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
import os
os.chdir("D:\\M.Tech\\Main_Project Files")
```

In [3]:
```python
df = pd.read_csv("a4.csv")
```

In [4]:
```python
df.head()
```

Out[4]:

age	sex	bc	bp	hereditary	smoking	alcohol	exercise	diabetes	diet	obesity	stress	target

	age	sex	bc	bp	hereditary	smoking	alcohol	exercise	diabetes	diet	obesity	stress	target
0	69	1	197	101	1	0	1	1	1	0	0	0	1
1	61	0	250	144	0	1	0	0	1	-1	1	1	0
2	35	0	182	123	0	0	1	0	0	1	0	0	1
3	29	1	170	131	0	0	1	1	0	0	0	0	1
4	38	0	192	123	1	0	1	1	1	0	0	1	1

In [5]:
```python
# Split the dataframe into data and labels
X_train = df.drop('obesity', axis=1) # data
y_train = df.target # labels
```

In [6]:
```python
# 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 [7]:
```python
# 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: 100.0
Accuracy CV 10-Fold: 100.0
Running Time: 0:00:03.867451
```

In [8]:
```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: 88.37
Accuracy CV 10-Fold: 85.38
Running Time: 0:00:00.096117
```

In [9]:
```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: 0:00:00.034906
```

In [10]:
```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: 91.69
Accuracy CV 10-Fold: 92.03
Running Time: 0:00:00.063932
```

In [11]:
```
# 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: 68.44
Accuracy CV 10-Fold: 54.15
Running Time: 0:00:00.029919
```

In [12]:
```
# 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: 0:00:00.046874
```

In [13]:
```
# 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: 0:00:00.209229
```

In [14]:
```python
# Define the categorical features for the CatBoost model
cat_features = np.where(X_train.dtypes != np.float)[0]
cat_features
```

Out[14]: `array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11], dtype=int64)`

In [15]:
```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 [16]:
```python
catboost_model = CatBoostClassifier(iterations=1000,
                                    custom_loss=['Accuracy'],
                                    loss_function='Logloss')

# 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 0.00617
0:      learn: 0.6763783      total: 139ms     remaining: 2m 18s
1:      learn: 0.6623684      total: 173ms     remaining: 1m 26s
2:      learn: 0.6454785      total: 184ms     remaining: 1m 1s
3:      learn: 0.6339961      total: 214ms     remaining: 53.4s
4:      learn: 0.6178471      total: 227ms     remaining: 45.2s
5:      learn: 0.6022904      total: 247ms     remaining: 40.9s
6:      learn: 0.5909676      total: 270ms     remaining: 38.3s
7:      learn: 0.5758241      total: 280ms     remaining: 34.7s
8:      learn: 0.5611752      total: 294ms     remaining: 32.3s
9:      learn: 0.5470642      total: 311ms     remaining: 30.8s
10:     learn: 0.5355469      total: 346ms     remaining: 31.1s
11:     learn: 0.5240925      total: 369ms     remaining: 30.3s
12:     learn: 0.5106299      total: 378ms     remaining: 28.7s
13:     learn: 0.4992488      total: 403ms     remaining: 28.4s
```

```
14:     learn: 0.4909818        total: 435ms     remaining: 28.6s
15:     learn: 0.4783679        total: 446ms     remaining: 27.4s
16:     learn: 0.4660797        total: 453ms     remaining: 26.2s
17:     learn: 0.4566497        total: 480ms     remaining: 26.2s
18:     learn: 0.4459404        total: 505ms     remaining: 26.1s
19:     learn: 0.4354968        total: 517ms     remaining: 25.4s
20:     learn: 0.4263545        total: 537ms     remaining: 25s
21:     learn: 0.4158287        total: 556ms     remaining: 24.7s
22:     learn: 0.4069225        total: 579ms     remaining: 24.6s
23:     learn: 0.3987202        total: 606ms     remaining: 24.6s
24:     learn: 0.3886218        total: 618ms     remaining: 24.1s
25:     learn: 0.3817742        total: 656ms     remaining: 24.6s
26:     learn: 0.3730750        total: 676ms     remaining: 24.3s
27:     learn: 0.3635607        total: 683ms     remaining: 23.7s
28:     learn: 0.3555346        total: 701ms     remaining: 23.5s
29:     learn: 0.3468123        total: 720ms     remaining: 23.3s
30:     learn: 0.3380031        total: 732ms     remaining: 22.9s
31:     learn: 0.3317916        total: 773ms     remaining: 23.4s
32:     learn: 0.3236605        total: 794ms     remaining: 23.3s
33:     learn: 0.3177881        total: 825ms     remaining: 23.4s
34:     learn: 0.3107565        total: 852ms     remaining: 23.5s
35:     learn: 0.3041666        total: 886ms     remaining: 23.7s
36:     learn: 0.2989127        total: 923ms     remaining: 24s
37:     learn: 0.2930465        total: 950ms     remaining: 24s
38:     learn: 0.2873302        total: 982ms     remaining: 24.2s
39:     learn: 0.2808396        total: 1s         remaining: 24s
40:     learn: 0.2742680        total: 1.03s     remaining: 24s
41:     learn: 0.2677578        total: 1.04s     remaining: 23.8s
42:     learn: 0.2627527        total: 1.07s     remaining: 23.8s
43:     learn: 0.2572702        total: 1.1s      remaining: 23.9s
44:     learn: 0.2508925        total: 1.11s     remaining: 23.6s
45:     learn: 0.2455356        total: 1.13s     remaining: 23.4s
46:     learn: 0.2402239        total: 1.15s     remaining: 23.4s
47:     learn: 0.2353906        total: 1.19s     remaining: 23.6s
48:     learn: 0.2296103        total: 1.2s      remaining: 23.2s
49:     learn: 0.2246374        total: 1.23s     remaining: 23.5s
50:     learn: 0.2202385        total: 1.28s     remaining: 23.9s
51:     learn: 0.2157065        total: 1.33s     remaining: 24.3s
52:     learn: 0.2115584        total: 1.36s     remaining: 24.4s
53:     learn: 0.2064290        total: 1.37s     remaining: 24.1s
54:     learn: 0.2036879        total: 1.41s     remaining: 24.2s
55:     learn: 0.1994933        total: 1.43s     remaining: 24.1s
56:     learn: 0.1949503        total: 1.45s     remaining: 24s
57:     learn: 0.1909657        total: 1.48s     remaining: 24.1s
58:     learn: 0.1870223        total: 1.5s      remaining: 23.9s
59:     learn: 0.1835976        total: 1.53s     remaining: 24s
60:     learn: 0.1794075        total: 1.55s     remaining: 23.9s
```

```
61:     learn: 0.1755179      total: 1.57s    remaining: 23.8s
62:     learn: 0.1713904      total: 1.59s    remaining: 23.6s
63:     learn: 0.1684558      total: 1.61s    remaining: 23.6s
64:     learn: 0.1649038      total: 1.64s    remaining: 23.6s
65:     learn: 0.1615463      total: 1.66s    remaining: 23.6s
66:     learn: 0.1584107      total: 1.7s     remaining: 23.6s
67:     learn: 0.1547233      total: 1.71s    remaining: 23.4s
68:     learn: 0.1522693      total: 1.74s    remaining: 23.5s
69:     learn: 0.1492566      total: 1.77s    remaining: 23.5s
70:     learn: 0.1464087      total: 1.81s    remaining: 23.7s
71:     learn: 0.1438301      total: 1.84s    remaining: 23.7s
72:     learn: 0.1405339      total: 1.85s    remaining: 23.4s
73:     learn: 0.1374867      total: 1.88s    remaining: 23.6s
74:     learn: 0.1352426      total: 1.91s    remaining: 23.6s
75:     learn: 0.1321752      total: 1.92s    remaining: 23.4s
76:     learn: 0.1301623      total: 1.96s    remaining: 23.5s
77:     learn: 0.1277778      total: 1.98s    remaining: 23.4s
78:     learn: 0.1249084      total: 1.99s    remaining: 23.2s
79:     learn: 0.1223391      total: 2.01s    remaining: 23.1s
80:     learn: 0.1202545      total: 2.04s    remaining: 23.1s
81:     learn: 0.1175832      total: 2.05s    remaining: 22.9s
82:     learn: 0.1155069      total: 2.08s    remaining: 22.9s
83:     learn: 0.1129600      total: 2.08s    remaining: 22.7s
84:     learn: 0.1109673      total: 2.11s    remaining: 22.7s
85:     learn: 0.1091327      total: 2.13s    remaining: 22.6s
86:     learn: 0.1076066      total: 2.16s    remaining: 22.6s
87:     learn: 0.1057243      total: 2.19s    remaining: 22.7s
88:     learn: 0.1041067      total: 2.21s    remaining: 22.7s
89:     learn: 0.1018566      total: 2.22s    remaining: 22.5s
90:     learn: 0.0999881      total: 2.25s    remaining: 22.4s
91:     learn: 0.0978443      total: 2.25s    remaining: 22.2s
92:     learn: 0.0957555      total: 2.26s    remaining: 22s
93:     learn: 0.0937202      total: 2.27s    remaining: 21.9s
94:     learn: 0.0925733      total: 2.3s     remaining: 21.9s
95:     learn: 0.0912840      total: 2.32s    remaining: 21.8s
96:     learn: 0.0898027      total: 2.34s    remaining: 21.8s
97:     learn: 0.0887457      total: 2.36s    remaining: 21.7s
98:     learn: 0.0868889      total: 2.37s    remaining: 21.6s
99:     learn: 0.0855786      total: 2.4s     remaining: 21.6s
100:    learn: 0.0843805      total: 2.42s    remaining: 21.6s
101:    learn: 0.0828555      total: 2.44s    remaining: 21.4s
102:    learn: 0.0815535      total: 2.46s    remaining: 21.4s
103:    learn: 0.0801587      total: 2.48s    remaining: 21.4s
104:    learn: 0.0785626      total: 2.5s     remaining: 21.3s
105:    learn: 0.0774556      total: 2.53s    remaining: 21.4s
106:    learn: 0.0762016      total: 2.56s    remaining: 21.4s
107:    learn: 0.0751168      total: 2.59s    remaining: 21.4s
```

```
108:    learn: 0.0739549        total: 2.62s    remaining: 21.4s
109:    learn: 0.0726556        total: 2.64s    remaining: 21.3s
110:    learn: 0.0713706        total: 2.66s    remaining: 21.3s
111:    learn: 0.0701094        total: 2.68s    remaining: 21.3s
112:    learn: 0.0691776        total: 2.69s    remaining: 21.2s
113:    learn: 0.0680439        total: 2.71s    remaining: 21s
114:    learn: 0.0669884        total: 2.72s    remaining: 20.9s
115:    learn: 0.0661665        total: 2.76s    remaining: 21.1s
116:    learn: 0.0654700        total: 2.79s    remaining: 21.1s
117:    learn: 0.0644169        total: 2.81s    remaining: 21s
118:    learn: 0.0633364        total: 2.83s    remaining: 20.9s
119:    learn: 0.0622732        total: 2.85s    remaining: 20.9s
120:    learn: 0.0614304        total: 2.88s    remaining: 20.9s
121:    learn: 0.0608202        total: 2.9s     remaining: 20.9s
122:    learn: 0.0598007        total: 2.92s    remaining: 20.8s
123:    learn: 0.0591307        total: 2.94s    remaining: 20.8s
124:    learn: 0.0580035        total: 2.95s    remaining: 20.6s
125:    learn: 0.0570898        total: 2.97s    remaining: 20.6s
126:    learn: 0.0565894        total: 3s       remaining: 20.6s
127:    learn: 0.0556692        total: 3.02s    remaining: 20.5s
128:    learn: 0.0548173        total: 3.03s    remaining: 20.4s
129:    learn: 0.0540044        total: 3.04s    remaining: 20.4s
130:    learn: 0.0532041        total: 3.06s    remaining: 20.3s
131:    learn: 0.0522165        total: 3.07s    remaining: 20.2s
132:    learn: 0.0516322        total: 3.09s    remaining: 20.2s
133:    learn: 0.0510026        total: 3.12s    remaining: 20.1s
134:    learn: 0.0501422        total: 3.14s    remaining: 20.1s
135:    learn: 0.0492257        total: 3.15s    remaining: 20s
136:    learn: 0.0483303        total: 3.16s    remaining: 19.9s
137:    learn: 0.0478552        total: 3.19s    remaining: 19.9s
138:    learn: 0.0469912        total: 3.2s     remaining: 19.8s
139:    learn: 0.0463004        total: 3.22s    remaining: 19.8s
140:    learn: 0.0456227        total: 3.25s    remaining: 19.8s
141:    learn: 0.0450706        total: 3.28s    remaining: 19.8s
142:    learn: 0.0444131        total: 3.29s    remaining: 19.7s
143:    learn: 0.0439232        total: 3.31s    remaining: 19.7s
144:    learn: 0.0432891        total: 3.33s    remaining: 19.6s
145:    learn: 0.0427482        total: 3.35s    remaining: 19.6s
146:    learn: 0.0420121        total: 3.36s    remaining: 19.5s
147:    learn: 0.0414042        total: 3.37s    remaining: 19.4s
148:    learn: 0.0407381        total: 3.38s    remaining: 19.3s
149:    learn: 0.0401666        total: 3.41s    remaining: 19.3s
150:    learn: 0.0395435        total: 3.42s    remaining: 19.2s
151:    learn: 0.0391644        total: 3.45s    remaining: 19.2s
152:    learn: 0.0385569        total: 3.47s    remaining: 19.2s
153:    learn: 0.0380856        total: 3.49s    remaining: 19.2s
154:    learn: 0.0374552        total: 3.51s    remaining: 19.1s
```

```
155:     learn: 0.0368236     total: 3.52s     remaining: 19s
156:     learn: 0.0362057     total: 3.52s     remaining: 18.9s
157:     learn: 0.0357400     total: 3.56s     remaining: 19s
158:     learn: 0.0352800     total: 3.58s     remaining: 19s
159:     learn: 0.0346954     total: 3.59s     remaining: 18.9s
160:     learn: 0.0343301     total: 3.62s     remaining: 18.8s
161:     learn: 0.0337915     total: 3.63s     remaining: 18.8s
162:     learn: 0.0332779     total: 3.64s     remaining: 18.7s
163:     learn: 0.0329567     total: 3.67s     remaining: 18.7s
164:     learn: 0.0324871     total: 3.69s     remaining: 18.7s
165:     learn: 0.0321175     total: 3.71s     remaining: 18.7s
166:     learn: 0.0317279     total: 3.73s     remaining: 18.6s
167:     learn: 0.0314307     total: 3.75s     remaining: 18.6s
168:     learn: 0.0311729     total: 3.77s     remaining: 18.6s
169:     learn: 0.0307622     total: 3.8s      remaining: 18.5s
170:     learn: 0.0303799     total: 3.81s     remaining: 18.5s
171:     learn: 0.0298989     total: 3.82s     remaining: 18.4s
172:     learn: 0.0295201     total: 3.85s     remaining: 18.4s
173:     learn: 0.0292437     total: 3.88s     remaining: 18.4s
174:     learn: 0.0287861     total: 3.89s     remaining: 18.3s
175:     learn: 0.0286065     total: 3.91s     remaining: 18.3s
176:     learn: 0.0283888     total: 3.94s     remaining: 18.3s
177:     learn: 0.0280318     total: 3.96s     remaining: 18.3s
178:     learn: 0.0276527     total: 3.98s     remaining: 18.2s
179:     learn: 0.0272616     total: 4s        remaining: 18.2s
180:     learn: 0.0269237     total: 4.01s     remaining: 18.1s
181:     learn: 0.0266291     total: 4.04s     remaining: 18.2s
182:     learn: 0.0263951     total: 4.07s     remaining: 18.2s
183:     learn: 0.0261046     total: 4.09s     remaining: 18.2s
184:     learn: 0.0258550     total: 4.12s     remaining: 18.2s
185:     learn: 0.0255511     total: 4.14s     remaining: 18.1s
186:     learn: 0.0252292     total: 4.15s     remaining: 18.1s
187:     learn: 0.0248863     total: 4.17s     remaining: 18s
188:     learn: 0.0246327     total: 4.21s     remaining: 18s
189:     learn: 0.0243919     total: 4.23s     remaining: 18s
190:     learn: 0.0241031     total: 4.27s     remaining: 18.1s
191:     learn: 0.0238509     total: 4.3s      remaining: 18.1s
192:     learn: 0.0236980     total: 4.33s     remaining: 18.1s
193:     learn: 0.0233947     total: 4.34s     remaining: 18s
194:     learn: 0.0231238     total: 4.37s     remaining: 18s
195:     learn: 0.0229360     total: 4.41s     remaining: 18.1s
196:     learn: 0.0226301     total: 4.43s     remaining: 18s
197:     learn: 0.0224740     total: 4.46s     remaining: 18.1s
198:     learn: 0.0221515     total: 4.46s     remaining: 18s
199:     learn: 0.0219240     total: 4.48s     remaining: 17.9s
200:     learn: 0.0216121     total: 4.49s     remaining: 17.8s
201:     learn: 0.0214197     total: 4.51s     remaining: 17.8s
```

```
202:      learn: 0.0211174         total: 4.52s      remaining: 17.8s
203:      learn: 0.0209465         total: 4.55s      remaining: 17.8s
204:      learn: 0.0207098         total: 4.57s      remaining: 17.7s
205:      learn: 0.0204405         total: 4.59s      remaining: 17.7s
206:      learn: 0.0202567         total: 4.61s      remaining: 17.7s
207:      learn: 0.0200329         total: 4.63s      remaining: 17.6s
208:      learn: 0.0198338         total: 4.66s      remaining: 17.6s
209:      learn: 0.0196845         total: 4.69s      remaining: 17.6s
210:      learn: 0.0194149         total: 4.7s       remaining: 17.6s
211:      learn: 0.0192058         total: 4.72s      remaining: 17.6s
212:      learn: 0.0189485         total: 4.74s      remaining: 17.5s
213:      learn: 0.0188024         total: 4.76s      remaining: 17.5s
214:      learn: 0.0186478         total: 4.79s      remaining: 17.5s
215:      learn: 0.0183999         total: 4.8s       remaining: 17.4s
216:      learn: 0.0181888         total: 4.83s      remaining: 17.4s
217:      learn: 0.0179664         total: 4.85s      remaining: 17.4s
218:      learn: 0.0177795         total: 4.88s      remaining: 17.4s
219:      learn: 0.0175805         total: 4.89s      remaining: 17.3s
220:      learn: 0.0174068         total: 4.92s      remaining: 17.4s
221:      learn: 0.0172251         total: 4.95s      remaining: 17.3s
222:      learn: 0.0170310         total: 4.98s      remaining: 17.3s
223:      learn: 0.0168400         total: 5s         remaining: 17.3s
224:      learn: 0.0167242         total: 5.02s      remaining: 17.3s
225:      learn: 0.0165796         total: 5.04s      remaining: 17.3s
226:      learn: 0.0163753         total: 5.05s      remaining: 17.2s
227:      learn: 0.0162270         total: 5.07s      remaining: 17.2s
228:      learn: 0.0161155         total: 5.11s      remaining: 17.2s
229:      learn: 0.0159189         total: 5.13s      remaining: 17.2s
230:      learn: 0.0158585         total: 5.16s      remaining: 17.2s
231:      learn: 0.0157486         total: 5.18s      remaining: 17.2s
232:      learn: 0.0155501         total: 5.19s      remaining: 17.1s
233:      learn: 0.0154795         total: 5.22s      remaining: 17.1s
234:      learn: 0.0153740         total: 5.25s      remaining: 17.1s
235:      learn: 0.0152817         total: 5.28s      remaining: 17.1s
236:      learn: 0.0151259         total: 5.29s      remaining: 17s
237:      learn: 0.0149446         total: 5.31s      remaining: 17s
238:      learn: 0.0147696         total: 5.33s      remaining: 17s
239:      learn: 0.0146492         total: 5.36s      remaining: 17s
240:      learn: 0.0145227         total: 5.38s      remaining: 17s
241:      learn: 0.0144111         total: 5.41s      remaining: 17s
242:      learn: 0.0142546         total: 5.43s      remaining: 16.9s
243:      learn: 0.0141050         total: 5.45s      remaining: 16.9s
244:      learn: 0.0139794         total: 5.47s      remaining: 16.9s
245:      learn: 0.0138113         total: 5.47s      remaining: 16.8s
246:      learn: 0.0136915         total: 5.52s      remaining: 16.8s
247:      learn: 0.0135603         total: 5.55s      remaining: 16.8s
248:      learn: 0.0133992         total: 5.56s      remaining: 16.8s
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249:    learn: 0.0132972    total: 5.58s    remaining: 16.8s
250:    learn: 0.0131959    total: 5.6s     remaining: 16.7s
251:    learn: 0.0130687    total: 5.62s    remaining: 16.7s
252:    learn: 0.0129913    total: 5.65s    remaining: 16.7s
253:    learn: 0.0129088    total: 5.67s    remaining: 16.6s
254:    learn: 0.0127997    total: 5.68s    remaining: 16.6s
255:    learn: 0.0127293    total: 5.7s     remaining: 16.6s
256:    learn: 0.0126050    total: 5.72s    remaining: 16.5s
257:    learn: 0.0125280    total: 5.75s    remaining: 16.5s
258:    learn: 0.0123839    total: 5.76s    remaining: 16.5s
259:    learn: 0.0122981    total: 5.79s    remaining: 16.5s
260:    learn: 0.0122141    total: 5.83s    remaining: 16.5s
261:    learn: 0.0120869    total: 5.85s    remaining: 16.5s
262:    learn: 0.0119780    total: 5.86s    remaining: 16.4s
263:    learn: 0.0119142    total: 5.91s    remaining: 16.5s
264:    learn: 0.0117847    total: 5.93s    remaining: 16.5s
265:    learn: 0.0116841    total: 5.95s    remaining: 16.4s
266:    learn: 0.0116112    total: 5.98s    remaining: 16.4s
267:    learn: 0.0114901    total: 5.99s    remaining: 16.4s
268:    learn: 0.0114064    total: 6.01s    remaining: 16.3s
269:    learn: 0.0113358    total: 6.04s    remaining: 16.3s
270:    learn: 0.0112108    total: 6.04s    remaining: 16.3s
271:    learn: 0.0111673    total: 6.07s    remaining: 16.2s
272:    learn: 0.0110513    total: 6.08s    remaining: 16.2s
273:    learn: 0.0109621    total: 6.1s     remaining: 16.2s
274:    learn: 0.0108571    total: 6.12s    remaining: 16.1s
275:    learn: 0.0107601    total: 6.13s    remaining: 16.1s
276:    learn: 0.0106728    total: 6.16s    remaining: 16.1s
277:    learn: 0.0105581    total: 6.17s    remaining: 16s
278:    learn: 0.0104658    total: 6.2s     remaining: 16s
279:    learn: 0.0103770    total: 6.21s    remaining: 16s
280:    learn: 0.0102966    total: 6.23s    remaining: 16s
281:    learn: 0.0102358    total: 6.25s    remaining: 15.9s
282:    learn: 0.0101672    total: 6.28s    remaining: 15.9s
283:    learn: 0.0101173    total: 6.33s    remaining: 16s
284:    learn: 0.0100307    total: 6.34s    remaining: 15.9s
285:    learn: 0.0099556    total: 6.37s    remaining: 15.9s
286:    learn: 0.0098842    total: 6.41s    remaining: 15.9s
287:    learn: 0.0098442    total: 6.43s    remaining: 15.9s
288:    learn: 0.0097664    total: 6.46s    remaining: 15.9s
289:    learn: 0.0096922    total: 6.48s    remaining: 15.9s
290:    learn: 0.0096476    total: 6.51s    remaining: 15.9s
291:    learn: 0.0095732    total: 6.54s    remaining: 15.9s
292:    learn: 0.0094752    total: 6.55s    remaining: 15.8s
293:    learn: 0.0093786    total: 6.55s    remaining: 15.7s
294:    learn: 0.0093233    total: 6.58s    remaining: 15.7s
295:    learn: 0.0092592    total: 6.61s    remaining: 15.7s
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296:    learn: 0.0092207      total: 6.64s    remaining: 15.7s
297:    learn: 0.0091370      total: 6.65s    remaining: 15.7s
298:    learn: 0.0090561      total: 6.67s    remaining: 15.6s
299:    learn: 0.0089998      total: 6.69s    remaining: 15.6s
300:    learn: 0.0089439      total: 6.71s    remaining: 15.6s
301:    learn: 0.0088590      total: 6.73s    remaining: 15.5s
302:    learn: 0.0088306      total: 6.75s    remaining: 15.5s
303:    learn: 0.0087875      total: 6.78s    remaining: 15.5s
304:    learn: 0.0087648      total: 6.8s     remaining: 15.5s
305:    learn: 0.0087229      total: 6.84s    remaining: 15.5s
306:    learn: 0.0086766      total: 6.86s    remaining: 15.5s
307:    learn: 0.0086103      total: 6.89s    remaining: 15.5s
308:    learn: 0.0085545      total: 6.91s    remaining: 15.4s
309:    learn: 0.0084954      total: 6.93s    remaining: 15.4s
310:    learn: 0.0084231      total: 6.95s    remaining: 15.4s
311:    learn: 0.0083989      total: 6.97s    remaining: 15.4s
312:    learn: 0.0083402      total: 7s       remaining: 15.4s
313:    learn: 0.0082973      total: 7.04s    remaining: 15.4s
314:    learn: 0.0082332      total: 7.07s    remaining: 15.4s
315:    learn: 0.0081964      total: 7.09s    remaining: 15.4s
316:    learn: 0.0081561      total: 7.12s    remaining: 15.3s
317:    learn: 0.0080922      total: 7.13s    remaining: 15.3s
318:    learn: 0.0080215      total: 7.15s    remaining: 15.3s
319:    learn: 0.0079459      total: 7.16s    remaining: 15.2s
320:    learn: 0.0078856      total: 7.18s    remaining: 15.2s
321:    learn: 0.0078242      total: 7.2s     remaining: 15.2s
322:    learn: 0.0077841      total: 7.22s    remaining: 15.1s
323:    learn: 0.0077237      total: 7.25s    remaining: 15.1s
324:    learn: 0.0076680      total: 7.27s    remaining: 15.1s
325:    learn: 0.0076332      total: 7.29s    remaining: 15.1s
326:    learn: 0.0075818      total: 7.31s    remaining: 15s
327:    learn: 0.0075217      total: 7.33s    remaining: 15s
328:    learn: 0.0074788      total: 7.35s    remaining: 15s
329:    learn: 0.0074152      total: 7.36s    remaining: 14.9s
330:    learn: 0.0073824      total: 7.38s    remaining: 14.9s
331:    learn: 0.0073300      total: 7.41s    remaining: 14.9s
332:    learn: 0.0072638      total: 7.42s    remaining: 14.9s
333:    learn: 0.0072170      total: 7.44s    remaining: 14.8s
334:    learn: 0.0071821      total: 7.47s    remaining: 14.8s
335:    learn: 0.0071322      total: 7.49s    remaining: 14.8s
336:    learn: 0.0070798      total: 7.51s    remaining: 14.8s
337:    learn: 0.0070317      total: 7.53s    remaining: 14.7s
338:    learn: 0.0069888      total: 7.54s    remaining: 14.7s
339:    learn: 0.0069468      total: 7.57s    remaining: 14.7s
340:    learn: 0.0069161      total: 7.59s    remaining: 14.7s
341:    learn: 0.0068795      total: 7.62s    remaining: 14.7s
342:    learn: 0.0068302      total: 7.64s    remaining: 14.6s
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343:    learn: 0.0067837    total: 7.65s    remaining: 14.6s
344:    learn: 0.0067483    total: 7.69s    remaining: 14.6s
345:    learn: 0.0067167    total: 7.71s    remaining: 14.6s
346:    learn: 0.0066890    total: 7.74s    remaining: 14.6s
347:    learn: 0.0066572    total: 7.76s    remaining: 14.5s
348:    learn: 0.0066095    total: 7.78s    remaining: 14.5s
349:    learn: 0.0065650    total: 7.82s    remaining: 14.5s
350:    learn: 0.0065203    total: 7.85s    remaining: 14.5s
351:    learn: 0.0065007    total: 7.88s    remaining: 14.5s
352:    learn: 0.0064754    total: 7.9s     remaining: 14.5s
353:    learn: 0.0064461    total: 7.93s    remaining: 14.5s
354:    learn: 0.0064211    total: 7.95s    remaining: 14.4s
355:    learn: 0.0063707    total: 7.97s    remaining: 14.4s
356:    learn: 0.0063436    total: 7.99s    remaining: 14.4s
357:    learn: 0.0063080    total: 8.02s    remaining: 14.4s
358:    learn: 0.0062589    total: 8.03s    remaining: 14.3s
359:    learn: 0.0062109    total: 8.04s    remaining: 14.3s
360:    learn: 0.0061811    total: 8.07s    remaining: 14.3s
361:    learn: 0.0061625    total: 8.1s     remaining: 14.3s
362:    learn: 0.0061305    total: 8.14s    remaining: 14.3s
363:    learn: 0.0060983    total: 8.17s    remaining: 14.3s
364:    learn: 0.0060605    total: 8.19s    remaining: 14.2s
365:    learn: 0.0060479    total: 8.22s    remaining: 14.2s
366:    learn: 0.0060220    total: 8.25s    remaining: 14.2s
367:    learn: 0.0059811    total: 8.27s    remaining: 14.2s
368:    learn: 0.0059456    total: 8.29s    remaining: 14.2s
369:    learn: 0.0059019    total: 8.31s    remaining: 14.2s
370:    learn: 0.0058680    total: 8.33s    remaining: 14.1s
371:    learn: 0.0058330    total: 8.36s    remaining: 14.1s
372:    learn: 0.0058047    total: 8.38s    remaining: 14.1s
373:    learn: 0.0057664    total: 8.4s     remaining: 14.1s
374:    learn: 0.0057452    total: 8.43s    remaining: 14s
375:    learn: 0.0057081    total: 8.44s    remaining: 14s
376:    learn: 0.0056754    total: 8.46s    remaining: 14s
377:    learn: 0.0056673    total: 8.48s    remaining: 14s
378:    learn: 0.0056510    total: 8.51s    remaining: 13.9s
379:    learn: 0.0056201    total: 8.53s    remaining: 13.9s
380:    learn: 0.0055923    total: 8.55s    remaining: 13.9s
381:    learn: 0.0055695    total: 8.57s    remaining: 13.9s
382:    learn: 0.0055335    total: 8.59s    remaining: 13.8s
383:    learn: 0.0054958    total: 8.61s    remaining: 13.8s
384:    learn: 0.0054562    total: 8.62s    remaining: 13.8s
385:    learn: 0.0054326    total: 8.64s    remaining: 13.7s
386:    learn: 0.0053940    total: 8.66s    remaining: 13.7s
387:    learn: 0.0053642    total: 8.69s    remaining: 13.7s
388:    learn: 0.0053522    total: 8.74s    remaining: 13.7s
389:    learn: 0.0053174    total: 8.77s    remaining: 13.7s
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390:      learn: 0.0052892          total: 8.8s      remaining: 13.7s
391:      learn: 0.0052695          total: 8.83s     remaining: 13.7s
392:      learn: 0.0052390          total: 8.86s     remaining: 13.7s
393:      learn: 0.0052187          total: 8.89s     remaining: 13.7s
394:      learn: 0.0052012          total: 8.92s     remaining: 13.7s
395:      learn: 0.0051757          total: 8.94s     remaining: 13.6s
396:      learn: 0.0051602          total: 8.97s     remaining: 13.6s
397:      learn: 0.0051253          total: 8.98s     remaining: 13.6s
398:      learn: 0.0051046          total: 9.02s     remaining: 13.6s
399:      learn: 0.0050733          total: 9.03s     remaining: 13.6s
400:      learn: 0.0050422          total: 9.07s     remaining: 13.5s
401:      learn: 0.0050168          total: 9.11s     remaining: 13.5s
402:      learn: 0.0050027          total: 9.13s     remaining: 13.5s
403:      learn: 0.0049742          total: 9.15s     remaining: 13.5s
404:      learn: 0.0049513          total: 9.18s     remaining: 13.5s
405:      learn: 0.0049345          total: 9.19s     remaining: 13.5s
406:      learn: 0.0049222          total: 9.22s     remaining: 13.4s
407:      learn: 0.0049037          total: 9.25s     remaining: 13.4s
408:      learn: 0.0048918          total: 9.28s     remaining: 13.4s
409:      learn: 0.0048590          total: 9.3s      remaining: 13.4s
410:      learn: 0.0048303          total: 9.32s     remaining: 13.3s
411:      learn: 0.0048057          total: 9.34s     remaining: 13.3s
412:      learn: 0.0047787          total: 9.35s     remaining: 13.3s
413:      learn: 0.0047533          total: 9.37s     remaining: 13.3s
414:      learn: 0.0047446          total: 9.4s      remaining: 13.2s
415:      learn: 0.0047279          total: 9.43s     remaining: 13.2s
416:      learn: 0.0047026          total: 9.44s     remaining: 13.2s
417:      learn: 0.0046888          total: 9.47s     remaining: 13.2s
418:      learn: 0.0046765          total: 9.5s      remaining: 13.2s
419:      learn: 0.0046621          total: 9.53s     remaining: 13.2s
420:      learn: 0.0046323          total: 9.54s     remaining: 13.1s
421:      learn: 0.0046211          total: 9.57s     remaining: 13.1s
422:      learn: 0.0045994          total: 9.6s      remaining: 13.1s
423:      learn: 0.0045859          total: 9.63s     remaining: 13.1s
424:      learn: 0.0045673          total: 9.65s     remaining: 13.1s
425:      learn: 0.0045525          total: 9.67s     remaining: 13s
426:      learn: 0.0045324          total: 9.7s      remaining: 13s
427:      learn: 0.0045072          total: 9.72s     remaining: 13s
428:      learn: 0.0044828          total: 9.74s     remaining: 13s
429:      learn: 0.0044725          total: 9.76s     remaining: 12.9s
430:      learn: 0.0044622          total: 9.78s     remaining: 12.9s
431:      learn: 0.0044373          total: 9.8s      remaining: 12.9s
432:      learn: 0.0044137          total: 9.82s     remaining: 12.9s
433:      learn: 0.0043971          total: 9.84s     remaining: 12.8s
434:      learn: 0.0043755          total: 9.88s     remaining: 12.8s
435:      learn: 0.0043515          total: 9.89s     remaining: 12.8s
436:      learn: 0.0043278          total: 9.91s     remaining: 12.8s
```

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437:    learn: 0.0043083    total: 9.93s   remaining: 12.7s
438:    learn: 0.0042997    total: 9.96s   remaining: 12.7s
439:    learn: 0.0042823    total: 9.98s   remaining: 12.7s
440:    learn: 0.0042674    total: 10s     remaining: 12.7s
441:    learn: 0.0042543    total: 10.1s   remaining: 12.7s
442:    learn: 0.0042283    total: 10.1s   remaining: 12.7s
443:    learn: 0.0042090    total: 10.1s   remaining: 12.6s
444:    learn: 0.0041974    total: 10.1s   remaining: 12.6s
445:    learn: 0.0041802    total: 10.2s   remaining: 12.6s
446:    learn: 0.0041716    total: 10.2s   remaining: 12.6s
447:    learn: 0.0041484    total: 10.2s   remaining: 12.6s
448:    learn: 0.0041297    total: 10.2s   remaining: 12.5s
449:    learn: 0.0041201    total: 10.3s   remaining: 12.5s
450:    learn: 0.0041133    total: 10.3s   remaining: 12.5s
451:    learn: 0.0040907    total: 10.3s   remaining: 12.5s
452:    learn: 0.0040721    total: 10.3s   remaining: 12.5s
453:    learn: 0.0040606    total: 10.4s   remaining: 12.5s
454:    learn: 0.0040418    total: 10.4s   remaining: 12.4s
455:    learn: 0.0040344    total: 10.4s   remaining: 12.4s
456:    learn: 0.0040230    total: 10.5s   remaining: 12.4s
457:    learn: 0.0040020    total: 10.5s   remaining: 12.4s
458:    learn: 0.0039942    total: 10.5s   remaining: 12.4s
459:    learn: 0.0039783    total: 10.5s   remaining: 12.4s
460:    learn: 0.0039668    total: 10.6s   remaining: 12.3s
461:    learn: 0.0039510    total: 10.6s   remaining: 12.3s
462:    learn: 0.0039428    total: 10.6s   remaining: 12.3s
463:    learn: 0.0039257    total: 10.6s   remaining: 12.3s
464:    learn: 0.0039180    total: 10.7s   remaining: 12.3s
465:    learn: 0.0039014    total: 10.7s   remaining: 12.3s
466:    learn: 0.0038903    total: 10.7s   remaining: 12.2s
467:    learn: 0.0038678    total: 10.7s   remaining: 12.2s
468:    learn: 0.0038597    total: 10.8s   remaining: 12.2s
469:    learn: 0.0038422    total: 10.8s   remaining: 12.2s
470:    learn: 0.0038311    total: 10.8s   remaining: 12.1s
471:    learn: 0.0038182    total: 10.8s   remaining: 12.1s
472:    learn: 0.0037992    total: 10.8s   remaining: 12.1s
473:    learn: 0.0037856    total: 10.9s   remaining: 12s
474:    learn: 0.0037705    total: 10.9s   remaining: 12s
475:    learn: 0.0037493    total: 10.9s   remaining: 12s
476:    learn: 0.0037343    total: 10.9s   remaining: 12s
477:    learn: 0.0037151    total: 10.9s   remaining: 11.9s
478:    learn: 0.0036974    total: 10.9s   remaining: 11.9s
479:    learn: 0.0036892    total: 11s     remaining: 11.9s
480:    learn: 0.0036730    total: 11s     remaining: 11.9s
481:    learn: 0.0036590    total: 11s     remaining: 11.8s
482:    learn: 0.0036454    total: 11s     remaining: 11.8s
483:    learn: 0.0036333    total: 11s     remaining: 11.8s
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484:     learn: 0.0036134      total: 11.1s     remaining: 11.7s
485:     learn: 0.0036040      total: 11.1s     remaining: 11.7s
486:     learn: 0.0035921      total: 11.1s     remaining: 11.7s
487:     learn: 0.0035776      total: 11.1s     remaining: 11.7s
488:     learn: 0.0035580      total: 11.2s     remaining: 11.7s
489:     learn: 0.0035434      total: 11.2s     remaining: 11.6s
490:     learn: 0.0035298      total: 11.2s     remaining: 11.6s
491:     learn: 0.0035221      total: 11.2s     remaining: 11.6s
492:     learn: 0.0035076      total: 11.3s     remaining: 11.6s
493:     learn: 0.0034933      total: 11.3s     remaining: 11.6s
494:     learn: 0.0034846      total: 11.3s     remaining: 11.6s
495:     learn: 0.0034738      total: 11.4s     remaining: 11.5s
496:     learn: 0.0034569      total: 11.4s     remaining: 11.5s
497:     learn: 0.0034410      total: 11.4s     remaining: 11.5s
498:     learn: 0.0034309      total: 11.4s     remaining: 11.5s
499:     learn: 0.0034225      total: 11.4s     remaining: 11.4s
500:     learn: 0.0034043      total: 11.4s     remaining: 11.4s
501:     learn: 0.0033973      total: 11.5s     remaining: 11.4s
502:     learn: 0.0033823      total: 11.5s     remaining: 11.4s
503:     learn: 0.0033753      total: 11.5s     remaining: 11.3s
504:     learn: 0.0033631      total: 11.5s     remaining: 11.3s
505:     learn: 0.0033488      total: 11.6s     remaining: 11.3s
506:     learn: 0.0033386      total: 11.6s     remaining: 11.3s
507:     learn: 0.0033259      total: 11.6s     remaining: 11.2s
508:     learn: 0.0033106      total: 11.6s     remaining: 11.2s
509:     learn: 0.0033015      total: 11.7s     remaining: 11.2s
510:     learn: 0.0032854      total: 11.7s     remaining: 11.2s
511:     learn: 0.0032764      total: 11.7s     remaining: 11.2s
512:     learn: 0.0032644      total: 11.7s     remaining: 11.1s
513:     learn: 0.0032547      total: 11.8s     remaining: 11.1s
514:     learn: 0.0032451      total: 11.8s     remaining: 11.1s
515:     learn: 0.0032364      total: 11.8s     remaining: 11.1s
516:     learn: 0.0032261      total: 11.8s     remaining: 11.1s
517:     learn: 0.0032175      total: 11.9s     remaining: 11s
518:     learn: 0.0032037      total: 11.9s     remaining: 11s
519:     learn: 0.0031960      total: 11.9s     remaining: 11s
520:     learn: 0.0031839      total: 11.9s     remaining: 11s
521:     learn: 0.0031741      total: 12s       remaining: 11s
522:     learn: 0.0031587      total: 12s       remaining: 10.9s
523:     learn: 0.0031528      total: 12s       remaining: 10.9s
524:     learn: 0.0031384      total: 12s       remaining: 10.9s
525:     learn: 0.0031276      total: 12s       remaining: 10.9s
526:     learn: 0.0031133      total: 12.1s     remaining: 10.8s
527:     learn: 0.0031074      total: 12.1s     remaining: 10.8s
528:     learn: 0.0030947      total: 12.1s     remaining: 10.8s
529:     learn: 0.0030821      total: 12.1s     remaining: 10.7s
530:     learn: 0.0030671      total: 12.1s     remaining: 10.7s
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531:     learn: 0.0030567      total: 12.1s      remaining: 10.7s
532:     learn: 0.0030440      total: 12.2s      remaining: 10.7s
533:     learn: 0.0030385      total: 12.2s      remaining: 10.6s
534:     learn: 0.0030278      total: 12.2s      remaining: 10.6s
535:     learn: 0.0030148      total: 12.2s      remaining: 10.6s
536:     learn: 0.0030076      total: 12.3s      remaining: 10.6s
537:     learn: 0.0029963      total: 12.3s      remaining: 10.5s
538:     learn: 0.0029854      total: 12.3s      remaining: 10.5s
539:     learn: 0.0029723      total: 12.3s      remaining: 10.5s
540:     learn: 0.0029642      total: 12.3s      remaining: 10.5s
541:     learn: 0.0029550      total: 12.3s      remaining: 10.4s
542:     learn: 0.0029477      total: 12.4s      remaining: 10.4s
543:     learn: 0.0029387      total: 12.4s      remaining: 10.4s
544:     learn: 0.0029273      total: 12.5s      remaining: 10.4s
545:     learn: 0.0029158      total: 12.5s      remaining: 10.4s
546:     learn: 0.0029076      total: 12.5s      remaining: 10.3s
547:     learn: 0.0028998      total: 12.5s      remaining: 10.3s
548:     learn: 0.0028862      total: 12.5s      remaining: 10.3s
549:     learn: 0.0028796      total: 12.6s      remaining: 10.3s
550:     learn: 0.0028702      total: 12.6s      remaining: 10.3s
551:     learn: 0.0028591      total: 12.6s      remaining: 10.2s
552:     learn: 0.0028498      total: 12.6s      remaining: 10.2s
553:     learn: 0.0028441      total: 12.7s      remaining: 10.2s
554:     learn: 0.0028344      total: 12.7s      remaining: 10.2s
555:     learn: 0.0028245      total: 12.7s      remaining: 10.2s
556:     learn: 0.0028186      total: 12.7s      remaining: 10.1s
557:     learn: 0.0028125      total: 12.8s      remaining: 10.1s
558:     learn: 0.0028063      total: 12.8s      remaining: 10.1s
559:     learn: 0.0027975      total: 12.8s      remaining: 10.1s
560:     learn: 0.0027925      total: 12.8s      remaining: 10.1s
561:     learn: 0.0027812      total: 12.9s      remaining: 10s
562:     learn: 0.0027766      total: 12.9s      remaining: 10s
563:     learn: 0.0027669      total: 12.9s      remaining: 10s
564:     learn: 0.0027632      total: 13s        remaining: 9.98s
565:     learn: 0.0027559      total: 13s        remaining: 9.96s
566:     learn: 0.0027461      total: 13s        remaining: 9.93s
567:     learn: 0.0027399      total: 13s        remaining: 9.91s
568:     learn: 0.0027362      total: 13.1s      remaining: 9.9s
569:     learn: 0.0027298      total: 13.1s      remaining: 9.88s
570:     learn: 0.0027189      total: 13.1s      remaining: 9.86s
571:     learn: 0.0027098      total: 13.2s      remaining: 9.84s
572:     learn: 0.0027060      total: 13.2s      remaining: 9.82s
573:     learn: 0.0026981      total: 13.2s      remaining: 9.79s
574:     learn: 0.0026890      total: 13.2s      remaining: 9.77s
575:     learn: 0.0026886      total: 13.2s      remaining: 9.74s
576:     learn: 0.0026840      total: 13.3s      remaining: 9.72s
577:     learn: 0.0026754      total: 13.3s      remaining: 9.7s
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578:    learn: 0.0026640      total: 13.3s     remaining: 9.67s
579:    learn: 0.0026553      total: 13.3s     remaining: 9.65s
580:    learn: 0.0026499      total: 13.4s     remaining: 9.64s
581:    learn: 0.0026407      total: 13.4s     remaining: 9.61s
582:    learn: 0.0026331      total: 13.4s     remaining: 9.58s
583:    learn: 0.0026263      total: 13.4s     remaining: 9.56s
584:    learn: 0.0026228      total: 13.4s     remaining: 9.54s
585:    learn: 0.0026158      total: 13.5s     remaining: 9.51s
586:    learn: 0.0026100      total: 13.5s     remaining: 9.49s
587:    learn: 0.0025987      total: 13.5s     remaining: 9.46s
588:    learn: 0.0025964      total: 13.5s     remaining: 9.44s
589:    learn: 0.0025906      total: 13.5s     remaining: 9.41s
590:    learn: 0.0025819      total: 13.6s     remaining: 9.38s
591:    learn: 0.0025721      total: 13.6s     remaining: 9.35s
592:    learn: 0.0025655      total: 13.6s     remaining: 9.33s
593:    learn: 0.0025592      total: 13.6s     remaining: 9.3s
594:    learn: 0.0025503      total: 13.6s     remaining: 9.28s
595:    learn: 0.0025483      total: 13.7s     remaining: 9.25s
596:    learn: 0.0025408      total: 13.7s     remaining: 9.24s
597:    learn: 0.0025355      total: 13.7s     remaining: 9.22s
598:    learn: 0.0025263      total: 13.7s     remaining: 9.19s
599:    learn: 0.0025233      total: 13.7s     remaining: 9.16s
600:    learn: 0.0025188      total: 13.8s     remaining: 9.14s
601:    learn: 0.0025106      total: 13.8s     remaining: 9.11s
602:    learn: 0.0025031      total: 13.8s     remaining: 9.09s
603:    learn: 0.0024979      total: 13.8s     remaining: 9.06s
604:    learn: 0.0024928      total: 13.8s     remaining: 9.04s
605:    learn: 0.0024834      total: 13.9s     remaining: 9.01s
606:    learn: 0.0024750      total: 13.9s     remaining: 8.98s
607:    learn: 0.0024720      total: 13.9s     remaining: 8.96s
608:    learn: 0.0024680      total: 13.9s     remaining: 8.95s
609:    learn: 0.0024630      total: 14s       remaining: 8.93s
610:    learn: 0.0024586      total: 14s       remaining: 8.91s
611:    learn: 0.0024529      total: 14s       remaining: 8.89s
612:    learn: 0.0024459      total: 14s       remaining: 8.86s
613:    learn: 0.0024357      total: 14s       remaining: 8.83s
614:    learn: 0.0024278      total: 14.1s     remaining: 8.8s
615:    learn: 0.0024224      total: 14.1s     remaining: 8.79s
616:    learn: 0.0024165      total: 14.1s     remaining: 8.77s
617:    learn: 0.0024130      total: 14.2s     remaining: 8.75s
618:    learn: 0.0024070      total: 14.2s     remaining: 8.73s
619:    learn: 0.0024042      total: 14.2s     remaining: 8.71s
620:    learn: 0.0024013      total: 14.2s     remaining: 8.69s
621:    learn: 0.0023926      total: 14.3s     remaining: 8.66s
622:    learn: 0.0023870      total: 14.3s     remaining: 8.65s
623:    learn: 0.0023808      total: 14.3s     remaining: 8.63s
624:    learn: 0.0023749      total: 14.3s     remaining: 8.61s
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625:     learn: 0.0023696     total: 14.4s     remaining: 8.59s
626:     learn: 0.0023651     total: 14.4s     remaining: 8.57s
627:     learn: 0.0023613     total: 14.4s     remaining: 8.55s
628:     learn: 0.0023577     total: 14.5s     remaining: 8.54s
629:     learn: 0.0023501     total: 14.5s     remaining: 8.51s
630:     learn: 0.0023465     total: 14.5s     remaining: 8.5s
631:     learn: 0.0023429     total: 14.6s     remaining: 8.48s
632:     learn: 0.0023356     total: 14.6s     remaining: 8.45s
633:     learn: 0.0023311     total: 14.6s     remaining: 8.43s
634:     learn: 0.0023242     total: 14.6s     remaining: 8.41s
635:     learn: 0.0023182     total: 14.6s     remaining: 8.38s
636:     learn: 0.0023107     total: 14.7s     remaining: 8.36s
637:     learn: 0.0023015     total: 14.7s     remaining: 8.33s
638:     learn: 0.0022923     total: 14.7s     remaining: 8.3s
639:     learn: 0.0022875     total: 14.7s     remaining: 8.28s
640:     learn: 0.0022785     total: 14.7s     remaining: 8.25s
641:     learn: 0.0022726     total: 14.8s     remaining: 8.23s
642:     learn: 0.0022662     total: 14.8s     remaining: 8.21s
643:     learn: 0.0022574     total: 14.8s     remaining: 8.19s
644:     learn: 0.0022486     total: 14.8s     remaining: 8.16s
645:     learn: 0.0022413     total: 14.8s     remaining: 8.13s
646:     learn: 0.0022373     total: 14.9s     remaining: 8.11s
647:     learn: 0.0022347     total: 14.9s     remaining: 8.09s
648:     learn: 0.0022301     total: 14.9s     remaining: 8.07s
649:     learn: 0.0022231     total: 14.9s     remaining: 8.04s
650:     learn: 0.0022192     total: 15s       remaining: 8.02s
651:     learn: 0.0022129     total: 15s       remaining: 8s
652:     learn: 0.0022098     total: 15s       remaining: 7.98s
653:     learn: 0.0022013     total: 15s       remaining: 7.96s
654:     learn: 0.0021984     total: 15.1s     remaining: 7.93s
655:     learn: 0.0021944     total: 15.1s     remaining: 7.91s
656:     learn: 0.0021901     total: 15.1s     remaining: 7.89s
657:     learn: 0.0021848     total: 15.1s     remaining: 7.87s
658:     learn: 0.0021829     total: 15.2s     remaining: 7.85s
659:     learn: 0.0021747     total: 15.2s     remaining: 7.82s
660:     learn: 0.0021690     total: 15.2s     remaining: 7.8s
661:     learn: 0.0021647     total: 15.2s     remaining: 7.78s
662:     learn: 0.0021608     total: 15.3s     remaining: 7.76s
663:     learn: 0.0021556     total: 15.3s     remaining: 7.74s
664:     learn: 0.0021527     total: 15.3s     remaining: 7.72s
665:     learn: 0.0021487     total: 15.3s     remaining: 7.7s
666:     learn: 0.0021422     total: 15.4s     remaining: 7.67s
667:     learn: 0.0021371     total: 15.4s     remaining: 7.67s
668:     learn: 0.0021339     total: 15.5s     remaining: 7.65s
669:     learn: 0.0021312     total: 15.5s     remaining: 7.63s
670:     learn: 0.0021283     total: 15.5s     remaining: 7.61s
671:     learn: 0.0021204     total: 15.5s     remaining: 7.58s
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672:    learn: 0.0021148    total: 15.6s    remaining: 7.56s
673:    learn: 0.0021110    total: 15.6s    remaining: 7.54s
674:    learn: 0.0021110    total: 15.6s    remaining: 7.52s
675:    learn: 0.0021068    total: 15.7s    remaining: 7.5s
676:    learn: 0.0021035    total: 15.7s    remaining: 7.48s
677:    learn: 0.0021011    total: 15.7s    remaining: 7.46s
678:    learn: 0.0021009    total: 15.7s    remaining: 7.43s
679:    learn: 0.0021005    total: 15.7s    remaining: 7.4s
680:    learn: 0.0020956    total: 15.8s    remaining: 7.38s
681:    learn: 0.0020921    total: 15.8s    remaining: 7.36s
682:    learn: 0.0020874    total: 15.8s    remaining: 7.34s
683:    learn: 0.0020837    total: 15.8s    remaining: 7.32s
684:    learn: 0.0020796    total: 15.9s    remaining: 7.3s
685:    learn: 0.0020775    total: 15.9s    remaining: 7.28s
686:    learn: 0.0020729    total: 15.9s    remaining: 7.25s
687:    learn: 0.0020693    total: 16s      remaining: 7.23s
688:    learn: 0.0020667    total: 16s      remaining: 7.22s
689:    learn: 0.0020625    total: 16s      remaining: 7.21s
690:    learn: 0.0020601    total: 16.1s    remaining: 7.18s
691:    learn: 0.0020599    total: 16.1s    remaining: 7.17s
692:    learn: 0.0020570    total: 16.1s    remaining: 7.14s
693:    learn: 0.0020504    total: 16.1s    remaining: 7.12s
694:    learn: 0.0020458    total: 16.2s    remaining: 7.1s
695:    learn: 0.0020385    total: 16.2s    remaining: 7.07s
696:    learn: 0.0020323    total: 16.2s    remaining: 7.04s
697:    learn: 0.0020289    total: 16.2s    remaining: 7.02s
698:    learn: 0.0020289    total: 16.2s    remaining: 7s
699:    learn: 0.0020247    total: 16.3s    remaining: 6.97s
700:    learn: 0.0020224    total: 16.3s    remaining: 6.96s
701:    learn: 0.0020172    total: 16.3s    remaining: 6.93s
702:    learn: 0.0020101    total: 16.3s    remaining: 6.9s
703:    learn: 0.0020053    total: 16.4s    remaining: 6.88s
704:    learn: 0.0019997    total: 16.4s    remaining: 6.86s
705:    learn: 0.0019943    total: 16.4s    remaining: 6.83s
706:    learn: 0.0019901    total: 16.4s    remaining: 6.82s
707:    learn: 0.0019862    total: 16.5s    remaining: 6.79s
708:    learn: 0.0019859    total: 16.5s    remaining: 6.78s
709:    learn: 0.0019788    total: 16.5s    remaining: 6.75s
710:    learn: 0.0019763    total: 16.6s    remaining: 6.73s
711:    learn: 0.0019735    total: 16.6s    remaining: 6.71s
712:    learn: 0.0019691    total: 16.6s    remaining: 6.7s
713:    learn: 0.0019642    total: 16.7s    remaining: 6.68s
714:    learn: 0.0019574    total: 16.7s    remaining: 6.66s
715:    learn: 0.0019534    total: 16.7s    remaining: 6.64s
716:    learn: 0.0019467    total: 16.7s    remaining: 6.61s
717:    learn: 0.0019412    total: 16.8s    remaining: 6.58s
718:    learn: 0.0019362    total: 16.8s    remaining: 6.56s
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719:      learn: 0.0019317       total: 16.8s      remaining: 6.54s
720:      learn: 0.0019281       total: 16.8s      remaining: 6.52s
721:      learn: 0.0019248       total: 16.9s      remaining: 6.49s
722:      learn: 0.0019248       total: 16.9s      remaining: 6.47s
723:      learn: 0.0019211       total: 16.9s      remaining: 6.45s
724:      learn: 0.0019181       total: 17s        remaining: 6.43s
725:      learn: 0.0019158       total: 17s        remaining: 6.43s
726:      learn: 0.0019092       total: 17.1s      remaining: 6.41s
727:      learn: 0.0019047       total: 17.1s      remaining: 6.38s
728:      learn: 0.0018997       total: 17.1s      remaining: 6.36s
729:      learn: 0.0018980       total: 17.1s      remaining: 6.34s
730:      learn: 0.0018946       total: 17.2s      remaining: 6.31s
731:      learn: 0.0018899       total: 17.2s      remaining: 6.29s
732:      learn: 0.0018861       total: 17.2s      remaining: 6.26s
733:      learn: 0.0018809       total: 17.2s      remaining: 6.24s
734:      learn: 0.0018758       total: 17.2s      remaining: 6.21s
735:      learn: 0.0018732       total: 17.3s      remaining: 6.19s
736:      learn: 0.0018700       total: 17.3s      remaining: 6.17s
737:      learn: 0.0018637       total: 17.3s      remaining: 6.14s
738:      learn: 0.0018599       total: 17.3s      remaining: 6.12s
739:      learn: 0.0018563       total: 17.3s      remaining: 6.09s
740:      learn: 0.0018539       total: 17.4s      remaining: 6.07s
741:      learn: 0.0018489       total: 17.4s      remaining: 6.04s
742:      learn: 0.0018443       total: 17.4s      remaining: 6.02s
743:      learn: 0.0018382       total: 17.4s      remaining: 6s
744:      learn: 0.0018362       total: 17.5s      remaining: 5.98s
745:      learn: 0.0018302       total: 17.5s      remaining: 5.95s
746:      learn: 0.0018274       total: 17.5s      remaining: 5.93s
747:      learn: 0.0018222       total: 17.5s      remaining: 5.91s
748:      learn: 0.0018197       total: 17.6s      remaining: 5.89s
749:      learn: 0.0018162       total: 17.6s      remaining: 5.87s
750:      learn: 0.0018135       total: 17.6s      remaining: 5.84s
751:      learn: 0.0018093       total: 17.6s      remaining: 5.82s
752:      learn: 0.0018034       total: 17.7s      remaining: 5.79s
753:      learn: 0.0017996       total: 17.7s      remaining: 5.77s
754:      learn: 0.0017952       total: 17.7s      remaining: 5.74s
755:      learn: 0.0017928       total: 17.7s      remaining: 5.72s
756:      learn: 0.0017907       total: 17.8s      remaining: 5.7s
757:      learn: 0.0017891       total: 17.8s      remaining: 5.67s
758:      learn: 0.0017856       total: 17.8s      remaining: 5.65s
759:      learn: 0.0017854       total: 17.8s      remaining: 5.63s
760:      learn: 0.0017797       total: 17.8s      remaining: 5.6s
761:      learn: 0.0017771       total: 17.9s      remaining: 5.58s
762:      learn: 0.0017759       total: 17.9s      remaining: 5.55s
763:      learn: 0.0017711       total: 17.9s      remaining: 5.53s
764:      learn: 0.0017690       total: 17.9s      remaining: 5.5s
765:      learn: 0.0017675       total: 18s        remaining: 5.48s
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766:    learn: 0.0017631    total: 18s      remaining: 5.46s
767:    learn: 0.0017607    total: 18s      remaining: 5.44s
768:    learn: 0.0017551    total: 18s      remaining: 5.41s
769:    learn: 0.0017535    total: 18.1s    remaining: 5.4s
770:    learn: 0.0017494    total: 18.1s    remaining: 5.38s
771:    learn: 0.0017494    total: 18.1s    remaining: 5.35s
772:    learn: 0.0017456    total: 18.1s    remaining: 5.33s
773:    learn: 0.0017418    total: 18.2s    remaining: 5.3s
774:    learn: 0.0017385    total: 18.2s    remaining: 5.28s
775:    learn: 0.0017363    total: 18.2s    remaining: 5.26s
776:    learn: 0.0017320    total: 18.2s    remaining: 5.24s
777:    learn: 0.0017288    total: 18.3s    remaining: 5.21s
778:    learn: 0.0017244    total: 18.3s    remaining: 5.19s
779:    learn: 0.0017242    total: 18.3s    remaining: 5.16s
780:    learn: 0.0017198    total: 18.3s    remaining: 5.14s
781:    learn: 0.0017172    total: 18.4s    remaining: 5.12s
782:    learn: 0.0017129    total: 18.4s    remaining: 5.09s
783:    learn: 0.0017095    total: 18.4s    remaining: 5.07s
784:    learn: 0.0017042    total: 18.4s    remaining: 5.04s
785:    learn: 0.0017023    total: 18.4s    remaining: 5.02s
786:    learn: 0.0017009    total: 18.5s    remaining: 5s
787:    learn: 0.0016985    total: 18.5s    remaining: 4.98s
788:    learn: 0.0016947    total: 18.5s    remaining: 4.96s
789:    learn: 0.0016921    total: 18.6s    remaining: 4.93s
790:    learn: 0.0016883    total: 18.6s    remaining: 4.91s
791:    learn: 0.0016858    total: 18.6s    remaining: 4.88s
792:    learn: 0.0016821    total: 18.6s    remaining: 4.86s
793:    learn: 0.0016780    total: 18.6s    remaining: 4.84s
794:    learn: 0.0016761    total: 18.7s    remaining: 4.81s
795:    learn: 0.0016728    total: 18.7s    remaining: 4.79s
796:    learn: 0.0016706    total: 18.7s    remaining: 4.77s
797:    learn: 0.0016693    total: 18.8s    remaining: 4.75s
798:    learn: 0.0016667    total: 18.8s    remaining: 4.73s
799:    learn: 0.0016629    total: 18.8s    remaining: 4.7s
800:    learn: 0.0016607    total: 18.8s    remaining: 4.68s
801:    learn: 0.0016589    total: 18.9s    remaining: 4.66s
802:    learn: 0.0016587    total: 18.9s    remaining: 4.63s
803:    learn: 0.0016557    total: 18.9s    remaining: 4.61s
804:    learn: 0.0016529    total: 18.9s    remaining: 4.59s
805:    learn: 0.0016529    total: 19s      remaining: 4.56s
806:    learn: 0.0016507    total: 19s      remaining: 4.54s
807:    learn: 0.0016483    total: 19s      remaining: 4.52s
808:    learn: 0.0016465    total: 19s      remaining: 4.5s
809:    learn: 0.0016417    total: 19.1s    remaining: 4.47s
810:    learn: 0.0016386    total: 19.1s    remaining: 4.45s
811:    learn: 0.0016366    total: 19.1s    remaining: 4.43s
812:    learn: 0.0016351    total: 19.2s    remaining: 4.41s
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813:    learn: 0.0016317    total: 19.2s    remaining: 4.38s
814:    learn: 0.0016317    total: 19.2s    remaining: 4.36s
815:    learn: 0.0016289    total: 19.2s    remaining: 4.33s
816:    learn: 0.0016251    total: 19.2s    remaining: 4.31s
817:    learn: 0.0016215    total: 19.3s    remaining: 4.28s
818:    learn: 0.0016215    total: 19.3s    remaining: 4.26s
819:    learn: 0.0016193    total: 19.3s    remaining: 4.24s
820:    learn: 0.0016161    total: 19.3s    remaining: 4.21s
821:    learn: 0.0016126    total: 19.3s    remaining: 4.19s
822:    learn: 0.0016107    total: 19.4s    remaining: 4.17s
823:    learn: 0.0016084    total: 19.4s    remaining: 4.15s
824:    learn: 0.0016049    total: 19.4s    remaining: 4.12s
825:    learn: 0.0016030    total: 19.4s    remaining: 4.1s
826:    learn: 0.0016009    total: 19.5s    remaining: 4.07s
827:    learn: 0.0015973    total: 19.5s    remaining: 4.05s
828:    learn: 0.0015971    total: 19.5s    remaining: 4.03s
829:    learn: 0.0015971    total: 19.5s    remaining: 4s
830:    learn: 0.0015953    total: 19.6s    remaining: 3.98s
831:    learn: 0.0015918    total: 19.6s    remaining: 3.95s
832:    learn: 0.0015909    total: 19.6s    remaining: 3.93s
833:    learn: 0.0015879    total: 19.6s    remaining: 3.91s
834:    learn: 0.0015865    total: 19.6s    remaining: 3.88s
835:    learn: 0.0015848    total: 19.7s    remaining: 3.86s
836:    learn: 0.0015848    total: 19.7s    remaining: 3.83s
837:    learn: 0.0015807    total: 19.7s    remaining: 3.81s
838:    learn: 0.0015779    total: 19.7s    remaining: 3.78s
839:    learn: 0.0015744    total: 19.8s    remaining: 3.76s
840:    learn: 0.0015699    total: 19.8s    remaining: 3.74s
841:    learn: 0.0015681    total: 19.8s    remaining: 3.72s
842:    learn: 0.0015662    total: 19.8s    remaining: 3.69s
843:    learn: 0.0015661    total: 19.9s    remaining: 3.67s
844:    learn: 0.0015661    total: 19.9s    remaining: 3.65s
845:    learn: 0.0015628    total: 19.9s    remaining: 3.62s
846:    learn: 0.0015608    total: 20s      remaining: 3.6s
847:    learn: 0.0015578    total: 20s      remaining: 3.58s
848:    learn: 0.0015578    total: 20s      remaining: 3.56s
849:    learn: 0.0015578    total: 20s      remaining: 3.53s
850:    learn: 0.0015565    total: 20s      remaining: 3.51s
851:    learn: 0.0015520    total: 20s      remaining: 3.48s
852:    learn: 0.0015497    total: 20.1s    remaining: 3.46s
853:    learn: 0.0015460    total: 20.1s    remaining: 3.44s
854:    learn: 0.0015434    total: 20.1s    remaining: 3.41s
855:    learn: 0.0015434    total: 20.2s    remaining: 3.39s
856:    learn: 0.0015414    total: 20.2s    remaining: 3.37s
857:    learn: 0.0015381    total: 20.2s    remaining: 3.34s
858:    learn: 0.0015352    total: 20.2s    remaining: 3.32s
859:    learn: 0.0015339    total: 20.3s    remaining: 3.3s
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860:	learn: 0.0015321	total: 20.3s	remaining: 3.27s
861:	learn: 0.0015305	total: 20.3s	remaining: 3.25s
862:	learn: 0.0015295	total: 20.3s	remaining: 3.23s
863:	learn: 0.0015267	total: 20.3s	remaining: 3.2s
864:	learn: 0.0015267	total: 20.4s	remaining: 3.18s
865:	learn: 0.0015265	total: 20.4s	remaining: 3.15s
866:	learn: 0.0015234	total: 20.4s	remaining: 3.13s
867:	learn: 0.0015216	total: 20.4s	remaining: 3.11s
868:	learn: 0.0015199	total: 20.5s	remaining: 3.08s
869:	learn: 0.0015162	total: 20.5s	remaining: 3.06s
870:	learn: 0.0015131	total: 20.5s	remaining: 3.03s
871:	learn: 0.0015109	total: 20.5s	remaining: 3.01s
872:	learn: 0.0015082	total: 20.5s	remaining: 2.99s
873:	learn: 0.0015049	total: 20.6s	remaining: 2.96s
874:	learn: 0.0015028	total: 20.6s	remaining: 2.94s
875:	learn: 0.0015011	total: 20.6s	remaining: 2.92s
876:	learn: 0.0014991	total: 20.6s	remaining: 2.89s
877:	learn: 0.0014991	total: 20.7s	remaining: 2.87s
878:	learn: 0.0014960	total: 20.7s	remaining: 2.85s
879:	learn: 0.0014948	total: 20.7s	remaining: 2.83s
880:	learn: 0.0014926	total: 20.7s	remaining: 2.8s
881:	learn: 0.0014896	total: 20.8s	remaining: 2.78s
882:	learn: 0.0014872	total: 20.8s	remaining: 2.76s
883:	learn: 0.0014839	total: 20.8s	remaining: 2.73s
884:	learn: 0.0014809	total: 20.8s	remaining: 2.71s
885:	learn: 0.0014781	total: 20.9s	remaining: 2.69s
886:	learn: 0.0014753	total: 20.9s	remaining: 2.66s
887:	learn: 0.0014730	total: 20.9s	remaining: 2.64s
888:	learn: 0.0014710	total: 20.9s	remaining: 2.61s
889:	learn: 0.0014669	total: 20.9s	remaining: 2.59s
890:	learn: 0.0014655	total: 21s	remaining: 2.56s
891:	learn: 0.0014615	total: 21s	remaining: 2.54s
892:	learn: 0.0014589	total: 21s	remaining: 2.52s
893:	learn: 0.0014570	total: 21s	remaining: 2.49s
894:	learn: 0.0014545	total: 21s	remaining: 2.47s
895:	learn: 0.0014512	total: 21.1s	remaining: 2.44s
896:	learn: 0.0014495	total: 21.1s	remaining: 2.42s
897:	learn: 0.0014474	total: 21.1s	remaining: 2.4s
898:	learn: 0.0014457	total: 21.1s	remaining: 2.38s
899:	learn: 0.0014417	total: 21.2s	remaining: 2.35s
900:	learn: 0.0014395	total: 21.2s	remaining: 2.33s
901:	learn: 0.0014356	total: 21.2s	remaining: 2.3s
902:	learn: 0.0014329	total: 21.2s	remaining: 2.28s
903:	learn: 0.0014304	total: 21.2s	remaining: 2.25s
904:	learn: 0.0014304	total: 21.3s	remaining: 2.23s
905:	learn: 0.0014293	total: 21.3s	remaining: 2.21s
906:	learn: 0.0014275	total: 21.3s	remaining: 2.19s
```

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907:     learn: 0.0014242     total: 21.3s     remaining: 2.16s
908:     learn: 0.0014228     total: 21.4s     remaining: 2.14s
909:     learn: 0.0014219     total: 21.4s     remaining: 2.11s
910:     learn: 0.0014219     total: 21.4s     remaining: 2.09s
911:     learn: 0.0014219     total: 21.4s     remaining: 2.07s
912:     learn: 0.0014194     total: 21.4s     remaining: 2.04s
913:     learn: 0.0014172     total: 21.5s     remaining: 2.02s
914:     learn: 0.0014172     total: 21.5s     remaining: 2s
915:     learn: 0.0014141     total: 21.5s     remaining: 1.97s
916:     learn: 0.0014122     total: 21.5s     remaining: 1.95s
917:     learn: 0.0014088     total: 21.5s     remaining: 1.92s
918:     learn: 0.0014064     total: 21.5s     remaining: 1.9s
919:     learn: 0.0014051     total: 21.6s     remaining: 1.88s
920:     learn: 0.0014027     total: 21.6s     remaining: 1.85s
921:     learn: 0.0014013     total: 21.6s     remaining: 1.83s
922:     learn: 0.0013997     total: 21.6s     remaining: 1.81s
923:     learn: 0.0013972     total: 21.7s     remaining: 1.78s
924:     learn: 0.0013972     total: 21.7s     remaining: 1.76s
925:     learn: 0.0013956     total: 21.7s     remaining: 1.73s
926:     learn: 0.0013935     total: 21.7s     remaining: 1.71s
927:     learn: 0.0013935     total: 21.8s     remaining: 1.69s
928:     learn: 0.0013898     total: 21.8s     remaining: 1.66s
929:     learn: 0.0013866     total: 21.8s     remaining: 1.64s
930:     learn: 0.0013850     total: 21.8s     remaining: 1.62s
931:     learn: 0.0013828     total: 21.8s     remaining: 1.59s
932:     learn: 0.0013811     total: 21.9s     remaining: 1.57s
933:     learn: 0.0013811     total: 21.9s     remaining: 1.55s
934:     learn: 0.0013811     total: 21.9s     remaining: 1.52s
935:     learn: 0.0013786     total: 21.9s     remaining: 1.5s
936:     learn: 0.0013786     total: 22s       remaining: 1.48s
937:     learn: 0.0013764     total: 22s       remaining: 1.45s
938:     learn: 0.0013753     total: 22s       remaining: 1.43s
939:     learn: 0.0013724     total: 22s       remaining: 1.41s
940:     learn: 0.0013706     total: 22.1s     remaining: 1.38s
941:     learn: 0.0013706     total: 22.1s     remaining: 1.36s
942:     learn: 0.0013671     total: 22.1s     remaining: 1.33s
943:     learn: 0.0013656     total: 22.2s     remaining: 1.31s
944:     learn: 0.0013627     total: 22.2s     remaining: 1.29s
945:     learn: 0.0013601     total: 22.2s     remaining: 1.27s
946:     learn: 0.0013576     total: 22.2s     remaining: 1.24s
947:     learn: 0.0013552     total: 22.2s     remaining: 1.22s
948:     learn: 0.0013551     total: 22.2s     remaining: 1.2s
949:     learn: 0.0013532     total: 22.3s     remaining: 1.17s
950:     learn: 0.0013532     total: 22.3s     remaining: 1.15s
951:     learn: 0.0013511     total: 22.3s     remaining: 1.12s
952:     learn: 0.0013511     total: 22.3s     remaining: 1.1s
953:     learn: 0.0013511     total: 22.3s     remaining: 1.08s
```

```
954:    learn: 0.0013487    total: 22.4s    remaining: 1.05s
955:    learn: 0.0013463    total: 22.4s    remaining: 1.03s
956:    learn: 0.0013436    total: 22.4s    remaining: 1.01s
957:    learn: 0.0013423    total: 22.5s    remaining: 985ms
958:    learn: 0.0013423    total: 22.5s    remaining: 962ms
959:    learn: 0.0013423    total: 22.5s    remaining: 938ms
960:    learn: 0.0013399    total: 22.5s    remaining: 914ms
961:    learn: 0.0013380    total: 22.6s    remaining: 891ms
962:    learn: 0.0013355    total: 22.6s    remaining: 867ms
963:    learn: 0.0013336    total: 22.6s    remaining: 844ms
964:    learn: 0.0013309    total: 22.6s    remaining: 820ms
965:    learn: 0.0013308    total: 22.6s    remaining: 797ms
966:    learn: 0.0013308    total: 22.7s    remaining: 774ms
967:    learn: 0.0013307    total: 22.7s    remaining: 751ms
968:    learn: 0.0013273    total: 22.7s    remaining: 727ms
969:    learn: 0.0013273    total: 22.8s    remaining: 704ms
970:    learn: 0.0013253    total: 22.8s    remaining: 680ms
971:    learn: 0.0013253    total: 22.8s    remaining: 657ms
972:    learn: 0.0013225    total: 22.8s    remaining: 633ms
973:    learn: 0.0013192    total: 22.8s    remaining: 609ms
974:    learn: 0.0013183    total: 22.9s    remaining: 586ms
975:    learn: 0.0013169    total: 22.9s    remaining: 562ms
976:    learn: 0.0013144    total: 22.9s    remaining: 539ms
977:    learn: 0.0013130    total: 22.9s    remaining: 516ms
978:    learn: 0.0013119    total: 23s      remaining: 493ms
979:    learn: 0.0013119    total: 23s      remaining: 469ms
980:    learn: 0.0013096    total: 23s      remaining: 446ms
981:    learn: 0.0013096    total: 23s      remaining: 422ms
982:    learn: 0.0013080    total: 23.1s    remaining: 399ms
983:    learn: 0.0013069    total: 23.1s    remaining: 375ms
984:    learn: 0.0013052    total: 23.1s    remaining: 352ms
985:    learn: 0.0013052    total: 23.2s    remaining: 329ms
986:    learn: 0.0013029    total: 23.2s    remaining: 305ms
987:    learn: 0.0013009    total: 23.2s    remaining: 282ms
988:    learn: 0.0012976    total: 23.2s    remaining: 258ms
989:    learn: 0.0012966    total: 23.2s    remaining: 235ms
990:    learn: 0.0012955    total: 23.3s    remaining: 211ms
991:    learn: 0.0012936    total: 23.3s    remaining: 188ms
992:    learn: 0.0012906    total: 23.3s    remaining: 164ms
993:    learn: 0.0012906    total: 23.3s    remaining: 141ms
994:    learn: 0.0012894    total: 23.4s    remaining: 117ms
995:    learn: 0.0012893    total: 23.4s    remaining: 93.9ms
996:    learn: 0.0012893    total: 23.4s    remaining: 70.4ms
997:    learn: 0.0012880    total: 23.4s    remaining: 46.9ms
998:    learn: 0.0012857    total: 23.4s    remaining: 23.5ms
999:    learn: 0.0012848    total: 23.5s    remaining: 0us
```

In [17]:
```python
# 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()

# 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: 0.6195094        test: 0.6193184 best: 0.6193184 (0)
1:      learn: 0.5562515        test: 0.5535427 best: 0.5535427 (1)
2:      learn: 0.4915136        test: 0.4885237 best: 0.4885237 (2)
3:      learn: 0.4396479        test: 0.4356553 best: 0.4356553 (3)
4:      learn: 0.3937077        test: 0.3895247 best: 0.3895247 (4)
5:      learn: 0.3509279        test: 0.3468137 best: 0.3468137 (5)
6:      learn: 0.3171245        test: 0.3127685 best: 0.3127685 (6)
7:      learn: 0.2843246        test: 0.2790015 best: 0.2790015 (7)
8:      learn: 0.2549413        test: 0.2484996 best: 0.2484996 (8)
9:      learn: 0.2287265        test: 0.2224477 best: 0.2224477 (9)
10:     learn: 0.2058484        test: 0.1995842 best: 0.1995842 (10)
11:     learn: 0.1870064        test: 0.1806483 best: 0.1806483 (11)
12:     learn: 0.1699067        test: 0.1637665 best: 0.1637665 (12)
13:     learn: 0.1556020        test: 0.1498047 best: 0.1498047 (13)
14:     learn: 0.1410232        test: 0.1352597 best: 0.1352597 (14)
15:     learn: 0.1286831        test: 0.1231102 best: 0.1231102 (15)
16:     learn: 0.1178099        test: 0.1126320 best: 0.1126320 (16)
17:     learn: 0.1075353        test: 0.1025689 best: 0.1025689 (17)
18:     learn: 0.0988339        test: 0.0938084 best: 0.0938084 (18)
19:     learn: 0.0902621        test: 0.0855762 best: 0.0855762 (19)
20:     learn: 0.0826358        test: 0.0782185 best: 0.0782185 (20)
21:     learn: 0.0758848        test: 0.0717186 best: 0.0717186 (21)
22:     learn: 0.0698572        test: 0.0658877 best: 0.0658877 (22)
23:     learn: 0.0639072        test: 0.0600939 best: 0.0600939 (23)
24:     learn: 0.0595496        test: 0.0558328 best: 0.0558328 (24)     total: 4.73s     remaining: 3m 4s
25:     learn: 0.0552863        test: 0.0517232 best: 0.0517232 (25)
26:     learn: 0.0511239        test: 0.0477065 best: 0.0477065 (26)
27:     learn: 0.0478623        test: 0.0445318 best: 0.0445318 (27)
```

```
28:     learn: 0.0447302     test: 0.0415528 best: 0.0415528 (28)
29:     learn: 0.0419502     test: 0.0388311 best: 0.0388311 (29)
30:     learn: 0.0392549     test: 0.0362906 best: 0.0362906 (30)
31:     learn: 0.0364708     test: 0.0336947 best: 0.0336947 (31)
32:     learn: 0.0342665     test: 0.0315205 best: 0.0315205 (32)
33:     learn: 0.0322519     test: 0.0295790 best: 0.0295790 (33)
34:     learn: 0.0303640     test: 0.0278245 best: 0.0278245 (34)
35:     learn: 0.0288624     test: 0.0263860 best: 0.0263860 (35)
36:     learn: 0.0271542     test: 0.0247523 best: 0.0247523 (36)
37:     learn: 0.0256179     test: 0.0232803 best: 0.0232803 (37)
38:     learn: 0.0242743     test: 0.0220118 best: 0.0220118 (38)
39:     learn: 0.0230145     test: 0.0208131 best: 0.0208131 (39)
40:     learn: 0.0219019     test: 0.0197348 best: 0.0197348 (40)
41:     learn: 0.0208202     test: 0.0187040 best: 0.0187040 (41)
42:     learn: 0.0199570     test: 0.0178766 best: 0.0178766 (42)
43:     learn: 0.0190173     test: 0.0169673 best: 0.0169673 (43)
44:     learn: 0.0180961     test: 0.0161111 best: 0.0161111 (44)
45:     learn: 0.0172578     test: 0.0153080 best: 0.0153080 (45)
46:     learn: 0.0164190     test: 0.0145074 best: 0.0145074 (46)
47:     learn: 0.0157473     test: 0.0138670 best: 0.0138670 (47)
48:     learn: 0.0151330     test: 0.0132857 best: 0.0132857 (48)
49:     learn: 0.0144713     test: 0.0126464 best: 0.0126464 (49)
50:     learn: 0.0138636     test: 0.0120733 best: 0.0120733 (50)
51:     learn: 0.0133289     test: 0.0115689 best: 0.0115689 (51)
52:     learn: 0.0128000     test: 0.0110503 best: 0.0110503 (52)
53:     learn: 0.0123732     test: 0.0106387 best: 0.0106387 (53)
54:     learn: 0.0118823     test: 0.0101815 best: 0.0101815 (54)
55:     learn: 0.0114390     test: 0.0097514 best: 0.0097514 (55)
56:     learn: 0.0109581     test: 0.0093069 best: 0.0093069 (56)
57:     learn: 0.0105234     test: 0.0089071 best: 0.0089071 (57)    total: 11.5s    remaining: 3m 7s
58:     learn: 0.0101553     test: 0.0085696 best: 0.0085696 (58)
59:     learn: 0.0097646     test: 0.0082079 best: 0.0082079 (59)
60:     learn: 0.0094565     test: 0.0079202 best: 0.0079202 (60)
61:     learn: 0.0091725     test: 0.0076476 best: 0.0076476 (61)
62:     learn: 0.0089046     test: 0.0073999 best: 0.0073999 (62)
63:     learn: 0.0086625     test: 0.0071680 best: 0.0071680 (63)
64:     learn: 0.0083778     test: 0.0069150 best: 0.0069150 (64)
65:     learn: 0.0081414     test: 0.0067011 best: 0.0067011 (65)
66:     learn: 0.0078954     test: 0.0064797 best: 0.0064797 (66)
67:     learn: 0.0076793     test: 0.0062776 best: 0.0062776 (67)
68:     learn: 0.0074495     test: 0.0060712 best: 0.0060712 (68)
69:     learn: 0.0072293     test: 0.0058718 best: 0.0058718 (69)
70:     learn: 0.0070259     test: 0.0056882 best: 0.0056882 (70)
71:     learn: 0.0068553     test: 0.0055245 best: 0.0055245 (71)
72:     learn: 0.0066830     test: 0.0053769 best: 0.0053769 (72)
73:     learn: 0.0065134     test: 0.0052157 best: 0.0052157 (73)
74:     learn: 0.0063599     test: 0.0050731 best: 0.0050731 (74)
```

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75:      learn: 0.0062014      test: 0.0049328 best: 0.0049328 (75)
76:      learn: 0.0060354      test: 0.0047821 best: 0.0047821 (76)
77:      learn: 0.0059008      test: 0.0046584 best: 0.0046584 (77)
78:      learn: 0.0057559      test: 0.0045279 best: 0.0045279 (78)
79:      learn: 0.0056430      test: 0.0044234 best: 0.0044234 (79)
80:      learn: 0.0055186      test: 0.0043114 best: 0.0043114 (80)    total: 16.6s    remaining: 3m 8s
81:      learn: 0.0054031      test: 0.0042046 best: 0.0042046 (81)
82:      learn: 0.0052756      test: 0.0040911 best: 0.0040911 (82)
83:      learn: 0.0051942      test: 0.0040147 best: 0.0040147 (83)
84:      learn: 0.0050841      test: 0.0039192 best: 0.0039192 (84)
85:      learn: 0.0049743      test: 0.0038243 best: 0.0038243 (85)
86:      learn: 0.0048611      test: 0.0037243 best: 0.0037243 (86)
87:      learn: 0.0047649      test: 0.0036351 best: 0.0036351 (87)
88:      learn: 0.0046595      test: 0.0035413 best: 0.0035413 (88)
89:      learn: 0.0045652      test: 0.0034554 best: 0.0034554 (89)
90:      learn: 0.0044878      test: 0.0033860 best: 0.0033860 (90)
91:      learn: 0.0044134      test: 0.0033185 best: 0.0033185 (91)
92:      learn: 0.0043294      test: 0.0032459 best: 0.0032459 (92)
93:      learn: 0.0042536      test: 0.0031773 best: 0.0031773 (93)
94:      learn: 0.0041787      test: 0.0031108 best: 0.0031108 (94)
95:      learn: 0.0040988      test: 0.0030415 best: 0.0030415 (95)
96:      learn: 0.0040290      test: 0.0029800 best: 0.0029800 (96)
97:      learn: 0.0039686      test: 0.0029280 best: 0.0029280 (97)
98:      learn: 0.0039051      test: 0.0028720 best: 0.0028720 (98)
99:      learn: 0.0038377      test: 0.0028141 best: 0.0028141 (99)
100:     learn: 0.0037821      test: 0.0027647 best: 0.0027647 (100)
101:     learn: 0.0037261      test: 0.0027144 best: 0.0027144 (101)
102:     learn: 0.0036561      test: 0.0026546 best: 0.0026546 (102)
103:     learn: 0.0035939      test: 0.0026013 best: 0.0026013 (103)
104:     learn: 0.0035428      test: 0.0025571 best: 0.0025571 (104)
105:     learn: 0.0034874      test: 0.0025106 best: 0.0025106 (105)
106:     learn: 0.0034381      test: 0.0024689 best: 0.0024689 (106)
107:     learn: 0.0033907      test: 0.0024281 best: 0.0024281 (107)
108:     learn: 0.0033445      test: 0.0023879 best: 0.0023879 (108)
109:     learn: 0.0032976      test: 0.0023467 best: 0.0023467 (109)
110:     learn: 0.0032445      test: 0.0023015 best: 0.0023015 (110)
111:     learn: 0.0031964      test: 0.0022618 best: 0.0022618 (111)
112:     learn: 0.0031491      test: 0.0022229 best: 0.0022229 (112)
113:     learn: 0.0031002      test: 0.0021824 best: 0.0021824 (113)    total: 23.8s    remaining: 3m 4s
114:     learn: 0.0030626      test: 0.0021495 best: 0.0021495 (114)
115:     learn: 0.0030202      test: 0.0021140 best: 0.0021140 (115)
116:     learn: 0.0029752      test: 0.0020758 best: 0.0020758 (116)
117:     learn: 0.0029411      test: 0.0020474 best: 0.0020474 (117)
118:     learn: 0.0029021      test: 0.0020143 best: 0.0020143 (118)
119:     learn: 0.0028597      test: 0.0019788 best: 0.0019788 (119)
120:     learn: 0.0028181      test: 0.0019443 best: 0.0019443 (120)
121:     learn: 0.0027861      test: 0.0019170 best: 0.0019170 (121)
```

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122:    learn: 0.0027475    test: 0.0018856 best: 0.0018856 (122)
123:    learn: 0.0027121    test: 0.0018571 best: 0.0018571 (123)
124:    learn: 0.0026798    test: 0.0018305 best: 0.0018305 (124)
125:    learn: 0.0026492    test: 0.0018042 best: 0.0018042 (125)
126:    learn: 0.0026241    test: 0.0017829 best: 0.0017829 (126)
127:    learn: 0.0025925    test: 0.0017570 best: 0.0017570 (127)    total: 27.2s    remaining: 3m 5s
128:    learn: 0.0025631    test: 0.0017324 best: 0.0017324 (128)
129:    learn: 0.0025341    test: 0.0017084 best: 0.0017084 (129)
130:    learn: 0.0025062    test: 0.0016854 best: 0.0016854 (130)
131:    learn: 0.0024738    test: 0.0016589 best: 0.0016589 (131)
132:    learn: 0.0024438    test: 0.0016346 best: 0.0016346 (132)
133:    learn: 0.0024218    test: 0.0016154 best: 0.0016154 (133)
134:    learn: 0.0023920    test: 0.0015921 best: 0.0015921 (134)
135:    learn: 0.0023696    test: 0.0015737 best: 0.0015737 (135)
136:    learn: 0.0023435    test: 0.0015522 best: 0.0015522 (136)
137:    learn: 0.0023173    test: 0.0015314 best: 0.0015314 (137)
138:    learn: 0.0023009    test: 0.0015178 best: 0.0015178 (138)
139:    learn: 0.0022753    test: 0.0014972 best: 0.0014972 (139)
140:    learn: 0.0022561    test: 0.0014824 best: 0.0014824 (140)
141:    learn: 0.0022382    test: 0.0014679 best: 0.0014679 (141)
142:    learn: 0.0022167    test: 0.0014507 best: 0.0014507 (142)
143:    learn: 0.0021935    test: 0.0014324 best: 0.0014324 (143)
144:    learn: 0.0021744    test: 0.0014170 best: 0.0014170 (144)    total: 31.2s    remaining: 3m 4s
145:    learn: 0.0021524    test: 0.0013995 best: 0.0013995 (145)
146:    learn: 0.0021394    test: 0.0013887 best: 0.0013887 (146)
147:    learn: 0.0021263    test: 0.0013789 best: 0.0013789 (147)
148:    learn: 0.0021078    test: 0.0013645 best: 0.0013645 (148)
149:    learn: 0.0020904    test: 0.0013501 best: 0.0013501 (149)
150:    learn: 0.0020712    test: 0.0013357 best: 0.0013357 (150)
151:    learn: 0.0020545    test: 0.0013228 best: 0.0013228 (151)
152:    learn: 0.0020364    test: 0.0013085 best: 0.0013085 (152)
153:    learn: 0.0020217    test: 0.0012974 best: 0.0012974 (153)
154:    learn: 0.0020017    test: 0.0012823 best: 0.0012823 (154)
155:    learn: 0.0019823    test: 0.0012674 best: 0.0012674 (155)
156:    learn: 0.0019683    test: 0.0012571 best: 0.0012571 (156)
157:    learn: 0.0019536    test: 0.0012448 best: 0.0012448 (157)
158:    learn: 0.0019393    test: 0.0012347 best: 0.0012347 (158)
159:    learn: 0.0019235    test: 0.0012223 best: 0.0012223 (159)
160:    learn: 0.0019081    test: 0.0012108 best: 0.0012108 (160)
161:    learn: 0.0018946    test: 0.0011999 best: 0.0011999 (161)
162:    learn: 0.0018825    test: 0.0011910 best: 0.0011910 (162)
163:    learn: 0.0018656    test: 0.0011774 best: 0.0011774 (163)
164:    learn: 0.0018470    test: 0.0011626 best: 0.0011626 (164)
165:    learn: 0.0018346    test: 0.0011533 best: 0.0011533 (165)
166:    learn: 0.0018190    test: 0.0011406 best: 0.0011406 (166)
167:    learn: 0.0018093    test: 0.0011330 best: 0.0011330 (167)
168:    learn: 0.0018017    test: 0.0011266 best: 0.0011266 (168)
```

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169:    learn: 0.0017898    test: 0.0011177 best: 0.0011177 (169)   total: 37.2s    remaining: 3m 1s
170:    learn: 0.0017820    test: 0.0011119 best: 0.0011119 (170)
171:    learn: 0.0017696    test: 0.0011014 best: 0.0011014 (171)
172:    learn: 0.0017560    test: 0.0010910 best: 0.0010910 (172)
173:    learn: 0.0017408    test: 0.0010795 best: 0.0010795 (173)
174:    learn: 0.0017297    test: 0.0010710 best: 0.0010710 (174)
175:    learn: 0.0017200    test: 0.0010637 best: 0.0010637 (175)
176:    learn: 0.0017103    test: 0.0010566 best: 0.0010566 (176)
177:    learn: 0.0016987    test: 0.0010474 best: 0.0010474 (177)
178:    learn: 0.0016932    test: 0.0010433 best: 0.0010433 (178)
179:    learn: 0.0016806    test: 0.0010333 best: 0.0010333 (179)
180:    learn: 0.0016691    test: 0.0010245 best: 0.0010245 (180)
181:    learn: 0.0016562    test: 0.0010146 best: 0.0010146 (181)
182:    learn: 0.0016507    test: 0.0010101 best: 0.0010101 (182)
183:    learn: 0.0016390    test: 0.0010009 best: 0.0010009 (183)
184:    learn: 0.0016273    test: 0.0009917 best: 0.0009917 (184)   total: 40.9s    remaining: 3m
185:    learn: 0.0016180    test: 0.0009847 best: 0.0009847 (185)
186:    learn: 0.0016092    test: 0.0009776 best: 0.0009776 (186)
187:    learn: 0.0015994    test: 0.0009697 best: 0.0009697 (187)
188:    learn: 0.0015910    test: 0.0009636 best: 0.0009636 (188)
189:    learn: 0.0015856    test: 0.0009598 best: 0.0009598 (189)
190:    learn: 0.0015763    test: 0.0009525 best: 0.0009525 (190)
191:    learn: 0.0015676    test: 0.0009455 best: 0.0009455 (191)
192:    learn: 0.0015586    test: 0.0009388 best: 0.0009388 (192)
193:    learn: 0.0015478    test: 0.0009308 best: 0.0009308 (193)
194:    learn: 0.0015390    test: 0.0009237 best: 0.0009237 (194)
195:    learn: 0.0015306    test: 0.0009168 best: 0.0009168 (195)
196:    learn: 0.0015218    test: 0.0009104 best: 0.0009104 (196)
197:    learn: 0.0015134    test: 0.0009041 best: 0.0009041 (197)
198:    learn: 0.0015068    test: 0.0008988 best: 0.0008988 (198)
199:    learn: 0.0014994    test: 0.0008934 best: 0.0008934 (199)
200:    learn: 0.0014914    test: 0.0008875 best: 0.0008875 (200)
201:    learn: 0.0014850    test: 0.0008830 best: 0.0008830 (201)
202:    learn: 0.0014787    test: 0.0008779 best: 0.0008779 (202)
203:    learn: 0.0014739    test: 0.0008744 best: 0.0008744 (203)
204:    learn: 0.0014686    test: 0.0008707 best: 0.0008707 (204)
205:    learn: 0.0014630    test: 0.0008666 best: 0.0008666 (205)   total: 46.1s    remaining: 2m 57s
206:    learn: 0.0014546    test: 0.0008609 best: 0.0008609 (206)
207:    learn: 0.0014470    test: 0.0008550 best: 0.0008550 (207)
208:    learn: 0.0014371    test: 0.0008470 best: 0.0008470 (208)
209:    learn: 0.0014288    test: 0.0008411 best: 0.0008411 (209)
210:    learn: 0.0014234    test: 0.0008371 best: 0.0008371 (210)
211:    learn: 0.0014153    test: 0.0008308 best: 0.0008308 (211)
212:    learn: 0.0014115    test: 0.0008282 best: 0.0008282 (212)
213:    learn: 0.0014053    test: 0.0008235 best: 0.0008235 (213)
214:    learn: 0.0013985    test: 0.0008188 best: 0.0008188 (214)
215:    learn: 0.0013933    test: 0.0008147 best: 0.0008147 (215)
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216:     learn: 0.0013865       test: 0.0008093 best: 0.0008093 (216)
217:     learn: 0.0013799       test: 0.0008043 best: 0.0008043 (217)
218:     learn: 0.0013732       test: 0.0007992 best: 0.0007992 (218)
219:     learn: 0.0013675       test: 0.0007948 best: 0.0007948 (219)
220:     learn: 0.0013617       test: 0.0007902 best: 0.0007902 (220)
221:     learn: 0.0013554       test: 0.0007851 best: 0.0007851 (221)
222:     learn: 0.0013508       test: 0.0007821 best: 0.0007821 (222)
223:     learn: 0.0013453       test: 0.0007781 best: 0.0007781 (223)
224:     learn: 0.0013401       test: 0.0007744 best: 0.0007744 (224)
225:     learn: 0.0013336       test: 0.0007693 best: 0.0007693 (225)
226:     learn: 0.0013286       test: 0.0007654 best: 0.0007654 (226)
227:     learn: 0.0013251       test: 0.0007629 best: 0.0007629 (227)   total: 51.4s    remaining: 2m 54s
228:     learn: 0.0013198       test: 0.0007591 best: 0.0007591 (228)
229:     learn: 0.0013164       test: 0.0007567 best: 0.0007567 (229)
230:     learn: 0.0013116       test: 0.0007533 best: 0.0007533 (230)
231:     learn: 0.0013073       test: 0.0007502 best: 0.0007502 (231)
232:     learn: 0.0013034       test: 0.0007471 best: 0.0007471 (232)
233:     learn: 0.0012970       test: 0.0007427 best: 0.0007427 (233)
234:     learn: 0.0012910       test: 0.0007379 best: 0.0007379 (234)
235:     learn: 0.0012855       test: 0.0007338 best: 0.0007338 (235)
236:     learn: 0.0012810       test: 0.0007304 best: 0.0007304 (236)
237:     learn: 0.0012755       test: 0.0007262 best: 0.0007262 (237)
238:     learn: 0.0012701       test: 0.0007223 best: 0.0007223 (238)
239:     learn: 0.0012650       test: 0.0007184 best: 0.0007184 (239)
240:     learn: 0.0012607       test: 0.0007151 best: 0.0007151 (240)
241:     learn: 0.0012576       test: 0.0007131 best: 0.0007131 (241)
242:     learn: 0.0012537       test: 0.0007103 best: 0.0007103 (242)
243:     learn: 0.0012498       test: 0.0007075 best: 0.0007075 (243)
244:     learn: 0.0012445       test: 0.0007038 best: 0.0007038 (244)
245:     learn: 0.0012419       test: 0.0007019 best: 0.0007019 (245)
246:     learn: 0.0012383       test: 0.0006992 best: 0.0006992 (246)
247:     learn: 0.0012351       test: 0.0006970 best: 0.0006970 (247)
248:     learn: 0.0012328       test: 0.0006953 best: 0.0006953 (248)
249:     learn: 0.0012296       test: 0.0006930 best: 0.0006930 (249)
250:     learn: 0.0012266       test: 0.0006910 best: 0.0006910 (250)   total: 57.2s    remaining: 2m 50s
251:     learn: 0.0012231       test: 0.0006884 best: 0.0006884 (251)
252:     learn: 0.0012181       test: 0.0006845 best: 0.0006845 (252)
253:     learn: 0.0012156       test: 0.0006829 best: 0.0006829 (253)
254:     learn: 0.0012124       test: 0.0006806 best: 0.0006806 (254)
255:     learn: 0.0012080       test: 0.0006773 best: 0.0006773 (255)
256:     learn: 0.0012026       test: 0.0006732 best: 0.0006732 (256)
257:     learn: 0.0011986       test: 0.0006703 best: 0.0006703 (257)
258:     learn: 0.0011943       test: 0.0006671 best: 0.0006671 (258)
259:     learn: 0.0011899       test: 0.0006636 best: 0.0006636 (259)
260:     learn: 0.0011863       test: 0.0006609 best: 0.0006609 (260)
261:     learn: 0.0011827       test: 0.0006581 best: 0.0006581 (261)
262:     learn: 0.0011799       test: 0.0006563 best: 0.0006563 (262)
```

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263:    learn: 0.0011753    test: 0.0006527 best: 0.0006527 (263)
264:    learn: 0.0011728    test: 0.0006507 best: 0.0006507 (264)
265:    learn: 0.0011699    test: 0.0006487 best: 0.0006487 (265)
266:    learn: 0.0011665    test: 0.0006463 best: 0.0006463 (266)
267:    learn: 0.0011623    test: 0.0006431 best: 0.0006431 (267)    total: 1m 1s     remaining: 2m 48s
268:    learn: 0.0011597    test: 0.0006412 best: 0.0006412 (268)
269:    learn: 0.0011563    test: 0.0006387 best: 0.0006387 (269)
270:    learn: 0.0011544    test: 0.0006373 best: 0.0006373 (270)
271:    learn: 0.0011525    test: 0.0006360 best: 0.0006360 (271)
272:    learn: 0.0011504    test: 0.0006345 best: 0.0006345 (272)
273:    learn: 0.0011492    test: 0.0006338 best: 0.0006338 (273)
274:    learn: 0.0011468    test: 0.0006323 best: 0.0006323 (274)
275:    learn: 0.0011438    test: 0.0006300 best: 0.0006300 (275)
276:    learn: 0.0011409    test: 0.0006278 best: 0.0006278 (276)
277:    learn: 0.0011390    test: 0.0006266 best: 0.0006266 (277)
278:    learn: 0.0011346    test: 0.0006237 best: 0.0006237 (278)
279:    learn: 0.0011327    test: 0.0006224 best: 0.0006224 (279)
280:    learn: 0.0011318    test: 0.0006218 best: 0.0006218 (280)
281:    learn: 0.0011305    test: 0.0006209 best: 0.0006209 (281)
282:    learn: 0.0011284    test: 0.0006195 best: 0.0006195 (282)
283:    learn: 0.0011261    test: 0.0006180 best: 0.0006180 (283)
284:    learn: 0.0011240    test: 0.0006163 best: 0.0006163 (284)
285:    learn: 0.0011219    test: 0.0006149 best: 0.0006149 (285)    total: 1m 6s     remaining: 2m 46s
286:    learn: 0.0011196    test: 0.0006133 best: 0.0006133 (286)
287:    learn: 0.0011174    test: 0.0006118 best: 0.0006118 (287)
288:    learn: 0.0011143    test: 0.0006094 best: 0.0006094 (288)
289:    learn: 0.0011126    test: 0.0006082 best: 0.0006082 (289)
290:    learn: 0.0011098    test: 0.0006062 best: 0.0006062 (290)
291:    learn: 0.0011083    test: 0.0006050 best: 0.0006050 (291)
292:    learn: 0.0011070    test: 0.0006042 best: 0.0006042 (292)
293:    learn: 0.0011052    test: 0.0006029 best: 0.0006029 (293)
294:    learn: 0.0011038    test: 0.0006021 best: 0.0006021 (294)
295:    learn: 0.0011027    test: 0.0006013 best: 0.0006013 (295)
296:    learn: 0.0011014    test: 0.0006004 best: 0.0006004 (296)
297:    learn: 0.0010997    test: 0.0005992 best: 0.0005992 (297)
298:    learn: 0.0010987    test: 0.0005986 best: 0.0005986 (298)
299:    learn: 0.0010977    test: 0.0005978 best: 0.0005978 (299)
300:    learn: 0.0010964    test: 0.0005971 best: 0.0005971 (300)
301:    learn: 0.0010949    test: 0.0005961 best: 0.0005961 (301)
302:    learn: 0.0010935    test: 0.0005953 best: 0.0005953 (302)
303:    learn: 0.0010910    test: 0.0005934 best: 0.0005934 (303)
304:    learn: 0.0010889    test: 0.0005917 best: 0.0005917 (304)
305:    learn: 0.0010882    test: 0.0005914 best: 0.0005914 (305)
306:    learn: 0.0010869    test: 0.0005905 best: 0.0005905 (306)
307:    learn: 0.0010858    test: 0.0005898 best: 0.0005898 (307)
308:    learn: 0.0010849    test: 0.0005891 best: 0.0005891 (308)    total: 1m 12s    remaining: 2m 42s
309:    learn: 0.0010828    test: 0.0005876 best: 0.0005876 (309)
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310:     learn: 0.0010817       test: 0.0005868 best: 0.0005868 (310)
311:     learn: 0.0010815       test: 0.0005867 best: 0.0005867 (311)
312:     learn: 0.0010808       test: 0.0005863 best: 0.0005863 (312)
313:     learn: 0.0010783       test: 0.0005847 best: 0.0005847 (313)
314:     learn: 0.0010780       test: 0.0005845 best: 0.0005845 (314)
315:     learn: 0.0010767       test: 0.0005837 best: 0.0005837 (315)
316:     learn: 0.0010759       test: 0.0005833 best: 0.0005833 (316)
317:     learn: 0.0010758       test: 0.0005833 best: 0.0005833 (317)
318:     learn: 0.0010749       test: 0.0005827 best: 0.0005827 (318)
319:     learn: 0.0010740       test: 0.0005821 best: 0.0005821 (319)
320:     learn: 0.0010727       test: 0.0005812 best: 0.0005812 (320)
321:     learn: 0.0010708       test: 0.0005799 best: 0.0005799 (321)
322:     learn: 0.0010704       test: 0.0005796 best: 0.0005796 (322)
323:     learn: 0.0010694       test: 0.0005790 best: 0.0005790 (323)
324:     learn: 0.0010681       test: 0.0005782 best: 0.0005782 (324)
325:     learn: 0.0010667       test: 0.0005773 best: 0.0005773 (325)
326:     learn: 0.0010652       test: 0.0005762 best: 0.0005762 (326)
327:     learn: 0.0010648       test: 0.0005760 best: 0.0005760 (327)
328:     learn: 0.0010640       test: 0.0005756 best: 0.0005756 (328)   total: 1m 17s   remaining: 2m 39s
329:     learn: 0.0010622       test: 0.0005743 best: 0.0005743 (329)
330:     learn: 0.0010616       test: 0.0005739 best: 0.0005739 (330)
331:     learn: 0.0010608       test: 0.0005735 best: 0.0005735 (331)
332:     learn: 0.0010597       test: 0.0005727 best: 0.0005727 (332)
333:     learn: 0.0010587       test: 0.0005721 best: 0.0005721 (333)
334:     learn: 0.0010566       test: 0.0005707 best: 0.0005707 (334)
335:     learn: 0.0010556       test: 0.0005700 best: 0.0005700 (335)
336:     learn: 0.0010548       test: 0.0005695 best: 0.0005695 (336)
337:     learn: 0.0010541       test: 0.0005690 best: 0.0005690 (337)
338:     learn: 0.0010527       test: 0.0005681 best: 0.0005681 (338)
339:     learn: 0.0010521       test: 0.0005677 best: 0.0005677 (339)
340:     learn: 0.0010507       test: 0.0005668 best: 0.0005668 (340)
341:     learn: 0.0010496       test: 0.0005661 best: 0.0005661 (341)
342:     learn: 0.0010485       test: 0.0005653 best: 0.0005653 (342)
343:     learn: 0.0010472       test: 0.0005645 best: 0.0005645 (343)
344:     learn: 0.0010453       test: 0.0005631 best: 0.0005631 (344)
345:     learn: 0.0010432       test: 0.0005616 best: 0.0005616 (345)
346:     learn: 0.0010415       test: 0.0005604 best: 0.0005604 (346)
347:     learn: 0.0010403       test: 0.0005596 best: 0.0005596 (347)
348:     learn: 0.0010389       test: 0.0005586 best: 0.0005586 (348)   total: 1m 23s   remaining: 2m 35s
349:     learn: 0.0010371       test: 0.0005574 best: 0.0005574 (349)
350:     learn: 0.0010360       test: 0.0005567 best: 0.0005567 (350)
351:     learn: 0.0010355       test: 0.0005563 best: 0.0005563 (351)
352:     learn: 0.0010347       test: 0.0005558 best: 0.0005558 (352)
353:     learn: 0.0010343       test: 0.0005555 best: 0.0005555 (353)
354:     learn: 0.0010335       test: 0.0005550 best: 0.0005550 (354)
355:     learn: 0.0010323       test: 0.0005542 best: 0.0005542 (355)
356:     learn: 0.0010310       test: 0.0005534 best: 0.0005534 (356)
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357:     learn: 0.0010300       test: 0.0005526 best: 0.0005526 (357)
358:     learn: 0.0010291       test: 0.0005521 best: 0.0005521 (358)
359:     learn: 0.0010281       test: 0.0005514 best: 0.0005514 (359)
360:     learn: 0.0010278       test: 0.0005512 best: 0.0005512 (360)
361:     learn: 0.0010272       test: 0.0005508 best: 0.0005508 (361)
362:     learn: 0.0010258       test: 0.0005499 best: 0.0005499 (362)
363:     learn: 0.0010257       test: 0.0005499 best: 0.0005499 (363)
364:     learn: 0.0010245       test: 0.0005491 best: 0.0005491 (364)
365:     learn: 0.0010237       test: 0.0005486 best: 0.0005486 (365)
366:     learn: 0.0010235       test: 0.0005485 best: 0.0005485 (366)
367:     learn: 0.0010225       test: 0.0005479 best: 0.0005479 (367)
368:     learn: 0.0010211       test: 0.0005470 best: 0.0005470 (368)
369:     learn: 0.0010204       test: 0.0005466 best: 0.0005466 (369)
370:     learn: 0.0010201       test: 0.0005464 best: 0.0005464 (370)   total: 1m 29s    remaining: 2m 30s
371:     learn: 0.0010188       test: 0.0005456 best: 0.0005456 (371)
372:     learn: 0.0010182       test: 0.0005452 best: 0.0005452 (372)
373:     learn: 0.0010176       test: 0.0005448 best: 0.0005448 (373)
374:     learn: 0.0010169       test: 0.0005444 best: 0.0005444 (374)
375:     learn: 0.0010160       test: 0.0005438 best: 0.0005438 (375)
376:     learn: 0.0010154       test: 0.0005434 best: 0.0005434 (376)
377:     learn: 0.0010150       test: 0.0005431 best: 0.0005431 (377)
378:     learn: 0.0010143       test: 0.0005426 best: 0.0005426 (378)
379:     learn: 0.0010135       test: 0.0005421 best: 0.0005421 (379)
380:     learn: 0.0010131       test: 0.0005419 best: 0.0005419 (380)
381:     learn: 0.0010124       test: 0.0005414 best: 0.0005414 (381)
382:     learn: 0.0010120       test: 0.0005412 best: 0.0005412 (382)
383:     learn: 0.0010108       test: 0.0005404 best: 0.0005404 (383)
384:     learn: 0.0010098       test: 0.0005398 best: 0.0005398 (384)
385:     learn: 0.0010092       test: 0.0005393 best: 0.0005393 (385)
386:     learn: 0.0010085       test: 0.0005389 best: 0.0005389 (386)
387:     learn: 0.0010082       test: 0.0005388 best: 0.0005388 (387)
388:     learn: 0.0010077       test: 0.0005385 best: 0.0005385 (388)
389:     learn: 0.0010073       test: 0.0005383 best: 0.0005383 (389)   total: 1m 34s    remaining: 2m 27s
390:     learn: 0.0010067       test: 0.0005379 best: 0.0005379 (390)
391:     learn: 0.0010063       test: 0.0005377 best: 0.0005377 (391)
392:     learn: 0.0010051       test: 0.0005368 best: 0.0005368 (392)
393:     learn: 0.0010043       test: 0.0005363 best: 0.0005363 (393)
394:     learn: 0.0010032       test: 0.0005355 best: 0.0005355 (394)
395:     learn: 0.0010024       test: 0.0005350 best: 0.0005350 (395)
396:     learn: 0.0010022       test: 0.0005348 best: 0.0005348 (396)
397:     learn: 0.0010013       test: 0.0005343 best: 0.0005343 (397)
398:     learn: 0.0010009       test: 0.0005340 best: 0.0005340 (398)
399:     learn: 0.0010006       test: 0.0005338 best: 0.0005338 (399)
400:     learn: 0.0009995       test: 0.0005331 best: 0.0005331 (400)
401:     learn: 0.0009989       test: 0.0005327 best: 0.0005327 (401)
402:     learn: 0.0009983       test: 0.0005324 best: 0.0005324 (402)
403:     learn: 0.0009977       test: 0.0005319 best: 0.0005319 (403)   total: 1m 38s    remaining: 2m 24s
```

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404:     learn: 0.0009973      test: 0.0005317 best: 0.0005317 (404)
405:     learn: 0.0009967      test: 0.0005313 best: 0.0005313 (405)
406:     learn: 0.0009963      test: 0.0005310 best: 0.0005310 (406)
407:     learn: 0.0009948      test: 0.0005301 best: 0.0005301 (407)
408:     learn: 0.0009944      test: 0.0005298 best: 0.0005298 (408)
409:     learn: 0.0009932      test: 0.0005291 best: 0.0005291 (409)
410:     learn: 0.0009922      test: 0.0005284 best: 0.0005284 (410)
411:     learn: 0.0009917      test: 0.0005280 best: 0.0005280 (411)
412:     learn: 0.0009904      test: 0.0005273 best: 0.0005273 (412)
413:     learn: 0.0009898      test: 0.0005269 best: 0.0005269 (413)
414:     learn: 0.0009892      test: 0.0005266 best: 0.0005266 (414)
415:     learn: 0.0009891      test: 0.0005265 best: 0.0005265 (415)
416:     learn: 0.0009885      test: 0.0005261 best: 0.0005261 (416)
417:     learn: 0.0009876      test: 0.0005256 best: 0.0005256 (417)
418:     learn: 0.0009870      test: 0.0005251 best: 0.0005251 (418)
419:     learn: 0.0009860      test: 0.0005245 best: 0.0005245 (419)
420:     learn: 0.0009852      test: 0.0005239 best: 0.0005239 (420)
421:     learn: 0.0009848      test: 0.0005237 best: 0.0005237 (421)
422:     learn: 0.0009842      test: 0.0005233 best: 0.0005233 (422)   total: 1m 43s   remaining: 2m 21s
423:     learn: 0.0009840      test: 0.0005232 best: 0.0005232 (423)
424:     learn: 0.0009839      test: 0.0005231 best: 0.0005231 (424)
425:     learn: 0.0009836      test: 0.0005229 best: 0.0005229 (425)
426:     learn: 0.0009832      test: 0.0005227 best: 0.0005227 (426)
427:     learn: 0.0009825      test: 0.0005223 best: 0.0005223 (427)
428:     learn: 0.0009824      test: 0.0005222 best: 0.0005222 (428)
429:     learn: 0.0009818      test: 0.0005218 best: 0.0005218 (429)
430:     learn: 0.0009813      test: 0.0005215 best: 0.0005215 (430)
431:     learn: 0.0009810      test: 0.0005213 best: 0.0005213 (431)
432:     learn: 0.0009809      test: 0.0005213 best: 0.0005213 (432)
433:     learn: 0.0009807      test: 0.0005212 best: 0.0005212 (433)
434:     learn: 0.0009804      test: 0.0005210 best: 0.0005210 (434)
435:     learn: 0.0009800      test: 0.0005208 best: 0.0005208 (435)
436:     learn: 0.0009794      test: 0.0005203 best: 0.0005203 (436)
437:     learn: 0.0009788      test: 0.0005199 best: 0.0005199 (437)
438:     learn: 0.0009785      test: 0.0005198 best: 0.0005198 (438)
439:     learn: 0.0009783      test: 0.0005196 best: 0.0005196 (439)
440:     learn: 0.0009780      test: 0.0005195 best: 0.0005195 (440)
441:     learn: 0.0009776      test: 0.0005192 best: 0.0005192 (441)
442:     learn: 0.0009768      test: 0.0005187 best: 0.0005187 (442)
443:     learn: 0.0009762      test: 0.0005183 best: 0.0005183 (443)
444:     learn: 0.0009759      test: 0.0005181 best: 0.0005181 (444)
445:     learn: 0.0009753      test: 0.0005178 best: 0.0005178 (445)   total: 1m 49s   remaining: 2m 16s
446:     learn: 0.0009750      test: 0.0005176 best: 0.0005176 (446)
447:     learn: 0.0009743      test: 0.0005171 best: 0.0005171 (447)
448:     learn: 0.0009735      test: 0.0005165 best: 0.0005165 (448)
449:     learn: 0.0009731      test: 0.0005163 best: 0.0005163 (449)
450:     learn: 0.0009729      test: 0.0005161 best: 0.0005161 (450)
```

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451:    learn: 0.0009724    test: 0.0005158 best: 0.0005158 (451)
452:    learn: 0.0009719    test: 0.0005154 best: 0.0005154 (452)
453:    learn: 0.0009715    test: 0.0005152 best: 0.0005152 (453)
454:    learn: 0.0009707    test: 0.0005147 best: 0.0005147 (454)
455:    learn: 0.0009704    test: 0.0005144 best: 0.0005144 (455)
456:    learn: 0.0009702    test: 0.0005143 best: 0.0005143 (456)
457:    learn: 0.0009692    test: 0.0005136 best: 0.0005136 (457)
458:    learn: 0.0009692    test: 0.0005136 best: 0.0005136 (458)
459:    learn: 0.0009692    test: 0.0005136 best: 0.0005136 (459)
460:    learn: 0.0009691    test: 0.0005135 best: 0.0005135 (460)
461:    learn: 0.0009690    test: 0.0005135 best: 0.0005135 (461)
462:    learn: 0.0009686    test: 0.0005132 best: 0.0005132 (462)
463:    learn: 0.0009677    test: 0.0005126 best: 0.0005126 (463)
464:    learn: 0.0009670    test: 0.0005121 best: 0.0005121 (464)
465:    learn: 0.0009667    test: 0.0005119 best: 0.0005119 (465)
466:    learn: 0.0009666    test: 0.0005118 best: 0.0005118 (466)    total: 1m 55s    remaining: 2m 11s
467:    learn: 0.0009664    test: 0.0005117 best: 0.0005117 (467)
468:    learn: 0.0009659    test: 0.0005114 best: 0.0005114 (468)
469:    learn: 0.0009659    test: 0.0005114 best: 0.0005114 (469)
470:    learn: 0.0009654    test: 0.0005110 best: 0.0005110 (470)
471:    learn: 0.0009651    test: 0.0005109 best: 0.0005109 (471)
472:    learn: 0.0009649    test: 0.0005108 best: 0.0005108 (472)
473:    learn: 0.0009647    test: 0.0005107 best: 0.0005107 (473)
474:    learn: 0.0009642    test: 0.0005103 best: 0.0005103 (474)
475:    learn: 0.0009639    test: 0.0005101 best: 0.0005101 (475)
476:    learn: 0.0009638    test: 0.0005101 best: 0.0005101 (476)
477:    learn: 0.0009633    test: 0.0005097 best: 0.0005097 (477)
478:    learn: 0.0009628    test: 0.0005094 best: 0.0005094 (478)
479:    learn: 0.0009625    test: 0.0005092 best: 0.0005092 (479)
480:    learn: 0.0009623    test: 0.0005091 best: 0.0005091 (480)
481:    learn: 0.0009622    test: 0.0005091 best: 0.0005091 (481)
482:    learn: 0.0009614    test: 0.0005085 best: 0.0005085 (482)
483:    learn: 0.0009611    test: 0.0005084 best: 0.0005084 (483)
484:    learn: 0.0009608    test: 0.0005082 best: 0.0005082 (484)
485:    learn: 0.0009607    test: 0.0005081 best: 0.0005081 (485)
486:    learn: 0.0009600    test: 0.0005078 best: 0.0005078 (486)
487:    learn: 0.0009598    test: 0.0005076 best: 0.0005076 (487)
488:    learn: 0.0009594    test: 0.0005073 best: 0.0005073 (488)    total: 2m 1s     remaining: 2m 7s
489:    learn: 0.0009589    test: 0.0005070 best: 0.0005070 (489)
490:    learn: 0.0009587    test: 0.0005069 best: 0.0005069 (490)
491:    learn: 0.0009585    test: 0.0005068 best: 0.0005068 (491)
492:    learn: 0.0009583    test: 0.0005067 best: 0.0005067 (492)
493:    learn: 0.0009583    test: 0.0005067 best: 0.0005067 (493)
494:    learn: 0.0009580    test: 0.0005066 best: 0.0005066 (494)
495:    learn: 0.0009575    test: 0.0005062 best: 0.0005062 (495)
496:    learn: 0.0009573    test: 0.0005061 best: 0.0005061 (496)
497:    learn: 0.0009570    test: 0.0005059 best: 0.0005059 (497)
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498:     learn: 0.0009570        test: 0.0005059 best: 0.0005059 (498)
499:     learn: 0.0009566        test: 0.0005057 best: 0.0005057 (499)
500:     learn: 0.0009564        test: 0.0005055 best: 0.0005055 (500)
501:     learn: 0.0009560        test: 0.0005052 best: 0.0005052 (501)
502:     learn: 0.0009559        test: 0.0005052 best: 0.0005052 (502)
503:     learn: 0.0009552        test: 0.0005047 best: 0.0005047 (503)   total: 2m 6s    remaining: 2m 4s
504:     learn: 0.0009550        test: 0.0005046 best: 0.0005046 (504)
505:     learn: 0.0009549        test: 0.0005046 best: 0.0005046 (505)
506:     learn: 0.0009547        test: 0.0005044 best: 0.0005044 (506)
507:     learn: 0.0009545        test: 0.0005042 best: 0.0005042 (507)
508:     learn: 0.0009542        test: 0.0005040 best: 0.0005040 (508)
509:     learn: 0.0009540        test: 0.0005040 best: 0.0005040 (509)
510:     learn: 0.0009540        test: 0.0005039 best: 0.0005039 (510)
511:     learn: 0.0009538        test: 0.0005038 best: 0.0005038 (511)
512:     learn: 0.0009537        test: 0.0005038 best: 0.0005038 (512)
513:     learn: 0.0009537        test: 0.0005037 best: 0.0005037 (513)
514:     learn: 0.0009536        test: 0.0005037 best: 0.0005037 (514)
515:     learn: 0.0009532        test: 0.0005034 best: 0.0005034 (515)
516:     learn: 0.0009530        test: 0.0005033 best: 0.0005033 (516)
517:     learn: 0.0009526        test: 0.0005030 best: 0.0005030 (517)
518:     learn: 0.0009526        test: 0.0005030 best: 0.0005030 (518)
519:     learn: 0.0009523        test: 0.0005029 best: 0.0005029 (519)
520:     learn: 0.0009521        test: 0.0005027 best: 0.0005027 (520)   total: 2m 11s   remaining: 2m
521:     learn: 0.0009516        test: 0.0005024 best: 0.0005024 (521)
522:     learn: 0.0009513        test: 0.0005022 best: 0.0005022 (522)
523:     learn: 0.0009506        test: 0.0005017 best: 0.0005017 (523)
524:     learn: 0.0009504        test: 0.0005016 best: 0.0005016 (524)
525:     learn: 0.0009500        test: 0.0005013 best: 0.0005013 (525)
526:     learn: 0.0009498        test: 0.0005012 best: 0.0005012 (526)
527:     learn: 0.0009497        test: 0.0005011 best: 0.0005011 (527)
528:     learn: 0.0009494        test: 0.0005009 best: 0.0005009 (528)
529:     learn: 0.0009493        test: 0.0005009 best: 0.0005009 (529)
530:     learn: 0.0009493        test: 0.0005009 best: 0.0005009 (530)
531:     learn: 0.0009490        test: 0.0005007 best: 0.0005007 (531)
532:     learn: 0.0009490        test: 0.0005006 best: 0.0005006 (532)
533:     learn: 0.0009489        test: 0.0005006 best: 0.0005006 (533)
534:     learn: 0.0009487        test: 0.0005005 best: 0.0005005 (534)
535:     learn: 0.0009487        test: 0.0005005 best: 0.0005005 (535)
536:     learn: 0.0009484        test: 0.0005003 best: 0.0005003 (536)
537:     learn: 0.0009481        test: 0.0005001 best: 0.0005001 (537)
538:     learn: 0.0009481        test: 0.0005001 best: 0.0005001 (538)
539:     learn: 0.0009480        test: 0.0005000 best: 0.0005000 (539)
540:     learn: 0.0009480        test: 0.0005000 best: 0.0005000 (540)
541:     learn: 0.0009477        test: 0.0004998 best: 0.0004998 (541)
542:     learn: 0.0009474        test: 0.0004996 best: 0.0004996 (542)   total: 2m 17s   remaining: 1m 55s
543:     learn: 0.0009467        test: 0.0004991 best: 0.0004991 (543)
544:     learn: 0.0009465        test: 0.0004990 best: 0.0004990 (544)
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545:    learn: 0.0009464    test: 0.0004990 best: 0.0004990 (545)
546:    learn: 0.0009460    test: 0.0004987 best: 0.0004987 (546)
547:    learn: 0.0009459    test: 0.0004986 best: 0.0004986 (547)
548:    learn: 0.0009458    test: 0.0004986 best: 0.0004986 (548)
549:    learn: 0.0009455    test: 0.0004984 best: 0.0004984 (549)
550:    learn: 0.0009455    test: 0.0004984 best: 0.0004984 (550)
551:    learn: 0.0009453    test: 0.0004983 best: 0.0004983 (551)
552:    learn: 0.0009452    test: 0.0004983 best: 0.0004983 (552)
553:    learn: 0.0009450    test: 0.0004982 best: 0.0004982 (553)
554:    learn: 0.0009449    test: 0.0004981 best: 0.0004981 (554)
555:    learn: 0.0009443    test: 0.0004977 best: 0.0004977 (555)
556:    learn: 0.0009440    test: 0.0004975 best: 0.0004975 (556)
557:    learn: 0.0009439    test: 0.0004974 best: 0.0004974 (557)
558:    learn: 0.0009434    test: 0.0004971 best: 0.0004971 (558)    total: 2m 21s    remaining: 1m 51s
559:    learn: 0.0009432    test: 0.0004969 best: 0.0004969 (559)
560:    learn: 0.0009428    test: 0.0004967 best: 0.0004967 (560)
561:    learn: 0.0009425    test: 0.0004965 best: 0.0004965 (561)
562:    learn: 0.0009423    test: 0.0004964 best: 0.0004964 (562)
563:    learn: 0.0009421    test: 0.0004963 best: 0.0004963 (563)
564:    learn: 0.0009417    test: 0.0004960 best: 0.0004960 (564)
565:    learn: 0.0009415    test: 0.0004959 best: 0.0004959 (565)
566:    learn: 0.0009411    test: 0.0004956 best: 0.0004956 (566)
567:    learn: 0.0009409    test: 0.0004955 best: 0.0004955 (567)
568:    learn: 0.0009406    test: 0.0004953 best: 0.0004953 (568)
569:    learn: 0.0009404    test: 0.0004952 best: 0.0004952 (569)
570:    learn: 0.0009403    test: 0.0004952 best: 0.0004952 (570)
571:    learn: 0.0009401    test: 0.0004951 best: 0.0004951 (571)
572:    learn: 0.0009398    test: 0.0004949 best: 0.0004949 (572)
573:    learn: 0.0009396    test: 0.0004947 best: 0.0004947 (573)
574:    learn: 0.0009396    test: 0.0004947 best: 0.0004947 (574)
575:    learn: 0.0009393    test: 0.0004945 best: 0.0004945 (575)
576:    learn: 0.0009388    test: 0.0004941 best: 0.0004941 (576)
577:    learn: 0.0009386    test: 0.0004940 best: 0.0004940 (577)
578:    learn: 0.0009384    test: 0.0004938 best: 0.0004938 (578)
579:    learn: 0.0009381    test: 0.0004936 best: 0.0004936 (579)
580:    learn: 0.0009381    test: 0.0004936 best: 0.0004936 (580)
581:    learn: 0.0009377    test: 0.0004933 best: 0.0004933 (581)    total: 2m 27s    remaining: 1m 46s
582:    learn: 0.0009377    test: 0.0004933 best: 0.0004933 (582)
583:    learn: 0.0009377    test: 0.0004933 best: 0.0004933 (583)
584:    learn: 0.0009374    test: 0.0004931 best: 0.0004931 (584)
585:    learn: 0.0009373    test: 0.0004931 best: 0.0004931 (585)
586:    learn: 0.0009371    test: 0.0004929 best: 0.0004929 (586)
587:    learn: 0.0009370    test: 0.0004929 best: 0.0004929 (587)
588:    learn: 0.0009370    test: 0.0004928 best: 0.0004928 (588)
589:    learn: 0.0009367    test: 0.0004927 best: 0.0004927 (589)
590:    learn: 0.0009364    test: 0.0004924 best: 0.0004924 (590)
591:    learn: 0.0009364    test: 0.0004924 best: 0.0004924 (591)
```

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592:     learn: 0.0009362      test: 0.0004923 best: 0.0004923 (592)
593:     learn: 0.0009360      test: 0.0004922 best: 0.0004922 (593)
594:     learn: 0.0009357      test: 0.0004920 best: 0.0004920 (594)
595:     learn: 0.0009357      test: 0.0004920 best: 0.0004920 (595)
596:     learn: 0.0009357      test: 0.0004920 best: 0.0004920 (595)    total: 2m 32s    remaining: 1m 42s
597:     learn: 0.0009357      test: 0.0004920 best: 0.0004920 (597)
598:     learn: 0.0009356      test: 0.0004919 best: 0.0004919 (598)
599:     learn: 0.0009355      test: 0.0004919 best: 0.0004919 (599)
600:     learn: 0.0009353      test: 0.0004918 best: 0.0004918 (600)
601:     learn: 0.0009352      test: 0.0004917 best: 0.0004917 (601)
602:     learn: 0.0009350      test: 0.0004916 best: 0.0004916 (602)
603:     learn: 0.0009350      test: 0.0004916 best: 0.0004916 (603)
604:     learn: 0.0009350      test: 0.0004915 best: 0.0004915 (604)
605:     learn: 0.0009349      test: 0.0004915 best: 0.0004915 (605)
606:     learn: 0.0009349      test: 0.0004915 best: 0.0004915 (606)
607:     learn: 0.0009347      test: 0.0004914 best: 0.0004914 (607)
608:     learn: 0.0009344      test: 0.0004912 best: 0.0004912 (608)
609:     learn: 0.0009342      test: 0.0004911 best: 0.0004911 (609)
610:     learn: 0.0009340      test: 0.0004909 best: 0.0004909 (610)
611:     learn: 0.0009340      test: 0.0004909 best: 0.0004909 (611)
612:     learn: 0.0009337      test: 0.0004907 best: 0.0004907 (612)
613:     learn: 0.0009334      test: 0.0004905 best: 0.0004905 (613)    total: 2m 36s    remaining: 1m 38s
614:     learn: 0.0009332      test: 0.0004904 best: 0.0004904 (614)
615:     learn: 0.0009331      test: 0.0004904 best: 0.0004904 (615)
616:     learn: 0.0009328      test: 0.0004901 best: 0.0004901 (616)
617:     learn: 0.0009323      test: 0.0004899 best: 0.0004899 (617)
618:     learn: 0.0009323      test: 0.0004899 best: 0.0004899 (618)
619:     learn: 0.0009321      test: 0.0004897 best: 0.0004897 (619)
620:     learn: 0.0009320      test: 0.0004896 best: 0.0004896 (620)
621:     learn: 0.0009318      test: 0.0004895 best: 0.0004895 (621)
622:     learn: 0.0009317      test: 0.0004894 best: 0.0004894 (622)
623:     learn: 0.0009314      test: 0.0004893 best: 0.0004893 (623)
624:     learn: 0.0009313      test: 0.0004892 best: 0.0004892 (624)
625:     learn: 0.0009310      test: 0.0004890 best: 0.0004890 (625)
626:     learn: 0.0009309      test: 0.0004889 best: 0.0004889 (626)
627:     learn: 0.0009308      test: 0.0004889 best: 0.0004889 (627)    total: 2m 40s    remaining: 1m 35s
628:     learn: 0.0009308      test: 0.0004889 best: 0.0004889 (628)
629:     learn: 0.0009307      test: 0.0004889 best: 0.0004889 (629)
630:     learn: 0.0009306      test: 0.0004888 best: 0.0004888 (630)
631:     learn: 0.0009303      test: 0.0004886 best: 0.0004886 (631)
632:     learn: 0.0009301      test: 0.0004885 best: 0.0004885 (632)
633:     learn: 0.0009298      test: 0.0004884 best: 0.0004884 (633)
634:     learn: 0.0009298      test: 0.0004884 best: 0.0004884 (634)
635:     learn: 0.0009297      test: 0.0004883 best: 0.0004883 (635)
636:     learn: 0.0009296      test: 0.0004883 best: 0.0004883 (636)
637:     learn: 0.0009296      test: 0.0004882 best: 0.0004882 (637)
638:     learn: 0.0009295      test: 0.0004882 best: 0.0004882 (638)
```

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639:     learn: 0.0009294        test: 0.0004882 best: 0.0004882 (639)
640:     learn: 0.0009294        test: 0.0004882 best: 0.0004882 (639)
641:     learn: 0.0009292        test: 0.0004881 best: 0.0004881 (641)
642:     learn: 0.0009290        test: 0.0004880 best: 0.0004880 (642)
643:     learn: 0.0009290        test: 0.0004880 best: 0.0004880 (643)
644:     learn: 0.0009290        test: 0.0004880 best: 0.0004880 (644)
645:     learn: 0.0009289        test: 0.0004880 best: 0.0004880 (645)
646:     learn: 0.0009287        test: 0.0004878 best: 0.0004878 (646)
647:     learn: 0.0009287        test: 0.0004878 best: 0.0004878 (647)
648:     learn: 0.0009286        test: 0.0004877 best: 0.0004877 (648)
649:     learn: 0.0009284        test: 0.0004876 best: 0.0004876 (649)   total: 2m 46s    remaining: 1m 29s
650:     learn: 0.0009283        test: 0.0004876 best: 0.0004876 (650)
651:     learn: 0.0009282        test: 0.0004875 best: 0.0004875 (651)
652:     learn: 0.0009279        test: 0.0004873 best: 0.0004873 (652)
653:     learn: 0.0009276        test: 0.0004871 best: 0.0004871 (653)
654:     learn: 0.0009276        test: 0.0004871 best: 0.0004871 (654)
655:     learn: 0.0009275        test: 0.0004871 best: 0.0004871 (655)
656:     learn: 0.0009275        test: 0.0004871 best: 0.0004871 (656)
657:     learn: 0.0009274        test: 0.0004871 best: 0.0004871 (657)
658:     learn: 0.0009274        test: 0.0004870 best: 0.0004870 (658)
659:     learn: 0.0009272        test: 0.0004869 best: 0.0004869 (659)
660:     learn: 0.0009270        test: 0.0004867 best: 0.0004867 (660)
661:     learn: 0.0009270        test: 0.0004867 best: 0.0004867 (661)
662:     learn: 0.0009270        test: 0.0004867 best: 0.0004867 (662)
663:     learn: 0.0009270        test: 0.0004867 best: 0.0004867 (663)
664:     learn: 0.0009268        test: 0.0004866 best: 0.0004866 (664)
665:     learn: 0.0009268        test: 0.0004866 best: 0.0004866 (665)
666:     learn: 0.0009267        test: 0.0004866 best: 0.0004866 (666)
667:     learn: 0.0009265        test: 0.0004865 best: 0.0004865 (667)   total: 2m 52s    remaining: 1m 25s
668:     learn: 0.0009265        test: 0.0004865 best: 0.0004865 (668)
669:     learn: 0.0009263        test: 0.0004863 best: 0.0004863 (669)
670:     learn: 0.0009261        test: 0.0004862 best: 0.0004862 (670)
671:     learn: 0.0009259        test: 0.0004860 best: 0.0004860 (671)
672:     learn: 0.0009256        test: 0.0004859 best: 0.0004859 (672)
673:     learn: 0.0009256        test: 0.0004859 best: 0.0004859 (673)
674:     learn: 0.0009255        test: 0.0004858 best: 0.0004858 (674)
675:     learn: 0.0009255        test: 0.0004858 best: 0.0004858 (675)
676:     learn: 0.0009255        test: 0.0004858 best: 0.0004858 (676)
677:     learn: 0.0009253        test: 0.0004857 best: 0.0004857 (677)
678:     learn: 0.0009253        test: 0.0004857 best: 0.0004857 (678)
679:     learn: 0.0009253        test: 0.0004857 best: 0.0004857 (679)
680:     learn: 0.0009250        test: 0.0004855 best: 0.0004855 (680)
681:     learn: 0.0009250        test: 0.0004855 best: 0.0004855 (681)
682:     learn: 0.0009249        test: 0.0004855 best: 0.0004855 (682)
683:     learn: 0.0009248        test: 0.0004855 best: 0.0004855 (683)
684:     learn: 0.0009247        test: 0.0004853 best: 0.0004853 (684)
685:     learn: 0.0009245        test: 0.0004852 best: 0.0004852 (685)
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686:    learn: 0.0009243    test: 0.0004852 best: 0.0004852 (686)
687:    learn: 0.0009241    test: 0.0004850 best: 0.0004850 (687)    total: 2m 57s    remaining: 1m 20s
688:    learn: 0.0009240    test: 0.0004850 best: 0.0004850 (688)
689:    learn: 0.0009239    test: 0.0004849 best: 0.0004849 (689)
690:    learn: 0.0009237    test: 0.0004847 best: 0.0004847 (690)
691:    learn: 0.0009237    test: 0.0004847 best: 0.0004847 (691)
692:    learn: 0.0009234    test: 0.0004845 best: 0.0004845 (692)
693:    learn: 0.0009232    test: 0.0004844 best: 0.0004844 (693)
694:    learn: 0.0009232    test: 0.0004844 best: 0.0004844 (694)
695:    learn: 0.0009230    test: 0.0004843 best: 0.0004843 (695)
696:    learn: 0.0009230    test: 0.0004842 best: 0.0004842 (696)
697:    learn: 0.0009230    test: 0.0004842 best: 0.0004842 (697)
698:    learn: 0.0009228    test: 0.0004841 best: 0.0004841 (698)
699:    learn: 0.0009228    test: 0.0004841 best: 0.0004841 (699)
700:    learn: 0.0009227    test: 0.0004841 best: 0.0004841 (700)
701:    learn: 0.0009227    test: 0.0004841 best: 0.0004841 (701)
702:    learn: 0.0009227    test: 0.0004840 best: 0.0004840 (702)
703:    learn: 0.0009225    test: 0.0004839 best: 0.0004839 (703)
704:    learn: 0.0009222    test: 0.0004837 best: 0.0004837 (704)    total: 3m 2s    remaining: 1m 16s
705:    learn: 0.0009222    test: 0.0004837 best: 0.0004837 (705)
706:    learn: 0.0009221    test: 0.0004836 best: 0.0004836 (706)
707:    learn: 0.0009221    test: 0.0004836 best: 0.0004836 (707)
708:    learn: 0.0009219    test: 0.0004835 best: 0.0004835 (708)
709:    learn: 0.0009218    test: 0.0004835 best: 0.0004835 (709)
710:    learn: 0.0009216    test: 0.0004834 best: 0.0004834 (710)
711:    learn: 0.0009216    test: 0.0004834 best: 0.0004834 (711)
712:    learn: 0.0009216    test: 0.0004833 best: 0.0004833 (712)
713:    learn: 0.0009214    test: 0.0004833 best: 0.0004833 (713)
714:    learn: 0.0009214    test: 0.0004833 best: 0.0004833 (714)
715:    learn: 0.0009212    test: 0.0004832 best: 0.0004832 (715)
716:    learn: 0.0009212    test: 0.0004831 best: 0.0004831 (716)
717:    learn: 0.0009210    test: 0.0004831 best: 0.0004831 (717)
718:    learn: 0.0009208    test: 0.0004829 best: 0.0004829 (718)
719:    learn: 0.0009208    test: 0.0004829 best: 0.0004829 (719)
720:    learn: 0.0009208    test: 0.0004829 best: 0.0004829 (720)
721:    learn: 0.0009206    test: 0.0004828 best: 0.0004828 (721)
722:    learn: 0.0009206    test: 0.0004828 best: 0.0004828 (722)    total: 3m 7s    remaining: 1m 11s
723:    learn: 0.0009205    test: 0.0004827 best: 0.0004827 (723)
724:    learn: 0.0009205    test: 0.0004827 best: 0.0004827 (724)
725:    learn: 0.0009205    test: 0.0004827 best: 0.0004827 (725)
726:    learn: 0.0009203    test: 0.0004826 best: 0.0004826 (726)
727:    learn: 0.0009203    test: 0.0004826 best: 0.0004826 (727)
728:    learn: 0.0009203    test: 0.0004826 best: 0.0004826 (728)
729:    learn: 0.0009203    test: 0.0004826 best: 0.0004826 (729)
730:    learn: 0.0009202    test: 0.0004826 best: 0.0004826 (730)
731:    learn: 0.0009199    test: 0.0004824 best: 0.0004824 (731)
732:    learn: 0.0009198    test: 0.0004823 best: 0.0004823 (732)
```

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733:    learn: 0.0009198    test: 0.0004823 best: 0.0004823 (733)
734:    learn: 0.0009198    test: 0.0004823 best: 0.0004823 (734)
735:    learn: 0.0009197    test: 0.0004823 best: 0.0004823 (735)
736:    learn: 0.0009196    test: 0.0004822 best: 0.0004822 (736)    total: 3m 11s    remaining: 1m 8s
737:    learn: 0.0009194    test: 0.0004821 best: 0.0004821 (737)
738:    learn: 0.0009192    test: 0.0004820 best: 0.0004820 (738)
739:    learn: 0.0009189    test: 0.0004818 best: 0.0004818 (739)
740:    learn: 0.0009188    test: 0.0004817 best: 0.0004817 (740)
741:    learn: 0.0009187    test: 0.0004817 best: 0.0004817 (741)
742:    learn: 0.0009186    test: 0.0004816 best: 0.0004816 (742)
743:    learn: 0.0009185    test: 0.0004815 best: 0.0004815 (743)
744:    learn: 0.0009185    test: 0.0004815 best: 0.0004815 (744)
745:    learn: 0.0009184    test: 0.0004815 best: 0.0004815 (745)
746:    learn: 0.0009182    test: 0.0004814 best: 0.0004814 (746)
747:    learn: 0.0009182    test: 0.0004814 best: 0.0004814 (747)
748:    learn: 0.0009182    test: 0.0004814 best: 0.0004814 (748)
749:    learn: 0.0009182    test: 0.0004814 best: 0.0004814 (749)
750:    learn: 0.0009181    test: 0.0004814 best: 0.0004814 (750)
751:    learn: 0.0009181    test: 0.0004814 best: 0.0004814 (751)
752:    learn: 0.0009181    test: 0.0004813 best: 0.0004813 (752)
753:    learn: 0.0009181    test: 0.0004813 best: 0.0004813 (753)    total: 3m 16s    remaining: 1m 4s
754:    learn: 0.0009179    test: 0.0004813 best: 0.0004813 (754)
755:    learn: 0.0009179    test: 0.0004813 best: 0.0004813 (755)
756:    learn: 0.0009178    test: 0.0004812 best: 0.0004812 (756)
757:    learn: 0.0009177    test: 0.0004812 best: 0.0004812 (757)
758:    learn: 0.0009177    test: 0.0004812 best: 0.0004812 (758)
759:    learn: 0.0009176    test: 0.0004811 best: 0.0004811 (759)
760:    learn: 0.0009176    test: 0.0004811 best: 0.0004811 (760)
761:    learn: 0.0009174    test: 0.0004810 best: 0.0004810 (761)
762:    learn: 0.0009173    test: 0.0004809 best: 0.0004809 (762)
763:    learn: 0.0009173    test: 0.0004809 best: 0.0004809 (763)
764:    learn: 0.0009172    test: 0.0004809 best: 0.0004809 (764)
765:    learn: 0.0009170    test: 0.0004807 best: 0.0004807 (765)
766:    learn: 0.0009167    test: 0.0004805 best: 0.0004805 (766)
767:    learn: 0.0009167    test: 0.0004805 best: 0.0004805 (767)
768:    learn: 0.0009166    test: 0.0004805 best: 0.0004805 (768)
769:    learn: 0.0009166    test: 0.0004805 best: 0.0004805 (769)
770:    learn: 0.0009163    test: 0.0004803 best: 0.0004803 (770)    total: 3m 21s    remaining: 59.9s
771:    learn: 0.0009162    test: 0.0004803 best: 0.0004803 (771)
772:    learn: 0.0009161    test: 0.0004803 best: 0.0004803 (772)
773:    learn: 0.0009160    test: 0.0004802 best: 0.0004802 (773)
774:    learn: 0.0009159    test: 0.0004802 best: 0.0004802 (774)
775:    learn: 0.0009159    test: 0.0004802 best: 0.0004802 (775)
776:    learn: 0.0009157    test: 0.0004800 best: 0.0004800 (776)
777:    learn: 0.0009157    test: 0.0004800 best: 0.0004800 (777)
778:    learn: 0.0009156    test: 0.0004800 best: 0.0004800 (778)
779:    learn: 0.0009155    test: 0.0004800 best: 0.0004800 (779)
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780:    learn: 0.0009155      test: 0.0004800 best: 0.0004800 (780)
781:    learn: 0.0009155      test: 0.0004800 best: 0.0004800 (781)
782:    learn: 0.0009155      test: 0.0004800 best: 0.0004800 (782)
783:    learn: 0.0009155      test: 0.0004800 best: 0.0004800 (783)   total: 3m 25s    remaining: 56.7s
784:    learn: 0.0009154      test: 0.0004799 best: 0.0004799 (784)
785:    learn: 0.0009152      test: 0.0004798 best: 0.0004798 (785)
786:    learn: 0.0009152      test: 0.0004798 best: 0.0004798 (786)
787:    learn: 0.0009152      test: 0.0004798 best: 0.0004798 (787)
788:    learn: 0.0009151      test: 0.0004798 best: 0.0004798 (788)
789:    learn: 0.0009151      test: 0.0004798 best: 0.0004798 (789)
790:    learn: 0.0009150      test: 0.0004797 best: 0.0004797 (790)
791:    learn: 0.0009149      test: 0.0004796 best: 0.0004796 (791)
792:    learn: 0.0009149      test: 0.0004796 best: 0.0004796 (792)
793:    learn: 0.0009148      test: 0.0004796 best: 0.0004796 (793)
794:    learn: 0.0009147      test: 0.0004795 best: 0.0004795 (794)
795:    learn: 0.0009147      test: 0.0004795 best: 0.0004795 (795)
796:    learn: 0.0009147      test: 0.0004795 best: 0.0004795 (796)
797:    learn: 0.0009145      test: 0.0004794 best: 0.0004794 (797)
798:    learn: 0.0009144      test: 0.0004794 best: 0.0004794 (798)
799:    learn: 0.0009144      test: 0.0004794 best: 0.0004794 (799)
800:    learn: 0.0009144      test: 0.0004794 best: 0.0004794 (800)
801:    learn: 0.0009142      test: 0.0004793 best: 0.0004793 (801)
802:    learn: 0.0009142      test: 0.0004792 best: 0.0004792 (802)
803:    learn: 0.0009141      test: 0.0004792 best: 0.0004792 (803)
804:    learn: 0.0009141      test: 0.0004792 best: 0.0004792 (804)
805:    learn: 0.0009140      test: 0.0004792 best: 0.0004792 (805)
806:    learn: 0.0009140      test: 0.0004792 best: 0.0004792 (806)   total: 3m 31s    remaining: 50.7s
807:    learn: 0.0009140      test: 0.0004792 best: 0.0004792 (807)
808:    learn: 0.0009140      test: 0.0004792 best: 0.0004792 (808)
809:    learn: 0.0009139      test: 0.0004791 best: 0.0004791 (809)
810:    learn: 0.0009138      test: 0.0004791 best: 0.0004791 (810)
811:    learn: 0.0009136      test: 0.0004790 best: 0.0004790 (811)
812:    learn: 0.0009136      test: 0.0004790 best: 0.0004790 (812)
813:    learn: 0.0009135      test: 0.0004789 best: 0.0004789 (813)
814:    learn: 0.0009135      test: 0.0004789 best: 0.0004789 (814)
815:    learn: 0.0009134      test: 0.0004789 best: 0.0004789 (815)
816:    learn: 0.0009131      test: 0.0004787 best: 0.0004787 (816)
817:    learn: 0.0009130      test: 0.0004786 best: 0.0004786 (817)
818:    learn: 0.0009128      test: 0.0004785 best: 0.0004785 (818)
819:    learn: 0.0009127      test: 0.0004784 best: 0.0004784 (819)   total: 3m 35s    remaining: 47.4s
820:    learn: 0.0009127      test: 0.0004784 best: 0.0004784 (820)
821:    learn: 0.0009127      test: 0.0004784 best: 0.0004784 (821)
822:    learn: 0.0009127      test: 0.0004784 best: 0.0004784 (822)
823:    learn: 0.0009126      test: 0.0004784 best: 0.0004784 (823)
824:    learn: 0.0009125      test: 0.0004783 best: 0.0004783 (824)
825:    learn: 0.0009125      test: 0.0004783 best: 0.0004783 (825)
826:    learn: 0.0009124      test: 0.0004782 best: 0.0004782 (826)
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827:    learn: 0.0009124      test: 0.0004782 best: 0.0004782 (827)
828:    learn: 0.0009123      test: 0.0004782 best: 0.0004782 (828)
829:    learn: 0.0009123      test: 0.0004782 best: 0.0004782 (829)
830:    learn: 0.0009122      test: 0.0004782 best: 0.0004782 (830)
831:    learn: 0.0009122      test: 0.0004782 best: 0.0004782 (831)
832:    learn: 0.0009122      test: 0.0004782 best: 0.0004782 (832)
833:    learn: 0.0009121      test: 0.0004781 best: 0.0004781 (833)    total: 3m 40s    remaining: 43.8s
834:    learn: 0.0009120      test: 0.0004781 best: 0.0004781 (834)
835:    learn: 0.0009119      test: 0.0004780 best: 0.0004780 (835)
836:    learn: 0.0009118      test: 0.0004780 best: 0.0004780 (836)
837:    learn: 0.0009118      test: 0.0004780 best: 0.0004780 (837)
838:    learn: 0.0009117      test: 0.0004780 best: 0.0004780 (838)
839:    learn: 0.0009117      test: 0.0004780 best: 0.0004780 (839)
840:    learn: 0.0009117      test: 0.0004780 best: 0.0004780 (840)
841:    learn: 0.0009116      test: 0.0004780 best: 0.0004780 (841)
842:    learn: 0.0009115      test: 0.0004779 best: 0.0004779 (842)
843:    learn: 0.0009114      test: 0.0004778 best: 0.0004778 (843)
844:    learn: 0.0009111      test: 0.0004777 best: 0.0004777 (844)
845:    learn: 0.0009109      test: 0.0004775 best: 0.0004775 (845)
846:    learn: 0.0009107      test: 0.0004774 best: 0.0004774 (846)
847:    learn: 0.0009107      test: 0.0004774 best: 0.0004774 (847)
848:    learn: 0.0009106      test: 0.0004773 best: 0.0004773 (848)
849:    learn: 0.0009106      test: 0.0004773 best: 0.0004773 (849)
850:    learn: 0.0009105      test: 0.0004772 best: 0.0004772 (850)
851:    learn: 0.0009104      test: 0.0004772 best: 0.0004772 (851)
852:    learn: 0.0009103      test: 0.0004772 best: 0.0004772 (852)
853:    learn: 0.0009102      test: 0.0004771 best: 0.0004771 (853)
854:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (854)    total: 3m 45s    remaining: 38.3s
855:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (855)
856:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (856)
857:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (857)
858:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (858)
859:    learn: 0.0009101      test: 0.0004770 best: 0.0004770 (859)
860:    learn: 0.0009100      test: 0.0004770 best: 0.0004770 (860)
861:    learn: 0.0009100      test: 0.0004770 best: 0.0004770 (861)
862:    learn: 0.0009099      test: 0.0004769 best: 0.0004769 (862)
863:    learn: 0.0009098      test: 0.0004769 best: 0.0004769 (863)
864:    learn: 0.0009098      test: 0.0004769 best: 0.0004769 (864)
865:    learn: 0.0009097      test: 0.0004769 best: 0.0004769 (865)
866:    learn: 0.0009097      test: 0.0004769 best: 0.0004769 (866)
867:    learn: 0.0009096      test: 0.0004768 best: 0.0004768 (867)
868:    learn: 0.0009094      test: 0.0004767 best: 0.0004767 (868)
869:    learn: 0.0009093      test: 0.0004766 best: 0.0004766 (869)
870:    learn: 0.0009093      test: 0.0004766 best: 0.0004766 (870)    total: 3m 50s    remaining: 34.1s
871:    learn: 0.0009093      test: 0.0004766 best: 0.0004766 (871)
872:    learn: 0.0009093      test: 0.0004766 best: 0.0004766 (872)
873:    learn: 0.0009092      test: 0.0004765 best: 0.0004765 (873)
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874:    learn: 0.0009091    test: 0.0004765 best: 0.0004765 (874)
875:    learn: 0.0009090    test: 0.0004764 best: 0.0004764 (875)
876:    learn: 0.0009090    test: 0.0004764 best: 0.0004764 (876)
877:    learn: 0.0009090    test: 0.0004764 best: 0.0004764 (876)
878:    learn: 0.0009086    test: 0.0004762 best: 0.0004762 (878)
879:    learn: 0.0009084    test: 0.0004761 best: 0.0004761 (879)
880:    learn: 0.0009082    test: 0.0004760 best: 0.0004760 (880)
881:    learn: 0.0009082    test: 0.0004759 best: 0.0004759 (881)
882:    learn: 0.0009081    test: 0.0004759 best: 0.0004759 (882)
883:    learn: 0.0009081    test: 0.0004759 best: 0.0004759 (883)    total: 3m 54s    remaining: 30.8s
884:    learn: 0.0009081    test: 0.0004759 best: 0.0004759 (884)
885:    learn: 0.0009081    test: 0.0004759 best: 0.0004759 (885)
886:    learn: 0.0009080    test: 0.0004758 best: 0.0004758 (886)
887:    learn: 0.0009080    test: 0.0004758 best: 0.0004758 (887)
888:    learn: 0.0009080    test: 0.0004758 best: 0.0004758 (888)
889:    learn: 0.0009079    test: 0.0004758 best: 0.0004758 (889)
890:    learn: 0.0009079    test: 0.0004758 best: 0.0004758 (890)
891:    learn: 0.0009079    test: 0.0004758 best: 0.0004758 (891)
892:    learn: 0.0009078    test: 0.0004757 best: 0.0004757 (892)
893:    learn: 0.0009078    test: 0.0004757 best: 0.0004757 (893)
894:    learn: 0.0009078    test: 0.0004757 best: 0.0004757 (894)
895:    learn: 0.0009077    test: 0.0004757 best: 0.0004757 (895)
896:    learn: 0.0009077    test: 0.0004757 best: 0.0004757 (896)
897:    learn: 0.0009077    test: 0.0004757 best: 0.0004757 (897)    total: 3m 58s    remaining: 27.1s
898:    learn: 0.0009077    test: 0.0004757 best: 0.0004757 (898)
899:    learn: 0.0009076    test: 0.0004756 best: 0.0004756 (899)
900:    learn: 0.0009075    test: 0.0004756 best: 0.0004756 (900)
901:    learn: 0.0009074    test: 0.0004756 best: 0.0004756 (901)
902:    learn: 0.0009074    test: 0.0004756 best: 0.0004756 (902)
903:    learn: 0.0009073    test: 0.0004755 best: 0.0004755 (903)
904:    learn: 0.0009073    test: 0.0004755 best: 0.0004755 (904)
905:    learn: 0.0009072    test: 0.0004755 best: 0.0004755 (905)
906:    learn: 0.0009072    test: 0.0004755 best: 0.0004755 (906)
907:    learn: 0.0009072    test: 0.0004755 best: 0.0004755 (907)
908:    learn: 0.0009072    test: 0.0004755 best: 0.0004755 (908)
909:    learn: 0.0009071    test: 0.0004754 best: 0.0004754 (909)
910:    learn: 0.0009070    test: 0.0004754 best: 0.0004754 (910)
911:    learn: 0.0009070    test: 0.0004754 best: 0.0004754 (911)
912:    learn: 0.0009069    test: 0.0004753 best: 0.0004753 (912)
913:    learn: 0.0009069    test: 0.0004753 best: 0.0004753 (913)
914:    learn: 0.0009068    test: 0.0004752 best: 0.0004752 (914)
915:    learn: 0.0009067    test: 0.0004752 best: 0.0004752 (915)
916:    learn: 0.0009067    test: 0.0004752 best: 0.0004752 (916)
917:    learn: 0.0009067    test: 0.0004752 best: 0.0004752 (917)
918:    learn: 0.0009066    test: 0.0004752 best: 0.0004752 (918)
919:    learn: 0.0009066    test: 0.0004752 best: 0.0004752 (919)    total: 4m 4s    remaining: 21.3s
920:    learn: 0.0009066    test: 0.0004752 best: 0.0004752 (920)
```

```
921:     learn: 0.0009066       test: 0.0004752 best: 0.0004752 (921)
922:     learn: 0.0009066       test: 0.0004751 best: 0.0004751 (922)
923:     learn: 0.0009066       test: 0.0004751 best: 0.0004751 (923)
924:     learn: 0.0009065       test: 0.0004751 best: 0.0004751 (924)
925:     learn: 0.0009065       test: 0.0004751 best: 0.0004751 (925)
926:     learn: 0.0009065       test: 0.0004751 best: 0.0004751 (926)
927:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (927)
928:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (928)
929:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (929)
930:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (930)
931:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (931)
932:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (932)
933:     learn: 0.0009064       test: 0.0004751 best: 0.0004751 (933)
934:     learn: 0.0009062       test: 0.0004749 best: 0.0004749 (934)
935:     learn: 0.0009062       test: 0.0004749 best: 0.0004749 (935)
936:     learn: 0.0009061       test: 0.0004749 best: 0.0004749 (936)
937:     learn: 0.0009061       test: 0.0004749 best: 0.0004749 (937)
938:     learn: 0.0009060       test: 0.0004749 best: 0.0004749 (938)   total: 4m 10s    remaining: 16.3s
939:     learn: 0.0009060       test: 0.0004749 best: 0.0004749 (939)
940:     learn: 0.0009059       test: 0.0004748 best: 0.0004748 (940)
941:     learn: 0.0009058       test: 0.0004748 best: 0.0004748 (941)
942:     learn: 0.0009058       test: 0.0004748 best: 0.0004748 (942)
943:     learn: 0.0009058       test: 0.0004747 best: 0.0004747 (943)
944:     learn: 0.0009056       test: 0.0004747 best: 0.0004747 (944)
945:     learn: 0.0009056       test: 0.0004746 best: 0.0004746 (945)
946:     learn: 0.0009056       test: 0.0004746 best: 0.0004746 (946)
947:     learn: 0.0009055       test: 0.0004746 best: 0.0004746 (947)
948:     learn: 0.0009055       test: 0.0004746 best: 0.0004746 (948)
949:     learn: 0.0009055       test: 0.0004746 best: 0.0004746 (949)
950:     learn: 0.0009054       test: 0.0004746 best: 0.0004746 (950)
951:     learn: 0.0009054       test: 0.0004746 best: 0.0004746 (951)
952:     learn: 0.0009053       test: 0.0004745 best: 0.0004745 (952)
953:     learn: 0.0009053       test: 0.0004745 best: 0.0004745 (953)
954:     learn: 0.0009053       test: 0.0004745 best: 0.0004745 (954)
955:     learn: 0.0009053       test: 0.0004745 best: 0.0004745 (955)
956:     learn: 0.0009052       test: 0.0004745 best: 0.0004745 (956)
957:     learn: 0.0009051       test: 0.0004744 best: 0.0004744 (957)
958:     learn: 0.0009050       test: 0.0004743 best: 0.0004743 (958)   total: 4m 15s    remaining: 10.9s
959:     learn: 0.0009049       test: 0.0004743 best: 0.0004743 (959)
960:     learn: 0.0009047       test: 0.0004742 best: 0.0004742 (960)
961:     learn: 0.0009046       test: 0.0004741 best: 0.0004741 (961)
962:     learn: 0.0009046       test: 0.0004741 best: 0.0004741 (962)
963:     learn: 0.0009046       test: 0.0004741 best: 0.0004741 (963)
964:     learn: 0.0009046       test: 0.0004741 best: 0.0004741 (964)
965:     learn: 0.0009045       test: 0.0004741 best: 0.0004741 (965)
966:     learn: 0.0009045       test: 0.0004741 best: 0.0004741 (966)
967:     learn: 0.0009045       test: 0.0004741 best: 0.0004741 (967)   total: 4m 18s    remaining: 8.55s
```

```
968:    learn: 0.0009044        test: 0.0004741 best: 0.0004741 (968)
969:    learn: 0.0009044        test: 0.0004740 best: 0.0004740 (969)
970:    learn: 0.0009043        test: 0.0004740 best: 0.0004740 (970)
971:    learn: 0.0009043        test: 0.0004740 best: 0.0004740 (971)
972:    learn: 0.0009043        test: 0.0004740 best: 0.0004740 (972)
973:    learn: 0.0009042        test: 0.0004740 best: 0.0004740 (973)
974:    learn: 0.0009042        test: 0.0004740 best: 0.0004740 (974)
975:    learn: 0.0009042        test: 0.0004740 best: 0.0004740 (975)
976:    learn: 0.0009040        test: 0.0004739 best: 0.0004739 (976)
977:    learn: 0.0009038        test: 0.0004738 best: 0.0004738 (977)
978:    learn: 0.0009038        test: 0.0004738 best: 0.0004738 (978)
979:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (979)
980:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (980)
981:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (981)
982:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (982)
983:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (983)
984:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (984)
985:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (985)
986:    learn: 0.0009036        test: 0.0004736 best: 0.0004736 (986)
987:    learn: 0.0009035        test: 0.0004736 best: 0.0004736 (987)
988:    learn: 0.0009035        test: 0.0004736 best: 0.0004736 (988)
989:    learn: 0.0009035        test: 0.0004736 best: 0.0004736 (989)
990:    learn: 0.0009035        test: 0.0004736 best: 0.0004736 (990)   total: 4m 25s   remaining: 2.41s
991:    learn: 0.0009034        test: 0.0004735 best: 0.0004735 (991)
992:    learn: 0.0009034        test: 0.0004735 best: 0.0004735 (992)
993:    learn: 0.0009034        test: 0.0004735 best: 0.0004735 (993)
994:    learn: 0.0009034        test: 0.0004735 best: 0.0004735 (994)
995:    learn: 0.0009034        test: 0.0004735 best: 0.0004735 (995)
996:    learn: 0.0009033        test: 0.0004735 best: 0.0004735 (996)
997:    learn: 0.0009033        test: 0.0004735 best: 0.0004735 (997)
998:    learn: 0.0009033        test: 0.0004735 best: 0.0004735 (998)
999:    learn: 0.0009033        test: 0.0004735 best: 0.0004735 (999)   total: 4m 28s   remaining: 0us
```

In [18]:
```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: 0:04:31.346496
```

In [19]:
```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[19]:

	Model	Score
1	Logistic Regression	100.00
2	Naive Bayes	100.00
5	Decision Tree	100.00
6	Gradient Boosting Trees	100.00
7	CatBoost	100.00
4	Linear SVC	91.69
0	KNN	88.37
3	Stochastic Gradient Decent	68.44

In [20]:
```
    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[20]:

	Model	Score
1	Logistic Regression	100.00
2	Naive Bayes	100.00
5	Decision Tree	100.00
6	Gradient Boosting Trees	100.00
7	CatBoost	100.00
4	Linear SVC	92.03
0	KNN	85.38
3	Stochastic Gradient Decent	54.15

In [21]:
```python
# Feature Importance
def feature_importance(model, data):
    """
    Function to show which features are most important in the model.
    ::param_model:: Which model to use?
    ::param_data:: What data to use?
    """
    fea_imp = pd.DataFrame({'imp': model.feature_importances_, 'col': data.columns})
    fea_imp = fea_imp.sort_values(['imp', 'col'], ascending=[True, False]).iloc[-30:]
    _ = fea_imp.plot(kind='barh', x='col', y='imp', figsize=(20, 10))
    return fea_imp
    #plt.savefig('catboost_feature_importance.png')
```
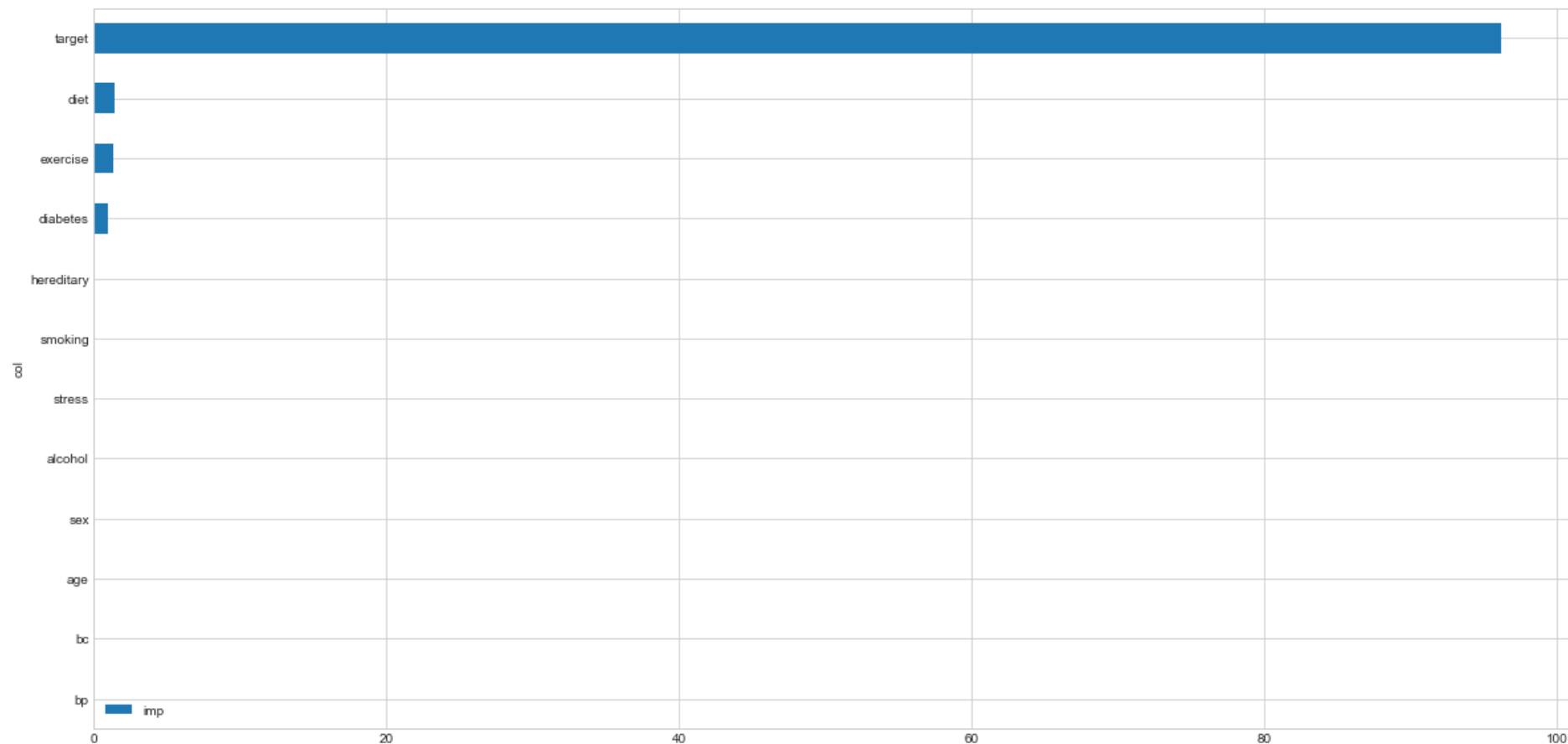
In [22]:
```python
# Plot the feature importance scores
feature_importance(catboost_model, X_train)
```

Out[22]:

	imp	col
3	0.000000	bp

	imp	col
2	0.000000	bc
0	0.000000	age
1	0.028091	sex
6	0.039237	alcohol
10	0.041736	stress
5	0.047778	smoking
4	0.051106	hereditary
8	0.920744	diabetes
7	1.312737	exercise
9	1.387320	diet
11	96.171250	target

```python
metrics = ['Precision', 'Recall', 'F1', 'AUC']

eval_metrics = catboost_model.eval_metrics(train_pool,
                                           metrics=metrics,
                                           plot=True)

for metric in metrics:
    print(str(metric)+": {}".format(np.mean(eval_metrics[metric])))
```

```
Precision: 1.0
Recall: 1.0
F1: 1.0
AUC: 1.0
```

In [ ]:

In [ ]: