 13s     remaining: 48.2s
605:     learn: 0.0065648     total: 1m 13s     remaining: 48.1s
606:     learn: 0.0065523     total: 1m 14s     remaining: 47.9s
607:     learn: 0.0065299     total: 1m 14s     remaining: 47.8s
608:     learn: 0.0065223     total: 1m 14s     remaining: 47.7s
609:     learn: 0.0065157     total: 1m 14s     remaining: 47.5s
610:     learn: 0.0065011     total: 1m 14s     remaining: 47.4s
611:     learn: 0.0064955     total: 1m 14s     remaining: 47.3s
612:     learn: 0.0064791     total: 1m 14s     remaining: 47.1s
613:     learn: 0.0064667     total: 1m 14s     remaining: 47s
614:     learn: 0.0064606     total: 1m 14s     remaining: 46.9s
615:     learn: 0.0064571     total: 1m 14s     remaining: 46.7s
616:     learn: 0.0064290     total: 1m 15s     remaining: 46.6s
617:     learn: 0.0064254     total: 1m 15s     remaining: 46.5s
618:     learn: 0.0064080     total: 1m 15s     remaining: 46.4s
619:     learn: 0.0063891     total: 1m 15s     remaining: 46.2s
620:     learn: 0.0063871     total: 1m 15s     remaining: 46.1s
621:     learn: 0.0063716     total: 1m 15s     remaining: 45.9s
622:     learn: 0.0063569     total: 1m 15s     remaining: 45.8s
623:     learn: 0.0063529     total: 1m 15s     remaining: 45.7s
624:     learn: 0.0063493     total: 1m 15s     remaining: 45.6s
625:     learn: 0.0063386     total: 1m 16s     remaining: 45.4s
626:     learn: 0.0063209     total: 1m 16s     remaining: 45.3s
627:     learn: 0.0063171     total: 1m 16s     remaining: 45.1s
628:     learn: 0.0063155     total: 1m 16s     remaining: 45s
629:     learn: 0.0063009     total: 1m 16s     remaining: 44.9s
```

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630:    learn: 0.0062894    total: 1m 16s    remaining: 44.8s
631:    learn: 0.0062693    total: 1m 16s    remaining: 44.6s
632:    learn: 0.0062567    total: 1m 16s    remaining: 44.5s
633:    learn: 0.0062429    total: 1m 16s    remaining: 44.4s
634:    learn: 0.0062260    total: 1m 16s    remaining: 44.3s
635:    learn: 0.0062061    total: 1m 17s    remaining: 44.1s
636:    learn: 0.0061888    total: 1m 17s    remaining: 44s
637:    learn: 0.0061820    total: 1m 17s    remaining: 43.9s
638:    learn: 0.0061723    total: 1m 17s    remaining: 43.8s
639:    learn: 0.0061589    total: 1m 17s    remaining: 43.6s
640:    learn: 0.0061490    total: 1m 17s    remaining: 43.5s
641:    learn: 0.0061368    total: 1m 17s    remaining: 43.4s
642:    learn: 0.0061194    total: 1m 17s    remaining: 43.2s
643:    learn: 0.0061058    total: 1m 17s    remaining: 43.1s
644:    learn: 0.0061033    total: 1m 18s    remaining: 43s
645:    learn: 0.0060948    total: 1m 18s    remaining: 42.8s
646:    learn: 0.0060745    total: 1m 18s    remaining: 42.7s
647:    learn: 0.0060722    total: 1m 18s    remaining: 42.6s
648:    learn: 0.0060644    total: 1m 18s    remaining: 42.4s
649:    learn: 0.0060528    total: 1m 18s    remaining: 42.3s
650:    learn: 0.0060396    total: 1m 18s    remaining: 42.2s
651:    learn: 0.0060335    total: 1m 18s    remaining: 42s
652:    learn: 0.0060243    total: 1m 18s    remaining: 41.9s
653:    learn: 0.0060109    total: 1m 18s    remaining: 41.8s
654:    learn: 0.0059987    total: 1m 19s    remaining: 41.7s
655:    learn: 0.0059877    total: 1m 19s    remaining: 41.5s
656:    learn: 0.0059712    total: 1m 19s    remaining: 41.4s
657:    learn: 0.0059604    total: 1m 19s    remaining: 41.3s
658:    learn: 0.0059551    total: 1m 19s    remaining: 41.2s
659:    learn: 0.0059518    total: 1m 19s    remaining: 41s
660:    learn: 0.0059492    total: 1m 19s    remaining: 40.9s
661:    learn: 0.0059443    total: 1m 19s    remaining: 40.8s
662:    learn: 0.0059419    total: 1m 20s    remaining: 40.7s
663:    learn: 0.0059359    total: 1m 20s    remaining: 40.6s
664:    learn: 0.0059308    total: 1m 20s    remaining: 40.5s
665:    learn: 0.0059178    total: 1m 20s    remaining: 40.4s
666:    learn: 0.0059148    total: 1m 20s    remaining: 40.3s
667:    learn: 0.0059037    total: 1m 20s    remaining: 40.1s
668:    learn: 0.0058918    total: 1m 20s    remaining: 40s
669:    learn: 0.0058884    total: 1m 20s    remaining: 39.9s
670:    learn: 0.0058803    total: 1m 21s    remaining: 39.7s
671:    learn: 0.0058696    total: 1m 21s    remaining: 39.6s
672:    learn: 0.0058670    total: 1m 21s    remaining: 39.5s
673:    learn: 0.0058531    total: 1m 21s    remaining: 39.4s
674:    learn: 0.0058495    total: 1m 21s    remaining: 39.2s
675:    learn: 0.0058390    total: 1m 21s    remaining: 39.1s
676:    learn: 0.0058340    total: 1m 21s    remaining: 39s
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677:    learn: 0.0058226    total: 1m 21s    remaining: 38.9s
678:    learn: 0.0058032    total: 1m 21s    remaining: 38.8s
679:    learn: 0.0057922    total: 1m 22s    remaining: 38.6s
680:    learn: 0.0057787    total: 1m 22s    remaining: 38.5s
681:    learn: 0.0057730    total: 1m 22s    remaining: 38.4s
682:    learn: 0.0057602    total: 1m 22s    remaining: 38.3s
683:    learn: 0.0057515    total: 1m 22s    remaining: 38.2s
684:    learn: 0.0057418    total: 1m 22s    remaining: 38s
685:    learn: 0.0057383    total: 1m 22s    remaining: 38s
686:    learn: 0.0057258    total: 1m 23s    remaining: 37.8s
687:    learn: 0.0057202    total: 1m 23s    remaining: 37.7s
688:    learn: 0.0057197    total: 1m 23s    remaining: 37.6s
689:    learn: 0.0057085    total: 1m 23s    remaining: 37.5s
690:    learn: 0.0056990    total: 1m 23s    remaining: 37.3s
691:    learn: 0.0056898    total: 1m 23s    remaining: 37.2s
692:    learn: 0.0056855    total: 1m 23s    remaining: 37.1s
693:    learn: 0.0056807    total: 1m 23s    remaining: 37s
694:    learn: 0.0056606    total: 1m 23s    remaining: 36.8s
695:    learn: 0.0056533    total: 1m 24s    remaining: 36.7s
696:    learn: 0.0056500    total: 1m 24s    remaining: 36.6s
697:    learn: 0.0056447    total: 1m 24s    remaining: 36.5s
698:    learn: 0.0056297    total: 1m 24s    remaining: 36.3s
699:    learn: 0.0056247    total: 1m 24s    remaining: 36.2s
700:    learn: 0.0056193    total: 1m 24s    remaining: 36.1s
701:    learn: 0.0056078    total: 1m 24s    remaining: 36s
702:    learn: 0.0056053    total: 1m 24s    remaining: 35.8s
703:    learn: 0.0055938    total: 1m 24s    remaining: 35.7s
704:    learn: 0.0055847    total: 1m 25s    remaining: 35.6s
705:    learn: 0.0055701    total: 1m 25s    remaining: 35.5s
706:    learn: 0.0055657    total: 1m 25s    remaining: 35.3s
707:    learn: 0.0055567    total: 1m 25s    remaining: 35.2s
708:    learn: 0.0055541    total: 1m 25s    remaining: 35.1s
709:    learn: 0.0055535    total: 1m 25s    remaining: 34.9s
710:    learn: 0.0055507    total: 1m 25s    remaining: 34.8s
711:    learn: 0.0055478    total: 1m 25s    remaining: 34.7s
712:    learn: 0.0055450    total: 1m 25s    remaining: 34.6s
713:    learn: 0.0055330    total: 1m 25s    remaining: 34.4s
714:    learn: 0.0055318    total: 1m 26s    remaining: 34.3s
715:    learn: 0.0055250    total: 1m 26s    remaining: 34.2s
716:    learn: 0.0055134    total: 1m 26s    remaining: 34.1s
717:    learn: 0.0055088    total: 1m 26s    remaining: 34s
718:    learn: 0.0054943    total: 1m 26s    remaining: 33.8s
719:    learn: 0.0054809    total: 1m 26s    remaining: 33.7s
720:    learn: 0.0054786    total: 1m 26s    remaining: 33.6s
721:    learn: 0.0054690    total: 1m 26s    remaining: 33.5s
722:    learn: 0.0054657    total: 1m 27s    remaining: 33.3s
723:    learn: 0.0054496    total: 1m 27s    remaining: 33.2s
```

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724:    learn: 0.0054467    total: 1m 27s    remaining: 33.1s
725:    learn: 0.0054443    total: 1m 27s    remaining: 33s
726:    learn: 0.0054405    total: 1m 27s    remaining: 32.8s
727:    learn: 0.0054287    total: 1m 27s    remaining: 32.7s
728:    learn: 0.0054200    total: 1m 27s    remaining: 32.6s
729:    learn: 0.0054159    total: 1m 27s    remaining: 32.5s
730:    learn: 0.0054012    total: 1m 27s    remaining: 32.3s
731:    learn: 0.0053967    total: 1m 27s    remaining: 32.2s
732:    learn: 0.0053864    total: 1m 28s    remaining: 32.1s
733:    learn: 0.0053854    total: 1m 28s    remaining: 31.9s
734:    learn: 0.0053828    total: 1m 28s    remaining: 31.8s
735:    learn: 0.0053771    total: 1m 28s    remaining: 31.7s
736:    learn: 0.0053641    total: 1m 28s    remaining: 31.5s
737:    learn: 0.0053615    total: 1m 28s    remaining: 31.4s
738:    learn: 0.0053516    total: 1m 28s    remaining: 31.3s
739:    learn: 0.0053468    total: 1m 28s    remaining: 31.2s
740:    learn: 0.0053347    total: 1m 28s    remaining: 31s
741:    learn: 0.0053273    total: 1m 28s    remaining: 30.9s
742:    learn: 0.0053247    total: 1m 28s    remaining: 30.8s
743:    learn: 0.0053123    total: 1m 29s    remaining: 30.6s
744:    learn: 0.0053081    total: 1m 29s    remaining: 30.5s
745:    learn: 0.0053044    total: 1m 29s    remaining: 30.4s
746:    learn: 0.0053007    total: 1m 29s    remaining: 30.3s
747:    learn: 0.0052902    total: 1m 29s    remaining: 30.2s
748:    learn: 0.0052783    total: 1m 29s    remaining: 30s
749:    learn: 0.0052734    total: 1m 29s    remaining: 29.9s
750:    learn: 0.0052648    total: 1m 29s    remaining: 29.8s
751:    learn: 0.0052529    total: 1m 29s    remaining: 29.7s
752:    learn: 0.0052471    total: 1m 30s    remaining: 29.5s
753:    learn: 0.0052415    total: 1m 30s    remaining: 29.4s
754:    learn: 0.0052369    total: 1m 30s    remaining: 29.3s
755:    learn: 0.0052263    total: 1m 30s    remaining: 29.2s
756:    learn: 0.0052154    total: 1m 30s    remaining: 29s
757:    learn: 0.0052055    total: 1m 30s    remaining: 28.9s
758:    learn: 0.0051999    total: 1m 30s    remaining: 28.8s
759:    learn: 0.0051945    total: 1m 30s    remaining: 28.7s
760:    learn: 0.0051814    total: 1m 30s    remaining: 28.5s
761:    learn: 0.0051761    total: 1m 30s    remaining: 28.4s
762:    learn: 0.0051629    total: 1m 31s    remaining: 28.3s
763:    learn: 0.0051599    total: 1m 31s    remaining: 28.2s
764:    learn: 0.0051586    total: 1m 31s    remaining: 28s
765:    learn: 0.0051530    total: 1m 31s    remaining: 27.9s
766:    learn: 0.0051504    total: 1m 31s    remaining: 27.8s
767:    learn: 0.0051422    total: 1m 31s    remaining: 27.7s
768:    learn: 0.0051380    total: 1m 31s    remaining: 27.5s
769:    learn: 0.0051354    total: 1m 31s    remaining: 27.4s
770:    learn: 0.0051318    total: 1m 31s    remaining: 27.3s
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771:    learn: 0.0051309    total: 1m 31s    remaining: 27.2s
772:    learn: 0.0051231    total: 1m 32s    remaining: 27s
773:    learn: 0.0051127    total: 1m 32s    remaining: 26.9s
774:    learn: 0.0051108    total: 1m 32s    remaining: 26.8s
775:    learn: 0.0051014    total: 1m 32s    remaining: 26.7s
776:    learn: 0.0050896    total: 1m 32s    remaining: 26.5s
777:    learn: 0.0050842    total: 1m 32s    remaining: 26.4s
778:    learn: 0.0050818    total: 1m 32s    remaining: 26.3s
779:    learn: 0.0050745    total: 1m 32s    remaining: 26.2s
780:    learn: 0.0050711    total: 1m 32s    remaining: 26.1s
781:    learn: 0.0050619    total: 1m 33s    remaining: 25.9s
782:    learn: 0.0050590    total: 1m 33s    remaining: 25.8s
783:    learn: 0.0050555    total: 1m 33s    remaining: 25.7s
784:    learn: 0.0050461    total: 1m 33s    remaining: 25.6s
785:    learn: 0.0050363    total: 1m 33s    remaining: 25.4s
786:    learn: 0.0050331    total: 1m 33s    remaining: 25.3s
787:    learn: 0.0050230    total: 1m 33s    remaining: 25.2s
788:    learn: 0.0050111    total: 1m 33s    remaining: 25.1s
789:    learn: 0.0050011    total: 1m 33s    remaining: 24.9s
790:    learn: 0.0049915    total: 1m 33s    remaining: 24.8s
791:    learn: 0.0049886    total: 1m 33s    remaining: 24.7s
792:    learn: 0.0049848    total: 1m 34s    remaining: 24.5s
793:    learn: 0.0049780    total: 1m 34s    remaining: 24.4s
794:    learn: 0.0049741    total: 1m 34s    remaining: 24.3s
795:    learn: 0.0049691    total: 1m 34s    remaining: 24.2s
796:    learn: 0.0049651    total: 1m 34s    remaining: 24s
797:    learn: 0.0049617    total: 1m 34s    remaining: 23.9s
798:    learn: 0.0049549    total: 1m 34s    remaining: 23.8s
799:    learn: 0.0049419    total: 1m 34s    remaining: 23.7s
800:    learn: 0.0049370    total: 1m 34s    remaining: 23.6s
801:    learn: 0.0049357    total: 1m 34s    remaining: 23.4s
802:    learn: 0.0049180    total: 1m 35s    remaining: 23.3s
803:    learn: 0.0049072    total: 1m 35s    remaining: 23.2s
804:    learn: 0.0049027    total: 1m 35s    remaining: 23.1s
805:    learn: 0.0048989    total: 1m 35s    remaining: 23s
806:    learn: 0.0048898    total: 1m 35s    remaining: 22.8s
807:    learn: 0.0048858    total: 1m 35s    remaining: 22.7s
808:    learn: 0.0048791    total: 1m 35s    remaining: 22.6s
809:    learn: 0.0048729    total: 1m 35s    remaining: 22.5s
810:    learn: 0.0048680    total: 1m 35s    remaining: 22.4s
811:    learn: 0.0048628    total: 1m 36s    remaining: 22.2s
812:    learn: 0.0048546    total: 1m 36s    remaining: 22.1s
813:    learn: 0.0048473    total: 1m 36s    remaining: 22s
814:    learn: 0.0048381    total: 1m 36s    remaining: 21.9s
815:    learn: 0.0048372    total: 1m 36s    remaining: 21.7s
816:    learn: 0.0048364    total: 1m 36s    remaining: 21.6s
817:    learn: 0.0048292    total: 1m 36s    remaining: 21.5s
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818:    learn: 0.0048231    total: 1m 36s    remaining: 21.4s
819:    learn: 0.0048154    total: 1m 36s    remaining: 21.3s
820:    learn: 0.0048047    total: 1m 36s    remaining: 21.1s
821:    learn: 0.0048036    total: 1m 37s    remaining: 21s
822:    learn: 0.0048017    total: 1m 37s    remaining: 20.9s
823:    learn: 0.0047975    total: 1m 37s    remaining: 20.8s
824:    learn: 0.0047900    total: 1m 37s    remaining: 20.6s
825:    learn: 0.0047842    total: 1m 37s    remaining: 20.5s
826:    learn: 0.0047765    total: 1m 37s    remaining: 20.4s
827:    learn: 0.0047711    total: 1m 37s    remaining: 20.3s
828:    learn: 0.0047630    total: 1m 37s    remaining: 20.1s
829:    learn: 0.0047604    total: 1m 37s    remaining: 20s
830:    learn: 0.0047584    total: 1m 37s    remaining: 19.9s
831:    learn: 0.0047503    total: 1m 38s    remaining: 19.8s
832:    learn: 0.0047415    total: 1m 38s    remaining: 19.7s
833:    learn: 0.0047382    total: 1m 38s    remaining: 19.5s
834:    learn: 0.0047315    total: 1m 38s    remaining: 19.4s
835:    learn: 0.0047204    total: 1m 38s    remaining: 19.3s
836:    learn: 0.0047151    total: 1m 38s    remaining: 19.2s
837:    learn: 0.0047021    total: 1m 38s    remaining: 19.1s
838:    learn: 0.0046926    total: 1m 38s    remaining: 18.9s
839:    learn: 0.0046853    total: 1m 38s    remaining: 18.8s
840:    learn: 0.0046809    total: 1m 38s    remaining: 18.7s
841:    learn: 0.0046738    total: 1m 39s    remaining: 18.6s
842:    learn: 0.0046690    total: 1m 39s    remaining: 18.5s
843:    learn: 0.0046677    total: 1m 39s    remaining: 18.3s
844:    learn: 0.0046601    total: 1m 39s    remaining: 18.2s
845:    learn: 0.0046521    total: 1m 39s    remaining: 18.1s
846:    learn: 0.0046465    total: 1m 39s    remaining: 18s
847:    learn: 0.0046381    total: 1m 39s    remaining: 17.9s
848:    learn: 0.0046292    total: 1m 39s    remaining: 17.7s
849:    learn: 0.0046250    total: 1m 39s    remaining: 17.6s
850:    learn: 0.0046174    total: 1m 39s    remaining: 17.5s
851:    learn: 0.0046115    total: 1m 39s    remaining: 17.4s
852:    learn: 0.0046110    total: 1m 40s    remaining: 17.2s
853:    learn: 0.0046099    total: 1m 40s    remaining: 17.1s
854:    learn: 0.0046078    total: 1m 40s    remaining: 17s
855:    learn: 0.0045993    total: 1m 40s    remaining: 16.9s
856:    learn: 0.0045918    total: 1m 40s    remaining: 16.8s
857:    learn: 0.0045897    total: 1m 40s    remaining: 16.6s
858:    learn: 0.0045883    total: 1m 40s    remaining: 16.5s
859:    learn: 0.0045824    total: 1m 40s    remaining: 16.4s
860:    learn: 0.0045801    total: 1m 40s    remaining: 16.3s
861:    learn: 0.0045710    total: 1m 40s    remaining: 16.2s
862:    learn: 0.0045690    total: 1m 40s    remaining: 16s
863:    learn: 0.0045652    total: 1m 41s    remaining: 15.9s
864:    learn: 0.0045572    total: 1m 41s    remaining: 15.8s
```

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865:     learn: 0.0045533     total: 1m 41s     remaining: 15.7s
866:     learn: 0.0045459     total: 1m 41s     remaining: 15.6s
867:     learn: 0.0045366     total: 1m 41s     remaining: 15.4s
868:     learn: 0.0045348     total: 1m 41s     remaining: 15.3s
869:     learn: 0.0045340     total: 1m 41s     remaining: 15.2s
870:     learn: 0.0045319     total: 1m 41s     remaining: 15.1s
871:     learn: 0.0045268     total: 1m 41s     remaining: 15s
872:     learn: 0.0045199     total: 1m 42s     remaining: 14.8s
873:     learn: 0.0045189     total: 1m 42s     remaining: 14.7s
874:     learn: 0.0045161     total: 1m 42s     remaining: 14.6s
875:     learn: 0.0045118     total: 1m 42s     remaining: 14.5s
876:     learn: 0.0045039     total: 1m 42s     remaining: 14.4s
877:     learn: 0.0044958     total: 1m 42s     remaining: 14.3s
878:     learn: 0.0044906     total: 1m 42s     remaining: 14.1s
879:     learn: 0.0044866     total: 1m 42s     remaining: 14s
880:     learn: 0.0044798     total: 1m 42s     remaining: 13.9s
881:     learn: 0.0044781     total: 1m 42s     remaining: 13.8s
882:     learn: 0.0044707     total: 1m 43s     remaining: 13.7s
883:     learn: 0.0044619     total: 1m 43s     remaining: 13.5s
884:     learn: 0.0044547     total: 1m 43s     remaining: 13.4s
885:     learn: 0.0044537     total: 1m 43s     remaining: 13.3s
886:     learn: 0.0044508     total: 1m 43s     remaining: 13.2s
887:     learn: 0.0044483     total: 1m 43s     remaining: 13.1s
888:     learn: 0.0044433     total: 1m 43s     remaining: 12.9s
889:     learn: 0.0044367     total: 1m 43s     remaining: 12.8s
890:     learn: 0.0044315     total: 1m 43s     remaining: 12.7s
891:     learn: 0.0044271     total: 1m 43s     remaining: 12.6s
892:     learn: 0.0044245     total: 1m 44s     remaining: 12.5s
893:     learn: 0.0044202     total: 1m 44s     remaining: 12.4s
894:     learn: 0.0044126     total: 1m 44s     remaining: 12.2s
895:     learn: 0.0044040     total: 1m 44s     remaining: 12.1s
896:     learn: 0.0043987     total: 1m 44s     remaining: 12s
897:     learn: 0.0043968     total: 1m 44s     remaining: 11.9s
898:     learn: 0.0043948     total: 1m 44s     remaining: 11.8s
899:     learn: 0.0043868     total: 1m 44s     remaining: 11.6s
900:     learn: 0.0043783     total: 1m 44s     remaining: 11.5s
901:     learn: 0.0043769     total: 1m 45s     remaining: 11.4s
902:     learn: 0.0043667     total: 1m 45s     remaining: 11.3s
903:     learn: 0.0043575     total: 1m 45s     remaining: 11.2s
904:     learn: 0.0043500     total: 1m 45s     remaining: 11.1s
905:     learn: 0.0043421     total: 1m 45s     remaining: 10.9s
906:     learn: 0.0043402     total: 1m 45s     remaining: 10.8s
907:     learn: 0.0043388     total: 1m 45s     remaining: 10.7s
908:     learn: 0.0043322     total: 1m 45s     remaining: 10.6s
909:     learn: 0.0043227     total: 1m 45s     remaining: 10.5s
910:     learn: 0.0043125     total: 1m 45s     remaining: 10.3s
911:     learn: 0.0043099     total: 1m 46s     remaining: 10.2s
```

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912:    learn: 0.0043026    total: 1m 46s    remaining: 10.1s
913:    learn: 0.0042983    total: 1m 46s    remaining: 9.99s
914:    learn: 0.0042948    total: 1m 46s    remaining: 9.88s
915:    learn: 0.0042886    total: 1m 46s    remaining: 9.76s
916:    learn: 0.0042806    total: 1m 46s    remaining: 9.65s
917:    learn: 0.0042716    total: 1m 46s    remaining: 9.53s
918:    learn: 0.0042660    total: 1m 46s    remaining: 9.41s
919:    learn: 0.0042646    total: 1m 46s    remaining: 9.29s
920:    learn: 0.0042573    total: 1m 46s    remaining: 9.18s
921:    learn: 0.0042517    total: 1m 47s    remaining: 9.06s
922:    learn: 0.0042494    total: 1m 47s    remaining: 8.94s
923:    learn: 0.0042475    total: 1m 47s    remaining: 8.82s
924:    learn: 0.0042407    total: 1m 47s    remaining: 8.7s
925:    learn: 0.0042376    total: 1m 47s    remaining: 8.58s
926:    learn: 0.0042307    total: 1m 47s    remaining: 8.47s
927:    learn: 0.0042273    total: 1m 47s    remaining: 8.35s
928:    learn: 0.0042201    total: 1m 47s    remaining: 8.23s
929:    learn: 0.0042174    total: 1m 47s    remaining: 8.12s
930:    learn: 0.0042095    total: 1m 47s    remaining: 8s
931:    learn: 0.0042053    total: 1m 48s    remaining: 7.88s
932:    learn: 0.0042015    total: 1m 48s    remaining: 7.77s
933:    learn: 0.0041986    total: 1m 48s    remaining: 7.65s
934:    learn: 0.0041952    total: 1m 48s    remaining: 7.53s
935:    learn: 0.0041889    total: 1m 48s    remaining: 7.41s
936:    learn: 0.0041748    total: 1m 48s    remaining: 7.3s
937:    learn: 0.0041734    total: 1m 48s    remaining: 7.18s
938:    learn: 0.0041690    total: 1m 48s    remaining: 7.07s
939:    learn: 0.0041623    total: 1m 48s    remaining: 6.95s
940:    learn: 0.0041609    total: 1m 48s    remaining: 6.83s
941:    learn: 0.0041558    total: 1m 49s    remaining: 6.71s
942:    learn: 0.0041545    total: 1m 49s    remaining: 6.6s
943:    learn: 0.0041515    total: 1m 49s    remaining: 6.48s
944:    learn: 0.0041448    total: 1m 49s    remaining: 6.36s
945:    learn: 0.0041400    total: 1m 49s    remaining: 6.25s
946:    learn: 0.0041374    total: 1m 49s    remaining: 6.13s
947:    learn: 0.0041315    total: 1m 49s    remaining: 6.01s
948:    learn: 0.0041294    total: 1m 49s    remaining: 5.9s
949:    learn: 0.0041259    total: 1m 49s    remaining: 5.79s
950:    learn: 0.0041221    total: 1m 50s    remaining: 5.67s
951:    learn: 0.0041106    total: 1m 50s    remaining: 5.55s
952:    learn: 0.0041052    total: 1m 50s    remaining: 5.44s
953:    learn: 0.0040993    total: 1m 50s    remaining: 5.32s
954:    learn: 0.0040943    total: 1m 50s    remaining: 5.2s
955:    learn: 0.0040891    total: 1m 50s    remaining: 5.09s
956:    learn: 0.0040833    total: 1m 50s    remaining: 4.97s
957:    learn: 0.0040766    total: 1m 50s    remaining: 4.86s
958:    learn: 0.0040723    total: 1m 50s    remaining: 4.74s
```

```
959:    learn: 0.0040688    total: 1m 51s    remaining: 4.62s
960:    learn: 0.0040622    total: 1m 51s    remaining: 4.51s
961:    learn: 0.0040544    total: 1m 51s    remaining: 4.39s
962:    learn: 0.0040520    total: 1m 51s    remaining: 4.28s
963:    learn: 0.0040492    total: 1m 51s    remaining: 4.16s
964:    learn: 0.0040435    total: 1m 51s    remaining: 4.04s
965:    learn: 0.0040379    total: 1m 51s    remaining: 3.93s
966:    learn: 0.0040317    total: 1m 51s    remaining: 3.81s
967:    learn: 0.0040239    total: 1m 51s    remaining: 3.7s
968:    learn: 0.0040225    total: 1m 51s    remaining: 3.58s
969:    learn: 0.0040216    total: 1m 52s    remaining: 3.47s
970:    learn: 0.0040162    total: 1m 52s    remaining: 3.35s
971:    learn: 0.0040098    total: 1m 52s    remaining: 3.23s
972:    learn: 0.0040080    total: 1m 52s    remaining: 3.12s
973:    learn: 0.0040032    total: 1m 52s    remaining: 3s
974:    learn: 0.0039937    total: 1m 52s    remaining: 2.89s
975:    learn: 0.0039908    total: 1m 52s    remaining: 2.77s
976:    learn: 0.0039857    total: 1m 52s    remaining: 2.65s
977:    learn: 0.0039829    total: 1m 52s    remaining: 2.54s
978:    learn: 0.0039809    total: 1m 52s    remaining: 2.42s
979:    learn: 0.0039767    total: 1m 53s    remaining: 2.31s
980:    learn: 0.0039743    total: 1m 53s    remaining: 2.19s
981:    learn: 0.0039718    total: 1m 53s    remaining: 2.08s
982:    learn: 0.0039673    total: 1m 53s    remaining: 1.96s
983:    learn: 0.0039606    total: 1m 53s    remaining: 1.85s
984:    learn: 0.0039586    total: 1m 53s    remaining: 1.73s
985:    learn: 0.0039566    total: 1m 53s    remaining: 1.62s
986:    learn: 0.0039498    total: 1m 53s    remaining: 1.5s
987:    learn: 0.0039466    total: 1m 54s    remaining: 1.38s
988:    learn: 0.0039446    total: 1m 54s    remaining: 1.27s
989:    learn: 0.0039390    total: 1m 54s    remaining: 1.15s
990:    learn: 0.0039375    total: 1m 54s    remaining: 1.04s
991:    learn: 0.0039308    total: 1m 54s    remaining: 923ms
992:    learn: 0.0039266    total: 1m 54s    remaining: 808ms
993:    learn: 0.0039245    total: 1m 54s    remaining: 692ms
994:    learn: 0.0039237    total: 1m 54s    remaining: 577ms
995:    learn: 0.0039192    total: 1m 54s    remaining: 461ms
996:    learn: 0.0039168    total: 1m 55s    remaining: 346ms
997:    learn: 0.0039137    total: 1m 55s    remaining: 231ms
998:    learn: 0.0039120    total: 1m 55s    remaining: 115ms
999:    learn: 0.0039017    total: 1m 55s    remaining: 0us
```

```python
In [19]:  # How long will this take?
          start_time = time.time()

          # Set params for cross-validation as same as initial model
          cv_params = catboost_model.get_params()
```

```python
# Run the cross-validation for 10-folds (same as the other models)
cv_data = cv(train_pool,
             cv_params,
             fold_count=10,
             plot=True)

# How long did it take?
catboost_time = (time.time() - start_time)

# CatBoost CV results save into a dataframe (cv_data), let's withdraw the maximum accuracy score
acc_cv_catboost = round(np.max(cv_data['test-Accuracy-mean']) * 100, 2)
```

```
0:      learn: 1.3272604        test: 1.3268467 best: 1.3268467 (0)
1:      learn: 1.2692980        test: 1.2669757 best: 1.2669757 (1)
2:      learn: 1.2179423        test: 1.2143520 best: 1.2143520 (2)
3:      learn: 1.1667041        test: 1.1610424 best: 1.1610424 (3)
4:      learn: 1.1196798        test: 1.1123733 best: 1.1123733 (4)
5:      learn: 1.0783368        test: 1.0677438 best: 1.0677438 (5)     total: 5.05s     remaining: 13m 56s
6:      learn: 1.0373924        test: 1.0245176 best: 1.0245176 (6)
7:      learn: 0.9998746        test: 0.9868407 best: 0.9868407 (7)
8:      learn: 0.9647743        test: 0.9501796 best: 0.9501796 (8)
9:      learn: 0.9307220        test: 0.9147410 best: 0.9147410 (9)
10:     learn: 0.8995755        test: 0.8827304 best: 0.8827304 (10)
11:     learn: 0.8712279        test: 0.8523408 best: 0.8523408 (11)
12:     learn: 0.8424610        test: 0.8216478 best: 0.8216478 (12)    total: 11.1s     remaining: 14m 1s
13:     learn: 0.8149721        test: 0.7923764 best: 0.7923764 (13)
14:     learn: 0.7888925        test: 0.7651763 best: 0.7651763 (14)
15:     learn: 0.7649002        test: 0.7401286 best: 0.7401286 (15)
16:     learn: 0.7410659        test: 0.7150406 best: 0.7150406 (16)
17:     learn: 0.7192891        test: 0.6923025 best: 0.6923025 (17)    total: 15.6s     remaining: 14m 13s
18:     learn: 0.6985873        test: 0.6704782 best: 0.6704782 (18)
19:     learn: 0.6778785        test: 0.6490739 best: 0.6490739 (19)
20:     learn: 0.6582836        test: 0.6287385 best: 0.6287385 (20)
21:     learn: 0.6386002        test: 0.6085018 best: 0.6085018 (21)
22:     learn: 0.6208432        test: 0.5902242 best: 0.5902242 (22)    total: 20.5s     remaining: 14m 32s
23:     learn: 0.6035323        test: 0.5721207 best: 0.5721207 (23)
24:     learn: 0.5882382        test: 0.5558494 best: 0.5558494 (24)
25:     learn: 0.5729369        test: 0.5395852 best: 0.5395852 (25)
26:     learn: 0.5580031        test: 0.5238207 best: 0.5238207 (26)
27:     learn: 0.5430578        test: 0.5081175 best: 0.5081175 (27)    total: 25.3s     remaining: 14m 38s
28:     learn: 0.5290541        test: 0.4936291 best: 0.4936291 (28)
29:     learn: 0.5153498        test: 0.4796612 best: 0.4796612 (29)
30:     learn: 0.5015304        test: 0.4656249 best: 0.4656249 (30)
31:     learn: 0.4889887        test: 0.4527398 best: 0.4527398 (31)
32:     learn: 0.4765001        test: 0.4397530 best: 0.4397530 (32)    total: 29.9s     remaining: 14m 35s
```

```
33:     learn: 0.4640823    test: 0.4273735 best: 0.4273735 (33)
34:     learn: 0.4534330    test: 0.4168684 best: 0.4168684 (34)
35:     learn: 0.4434810    test: 0.4067280 best: 0.4067280 (35)
36:     learn: 0.4324903    test: 0.3955854 best: 0.3955854 (36)
37:     learn: 0.4222045    test: 0.3856358 best: 0.3856358 (37)
38:     learn: 0.4123447    test: 0.3757395 best: 0.3757395 (38)    total: 35.5s    remaining: 14m 35s
39:     learn: 0.4026160    test: 0.3659917 best: 0.3659917 (39)
40:     learn: 0.3927308    test: 0.3559864 best: 0.3559864 (40)
41:     learn: 0.3836599    test: 0.3469834 best: 0.3469834 (41)
42:     learn: 0.3752571    test: 0.3384451 best: 0.3384451 (42)
43:     learn: 0.3668835    test: 0.3297955 best: 0.3297955 (43)
44:     learn: 0.3586918    test: 0.3216417 best: 0.3216417 (44)
45:     learn: 0.3509597    test: 0.3138375 best: 0.3138375 (45)    total: 42s      remaining: 14m 31s
46:     learn: 0.3436275    test: 0.3065729 best: 0.3065729 (46)
47:     learn: 0.3361530    test: 0.2991599 best: 0.2991599 (47)
48:     learn: 0.3291088    test: 0.2918335 best: 0.2918335 (48)
49:     learn: 0.3218530    test: 0.2846188 best: 0.2846188 (49)
50:     learn: 0.3151495    test: 0.2778797 best: 0.2778797 (50)
51:     learn: 0.3086818    test: 0.2714557 best: 0.2714557 (51)
52:     learn: 0.3021004    test: 0.2648052 best: 0.2648052 (52)
53:     learn: 0.2957153    test: 0.2583662 best: 0.2583662 (53)
54:     learn: 0.2896798    test: 0.2520765 best: 0.2520765 (54)
55:     learn: 0.2838621    test: 0.2461428 best: 0.2461428 (55)    total: 51.7s    remaining: 14m 32s
56:     learn: 0.2781038    test: 0.2404052 best: 0.2404052 (56)
57:     learn: 0.2724565    test: 0.2348544 best: 0.2348544 (57)
58:     learn: 0.2674476    test: 0.2297969 best: 0.2297969 (58)
59:     learn: 0.2621988    test: 0.2247558 best: 0.2247558 (59)
60:     learn: 0.2572007    test: 0.2195705 best: 0.2195705 (60)    total: 56.6s    remaining: 14m 31s
61:     learn: 0.2526222    test: 0.2150161 best: 0.2150161 (61)
62:     learn: 0.2481115    test: 0.2106025 best: 0.2106025 (62)
63:     learn: 0.2436712    test: 0.2064006 best: 0.2064006 (63)
64:     learn: 0.2393186    test: 0.2020955 best: 0.2020955 (64)
65:     learn: 0.2348658    test: 0.1977667 best: 0.1977667 (65)    total: 1m 1s    remaining: 14m 26s
66:     learn: 0.2307684    test: 0.1938871 best: 0.1938871 (66)
67:     learn: 0.2265077    test: 0.1898415 best: 0.1898415 (67)
68:     learn: 0.2227055    test: 0.1859767 best: 0.1859767 (68)
69:     learn: 0.2188956    test: 0.1821627 best: 0.1821627 (69)
70:     learn: 0.2152001    test: 0.1784229 best: 0.1784229 (70)
71:     learn: 0.2113828    test: 0.1747129 best: 0.1747129 (71)    total: 1m 7s    remaining: 14m 24s
72:     learn: 0.2079272    test: 0.1713530 best: 0.1713530 (72)
73:     learn: 0.2045567    test: 0.1681569 best: 0.1681569 (73)
74:     learn: 0.2010672    test: 0.1648383 best: 0.1648383 (74)
75:     learn: 0.1978730    test: 0.1616810 best: 0.1616810 (75)
76:     learn: 0.1948283    test: 0.1587042 best: 0.1587042 (76)
77:     learn: 0.1915829    test: 0.1556722 best: 0.1556722 (77)
78:     learn: 0.1885321    test: 0.1526520 best: 0.1526520 (78)    total: 1m 14s   remaining: 14m 33s
79:     learn: 0.1855318    test: 0.1498590 best: 0.1498590 (79)
```

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80:     learn: 0.1824512     test: 0.1469296 best: 0.1469296 (80)
81:     learn: 0.1798380     test: 0.1443807 best: 0.1443807 (81)
82:     learn: 0.1769543     test: 0.1416740 best: 0.1416740 (82)
83:     learn: 0.1741178     test: 0.1390896 best: 0.1390896 (83)     total: 1m 21s    remaining: 14m 49s
84:     learn: 0.1714061     test: 0.1365568 best: 0.1365568 (84)
85:     learn: 0.1688921     test: 0.1341683 best: 0.1341683 (85)
86:     learn: 0.1664059     test: 0.1317742 best: 0.1317742 (86)
87:     learn: 0.1638652     test: 0.1292789 best: 0.1292789 (87)
88:     learn: 0.1613067     test: 0.1268077 best: 0.1268077 (88)     total: 1m 27s    remaining: 15m
89:     learn: 0.1588732     test: 0.1245457 best: 0.1245457 (89)
90:     learn: 0.1564939     test: 0.1222528 best: 0.1222528 (90)
91:     learn: 0.1542871     test: 0.1202555 best: 0.1202555 (91)
92:     learn: 0.1520522     test: 0.1181422 best: 0.1181422 (92)     total: 1m 32s    remaining: 15m 6s
93:     learn: 0.1499429     test: 0.1161973 best: 0.1161973 (93)
94:     learn: 0.1477999     test: 0.1142060 best: 0.1142060 (94)
95:     learn: 0.1457841     test: 0.1123254 best: 0.1123254 (95)
96:     learn: 0.1435696     test: 0.1102892 best: 0.1102892 (96)     total: 1m 38s    remaining: 15m 19s
97:     learn: 0.1415914     test: 0.1083579 best: 0.1083579 (97)
98:     learn: 0.1397631     test: 0.1065674 best: 0.1065674 (98)
99:     learn: 0.1379686     test: 0.1048452 best: 0.1048452 (99)
100:    learn: 0.1360859     test: 0.1030941 best: 0.1030941 (100)    total: 1m 43s    remaining: 15m 22s
101:    learn: 0.1342043     test: 0.1012472 best: 0.1012472 (101)
102:    learn: 0.1325028     test: 0.0995921 best: 0.0995921 (102)
103:    learn: 0.1307321     test: 0.0979732 best: 0.0979732 (103)
104:    learn: 0.1290423     test: 0.0964055 best: 0.0964055 (104)    total: 1m 48s    remaining: 15m 23s
105:    learn: 0.1274077     test: 0.0948106 best: 0.0948106 (105)
106:    learn: 0.1257797     test: 0.0933284 best: 0.0933284 (106)
107:    learn: 0.1243221     test: 0.0919307 best: 0.0919307 (107)
108:    learn: 0.1228971     test: 0.0905469 best: 0.0905469 (108)    total: 1m 53s    remaining: 15m 27s
109:    learn: 0.1213983     test: 0.0891621 best: 0.0891621 (109)
110:    learn: 0.1198679     test: 0.0877332 best: 0.0877332 (110)
111:    learn: 0.1185233     test: 0.0865145 best: 0.0865145 (111)
112:    learn: 0.1171068     test: 0.0852144 best: 0.0852144 (112)    total: 1m 59s    remaining: 15m 36s
113:    learn: 0.1158597     test: 0.0840593 best: 0.0840593 (113)
114:    learn: 0.1144308     test: 0.0827569 best: 0.0827569 (114)
115:    learn: 0.1131143     test: 0.0815597 best: 0.0815597 (115)    total: 2m 4s     remaining: 15m 47s
116:    learn: 0.1118428     test: 0.0803591 best: 0.0803591 (116)
117:    learn: 0.1106217     test: 0.0792017 best: 0.0792017 (117)
118:    learn: 0.1095364     test: 0.0782221 best: 0.0782221 (118)    total: 2m 9s     remaining: 16m 1s
119:    learn: 0.1083279     test: 0.0771349 best: 0.0771349 (119)
120:    learn: 0.1072044     test: 0.0761140 best: 0.0761140 (120)
121:    learn: 0.1060886     test: 0.0751584 best: 0.0751584 (121)
122:    learn: 0.1050919     test: 0.0742218 best: 0.0742218 (122)    total: 2m 14s    remaining: 16m 2s
123:    learn: 0.1039072     test: 0.0731596 best: 0.0731596 (123)
124:    learn: 0.1028205     test: 0.0721667 best: 0.0721667 (124)
125:    learn: 0.1018029     test: 0.0713182 best: 0.0713182 (125)
126:    learn: 0.1008401     test: 0.0704576 best: 0.0704576 (126)
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127:    learn: 0.0998452    test: 0.0695276 best: 0.0695276 (127)    total: 2m 21s    remaining: 16m 1s
128:    learn: 0.0988460    test: 0.0686151 best: 0.0686151 (128)
129:    learn: 0.0978830    test: 0.0677567 best: 0.0677567 (129)
130:    learn: 0.0969169    test: 0.0668900 best: 0.0668900 (130)
131:    learn: 0.0958653    test: 0.0659353 best: 0.0659353 (131)
132:    learn: 0.0948282    test: 0.0650253 best: 0.0650253 (132)
133:    learn: 0.0938878    test: 0.0641893 best: 0.0641893 (133)    total: 2m 28s    remaining: 15m 57s
134:    learn: 0.0930006    test: 0.0633506 best: 0.0633506 (134)
135:    learn: 0.0922376    test: 0.0626703 best: 0.0626703 (135)
136:    learn: 0.0914268    test: 0.0619546 best: 0.0619546 (136)
137:    learn: 0.0905638    test: 0.0612342 best: 0.0612342 (137)    total: 2m 33s    remaining: 15m 57s
138:    learn: 0.0898240    test: 0.0605829 best: 0.0605829 (138)
139:    learn: 0.0889236    test: 0.0597984 best: 0.0597984 (139)
140:    learn: 0.0880752    test: 0.0590619 best: 0.0590619 (140)
141:    learn: 0.0873698    test: 0.0584702 best: 0.0584702 (141)    total: 2m 38s    remaining: 15m 56s
142:    learn: 0.0865484    test: 0.0577465 best: 0.0577465 (142)
143:    learn: 0.0858734    test: 0.0571564 best: 0.0571564 (143)
144:    learn: 0.0852115    test: 0.0565735 best: 0.0565735 (144)
145:    learn: 0.0845040    test: 0.0559720 best: 0.0559720 (145)    total: 2m 43s    remaining: 15m 54s
146:    learn: 0.0837567    test: 0.0553513 best: 0.0553513 (146)
147:    learn: 0.0830482    test: 0.0547878 best: 0.0547878 (147)
148:    learn: 0.0823669    test: 0.0542011 best: 0.0542011 (148)
149:    learn: 0.0817090    test: 0.0536941 best: 0.0536941 (149)    total: 2m 48s    remaining: 15m 52s
150:    learn: 0.0810157    test: 0.0531059 best: 0.0531059 (150)
151:    learn: 0.0802778    test: 0.0525289 best: 0.0525289 (151)
152:    learn: 0.0796376    test: 0.0520007 best: 0.0520007 (152)
153:    learn: 0.0788938    test: 0.0513462 best: 0.0513462 (153)    total: 2m 52s    remaining: 15m 49s
154:    learn: 0.0782926    test: 0.0508446 best: 0.0508446 (154)
155:    learn: 0.0776867    test: 0.0503271 best: 0.0503271 (155)
156:    learn: 0.0771026    test: 0.0498370 best: 0.0498370 (156)
157:    learn: 0.0765207    test: 0.0493649 best: 0.0493649 (157)    total: 2m 58s    remaining: 15m 48s
158:    learn: 0.0758914    test: 0.0488253 best: 0.0488253 (158)
159:    learn: 0.0752225    test: 0.0482753 best: 0.0482753 (159)
160:    learn: 0.0745977    test: 0.0477900 best: 0.0477900 (160)
161:    learn: 0.0741196    test: 0.0474300 best: 0.0474300 (161)    total: 3m 3s     remaining: 15m 47s
162:    learn: 0.0735650    test: 0.0469541 best: 0.0469541 (162)
163:    learn: 0.0731519    test: 0.0466104 best: 0.0466104 (163)
164:    learn: 0.0725817    test: 0.0461360 best: 0.0461360 (164)
165:    learn: 0.0719931    test: 0.0456636 best: 0.0456636 (165)    total: 3m 8s     remaining: 15m 45s
166:    learn: 0.0714434    test: 0.0452087 best: 0.0452087 (166)
167:    learn: 0.0708755    test: 0.0447394 best: 0.0447394 (167)
168:    learn: 0.0703931    test: 0.0443609 best: 0.0443609 (168)
169:    learn: 0.0698113    test: 0.0438934 best: 0.0438934 (169)
170:    learn: 0.0693515    test: 0.0435071 best: 0.0435071 (170)    total: 3m 14s    remaining: 15m 42s
171:    learn: 0.0688342    test: 0.0430787 best: 0.0430787 (171)
172:    learn: 0.0683343    test: 0.0426781 best: 0.0426781 (172)
173:    learn: 0.0678029    test: 0.0422265 best: 0.0422265 (173)
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174:    learn: 0.0673359    test: 0.0418800 best: 0.0418800 (174)    total: 3m 19s   remaining: 15m 40s
175:    learn: 0.0668681    test: 0.0414943 best: 0.0414943 (175)
176:    learn: 0.0663560    test: 0.0410741 best: 0.0410741 (176)
177:    learn: 0.0659301    test: 0.0407321 best: 0.0407321 (177)
178:    learn: 0.0654698    test: 0.0403661 best: 0.0403661 (178)    total: 3m 24s   remaining: 15m 37s
179:    learn: 0.0650264    test: 0.0400131 best: 0.0400131 (179)
180:    learn: 0.0647152    test: 0.0398181 best: 0.0398181 (180)
181:    learn: 0.0642573    test: 0.0394379 best: 0.0394379 (181)
182:    learn: 0.0638116    test: 0.0390807 best: 0.0390807 (182)    total: 3m 29s   remaining: 15m 35s
183:    learn: 0.0634403    test: 0.0387922 best: 0.0387922 (183)
184:    learn: 0.0630769    test: 0.0385052 best: 0.0385052 (184)
185:    learn: 0.0627232    test: 0.0382326 best: 0.0382326 (185)
186:    learn: 0.0622951    test: 0.0378582 best: 0.0378582 (186)
187:    learn: 0.0619782    test: 0.0376376 best: 0.0376376 (187)    total: 3m 35s   remaining: 15m 31s
188:    learn: 0.0616151    test: 0.0373362 best: 0.0373362 (188)
189:    learn: 0.0612215    test: 0.0370422 best: 0.0370422 (189)
190:    learn: 0.0608271    test: 0.0367397 best: 0.0367397 (190)
191:    learn: 0.0603992    test: 0.0364161 best: 0.0364161 (191)
192:    learn: 0.0600063    test: 0.0360998 best: 0.0360998 (192)    total: 3m 41s   remaining: 15m 27s
193:    learn: 0.0596466    test: 0.0358352 best: 0.0358352 (193)
194:    learn: 0.0593263    test: 0.0355885 best: 0.0355885 (194)
195:    learn: 0.0590022    test: 0.0353426 best: 0.0353426 (195)
196:    learn: 0.0587294    test: 0.0351555 best: 0.0351555 (196)    total: 3m 46s   remaining: 15m 25s
197:    learn: 0.0583270    test: 0.0348507 best: 0.0348507 (197)
198:    learn: 0.0579750    test: 0.0345847 best: 0.0345847 (198)
199:    learn: 0.0575467    test: 0.0342553 best: 0.0342553 (199)
200:    learn: 0.0572210    test: 0.0340259 best: 0.0340259 (200)
201:    learn: 0.0569170    test: 0.0338018 best: 0.0338018 (201)    total: 3m 53s   remaining: 15m 21s
202:    learn: 0.0566056    test: 0.0335743 best: 0.0335743 (202)
203:    learn: 0.0562645    test: 0.0333104 best: 0.0333104 (203)
204:    learn: 0.0559174    test: 0.0330623 best: 0.0330623 (204)
205:    learn: 0.0555804    test: 0.0328257 best: 0.0328257 (205)    total: 3m 58s   remaining: 15m 18s
206:    learn: 0.0552624    test: 0.0325623 best: 0.0325623 (206)
207:    learn: 0.0549277    test: 0.0323009 best: 0.0323009 (207)
208:    learn: 0.0546673    test: 0.0321068 best: 0.0321068 (208)
209:    learn: 0.0543642    test: 0.0318898 best: 0.0318898 (209)    total: 4m 3s    remaining: 15m 15s
210:    learn: 0.0540825    test: 0.0316919 best: 0.0316919 (210)
211:    learn: 0.0537814    test: 0.0314566 best: 0.0314566 (211)
212:    learn: 0.0535168    test: 0.0312652 best: 0.0312652 (212)
213:    learn: 0.0532648    test: 0.0311034 best: 0.0311034 (213)
214:    learn: 0.0530212    test: 0.0309194 best: 0.0309194 (214)
215:    learn: 0.0526691    test: 0.0306607 best: 0.0306607 (215)    total: 4m 11s   remaining: 15m 11s
216:    learn: 0.0523738    test: 0.0304330 best: 0.0304330 (216)
217:    learn: 0.0521121    test: 0.0302295 best: 0.0302295 (217)    total: 4m 14s   remaining: 15m 11s
218:    learn: 0.0518091    test: 0.0300054 best: 0.0300054 (218)
219:    learn: 0.0515524    test: 0.0298383 best: 0.0298383 (219)    total: 4m 17s   remaining: 15m 11s
220:    learn: 0.0513058    test: 0.0296756 best: 0.0296756 (220)
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221:    learn: 0.0510770    test: 0.0295193 best: 0.0295193 (221)
222:    learn: 0.0507850    test: 0.0292900 best: 0.0292900 (222)
223:    learn: 0.0505506    test: 0.0291406 best: 0.0291406 (223)    total: 4m 23s    remaining: 15m 12s
224:    learn: 0.0503279    test: 0.0289936 best: 0.0289936 (224)
225:    learn: 0.0500700    test: 0.0288036 best: 0.0288036 (225)    total: 4m 26s    remaining: 15m 13s
226:    learn: 0.0498547    test: 0.0286410 best: 0.0286410 (226)
227:    learn: 0.0495917    test: 0.0284540 best: 0.0284540 (227)
228:    learn: 0.0493118    test: 0.0282612 best: 0.0282612 (228)
229:    learn: 0.0490829    test: 0.0281021 best: 0.0281021 (229)    total: 4m 33s    remaining: 15m 16s
230:    learn: 0.0488332    test: 0.0279353 best: 0.0279353 (230)
231:    learn: 0.0486353    test: 0.0277897 best: 0.0277897 (231)
232:    learn: 0.0483861    test: 0.0276091 best: 0.0276091 (232)
233:    learn: 0.0481732    test: 0.0274835 best: 0.0274835 (233)    total: 4m 39s    remaining: 15m 16s
234:    learn: 0.0479520    test: 0.0273332 best: 0.0273332 (234)
235:    learn: 0.0477197    test: 0.0271637 best: 0.0271637 (235)
236:    learn: 0.0475311    test: 0.0270347 best: 0.0270347 (236)    total: 4m 44s    remaining: 15m 15s
237:    learn: 0.0473212    test: 0.0268847 best: 0.0268847 (237)
238:    learn: 0.0471124    test: 0.0267475 best: 0.0267475 (238)
239:    learn: 0.0468888    test: 0.0265920 best: 0.0265920 (239)    total: 4m 49s    remaining: 15m 15s
240:    learn: 0.0466805    test: 0.0264476 best: 0.0264476 (240)
241:    learn: 0.0465034    test: 0.0263227 best: 0.0263227 (241)
242:    learn: 0.0462514    test: 0.0261333 best: 0.0261333 (242)    total: 4m 53s    remaining: 15m 14s
243:    learn: 0.0460056    test: 0.0259693 best: 0.0259693 (243)
244:    learn: 0.0457710    test: 0.0257974 best: 0.0257974 (244)
245:    learn: 0.0455751    test: 0.0256533 best: 0.0256533 (245)    total: 4m 58s    remaining: 15m 14s
246:    learn: 0.0454077    test: 0.0255373 best: 0.0255373 (246)
247:    learn: 0.0452106    test: 0.0253995 best: 0.0253995 (247)
248:    learn: 0.0449986    test: 0.0252489 best: 0.0252489 (248)
249:    learn: 0.0447826    test: 0.0250919 best: 0.0250919 (249)    total: 5m 4s     remaining: 15m 12s
250:    learn: 0.0446341    test: 0.0250081 best: 0.0250081 (250)
251:    learn: 0.0444283    test: 0.0248660 best: 0.0248660 (251)
252:    learn: 0.0441987    test: 0.0246986 best: 0.0246986 (252)    total: 5m 8s     remaining: 15m 12s
253:    learn: 0.0439913    test: 0.0245492 best: 0.0245492 (253)
254:    learn: 0.0438147    test: 0.0244308 best: 0.0244308 (254)
255:    learn: 0.0436346    test: 0.0243039 best: 0.0243039 (255)    total: 5m 13s    remaining: 15m 10s
256:    learn: 0.0434728    test: 0.0241961 best: 0.0241961 (256)
257:    learn: 0.0432764    test: 0.0240518 best: 0.0240518 (257)
258:    learn: 0.0430835    test: 0.0239252 best: 0.0239252 (258)
259:    learn: 0.0428998    test: 0.0237931 best: 0.0237931 (259)    total: 5m 19s    remaining: 15m 8s
260:    learn: 0.0427308    test: 0.0236780 best: 0.0236780 (260)    total: 5m 20s    remaining: 15m 8s
261:    learn: 0.0425171    test: 0.0235511 best: 0.0235511 (261)
262:    learn: 0.0423351    test: 0.0234432 best: 0.0234432 (262)
263:    learn: 0.0421731    test: 0.0233390 best: 0.0233390 (263)    total: 5m 25s    remaining: 15m 6s
264:    learn: 0.0420067    test: 0.0232385 best: 0.0232385 (264)
265:    learn: 0.0418439    test: 0.0231304 best: 0.0231304 (265)
266:    learn: 0.0416801    test: 0.0230281 best: 0.0230281 (266)
267:    learn: 0.0414957    test: 0.0229041 best: 0.0229041 (267)    total: 5m 31s    remaining: 15m 4s
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268:    learn: 0.0413531    test: 0.0228106 best: 0.0228106 (268)
269:    learn: 0.0412093    test: 0.0227203 best: 0.0227203 (269)    total: 5m 35s    remaining: 15m 7s
270:    learn: 0.0410487    test: 0.0226214 best: 0.0226214 (270)
271:    learn: 0.0409055    test: 0.0225194 best: 0.0225194 (271)
272:    learn: 0.0407422    test: 0.0224185 best: 0.0224185 (272)
273:    learn: 0.0405751    test: 0.0223050 best: 0.0223050 (273)    total: 5m 41s    remaining: 15m 4s
274:    learn: 0.0404694    test: 0.0222512 best: 0.0222512 (274)
275:    learn: 0.0403270    test: 0.0221515 best: 0.0221515 (275)
276:    learn: 0.0401701    test: 0.0220602 best: 0.0220602 (276)
277:    learn: 0.0399935    test: 0.0219513 best: 0.0219513 (277)
278:    learn: 0.0398182    test: 0.0218307 best: 0.0218307 (278)    total: 5m 48s    remaining: 15m
279:    learn: 0.0396757    test: 0.0217511 best: 0.0217511 (279)
280:    learn: 0.0394985    test: 0.0216360 best: 0.0216360 (280)
281:    learn: 0.0393704    test: 0.0215609 best: 0.0215609 (281)
282:    learn: 0.0392227    test: 0.0214750 best: 0.0214750 (282)    total: 5m 54s    remaining: 14m 57s
283:    learn: 0.0390369    test: 0.0213513 best: 0.0213513 (283)
284:    learn: 0.0389240    test: 0.0212791 best: 0.0212791 (284)
285:    learn: 0.0387692    test: 0.0211762 best: 0.0211762 (285)
286:    learn: 0.0386193    test: 0.0210865 best: 0.0210865 (286)    total: 5m 59s    remaining: 14m 53s
287:    learn: 0.0384363    test: 0.0209631 best: 0.0209631 (287)
288:    learn: 0.0382695    test: 0.0208494 best: 0.0208494 (288)
289:    learn: 0.0381351    test: 0.0207656 best: 0.0207656 (289)
290:    learn: 0.0380083    test: 0.0206798 best: 0.0206798 (290)    total: 6m 5s     remaining: 14m 49s
291:    learn: 0.0378508    test: 0.0205650 best: 0.0205650 (291)
292:    learn: 0.0376922    test: 0.0204569 best: 0.0204569 (292)
293:    learn: 0.0375807    test: 0.0203957 best: 0.0203957 (293)
294:    learn: 0.0374415    test: 0.0203001 best: 0.0203001 (294)    total: 6m 10s    remaining: 14m 45s
295:    learn: 0.0372889    test: 0.0201990 best: 0.0201990 (295)
296:    learn: 0.0371574    test: 0.0201207 best: 0.0201207 (296)
297:    learn: 0.0369961    test: 0.0200195 best: 0.0200195 (297)
298:    learn: 0.0368885    test: 0.0199494 best: 0.0199494 (298)    total: 6m 15s    remaining: 14m 40s
299:    learn: 0.0367504    test: 0.0198598 best: 0.0198598 (299)
300:    learn: 0.0366384    test: 0.0197891 best: 0.0197891 (300)
301:    learn: 0.0365129    test: 0.0197146 best: 0.0197146 (301)
302:    learn: 0.0363723    test: 0.0196277 best: 0.0196277 (302)    total: 6m 20s    remaining: 14m 36s
303:    learn: 0.0362511    test: 0.0195625 best: 0.0195625 (303)
304:    learn: 0.0361180    test: 0.0194782 best: 0.0194782 (304)    total: 6m 23s    remaining: 14m 34s
305:    learn: 0.0359858    test: 0.0193914 best: 0.0193914 (305)
306:    learn: 0.0358489    test: 0.0192995 best: 0.0192995 (306)
307:    learn: 0.0357566    test: 0.0192490 best: 0.0192490 (307)
308:    learn: 0.0356501    test: 0.0191839 best: 0.0191839 (308)    total: 6m 29s    remaining: 14m 31s
309:    learn: 0.0355250    test: 0.0191025 best: 0.0191025 (309)
310:    learn: 0.0354217    test: 0.0190377 best: 0.0190377 (310)
311:    learn: 0.0352945    test: 0.0189554 best: 0.0189554 (311)    total: 6m 37s    remaining: 14m 36s
312:    learn: 0.0351712    test: 0.0188745 best: 0.0188745 (312)
313:    learn: 0.0350807    test: 0.0188232 best: 0.0188232 (313)
314:    learn: 0.0349456    test: 0.0187320 best: 0.0187320 (314)
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315:    learn: 0.0348215    test: 0.0186640 best: 0.0186640 (315)
316:    learn: 0.0347070    test: 0.0185980 best: 0.0185980 (316)
317:    learn: 0.0345856    test: 0.0185162 best: 0.0185162 (317)
318:    learn: 0.0344719    test: 0.0184425 best: 0.0184425 (318)
319:    learn: 0.0343521    test: 0.0183689 best: 0.0183689 (319)    total: 6m 47s    remaining: 14m 25s
320:    learn: 0.0342730    test: 0.0183316 best: 0.0183316 (320)
321:    learn: 0.0341665    test: 0.0182735 best: 0.0182735 (321)
322:    learn: 0.0340435    test: 0.0182069 best: 0.0182069 (322)
323:    learn: 0.0339367    test: 0.0181388 best: 0.0181388 (323)
324:    learn: 0.0338317    test: 0.0180758 best: 0.0180758 (324)
325:    learn: 0.0337084    test: 0.0180021 best: 0.0180021 (325)
326:    learn: 0.0336090    test: 0.0179470 best: 0.0179470 (326)    total: 6m 52s    remaining: 14m 9s
327:    learn: 0.0334975    test: 0.0178803 best: 0.0178803 (327)
328:    learn: 0.0333837    test: 0.0178089 best: 0.0178089 (328)
329:    learn: 0.0332533    test: 0.0177187 best: 0.0177187 (329)
330:    learn: 0.0331768    test: 0.0176817 best: 0.0176817 (330)
331:    learn: 0.0330979    test: 0.0176468 best: 0.0176468 (331)
332:    learn: 0.0329783    test: 0.0175695 best: 0.0175695 (332)
333:    learn: 0.0328823    test: 0.0175092 best: 0.0175092 (333)
334:    learn: 0.0327333    test: 0.0174099 best: 0.0174099 (334)    total: 6m 57s    remaining: 13m 49s
335:    learn: 0.0326316    test: 0.0173532 best: 0.0173532 (335)
336:    learn: 0.0325608    test: 0.0173194 best: 0.0173194 (336)
337:    learn: 0.0325001    test: 0.0172934 best: 0.0172934 (337)
338:    learn: 0.0323845    test: 0.0172226 best: 0.0172226 (338)
339:    learn: 0.0323018    test: 0.0171776 best: 0.0171776 (339)
340:    learn: 0.0322002    test: 0.0171181 best: 0.0171181 (340)
341:    learn: 0.0321116    test: 0.0170701 best: 0.0170701 (341)
342:    learn: 0.0319932    test: 0.0169951 best: 0.0169951 (342)
343:    learn: 0.0319025    test: 0.0169488 best: 0.0169488 (343)
344:    learn: 0.0317986    test: 0.0168795 best: 0.0168795 (344)
345:    learn: 0.0317210    test: 0.0168400 best: 0.0168400 (345)    total: 7m 3s     remaining: 13m 20s
346:    learn: 0.0316078    test: 0.0167572 best: 0.0167572 (346)
347:    learn: 0.0315240    test: 0.0167146 best: 0.0167146 (347)
348:    learn: 0.0314394    test: 0.0166635 best: 0.0166635 (348)
349:    learn: 0.0313449    test: 0.0166066 best: 0.0166066 (349)
350:    learn: 0.0312353    test: 0.0165312 best: 0.0165312 (350)
351:    learn: 0.0311520    test: 0.0164864 best: 0.0164864 (351)
352:    learn: 0.0310644    test: 0.0164307 best: 0.0164307 (352)
353:    learn: 0.0309716    test: 0.0163751 best: 0.0163751 (353)
354:    learn: 0.0308686    test: 0.0163047 best: 0.0163047 (354)
355:    learn: 0.0307660    test: 0.0162332 best: 0.0162332 (355)    total: 7m 10s    remaining: 12m 59s
356:    learn: 0.0306763    test: 0.0161775 best: 0.0161775 (356)
357:    learn: 0.0305831    test: 0.0161210 best: 0.0161210 (357)
358:    learn: 0.0305096    test: 0.0160810 best: 0.0160810 (358)
359:    learn: 0.0304052    test: 0.0160145 best: 0.0160145 (359)    total: 7m 13s    remaining: 12m 50s
360:    learn: 0.0303023    test: 0.0159488 best: 0.0159488 (360)
361:    learn: 0.0302003    test: 0.0158884 best: 0.0158884 (361)
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362:    learn: 0.0300984    test: 0.0158268 best: 0.0158268 (362)
363:    learn: 0.0300161    test: 0.0157722 best: 0.0157722 (363)
364:    learn: 0.0299293    test: 0.0157305 best: 0.0157305 (364)
365:    learn: 0.0298617    test: 0.0156978 best: 0.0156978 (365)
366:    learn: 0.0297635    test: 0.0156419 best: 0.0156419 (366)    total: 7m 19s    remaining: 12m 37s
367:    learn: 0.0296632    test: 0.0155800 best: 0.0155800 (367)
368:    learn: 0.0295943    test: 0.0155464 best: 0.0155464 (368)
369:    learn: 0.0295005    test: 0.0154904 best: 0.0154904 (369)
370:    learn: 0.0294391    test: 0.0154596 best: 0.0154596 (370)
371:    learn: 0.0293787    test: 0.0154279 best: 0.0154279 (371)
372:    learn: 0.0292850    test: 0.0153691 best: 0.0153691 (372)
373:    learn: 0.0292124    test: 0.0153339 best: 0.0153339 (373)    total: 7m 24s    remaining: 12m 23s
374:    learn: 0.0291342    test: 0.0152921 best: 0.0152921 (374)
375:    learn: 0.0290525    test: 0.0152505 best: 0.0152505 (375)
376:    learn: 0.0289845    test: 0.0152103 best: 0.0152103 (376)
377:    learn: 0.0289177    test: 0.0151763 best: 0.0151763 (377)
378:    learn: 0.0288398    test: 0.0151280 best: 0.0151280 (378)
379:    learn: 0.0287539    test: 0.0150786 best: 0.0150786 (379)
380:    learn: 0.0286940    test: 0.0150494 best: 0.0150494 (380)
381:    learn: 0.0286193    test: 0.0150016 best: 0.0150016 (381)    total: 7m 29s    remaining: 12m 7s
382:    learn: 0.0285479    test: 0.0149632 best: 0.0149632 (382)
383:    learn: 0.0284945    test: 0.0149391 best: 0.0149391 (383)
384:    learn: 0.0283995    test: 0.0148808 best: 0.0148808 (384)
385:    learn: 0.0283168    test: 0.0148301 best: 0.0148301 (385)
386:    learn: 0.0282605    test: 0.0148003 best: 0.0148003 (386)
387:    learn: 0.0281852    test: 0.0147564 best: 0.0147564 (387)
388:    learn: 0.0280885    test: 0.0146977 best: 0.0146977 (388)
389:    learn: 0.0280183    test: 0.0146636 best: 0.0146636 (389)
390:    learn: 0.0279403    test: 0.0146174 best: 0.0146174 (390)    total: 7m 37s    remaining: 11m 52s
391:    learn: 0.0278603    test: 0.0145738 best: 0.0145738 (391)
392:    learn: 0.0277843    test: 0.0145314 best: 0.0145314 (392)
393:    learn: 0.0277123    test: 0.0144904 best: 0.0144904 (393)
394:    learn: 0.0276489    test: 0.0144553 best: 0.0144553 (394)
395:    learn: 0.0275641    test: 0.0144069 best: 0.0144069 (395)
396:    learn: 0.0275042    test: 0.0143776 best: 0.0143776 (396)    total: 7m 42s    remaining: 11m 42s
397:    learn: 0.0274356    test: 0.0143388 best: 0.0143388 (397)
398:    learn: 0.0273834    test: 0.0143149 best: 0.0143149 (398)
399:    learn: 0.0273020    test: 0.0142686 best: 0.0142686 (399)
400:    learn: 0.0272415    test: 0.0142358 best: 0.0142358 (400)
401:    learn: 0.0271673    test: 0.0141906 best: 0.0141906 (401)
402:    learn: 0.0270871    test: 0.0141431 best: 0.0141431 (402)
403:    learn: 0.0270007    test: 0.0140873 best: 0.0140873 (403)
404:    learn: 0.0269310    test: 0.0140467 best: 0.0140467 (404)    total: 7m 47s    remaining: 11m 27s
405:    learn: 0.0268602    test: 0.0140095 best: 0.0140095 (405)
406:    learn: 0.0267651    test: 0.0139559 best: 0.0139559 (406)
407:    learn: 0.0267106    test: 0.0139332 best: 0.0139332 (407)
408:    learn: 0.0266364    test: 0.0138811 best: 0.0138811 (408)
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409:    learn: 0.0265659    test: 0.0138431 best: 0.0138431 (409)
410:    learn: 0.0264981    test: 0.0138058 best: 0.0138058 (410)
411:    learn: 0.0264118    test: 0.0137475 best: 0.0137475 (411)
412:    learn: 0.0263265    test: 0.0136973 best: 0.0136973 (412)
413:    learn: 0.0262731    test: 0.0136662 best: 0.0136662 (413)   total: 7m 53s    remaining: 11m 10s
414:    learn: 0.0262059    test: 0.0136305 best: 0.0136305 (414)
415:    learn: 0.0261357    test: 0.0135927 best: 0.0135927 (415)
416:    learn: 0.0260855    test: 0.0135685 best: 0.0135685 (416)
417:    learn: 0.0260332    test: 0.0135443 best: 0.0135443 (417)
418:    learn: 0.0259846    test: 0.0135158 best: 0.0135158 (418)
419:    learn: 0.0259517    test: 0.0134995 best: 0.0134995 (419)
420:    learn: 0.0258981    test: 0.0134722 best: 0.0134722 (420)   total: 7m 58s    remaining: 10m 58s
421:    learn: 0.0258432    test: 0.0134419 best: 0.0134419 (421)
422:    learn: 0.0257701    test: 0.0133991 best: 0.0133991 (422)
423:    learn: 0.0257122    test: 0.0133704 best: 0.0133704 (423)
424:    learn: 0.0256756    test: 0.0133551 best: 0.0133551 (424)
425:    learn: 0.0256193    test: 0.0133207 best: 0.0133207 (425)
426:    learn: 0.0255453    test: 0.0132747 best: 0.0132747 (426)
427:    learn: 0.0254946    test: 0.0132475 best: 0.0132475 (427)
428:    learn: 0.0254088    test: 0.0132007 best: 0.0132007 (428)
429:    learn: 0.0253651    test: 0.0131782 best: 0.0131782 (429)   total: 8m 4s     remaining: 10m 42s
430:    learn: 0.0253066    test: 0.0131436 best: 0.0131436 (430)
431:    learn: 0.0252480    test: 0.0131103 best: 0.0131103 (431)
432:    learn: 0.0251863    test: 0.0130807 best: 0.0130807 (432)
433:    learn: 0.0251051    test: 0.0130308 best: 0.0130308 (433)
434:    learn: 0.0250446    test: 0.0129928 best: 0.0129928 (434)
435:    learn: 0.0249908    test: 0.0129640 best: 0.0129640 (435)
436:    learn: 0.0249326    test: 0.0129343 best: 0.0129343 (436)
437:    learn: 0.0248815    test: 0.0129054 best: 0.0129054 (437)
438:    learn: 0.0248117    test: 0.0128646 best: 0.0128646 (438)   total: 8m 10s    remaining: 10m 26s
439:    learn: 0.0247495    test: 0.0128293 best: 0.0128293 (439)
440:    learn: 0.0246966    test: 0.0128000 best: 0.0128000 (440)
441:    learn: 0.0246453    test: 0.0127758 best: 0.0127758 (441)
442:    learn: 0.0245815    test: 0.0127391 best: 0.0127391 (442)
443:    learn: 0.0245379    test: 0.0127187 best: 0.0127187 (443)
444:    learn: 0.0244759    test: 0.0126872 best: 0.0126872 (444)
445:    learn: 0.0244279    test: 0.0126644 best: 0.0126644 (445)
446:    learn: 0.0243849    test: 0.0126446 best: 0.0126446 (446)
447:    learn: 0.0243362    test: 0.0126175 best: 0.0126175 (447)
448:    learn: 0.0242764    test: 0.0125872 best: 0.0125872 (448)
449:    learn: 0.0242201    test: 0.0125611 best: 0.0125611 (449)
450:    learn: 0.0241776    test: 0.0125437 best: 0.0125437 (450)
451:    learn: 0.0241291    test: 0.0125207 best: 0.0125207 (451)
452:    learn: 0.0240822    test: 0.0124967 best: 0.0124967 (452)
453:    learn: 0.0240260    test: 0.0124622 best: 0.0124622 (453)   total: 8m 22s    remaining: 10m 3s
454:    learn: 0.0239615    test: 0.0124236 best: 0.0124236 (454)
455:    learn: 0.0239072    test: 0.0123925 best: 0.0123925 (455)
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456:    learn: 0.0238642    test: 0.0123693 best: 0.0123693 (456)
457:    learn: 0.0238160    test: 0.0123411 best: 0.0123411 (457)
458:    learn: 0.0237754    test: 0.0123167 best: 0.0123167 (458)
459:    learn: 0.0237135    test: 0.0122779 best: 0.0122779 (459)
460:    learn: 0.0236596    test: 0.0122406 best: 0.0122406 (460)
461:    learn: 0.0236147    test: 0.0122163 best: 0.0122163 (461)
462:    learn: 0.0235504    test: 0.0121764 best: 0.0121764 (462)    total: 8m 31s    remaining: 9m 53s
463:    learn: 0.0234972    test: 0.0121425 best: 0.0121425 (463)
464:    learn: 0.0234401    test: 0.0121137 best: 0.0121137 (464)
465:    learn: 0.0233990    test: 0.0120926 best: 0.0120926 (465)
466:    learn: 0.0233465    test: 0.0120640 best: 0.0120640 (466)
467:    learn: 0.0233076    test: 0.0120468 best: 0.0120468 (467)
468:    learn: 0.0232498    test: 0.0120077 best: 0.0120077 (468)
469:    learn: 0.0232057    test: 0.0119832 best: 0.0119832 (469)
470:    learn: 0.0231582    test: 0.0119639 best: 0.0119639 (470)
471:    learn: 0.0231124    test: 0.0119399 best: 0.0119399 (471)    total: 8m 37s    remaining: 9m 38s
472:    learn: 0.0230730    test: 0.0119203 best: 0.0119203 (472)
473:    learn: 0.0230156    test: 0.0118906 best: 0.0118906 (473)
474:    learn: 0.0229616    test: 0.0118594 best: 0.0118594 (474)
475:    learn: 0.0229200    test: 0.0118371 best: 0.0118371 (475)
476:    learn: 0.0228794    test: 0.0118137 best: 0.0118137 (476)
477:    learn: 0.0228450    test: 0.0117975 best: 0.0117975 (477)
478:    learn: 0.0227996    test: 0.0117716 best: 0.0117716 (478)
479:    learn: 0.0227446    test: 0.0117385 best: 0.0117385 (479)    total: 8m 42s    remaining: 9m 25s
480:    learn: 0.0227076    test: 0.0117174 best: 0.0117174 (480)
481:    learn: 0.0226597    test: 0.0116922 best: 0.0116922 (481)
482:    learn: 0.0226018    test: 0.0116582 best: 0.0116582 (482)
483:    learn: 0.0225511    test: 0.0116286 best: 0.0116286 (483)
484:    learn: 0.0224895    test: 0.0115945 best: 0.0115945 (484)
485:    learn: 0.0224457    test: 0.0115763 best: 0.0115763 (485)
486:    learn: 0.0224110    test: 0.0115595 best: 0.0115595 (486)
487:    learn: 0.0223751    test: 0.0115437 best: 0.0115437 (487)
488:    learn: 0.0223224    test: 0.0115118 best: 0.0115118 (488)    total: 8m 48s    remaining: 9m 12s
489:    learn: 0.0222794    test: 0.0114881 best: 0.0114881 (489)
490:    learn: 0.0222333    test: 0.0114626 best: 0.0114626 (490)
491:    learn: 0.0221835    test: 0.0114325 best: 0.0114325 (491)
492:    learn: 0.0221356    test: 0.0114037 best: 0.0114037 (492)
493:    learn: 0.0220927    test: 0.0113801 best: 0.0113801 (493)
494:    learn: 0.0220437    test: 0.0113543 best: 0.0113543 (494)
495:    learn: 0.0220045    test: 0.0113334 best: 0.0113334 (495)
496:    learn: 0.0219498    test: 0.0113015 best: 0.0113015 (496)    total: 8m 54s    remaining: 9m
497:    learn: 0.0219062    test: 0.0112763 best: 0.0112763 (497)
498:    learn: 0.0218728    test: 0.0112624 best: 0.0112624 (498)
499:    learn: 0.0218333    test: 0.0112395 best: 0.0112395 (499)
500:    learn: 0.0218028    test: 0.0112221 best: 0.0112221 (500)
501:    learn: 0.0217590    test: 0.0111975 best: 0.0111975 (501)
502:    learn: 0.0217260    test: 0.0111832 best: 0.0111832 (502)
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503:    learn: 0.0216890        test: 0.0111631 best: 0.0111631 (503)
504:    learn: 0.0216614        test: 0.0111518 best: 0.0111518 (504)   total: 8m 59s   remaining: 8m 49s
505:    learn: 0.0216272        test: 0.0111385 best: 0.0111385 (505)
506:    learn: 0.0215685        test: 0.0111041 best: 0.0111041 (506)
507:    learn: 0.0215316        test: 0.0110883 best: 0.0110883 (507)
508:    learn: 0.0214827        test: 0.0110568 best: 0.0110568 (508)
509:    learn: 0.0214350        test: 0.0110261 best: 0.0110261 (509)
510:    learn: 0.0213980        test: 0.0110069 best: 0.0110069 (510)
511:    learn: 0.0213612        test: 0.0109884 best: 0.0109884 (511)
512:    learn: 0.0213158        test: 0.0109615 best: 0.0109615 (512)
513:    learn: 0.0212708        test: 0.0109348 best: 0.0109348 (513)   total: 9m 6s    remaining: 8m 36s
514:    learn: 0.0212199        test: 0.0109076 best: 0.0109076 (514)
515:    learn: 0.0211864        test: 0.0108947 best: 0.0108947 (515)
516:    learn: 0.0211387        test: 0.0108693 best: 0.0108693 (516)
517:    learn: 0.0210999        test: 0.0108472 best: 0.0108472 (517)
518:    learn: 0.0210669        test: 0.0108328 best: 0.0108328 (518)
519:    learn: 0.0210337        test: 0.0108175 best: 0.0108175 (519)
520:    learn: 0.0209861        test: 0.0107921 best: 0.0107921 (520)
521:    learn: 0.0209317        test: 0.0107578 best: 0.0107578 (521)   total: 9m 11s   remaining: 8m 24s
522:    learn: 0.0208907        test: 0.0107350 best: 0.0107350 (522)
523:    learn: 0.0208512        test: 0.0107130 best: 0.0107130 (523)
524:    learn: 0.0208032        test: 0.0106843 best: 0.0106843 (524)
525:    learn: 0.0207638        test: 0.0106642 best: 0.0106642 (525)
526:    learn: 0.0207149        test: 0.0106333 best: 0.0106333 (526)
527:    learn: 0.0206662        test: 0.0106037 best: 0.0106037 (527)
528:    learn: 0.0206266        test: 0.0105855 best: 0.0105855 (528)
529:    learn: 0.0205929        test: 0.0105710 best: 0.0105710 (529)   total: 9m 16s   remaining: 8m 13s
530:    learn: 0.0205585        test: 0.0105558 best: 0.0105558 (530)
531:    learn: 0.0205292        test: 0.0105434 best: 0.0105434 (531)
532:    learn: 0.0204821        test: 0.0105170 best: 0.0105170 (532)
533:    learn: 0.0204358        test: 0.0104917 best: 0.0104917 (533)
534:    learn: 0.0204026        test: 0.0104761 best: 0.0104761 (534)
535:    learn: 0.0203647        test: 0.0104553 best: 0.0104553 (535)
536:    learn: 0.0203248        test: 0.0104328 best: 0.0104328 (536)
537:    learn: 0.0202826        test: 0.0104048 best: 0.0104048 (537)   total: 9m 23s   remaining: 8m 4s
538:    learn: 0.0202388        test: 0.0103778 best: 0.0103778 (538)
539:    learn: 0.0202057        test: 0.0103627 best: 0.0103627 (539)
540:    learn: 0.0201630        test: 0.0103380 best: 0.0103380 (540)
541:    learn: 0.0201238        test: 0.0103177 best: 0.0103177 (541)
542:    learn: 0.0200792        test: 0.0102966 best: 0.0102966 (542)
543:    learn: 0.0200293        test: 0.0102661 best: 0.0102661 (543)
544:    learn: 0.0199829        test: 0.0102422 best: 0.0102422 (544)
545:    learn: 0.0199329        test: 0.0102131 best: 0.0102131 (545)
546:    learn: 0.0198943        test: 0.0101937 best: 0.0101937 (546)   total: 9m 29s   remaining: 7m 51s
547:    learn: 0.0198469        test: 0.0101690 best: 0.0101690 (547)
548:    learn: 0.0198153        test: 0.0101531 best: 0.0101531 (548)
549:    learn: 0.0197713        test: 0.0101302 best: 0.0101302 (549)
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550:    learn: 0.0197335    test: 0.0101071 best: 0.0101071 (550)
551:    learn: 0.0196950    test: 0.0100854 best: 0.0100854 (551)
552:    learn: 0.0196444    test: 0.0100581 best: 0.0100581 (552)
553:    learn: 0.0196169    test: 0.0100477 best: 0.0100477 (553)
554:    learn: 0.0195900    test: 0.0100371 best: 0.0100371 (554)
555:    learn: 0.0195599    test: 0.0100216 best: 0.0100216 (555)    total: 9m 38s    remaining: 7m 41s
556:    learn: 0.0195304    test: 0.0100021 best: 0.0100021 (556)
557:    learn: 0.0195094    test: 0.0099939 best: 0.0099939 (557)
558:    learn: 0.0194767    test: 0.0099729 best: 0.0099729 (558)
559:    learn: 0.0194422    test: 0.0099546 best: 0.0099546 (559)
560:    learn: 0.0194090    test: 0.0099383 best: 0.0099383 (560)
561:    learn: 0.0193781    test: 0.0099204 best: 0.0099204 (561)
562:    learn: 0.0193537    test: 0.0099087 best: 0.0099087 (562)
563:    learn: 0.0193200    test: 0.0098916 best: 0.0098916 (563)
564:    learn: 0.0192858    test: 0.0098742 best: 0.0098742 (564)    total: 9m 46s    remaining: 7m 31s
565:    learn: 0.0192358    test: 0.0098456 best: 0.0098456 (565)
566:    learn: 0.0191948    test: 0.0098189 best: 0.0098189 (566)
567:    learn: 0.0191710    test: 0.0098097 best: 0.0098097 (567)
568:    learn: 0.0191414    test: 0.0097954 best: 0.0097954 (568)
569:    learn: 0.0191035    test: 0.0097735 best: 0.0097735 (569)
570:    learn: 0.0190736    test: 0.0097616 best: 0.0097616 (570)
571:    learn: 0.0190408    test: 0.0097430 best: 0.0097430 (571)
572:    learn: 0.0190134    test: 0.0097309 best: 0.0097309 (572)
573:    learn: 0.0189819    test: 0.0097163 best: 0.0097163 (573)
574:    learn: 0.0189478    test: 0.0096992 best: 0.0096992 (574)
575:    learn: 0.0189096    test: 0.0096815 best: 0.0096815 (575)    total: 9m 52s    remaining: 7m 16s
576:    learn: 0.0188800    test: 0.0096673 best: 0.0096673 (576)
577:    learn: 0.0188284    test: 0.0096379 best: 0.0096379 (577)
578:    learn: 0.0188012    test: 0.0096232 best: 0.0096232 (578)
579:    learn: 0.0187658    test: 0.0096027 best: 0.0096027 (579)
580:    learn: 0.0187346    test: 0.0095848 best: 0.0095848 (580)
581:    learn: 0.0187042    test: 0.0095691 best: 0.0095691 (581)
582:    learn: 0.0186654    test: 0.0095502 best: 0.0095502 (582)
583:    learn: 0.0186338    test: 0.0095332 best: 0.0095332 (583)
584:    learn: 0.0186049    test: 0.0095177 best: 0.0095177 (584)
585:    learn: 0.0185772    test: 0.0095023 best: 0.0095023 (585)
586:    learn: 0.0185442    test: 0.0094812 best: 0.0094812 (586)
587:    learn: 0.0185221    test: 0.0094713 best: 0.0094713 (587)
588:    learn: 0.0184864    test: 0.0094525 best: 0.0094525 (588)
589:    learn: 0.0184569    test: 0.0094378 best: 0.0094378 (589)    total: 10m       remaining: 6m 56s
590:    learn: 0.0184336    test: 0.0094298 best: 0.0094298 (590)
591:    learn: 0.0183969    test: 0.0094081 best: 0.0094081 (591)
592:    learn: 0.0183681    test: 0.0093940 best: 0.0093940 (592)
593:    learn: 0.0183349    test: 0.0093769 best: 0.0093769 (593)
594:    learn: 0.0182994    test: 0.0093566 best: 0.0093566 (594)
595:    learn: 0.0182606    test: 0.0093363 best: 0.0093363 (595)
596:    learn: 0.0182281    test: 0.0093188 best: 0.0093188 (596)
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597:    learn: 0.0181896    test: 0.0092969 best: 0.0092969 (597)
598:    learn: 0.0181535    test: 0.0092746 best: 0.0092746 (598)
599:    learn: 0.0181262    test: 0.0092649 best: 0.0092649 (599)
600:    learn: 0.0180985    test: 0.0092546 best: 0.0092546 (600)
601:    learn: 0.0180664    test: 0.0092378 best: 0.0092378 (601)    total: 10m 6s    remaining: 6m 40s
602:    learn: 0.0180373    test: 0.0092227 best: 0.0092227 (602)
603:    learn: 0.0180057    test: 0.0092043 best: 0.0092043 (603)
604:    learn: 0.0179733    test: 0.0091873 best: 0.0091873 (604)
605:    learn: 0.0179390    test: 0.0091672 best: 0.0091672 (605)
606:    learn: 0.0179225    test: 0.0091628 best: 0.0091628 (606)
607:    learn: 0.0178895    test: 0.0091476 best: 0.0091476 (607)
608:    learn: 0.0178552    test: 0.0091257 best: 0.0091257 (608)
609:    learn: 0.0178152    test: 0.0091019 best: 0.0091019 (609)
610:    learn: 0.0177818    test: 0.0090810 best: 0.0090810 (610)
611:    learn: 0.0177486    test: 0.0090626 best: 0.0090626 (611)    total: 10m 11s   remaining: 6m 27s
612:    learn: 0.0177242    test: 0.0090485 best: 0.0090485 (612)
613:    learn: 0.0176953    test: 0.0090328 best: 0.0090328 (613)
614:    learn: 0.0176687    test: 0.0090182 best: 0.0090182 (614)
615:    learn: 0.0176478    test: 0.0090086 best: 0.0090086 (615)
616:    learn: 0.0176157    test: 0.0089903 best: 0.0089903 (616)
617:    learn: 0.0175877    test: 0.0089767 best: 0.0089767 (617)
618:    learn: 0.0175542    test: 0.0089550 best: 0.0089550 (618)
619:    learn: 0.0175144    test: 0.0089323 best: 0.0089323 (619)
620:    learn: 0.0174824    test: 0.0089150 best: 0.0089150 (620)
621:    learn: 0.0174585    test: 0.0089061 best: 0.0089061 (621)
622:    learn: 0.0174276    test: 0.0088844 best: 0.0088844 (622)    total: 10m 18s   remaining: 6m 14s
623:    learn: 0.0174005    test: 0.0088723 best: 0.0088723 (623)
624:    learn: 0.0173720    test: 0.0088552 best: 0.0088552 (624)
625:    learn: 0.0173484    test: 0.0088421 best: 0.0088421 (625)
626:    learn: 0.0173265    test: 0.0088327 best: 0.0088327 (626)
627:    learn: 0.0172876    test: 0.0088104 best: 0.0088104 (627)
628:    learn: 0.0172623    test: 0.0087993 best: 0.0087993 (628)
629:    learn: 0.0172327    test: 0.0087814 best: 0.0087814 (629)
630:    learn: 0.0172075    test: 0.0087700 best: 0.0087700 (630)
631:    learn: 0.0171821    test: 0.0087559 best: 0.0087559 (631)
632:    learn: 0.0171562    test: 0.0087451 best: 0.0087451 (632)    total: 10m 24s   remaining: 6m 1s
633:    learn: 0.0171221    test: 0.0087246 best: 0.0087246 (633)
634:    learn: 0.0170874    test: 0.0087043 best: 0.0087043 (634)
635:    learn: 0.0170543    test: 0.0086847 best: 0.0086847 (635)
636:    learn: 0.0170243    test: 0.0086703 best: 0.0086703 (636)
637:    learn: 0.0169900    test: 0.0086501 best: 0.0086501 (637)
638:    learn: 0.0169544    test: 0.0086279 best: 0.0086279 (638)
639:    learn: 0.0169157    test: 0.0086073 best: 0.0086073 (639)
640:    learn: 0.0168867    test: 0.0085896 best: 0.0085896 (640)
641:    learn: 0.0168631    test: 0.0085817 best: 0.0085817 (641)
642:    learn: 0.0168300    test: 0.0085628 best: 0.0085628 (642)
643:    learn: 0.0167988    test: 0.0085454 best: 0.0085454 (643)    total: 10m 30s   remaining: 5m 48s
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644:    learn: 0.0167743    test: 0.0085316 best: 0.0085316 (644)
645:    learn: 0.0167485    test: 0.0085176 best: 0.0085176 (645)
646:    learn: 0.0167291    test: 0.0085097 best: 0.0085097 (646)
647:    learn: 0.0167076    test: 0.0084986 best: 0.0084986 (647)
648:    learn: 0.0166806    test: 0.0084841 best: 0.0084841 (648)
649:    learn: 0.0166541    test: 0.0084704 best: 0.0084704 (649)
650:    learn: 0.0166200    test: 0.0084496 best: 0.0084496 (650)
651:    learn: 0.0165870    test: 0.0084314 best: 0.0084314 (651)
652:    learn: 0.0165687    test: 0.0084251 best: 0.0084251 (652)
653:    learn: 0.0165398    test: 0.0084105 best: 0.0084105 (653)
654:    learn: 0.0165219    test: 0.0084035 best: 0.0084035 (654)    total: 10m 35s   remaining: 5m 34s
655:    learn: 0.0164894    test: 0.0083852 best: 0.0083852 (655)
656:    learn: 0.0164593    test: 0.0083686 best: 0.0083686 (656)
657:    learn: 0.0164271    test: 0.0083487 best: 0.0083487 (657)
658:    learn: 0.0164017    test: 0.0083353 best: 0.0083353 (658)
659:    learn: 0.0163759    test: 0.0083222 best: 0.0083222 (659)
660:    learn: 0.0163486    test: 0.0083082 best: 0.0083082 (660)
661:    learn: 0.0163213    test: 0.0082921 best: 0.0082921 (661)
662:    learn: 0.0163031    test: 0.0082840 best: 0.0082840 (662)
663:    learn: 0.0162808    test: 0.0082723 best: 0.0082723 (663)    total: 10m 41s   remaining: 5m 24s
664:    learn: 0.0162576    test: 0.0082592 best: 0.0082592 (664)
665:    learn: 0.0162296    test: 0.0082434 best: 0.0082434 (665)
666:    learn: 0.0162058    test: 0.0082319 best: 0.0082319 (666)
667:    learn: 0.0161834    test: 0.0082209 best: 0.0082209 (667)
668:    learn: 0.0161622    test: 0.0082110 best: 0.0082110 (668)
669:    learn: 0.0161430    test: 0.0082025 best: 0.0082025 (669)
670:    learn: 0.0161186    test: 0.0081879 best: 0.0081879 (670)
671:    learn: 0.0160949    test: 0.0081735 best: 0.0081735 (671)
672:    learn: 0.0160722    test: 0.0081609 best: 0.0081609 (672)
673:    learn: 0.0160479    test: 0.0081488 best: 0.0081488 (673)
674:    learn: 0.0160263    test: 0.0081389 best: 0.0081389 (674)    total: 10m 47s   remaining: 5m 11s
675:    learn: 0.0159999    test: 0.0081259 best: 0.0081259 (675)
676:    learn: 0.0159745    test: 0.0081104 best: 0.0081104 (676)
677:    learn: 0.0159443    test: 0.0080950 best: 0.0080950 (677)
678:    learn: 0.0159182    test: 0.0080822 best: 0.0080822 (678)
679:    learn: 0.0159012    test: 0.0080747 best: 0.0080747 (679)
680:    learn: 0.0158810    test: 0.0080668 best: 0.0080668 (680)
681:    learn: 0.0158536    test: 0.0080523 best: 0.0080523 (681)
682:    learn: 0.0158320    test: 0.0080409 best: 0.0080409 (682)
683:    learn: 0.0158058    test: 0.0080249 best: 0.0080249 (683)
684:    learn: 0.0157836    test: 0.0080136 best: 0.0080136 (684)    total: 10m 52s   remaining: 5m
685:    learn: 0.0157568    test: 0.0079986 best: 0.0079986 (685)
686:    learn: 0.0157341    test: 0.0079885 best: 0.0079885 (686)
687:    learn: 0.0157083    test: 0.0079743 best: 0.0079743 (687)
688:    learn: 0.0156815    test: 0.0079562 best: 0.0079562 (688)
689:    learn: 0.0156579    test: 0.0079421 best: 0.0079421 (689)
690:    learn: 0.0156353    test: 0.0079316 best: 0.0079316 (690)    total: 10m 56s   remaining: 4m 53s
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691:    learn: 0.0156191    test: 0.0079255 best: 0.0079255 (691)
692:    learn: 0.0155920    test: 0.0079093 best: 0.0079093 (692)
693:    learn: 0.0155715    test: 0.0079001 best: 0.0079001 (693)
694:    learn: 0.0155527    test: 0.0078911 best: 0.0078911 (694)
695:    learn: 0.0155303    test: 0.0078794 best: 0.0078794 (695)
696:    learn: 0.0155057    test: 0.0078664 best: 0.0078664 (696)    total: 10m 59s   remaining: 4m 46s
697:    learn: 0.0154814    test: 0.0078550 best: 0.0078550 (697)
698:    learn: 0.0154557    test: 0.0078391 best: 0.0078391 (698)
699:    learn: 0.0154400    test: 0.0078333 best: 0.0078333 (699)
700:    learn: 0.0154227    test: 0.0078265 best: 0.0078265 (700)
701:    learn: 0.0153981    test: 0.0078152 best: 0.0078152 (701)
702:    learn: 0.0153700    test: 0.0078010 best: 0.0078010 (702)
703:    learn: 0.0153477    test: 0.0077895 best: 0.0077895 (703)
704:    learn: 0.0153306    test: 0.0077808 best: 0.0077808 (704)
705:    learn: 0.0153117    test: 0.0077712 best: 0.0077712 (705)
706:    learn: 0.0152864    test: 0.0077569 best: 0.0077569 (706)    total: 11m 4s    remaining: 4m 35s
707:    learn: 0.0152619    test: 0.0077463 best: 0.0077463 (707)
708:    learn: 0.0152454    test: 0.0077392 best: 0.0077392 (708)
709:    learn: 0.0152279    test: 0.0077319 best: 0.0077319 (709)
710:    learn: 0.0152060    test: 0.0077208 best: 0.0077208 (710)
711:    learn: 0.0151850    test: 0.0077105 best: 0.0077105 (711)
712:    learn: 0.0151592    test: 0.0076949 best: 0.0076949 (712)
713:    learn: 0.0151375    test: 0.0076832 best: 0.0076832 (713)
714:    learn: 0.0151163    test: 0.0076726 best: 0.0076726 (714)
715:    learn: 0.0150921    test: 0.0076615 best: 0.0076615 (715)
716:    learn: 0.0150743    test: 0.0076547 best: 0.0076547 (716)
717:    learn: 0.0150556    test: 0.0076451 best: 0.0076451 (717)
718:    learn: 0.0150270    test: 0.0076255 best: 0.0076255 (718)    total: 11m 11s   remaining: 4m 22s
719:    learn: 0.0150068    test: 0.0076158 best: 0.0076158 (719)
720:    learn: 0.0149869    test: 0.0076053 best: 0.0076053 (720)
721:    learn: 0.0149634    test: 0.0075922 best: 0.0075922 (721)
722:    learn: 0.0149389    test: 0.0075806 best: 0.0075806 (722)    total: 11m 13s   remaining: 4m 18s
723:    learn: 0.0149179    test: 0.0075695 best: 0.0075695 (723)
724:    learn: 0.0148995    test: 0.0075597 best: 0.0075597 (724)
725:    learn: 0.0148758    test: 0.0075461 best: 0.0075461 (725)    total: 11m 15s   remaining: 4m 14s
726:    learn: 0.0148516    test: 0.0075335 best: 0.0075335 (726)
727:    learn: 0.0148250    test: 0.0075174 best: 0.0075174 (727)
728:    learn: 0.0148116    test: 0.0075141 best: 0.0075141 (728)
729:    learn: 0.0147873    test: 0.0074997 best: 0.0074997 (729)
730:    learn: 0.0147633    test: 0.0074870 best: 0.0074870 (730)
731:    learn: 0.0147405    test: 0.0074736 best: 0.0074736 (731)
732:    learn: 0.0147217    test: 0.0074642 best: 0.0074642 (732)
733:    learn: 0.0147011    test: 0.0074542 best: 0.0074542 (733)
734:    learn: 0.0146785    test: 0.0074430 best: 0.0074430 (734)
735:    learn: 0.0146547    test: 0.0074300 best: 0.0074300 (735)
736:    learn: 0.0146313    test: 0.0074166 best: 0.0074166 (736)    total: 11m 20s   remaining: 4m 2s
737:    learn: 0.0146065    test: 0.0074026 best: 0.0074026 (737)
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738:    learn: 0.0145881    test: 0.0073949 best: 0.0073949 (738)
739:    learn: 0.0145642    test: 0.0073816 best: 0.0073816 (739)
740:    learn: 0.0145465    test: 0.0073720 best: 0.0073720 (740)
741:    learn: 0.0145242    test: 0.0073604 best: 0.0073604 (741)
742:    learn: 0.0145071    test: 0.0073522 best: 0.0073522 (742)
743:    learn: 0.0144869    test: 0.0073410 best: 0.0073410 (743)
744:    learn: 0.0144719    test: 0.0073350 best: 0.0073350 (744)
745:    learn: 0.0144470    test: 0.0073210 best: 0.0073210 (745)    total: 11m 26s   remaining: 3m 53s
746:    learn: 0.0144299    test: 0.0073121 best: 0.0073121 (746)
747:    learn: 0.0144082    test: 0.0073011 best: 0.0073011 (747)
748:    learn: 0.0143871    test: 0.0072900 best: 0.0072900 (748)
749:    learn: 0.0143626    test: 0.0072771 best: 0.0072771 (749)
750:    learn: 0.0143449    test: 0.0072697 best: 0.0072697 (750)
751:    learn: 0.0143168    test: 0.0072505 best: 0.0072505 (751)
752:    learn: 0.0142982    test: 0.0072399 best: 0.0072399 (752)
753:    learn: 0.0142785    test: 0.0072289 best: 0.0072289 (753)
754:    learn: 0.0142546    test: 0.0072171 best: 0.0072171 (754)
755:    learn: 0.0142275    test: 0.0072017 best: 0.0072017 (755)    total: 11m 31s   remaining: 3m 43s
756:    learn: 0.0142037    test: 0.0071894 best: 0.0071894 (756)
757:    learn: 0.0141862    test: 0.0071829 best: 0.0071829 (757)
758:    learn: 0.0141650    test: 0.0071702 best: 0.0071702 (758)
759:    learn: 0.0141437    test: 0.0071590 best: 0.0071590 (759)
760:    learn: 0.0141196    test: 0.0071476 best: 0.0071476 (760)
761:    learn: 0.0141005    test: 0.0071398 best: 0.0071398 (761)
762:    learn: 0.0140851    test: 0.0071340 best: 0.0071340 (762)
763:    learn: 0.0140662    test: 0.0071227 best: 0.0071227 (763)
764:    learn: 0.0140447    test: 0.0071116 best: 0.0071116 (764)
765:    learn: 0.0140222    test: 0.0070996 best: 0.0070996 (765)
766:    learn: 0.0140047    test: 0.0070892 best: 0.0070892 (766)
767:    learn: 0.0139874    test: 0.0070797 best: 0.0070797 (767)    total: 11m 37s   remaining: 3m 30s
768:    learn: 0.0139680    test: 0.0070666 best: 0.0070666 (768)
769:    learn: 0.0139539    test: 0.0070607 best: 0.0070607 (769)
770:    learn: 0.0139291    test: 0.0070465 best: 0.0070465 (770)
771:    learn: 0.0139116    test: 0.0070397 best: 0.0070397 (771)
772:    learn: 0.0138931    test: 0.0070296 best: 0.0070296 (772)
773:    learn: 0.0138783    test: 0.0070233 best: 0.0070233 (773)
774:    learn: 0.0138646    test: 0.0070171 best: 0.0070171 (774)
775:    learn: 0.0138400    test: 0.0070027 best: 0.0070027 (775)
776:    learn: 0.0138243    test: 0.0069941 best: 0.0069941 (776)
777:    learn: 0.0138067    test: 0.0069857 best: 0.0069857 (777)
778:    learn: 0.0137883    test: 0.0069756 best: 0.0069756 (778)
779:    learn: 0.0137722    test: 0.0069663 best: 0.0069663 (779)    total: 11m 45s   remaining: 3m 18s
780:    learn: 0.0137526    test: 0.0069559 best: 0.0069559 (780)
781:    learn: 0.0137317    test: 0.0069454 best: 0.0069454 (781)
782:    learn: 0.0137141    test: 0.0069394 best: 0.0069394 (782)
783:    learn: 0.0136968    test: 0.0069293 best: 0.0069293 (783)
784:    learn: 0.0136731    test: 0.0069154 best: 0.0069154 (784)
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785:    learn: 0.0136567    test: 0.0069082 best: 0.0069082 (785)    total: 11m 48s   remaining: 3m 13s
786:    learn: 0.0136367    test: 0.0068977 best: 0.0068977 (786)
787:    learn: 0.0136141    test: 0.0068850 best: 0.0068850 (787)
788:    learn: 0.0135964    test: 0.0068744 best: 0.0068744 (788)    total: 11m 50s   remaining: 3m 10s
789:    learn: 0.0135810    test: 0.0068671 best: 0.0068671 (789)
790:    learn: 0.0135589    test: 0.0068554 best: 0.0068554 (790)
791:    learn: 0.0135396    test: 0.0068453 best: 0.0068453 (791)
792:    learn: 0.0135237    test: 0.0068381 best: 0.0068381 (792)
793:    learn: 0.0135070    test: 0.0068294 best: 0.0068294 (793)
794:    learn: 0.0134895    test: 0.0068189 best: 0.0068189 (794)
795:    learn: 0.0134724    test: 0.0068084 best: 0.0068084 (795)
796:    learn: 0.0134500    test: 0.0067943 best: 0.0067943 (796)
797:    learn: 0.0134358    test: 0.0067885 best: 0.0067885 (797)
798:    learn: 0.0134170    test: 0.0067789 best: 0.0067789 (798)
799:    learn: 0.0133975    test: 0.0067707 best: 0.0067707 (799)    total: 11m 56s   remaining: 2m 59s
800:    learn: 0.0133814    test: 0.0067626 best: 0.0067626 (800)
801:    learn: 0.0133618    test: 0.0067502 best: 0.0067502 (801)
802:    learn: 0.0133405    test: 0.0067390 best: 0.0067390 (802)
803:    learn: 0.0133244    test: 0.0067299 best: 0.0067299 (803)
804:    learn: 0.0133091    test: 0.0067204 best: 0.0067204 (804)
805:    learn: 0.0132925    test: 0.0067121 best: 0.0067121 (805)
806:    learn: 0.0132767    test: 0.0067045 best: 0.0067045 (806)    total: 12m       remaining: 2m 52s
807:    learn: 0.0132545    test: 0.0066925 best: 0.0066925 (807)
808:    learn: 0.0132428    test: 0.0066865 best: 0.0066865 (808)
809:    learn: 0.0132288    test: 0.0066814 best: 0.0066814 (809)
810:    learn: 0.0132131    test: 0.0066746 best: 0.0066746 (810)
811:    learn: 0.0131967    test: 0.0066650 best: 0.0066650 (811)
812:    learn: 0.0131788    test: 0.0066542 best: 0.0066542 (812)
813:    learn: 0.0131607    test: 0.0066451 best: 0.0066451 (813)
814:    learn: 0.0131458    test: 0.0066367 best: 0.0066367 (814)
815:    learn: 0.0131276    test: 0.0066276 best: 0.0066276 (815)
816:    learn: 0.0131064    test: 0.0066144 best: 0.0066144 (816)
817:    learn: 0.0130845    test: 0.0066015 best: 0.0066015 (817)    total: 12m 6s    remaining: 2m 41s
818:    learn: 0.0130734    test: 0.0065978 best: 0.0065978 (818)
819:    learn: 0.0130555    test: 0.0065881 best: 0.0065881 (819)
820:    learn: 0.0130317    test: 0.0065731 best: 0.0065731 (820)
821:    learn: 0.0130122    test: 0.0065614 best: 0.0065614 (821)
822:    learn: 0.0129963    test: 0.0065511 best: 0.0065511 (822)
823:    learn: 0.0129786    test: 0.0065429 best: 0.0065429 (823)
824:    learn: 0.0129596    test: 0.0065313 best: 0.0065313 (824)
825:    learn: 0.0129441    test: 0.0065233 best: 0.0065233 (825)
826:    learn: 0.0129302    test: 0.0065161 best: 0.0065161 (826)
827:    learn: 0.0129117    test: 0.0065072 best: 0.0065072 (827)
828:    learn: 0.0129008    test: 0.0065018 best: 0.0065018 (828)
829:    learn: 0.0128808    test: 0.0064905 best: 0.0064905 (829)    total: 12m 15s   remaining: 2m 30s
830:    learn: 0.0128605    test: 0.0064805 best: 0.0064805 (830)
831:    learn: 0.0128452    test: 0.0064721 best: 0.0064721 (831)
```

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832:    learn: 0.0128309    test: 0.0064649 best: 0.0064649 (832)
833:    learn: 0.0128126    test: 0.0064554 best: 0.0064554 (833)
834:    learn: 0.0127981    test: 0.0064471 best: 0.0064471 (834)
835:    learn: 0.0127804    test: 0.0064381 best: 0.0064381 (835)
836:    learn: 0.0127670    test: 0.0064309 best: 0.0064309 (836)
837:    learn: 0.0127503    test: 0.0064235 best: 0.0064235 (837)    total: 12m 22s   remaining: 2m 23s
838:    learn: 0.0127328    test: 0.0064134 best: 0.0064134 (838)
839:    learn: 0.0127197    test: 0.0064074 best: 0.0064074 (839)
840:    learn: 0.0127023    test: 0.0063974 best: 0.0063974 (840)
841:    learn: 0.0126903    test: 0.0063916 best: 0.0063916 (841)
842:    learn: 0.0126719    test: 0.0063812 best: 0.0063812 (842)
843:    learn: 0.0126578    test: 0.0063738 best: 0.0063738 (843)    total: 12m 28s   remaining: 2m 18s
844:    learn: 0.0126416    test: 0.0063652 best: 0.0063652 (844)
845:    learn: 0.0126274    test: 0.0063574 best: 0.0063574 (845)
846:    learn: 0.0126130    test: 0.0063507 best: 0.0063507 (846)
847:    learn: 0.0126016    test: 0.0063454 best: 0.0063454 (847)
848:    learn: 0.0125843    test: 0.0063361 best: 0.0063361 (848)
849:    learn: 0.0125607    test: 0.0063224 best: 0.0063224 (849)
850:    learn: 0.0125451    test: 0.0063139 best: 0.0063139 (850)    total: 12m 34s   remaining: 2m 12s
851:    learn: 0.0125269    test: 0.0063034 best: 0.0063034 (851)
852:    learn: 0.0125100    test: 0.0062961 best: 0.0062961 (852)
853:    learn: 0.0124953    test: 0.0062876 best: 0.0062876 (853)
854:    learn: 0.0124787    test: 0.0062782 best: 0.0062782 (854)
855:    learn: 0.0124662    test: 0.0062703 best: 0.0062703 (855)    total: 12m 39s   remaining: 2m 7s
856:    learn: 0.0124539    test: 0.0062642 best: 0.0062642 (856)
857:    learn: 0.0124402    test: 0.0062576 best: 0.0062576 (857)
858:    learn: 0.0124268    test: 0.0062519 best: 0.0062519 (858)
859:    learn: 0.0124096    test: 0.0062445 best: 0.0062445 (859)
860:    learn: 0.0123961    test: 0.0062380 best: 0.0062380 (860)
861:    learn: 0.0123833    test: 0.0062324 best: 0.0062324 (861)
862:    learn: 0.0123666    test: 0.0062228 best: 0.0062228 (862)
863:    learn: 0.0123519    test: 0.0062146 best: 0.0062146 (863)
864:    learn: 0.0123362    test: 0.0062080 best: 0.0062080 (864)
865:    learn: 0.0123219    test: 0.0062012 best: 0.0062012 (865)
866:    learn: 0.0123077    test: 0.0061945 best: 0.0061945 (866)
867:    learn: 0.0122936    test: 0.0061884 best: 0.0061884 (867)    total: 12m 49s   remaining: 1m 57s
868:    learn: 0.0122801    test: 0.0061833 best: 0.0061833 (868)    total: 12m 50s   remaining: 1m 56s
869:    learn: 0.0122604    test: 0.0061724 best: 0.0061724 (869)
870:    learn: 0.0122476    test: 0.0061661 best: 0.0061661 (870)
871:    learn: 0.0122366    test: 0.0061617 best: 0.0061617 (871)
872:    learn: 0.0122190    test: 0.0061540 best: 0.0061540 (872)
873:    learn: 0.0121976    test: 0.0061425 best: 0.0061425 (873)
874:    learn: 0.0121874    test: 0.0061379 best: 0.0061379 (874)
875:    learn: 0.0121757    test: 0.0061335 best: 0.0061335 (875)    total: 12m 57s   remaining: 1m 50s
876:    learn: 0.0121617    test: 0.0061270 best: 0.0061270 (876)
877:    learn: 0.0121460    test: 0.0061182 best: 0.0061182 (877)
878:    learn: 0.0121330    test: 0.0061104 best: 0.0061104 (878)
```

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879:    learn: 0.0121203    test: 0.0061042 best: 0.0061042 (879)
880:    learn: 0.0121039    test: 0.0060967 best: 0.0060967 (880)
881:    learn: 0.0120876    test: 0.0060886 best: 0.0060886 (881)
882:    learn: 0.0120680    test: 0.0060780 best: 0.0060780 (882)
883:    learn: 0.0120493    test: 0.0060676 best: 0.0060676 (883)    total: 13m 4s    remaining: 1m 42s
884:    learn: 0.0120371    test: 0.0060612 best: 0.0060612 (884)
885:    learn: 0.0120199    test: 0.0060523 best: 0.0060523 (885)
886:    learn: 0.0120081    test: 0.0060468 best: 0.0060468 (886)
887:    learn: 0.0119908    test: 0.0060371 best: 0.0060371 (887)
888:    learn: 0.0119777    test: 0.0060305 best: 0.0060305 (888)
889:    learn: 0.0119608    test: 0.0060217 best: 0.0060217 (889)
890:    learn: 0.0119452    test: 0.0060129 best: 0.0060129 (890)
891:    learn: 0.0119269    test: 0.0060033 best: 0.0060033 (891)
892:    learn: 0.0119154    test: 0.0059989 best: 0.0059989 (892)
893:    learn: 0.0118986    test: 0.0059884 best: 0.0059884 (893)
894:    learn: 0.0118841    test: 0.0059789 best: 0.0059789 (894)    total: 13m 14s   remaining: 1m 33s
895:    learn: 0.0118669    test: 0.0059691 best: 0.0059691 (895)
896:    learn: 0.0118521    test: 0.0059616 best: 0.0059616 (896)
897:    learn: 0.0118335    test: 0.0059511 best: 0.0059511 (897)
898:    learn: 0.0118179    test: 0.0059429 best: 0.0059429 (898)
899:    learn: 0.0118006    test: 0.0059317 best: 0.0059317 (899)
900:    learn: 0.0117874    test: 0.0059237 best: 0.0059237 (900)    total: 13m 19s   remaining: 1m 27s
901:    learn: 0.0117754    test: 0.0059176 best: 0.0059176 (901)
902:    learn: 0.0117625    test: 0.0059101 best: 0.0059101 (902)
903:    learn: 0.0117537    test: 0.0059062 best: 0.0059062 (903)
904:    learn: 0.0117412    test: 0.0059014 best: 0.0059014 (904)
905:    learn: 0.0117266    test: 0.0058943 best: 0.0058943 (905)
906:    learn: 0.0117165    test: 0.0058889 best: 0.0058889 (906)
907:    learn: 0.0117028    test: 0.0058824 best: 0.0058824 (907)    total: 13m 26s   remaining: 1m 21s
908:    learn: 0.0116924    test: 0.0058784 best: 0.0058784 (908)
909:    learn: 0.0116784    test: 0.0058710 best: 0.0058710 (909)
910:    learn: 0.0116640    test: 0.0058637 best: 0.0058637 (910)
911:    learn: 0.0116493    test: 0.0058577 best: 0.0058577 (911)
912:    learn: 0.0116386    test: 0.0058538 best: 0.0058538 (912)
913:    learn: 0.0116257    test: 0.0058486 best: 0.0058486 (913)    total: 13m 31s   remaining: 1m 16s
914:    learn: 0.0116124    test: 0.0058418 best: 0.0058418 (914)
915:    learn: 0.0115995    test: 0.0058346 best: 0.0058346 (915)
916:    learn: 0.0115839    test: 0.0058262 best: 0.0058262 (916)
917:    learn: 0.0115693    test: 0.0058197 best: 0.0058197 (917)
918:    learn: 0.0115567    test: 0.0058141 best: 0.0058141 (918)
919:    learn: 0.0115428    test: 0.0058066 best: 0.0058066 (919)    total: 13m 37s   remaining: 1m 11s
920:    learn: 0.0115311    test: 0.0058023 best: 0.0058023 (920)
921:    learn: 0.0115187    test: 0.0057964 best: 0.0057964 (921)
922:    learn: 0.0115061    test: 0.0057896 best: 0.0057896 (922)
923:    learn: 0.0114919    test: 0.0057803 best: 0.0057803 (923)
924:    learn: 0.0114785    test: 0.0057736 best: 0.0057736 (924)
925:    learn: 0.0114657    test: 0.0057673 best: 0.0057673 (925)
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926:     learn: 0.0114545     test: 0.0057612 best: 0.0057612 (926)
927:     learn: 0.0114427     test: 0.0057550 best: 0.0057550 (927)
928:     learn: 0.0114272     test: 0.0057461 best: 0.0057461 (928)     total: 13m 44s   remaining: 1m 3s
929:     learn: 0.0114153     test: 0.0057404 best: 0.0057404 (929)
930:     learn: 0.0113998     test: 0.0057318 best: 0.0057318 (930)
931:     learn: 0.0113866     test: 0.0057247 best: 0.0057247 (931)
932:     learn: 0.0113731     test: 0.0057160 best: 0.0057160 (932)
933:     learn: 0.0113630     test: 0.0057118 best: 0.0057118 (933)
934:     learn: 0.0113522     test: 0.0057076 best: 0.0057076 (934)
935:     learn: 0.0113374     test: 0.0056987 best: 0.0056987 (935)     total: 13m 50s   remaining: 56.8s
936:     learn: 0.0113232     test: 0.0056923 best: 0.0056923 (936)
937:     learn: 0.0113078     test: 0.0056838 best: 0.0056838 (937)
938:     learn: 0.0112929     test: 0.0056743 best: 0.0056743 (938)
939:     learn: 0.0112828     test: 0.0056689 best: 0.0056689 (939)
940:     learn: 0.0112674     test: 0.0056606 best: 0.0056606 (940)     total: 13m 57s   remaining: 52.5s
941:     learn: 0.0112564     test: 0.0056561 best: 0.0056561 (941)
942:     learn: 0.0112431     test: 0.0056502 best: 0.0056502 (942)
943:     learn: 0.0112295     test: 0.0056424 best: 0.0056424 (943)
944:     learn: 0.0112165     test: 0.0056355 best: 0.0056355 (944)     total: 14m 3s    remaining: 49.1s
945:     learn: 0.0112065     test: 0.0056317 best: 0.0056317 (945)
946:     learn: 0.0111965     test: 0.0056269 best: 0.0056269 (946)
947:     learn: 0.0111827     test: 0.0056193 best: 0.0056193 (947)
948:     learn: 0.0111716     test: 0.0056140 best: 0.0056140 (948)     total: 14m 9s    remaining: 45.6s
949:     learn: 0.0111603     test: 0.0056074 best: 0.0056074 (949)
950:     learn: 0.0111455     test: 0.0055991 best: 0.0055991 (950)
951:     learn: 0.0111357     test: 0.0055947 best: 0.0055947 (951)     total: 14m 13s   remaining: 43s
952:     learn: 0.0111242     test: 0.0055885 best: 0.0055885 (952)
953:     learn: 0.0111139     test: 0.0055830 best: 0.0055830 (953)
954:     learn: 0.0110970     test: 0.0055753 best: 0.0055753 (954)
955:     learn: 0.0110868     test: 0.0055704 best: 0.0055704 (955)     total: 14m 19s   remaining: 39.6s
956:     learn: 0.0110762     test: 0.0055651 best: 0.0055651 (956)
957:     learn: 0.0110624     test: 0.0055566 best: 0.0055566 (957)
958:     learn: 0.0110505     test: 0.0055504 best: 0.0055504 (958)
959:     learn: 0.0110382     test: 0.0055436 best: 0.0055436 (959)
960:     learn: 0.0110209     test: 0.0055321 best: 0.0055321 (960)     total: 14m 27s   remaining: 35.2s
961:     learn: 0.0110101     test: 0.0055272 best: 0.0055272 (961)
962:     learn: 0.0109972     test: 0.0055202 best: 0.0055202 (962)
963:     learn: 0.0109857     test: 0.0055148 best: 0.0055148 (963)
964:     learn: 0.0109722     test: 0.0055076 best: 0.0055076 (964)     total: 14m 32s   remaining: 31.6s
965:     learn: 0.0109601     test: 0.0055021 best: 0.0055021 (965)
966:     learn: 0.0109458     test: 0.0054949 best: 0.0054949 (966)
967:     learn: 0.0109324     test: 0.0054876 best: 0.0054876 (967)     total: 14m 37s   remaining: 29s
968:     learn: 0.0109212     test: 0.0054821 best: 0.0054821 (968)     total: 14m 39s   remaining: 28.1s
969:     learn: 0.0109131     test: 0.0054790 best: 0.0054790 (969)
970:     learn: 0.0109026     test: 0.0054738 best: 0.0054738 (970)
971:     learn: 0.0108922     test: 0.0054694 best: 0.0054694 (971)
972:     learn: 0.0108819     test: 0.0054636 best: 0.0054636 (972)     total: 14m 44s   remaining: 24.6s
```

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973:    learn: 0.0108696        test: 0.0054564 best: 0.0054564 (973)
974:    learn: 0.0108589        test: 0.0054491 best: 0.0054491 (974)
975:    learn: 0.0108486        test: 0.0054442 best: 0.0054442 (975)
976:    learn: 0.0108347        test: 0.0054366 best: 0.0054366 (976)    total: 14m 50s  remaining: 21s
977:    learn: 0.0108238        test: 0.0054324 best: 0.0054324 (977)
978:    learn: 0.0108117        test: 0.0054245 best: 0.0054245 (978)
979:    learn: 0.0107999        test: 0.0054171 best: 0.0054171 (979)
980:    learn: 0.0107877        test: 0.0054112 best: 0.0054112 (980)    total: 14m 56s  remaining: 17.4s
981:    learn: 0.0107759        test: 0.0054053 best: 0.0054053 (981)
982:    learn: 0.0107639        test: 0.0053995 best: 0.0053995 (982)
983:    learn: 0.0107545        test: 0.0053948 best: 0.0053948 (983)
984:    learn: 0.0107437        test: 0.0053884 best: 0.0053884 (984)    total: 15m 2s   remaining: 13.7s
985:    learn: 0.0107313        test: 0.0053833 best: 0.0053833 (985)    total: 15m 4s   remaining: 12.8s
986:    learn: 0.0107221        test: 0.0053776 best: 0.0053776 (986)    total: 15m 5s   remaining: 11.9s
987:    learn: 0.0107125        test: 0.0053731 best: 0.0053731 (987)
988:    learn: 0.0107019        test: 0.0053674 best: 0.0053674 (988)
989:    learn: 0.0106925        test: 0.0053634 best: 0.0053634 (989)    total: 15m 10s  remaining: 9.2s
990:    learn: 0.0106818        test: 0.0053570 best: 0.0053570 (990)
991:    learn: 0.0106717        test: 0.0053528 best: 0.0053528 (991)
992:    learn: 0.0106606        test: 0.0053468 best: 0.0053468 (992)
993:    learn: 0.0106519        test: 0.0053413 best: 0.0053413 (993)    total: 15m 15s  remaining: 5.53s
994:    learn: 0.0106407        test: 0.0053357 best: 0.0053357 (994)
995:    learn: 0.0106292        test: 0.0053292 best: 0.0053292 (995)
996:    learn: 0.0106193        test: 0.0053235 best: 0.0053235 (996)
997:    learn: 0.0106100        test: 0.0053199 best: 0.0053199 (997)    total: 15m 21s  remaining: 1.85s
998:    learn: 0.0106029        test: 0.0053175 best: 0.0053175 (998)
999:    learn: 0.0105913        test: 0.0053101 best: 0.0053101 (999)    total: 15m 24s  remaining: 0us
```

In [20]:
```python
print("---CatBoost Metrics---")
print("Accuracy: {}".format(acc_catboost))
print("Accuracy cross-validation 10-Fold: {}".format(acc_cv_catboost))
print("Running Time: {}".format(datetime.timedelta(seconds=catboost_time)))
```

```
---CatBoost Metrics---
Accuracy: 100.0
Accuracy cross-validation 10-Fold: 100.0
Running Time: 0:16:28.578107
```

In [21]:
```python
models = pd.DataFrame({
    'Model': ['KNN', 'Logistic Regression', 'Naive Bayes',
              'Stochastic Gradient Decent', 'Linear SVC',
              'Decision Tree', 'Gradient Boosting Trees',
              'CatBoost'],
    'Score': [
        acc_knn,
        acc_log,
```

```
            acc_gaussian,
            acc_sgd,
            acc_linear_svc,
            acc_dt,
            acc_gbt,
            acc_catboost
    ]})
 print("---Reuglar Accuracy Scores---")
 models.sort_values(by='Score', ascending=False)
```

---Reuglar Accuracy Scores---

Out[21]:

	Model	Score
2	Naive Bayes	100.00
5	Decision Tree	100.00
6	Gradient Boosting Trees	100.00
7	CatBoost	100.00
1	Logistic Regression	82.91
0	KNN	63.32
4	Linear SVC	57.29
3	Stochastic Gradient Decent	42.21

In [22]:
```python
cv_models = pd.DataFrame({
    'Model': ['KNN', 'Logistic Regression', 'Naive Bayes',
              'Stochastic Gradient Decent', 'Linear SVC',
              'Decision Tree', 'Gradient Boosting Trees',
              'CatBoost'],
    'Score': [
        acc_cv_knn,
        acc_cv_log,
        acc_cv_gaussian,
        acc_cv_sgd,
        acc_cv_linear_svc,
        acc_cv_dt,
        acc_cv_gbt,
        acc_cv_catboost
    ]})
```

```
print('---Cross-validation Accuracy Scores---')
cv_models.sort_values(by='Score', ascending=False)
```

---Cross-validation Accuracy Scores---

Out[22]:

	Model	Score
2	Naive Bayes	100.00
5	Decision Tree	100.00
6	Gradient Boosting Trees	100.00
7	CatBoost	100.00
1	Logistic Regression	80.40
4	Linear SVC	63.32
0	KNN	43.72
3	Stochastic Gradient Decent	37.69

In [ ]: