Kabir Nawani J043

In [1]:

```
pip install catboost
```

```
Requirement already satisfied: catboost in /usr/local/lib/python3.7/dist-packages (0.26.1
)
Requirement already satisfied: scipy in /usr/local/lib/python3.7/dist-packages (from catb
oost) (1.4.1)
Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages (from catboo
st) (1.15.0)
Requirement already satisfied: pandas>=0.24.0 in /usr/local/lib/python3.7/dist-packages (
from catboost) (1.1.5)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.7/dist-packages (from
catboost) (3.2.2)
Requirement already satisfied: plotly in /usr/local/lib/python3.7/dist-packages (from cat
boost) (4.4.1)
Requirement already satisfied: numpy>=1.16.0 in /usr/local/lib/python3.7/dist-packages (f
rom catboost) (1.19.5)
Requirement already satisfied: graphviz in /usr/local/lib/python3.7/dist-packages (from c
atboost) (0.10.1)
Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.7/dist-packages (fr
om pandas>=0.24.0->catboost) (2018.9)
Requirement already satisfied: python-dateutil>=2.7.3 in /usr/local/lib/python3.7/dist-pa
ckages (from pandas>=0.24.0->catboost) (2.8.2)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.7/dist-packages (fr
om matplotlib->catboost) (0.10.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/dist-package
s (from matplotlib->catboost) (1.3.2)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /usr/local/lib
/python3.7/dist-packages (from matplotlib->catboost) (2.4.7)
Requirement already satisfied: retrying>=1.3.3 in /usr/local/lib/python3.7/dist-packages
(from plotly->catboost) (1.3.3)
```

In [1]:

```
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from catboost import CatBoostClassifier
from sklearn.tree import DecisionTreeClassifier
from xgboost import XGBClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.ensemble import ExtraTreesClassifier
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.model_selection import StratifiedKFold
from sklearn.ensemble import AdaBoostClassifier
import lightgbm as lgb
from sklearn.metrics import roc_auc_score
```

In [2]:

```
train = pd.read_csv('/content/drive/MyDrive/Semester-V/Competitions/Classroom/train.csv')

test = pd.read_csv('/content/drive/MyDrive/Semester-V/Competitions/Classroom/test.csv')
```

In [3]:

```
train.head(10)
```

Out[3]:

id	Mean of the integrated	Standard deviation of the integrated	Excess kurtosis of the integrated	Skewness of the integrated	Mean of the DM-SNR	Standard deviation of the DM-	Excess kurtosis of the DM-	Skewness of the DM-SNR curve	target_class

	id	Mean of the integrated profile	Standard deviation of the integrated profile	Excess kurtosis of the integrated profile	Skewness of the integrated profile	Mean of the DM-SNR curve	Standard deviation of the DM-SNR curve	Excess kurtosis of the DM-SNR curve	Skewness of the DM-SNR curve	target_class
0	16330	138.835938	45.453922	-0.096961	0.096516	3.062709	16.820348	7.179262	60.660346	0
1	5999	130.296875	51.969548	-0.005585	-0.295889	4.299331	20.557530	6.883042	52.337106	0
2	10228	127.328125	55.471714	0.090976	-0.444422	69.913880	73.240545	0.434744	-1.249027	0
3	2980	102.453125	44.412987	0.652927	1.101361	2.425585	15.501871	9.213629	106.097405	0
4	2472	104.921875	41.629431	0.189677	0.725700	3.275084	18.661805	7.389537	65.169692	0
5	9491	123.914062	49.306286	0.058630	0.255576	14.983278	56.100928	3.497040	10.309213	0
6	5274	96.617188	49.176042	0.539350	0.470347	0.562709	10.827096	20.937929	453.459566	0
7	13581	131.406250	53.508241	-0.125222	-0.184864	6.304348	30.230182	5.459737	31.094668	0
8	11984	137.945312	58.241323	-0.004645	-0.676629	4.801839	26.189399	6.370659	42.819915	0
9	17494	113.656250	42.059006	0.392402	0.638596	9.760033	36.338525	3.867539	14.783672	0

In [4]:

```
test.head(10)
```

Out[4]:

	id	Mean of the integrated profile	Standard deviation of the integrated profile	Excess kurtosis of the integrated profile	Skewness of the integrated profile	Mean of the DM-SNR curve	Standard deviation of the DM-SNR curve	Excess kurtosis of the DM-SNR curve	Skewness of the DM-SNR curve
0	15	130.960938	51.285872	0.072242	-0.584550	1.940635	13.092250	10.481509	147.756658
1	28	23.703125	41.677774	4.112599	16.687125	12.272575	39.323386	3.710673	14.110997
2	30	113.882812	45.562907	0.064720	0.243603	2.101171	13.008511	10.184925	145.275542
3	35	101.882812	44.301633	0.584880	0.722995	2.645485	19.539765	9.101964	90.419878
4	48	96.335938	43.957060	0.302221	0.693381	1.807692	16.216959	11.322476	144.368633
5	49	101.031250	41.848487	0.424008	0.905820	1.258361	14.716245	12.787493	172.524321
6	51	117.765625	42.016084	0.138450	0.694804	1.589465	15.623695	11.745828	153.332749
7	60	106.179688	48.586976	0.057190	-0.142287	1.576087	12.382966	11.755978	181.704063
8	65	98.570312	45.069509	0.349157	0.853319	1.815217	13.492664	10.800264	146.393325
9	70	117.242188	55.248126	0.274790	-0.433701	162.786789	42.191598	-1.199483	1.401099

In [5]:

```
train.shape, test.shape
```

Out[5]:

```
((14318, 10), (3580, 9))
```

In [6]:

```
train['target_class'].value_counts()
```

Out[6]:

```
0    13003
1     1315
Name: target_class, dtype: int64
```

In [7]:

```
test['target_class'] = -1

test_ID = test['id']

df = pd.concat([train, test], axis=0)
```

```
df.drop('id', axis=1, inplace=True)
```

In [8]:

```
df.head(10)
```

Out[8]:

	Mean of the integrated profile	Standard deviation of the integrated profile	Excess kurtosis of the integrated profile	Skewness of the integrated profile	Mean of the DM-SNR curve	Standard deviation of the DM-SNR curve	Excess kurtosis of the DM-SNR curve	Skewness of the DM-SNR curve	target_class
0	138.835938	45.453922	-0.096961	0.086516	3.082776	18.529846	7.179262	60.660346	0
1	130.296875	51.969546	-0.005585	-0.295680	4.299331	23.557530	6.883942	52.337106	0
2	127.328125	55.471714	0.090976	-0.444422	69.913880	73.240545	0.434744	-1.249027	0
3	102.453125	44.412987	0.652927	1.101361	2.425585	15.501871	9.213629	106.097405	0
4	104.921875	41.629431	0.189677	0.725700	3.275084	18.661805	7.389537	65.169692	0
5	123.914062	49.306286	0.058630	0.255576	14.983278	56.100928	3.497040	10.309213	0
6	96.617188	49.176042	0.539350	0.470347	0.562709	10.827096	20.937929	453.459566	0
7	131.406250	53.508241	-0.125222	-0.184864	6.304348	30.230182	5.459737	31.094668	0
8	137.945312	58.241323	-0.004645	-0.676629	4.801839	26.189399	6.370659	42.819915	0
9	113.656250	42.059006	0.392402	0.638596	9.760033	36.338525	3.867539	14.783672	0

In [9]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 17898 entries, 0 to 3579
Data columns (total 9 columns):
 #   Column                                        Non-Null Count  Dtype  
---  ------                                        --------------  -----  
 0   Mean of the integrated profile                17898 non-null  float64
 1   Standard deviation of the integrated profile  17898 non-null  float64
 2   Excess kurtosis of the integrated profile     17898 non-null  float64
 3   Skewness of the integrated profile            17898 non-null  float64
 4   Mean of the DM-SNR curve                      17898 non-null  float64
 5   Standard deviation of the DM-SNR curve        17898 non-null  float64
 6   Excess kurtosis of the DM-SNR curve           17898 non-null  float64
 7   Skewness of the DM-SNR curve                  17898 non-null  float64
 8   target_class                                  17898 non-null  int64  
dtypes: float64(8), int64(1)
memory usage: 1.4 MB
```

In [10]:

```
df.var()
```

Out[10]:

```
Mean of the integrated profile                  658.073093
Standard deviation of the integrated profile     46.829241
Excess kurtosis of the integrated profile         1.132181
Skewness of the integrated profile               38.043154
Mean of the DM-SNR curve                        868.651666
Standard deviation of the DM-SNR curve          379.103187
Excess kurtosis of the DM-SNR curve              20.304864
Skewness of the DM-SNR curve                  11345.347132
target_class                                      0.257494
dtype: float64
```

In [11]:

```
df['Skewness of the DM-SNR curve'].describe()
```

Out[11]:

```
count    17898.000000
mean       104.857709
std        106.514540
min         -1.976976
25%         34.960504
50%         83.064556
75%        139.309331
max       1191.000837
Name: Skewness of the DM-SNR curve, dtype: float64
```

In [12]:

```
df['Skewness of the DM-SNR curve'] = np.abs(df['Skewness of the DM-SNR curve'])
```

In [13]:

```
df['Skewness of the DM-SNR curve'] = np.log(df['Skewness of the DM-SNR curve'])
```

In [14]:

```
df['Ratio1'] = df['Excess kurtosis of the integrated profile'] / df['Skewness of the inte
grated profile']
df['Ratio2'] = df['Excess kurtosis of the DM-SNR curve'] / df['Skewness of the DM-SNR cur
ve']
```

In [15]:

```
df.isna().sum()
```

Out[15]:

```
Mean of the integrated profile                0
Standard deviation of the integrated profile  0
Excess kurtosis of the integrated profile     0
Skewness of the integrated profile            0
Mean of the DM-SNR curve                      0
Standard deviation of the DM-SNR curve        0
Excess kurtosis of the DM-SNR curve           0
Skewness of the DM-SNR curve                  0
target_class                                  0
Ratio1                                        0
Ratio2                                        0
dtype: int64
```

In [16]:

```
test = df[df['target_class'] == -1]
test = test.drop('target_class', axis=1)

train = df[df['target_class'] != -1]
```

In [17]:

```
X = train.drop('target_class', axis=1).values

y = train['target_class'].values
```

In [18]:

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=22
, shuffle=True, stratify=y)
```

In [19]:

```
model = CatBoostClassifier()

model.fit(X_train, y_train)

y_pred = model.predict_proba(X_test)[:, 1]
```

```
Learning rate set to 0.029182
0: learn: 0.6344532 total: 59.9ms remaining: 59.9s
1: learn: 0.5769084 total: 78.7ms remaining: 39.3s
2: learn: 0.5262013 total: 88.9ms remaining: 29.6s
3: learn: 0.4838241 total: 100ms remaining: 25s
4: learn: 0.4462013 total: 113ms remaining: 22.5s
5: learn: 0.4092826 total: 128ms remaining: 21.2s
6: learn: 0.3797483 total: 138ms remaining: 19.6s
7: learn: 0.3508000 total: 148ms remaining: 18.4s
8: learn: 0.3251426 total: 158ms remaining: 17.4s
9: learn: 0.3022781 total: 167ms remaining: 16.6s
10: learn: 0.2809835 total: 178ms remaining: 16s
11: learn: 0.2599741 total: 187ms remaining: 15.4s
12: learn: 0.2434501 total: 201ms remaining: 15.3s
13: learn: 0.2291920 total: 211ms remaining: 14.9s
14: learn: 0.2175696 total: 221ms remaining: 14.5s
15: learn: 0.2035244 total: 230ms remaining: 14.2s
16: learn: 0.1921825 total: 240ms remaining: 13.9s
17: learn: 0.1819052 total: 249ms remaining: 13.6s
18: learn: 0.1727691 total: 259ms remaining: 13.4s
19: learn: 0.1648323 total: 276ms remaining: 13.5s
20: learn: 0.1575498 total: 286ms remaining: 13.3s
21: learn: 0.1507753 total: 296ms remaining: 13.1s
22: learn: 0.1436076 total: 306ms remaining: 13s
23: learn: 0.1383857 total: 315ms remaining: 12.8s
24: learn: 0.1332852 total: 324ms remaining: 12.7s
25: learn: 0.1287154 total: 334ms remaining: 12.5s
26: learn: 0.1244871 total: 345ms remaining: 12.4s
27: learn: 0.1206324 total: 355ms remaining: 12.3s
28: learn: 0.1170192 total: 365ms remaining: 12.2s
29: learn: 0.1139620 total: 375ms remaining: 12.1s
30: learn: 0.1109812 total: 384ms remaining: 12s
31: learn: 0.1081465 total: 394ms remaining: 11.9s
32: learn: 0.1051942 total: 407ms remaining: 11.9s
33: learn: 0.1030297 total: 416ms remaining: 11.8s
34: learn: 0.1012031 total: 429ms remaining: 11.8s
35: learn: 0.0990471 total: 441ms remaining: 11.8s
36: learn: 0.0969794 total: 451ms remaining: 11.7s
37: learn: 0.0950204 total: 460ms remaining: 11.7s
38: learn: 0.0933950 total: 470ms remaining: 11.6s
39: learn: 0.0921137 total: 480ms remaining: 11.5s
40: learn: 0.0908764 total: 489ms remaining: 11.4s
41: learn: 0.0894899 total: 499ms remaining: 11.4s
42: learn: 0.0881622 total: 508ms remaining: 11.3s
43: learn: 0.0873450 total: 517ms remaining: 11.2s
44: learn: 0.0863365 total: 527ms remaining: 11.2s
45: learn: 0.0851648 total: 537ms remaining: 11.1s
46: learn: 0.0841195 total: 546ms remaining: 11.1s
47: learn: 0.0831981 total: 555ms remaining: 11s
48: learn: 0.0822207 total: 565ms remaining: 11s
49: learn: 0.0816393 total: 574ms remaining: 10.9s
50: learn: 0.0808131 total: 584ms remaining: 10.9s
51: learn: 0.0801771 total: 594ms remaining: 10.8s
52: learn: 0.0793151 total: 603ms remaining: 10.8s
53: learn: 0.0786654 total: 616ms remaining: 10.8s
54: learn: 0.0781901 total: 625ms remaining: 10.7s
55: learn: 0.0776783 total: 639ms remaining: 10.8s
56: learn: 0.0772756 total: 648ms remaining: 10.7s
57: learn: 0.0767277 total: 658ms remaining: 10.7s
58: learn: 0.0761852 total: 668ms remaining: 10.6s
59: learn: 0.0756694 total: 677ms remaining: 10.6s
60: learn: 0.0753743 total: 687ms remaining: 10.6s
61: learn: 0.0750238 total: 696ms remaining: 10.5s
62: learn: 0.0747341 total: 705ms remaining: 10.5s
63: learn: 0.0741863 total: 715ms remaining: 10.5s
64: learn: 0.0737303 total: 724ms remaining: 10.4s
65: learn: 0.0734265 total: 734ms remaining: 10.4s
66: learn: 0.0730022 total: 743ms remaining: 10.4s
67: learn: 0.0727623 total: 753ms remaining: 10.3s
68: learn: 0.0723803 total: 762ms remaining: 10.3s
69: learn: 0.0721426 total: 772ms remaining: 10.3s
```

```
70: learn: 0.0719018 total: 782ms remaining: 10.2s
71: learn: 0.0715911 total: 791ms remaining: 10.2s
72: learn: 0.0713077 total: 801ms remaining: 10.2s
73: learn: 0.0709718 total: 811ms remaining: 10.1s
74: learn: 0.0706910 total: 824ms remaining: 10.2s
75: learn: 0.0703572 total: 833ms remaining: 10.1s
76: learn: 0.0700951 total: 842ms remaining: 10.1s
77: learn: 0.0698175 total: 853ms remaining: 10.1s
78: learn: 0.0695610 total: 863ms remaining: 10.1s
79: learn: 0.0693418 total: 873ms remaining: 10s
80: learn: 0.0691057 total: 886ms remaining: 10.1s
81: learn: 0.0689113 total: 906ms remaining: 10.1s
82: learn: 0.0688005 total: 924ms remaining: 10.2s
83: learn: 0.0686165 total: 938ms remaining: 10.2s
84: learn: 0.0684439 total: 947ms remaining: 10.2s
85: learn: 0.0682443 total: 958ms remaining: 10.2s
86: learn: 0.0681094 total: 968ms remaining: 10.2s
87: learn: 0.0678779 total: 978ms remaining: 10.1s
88: learn: 0.0676426 total: 988ms remaining: 10.1s
89: learn: 0.0674270 total: 999ms remaining: 10.1s
90: learn: 0.0672771 total: 1.01s remaining: 10.1s
91: learn: 0.0671212 total: 1.03s remaining: 10.2s
92: learn: 0.0670322 total: 1.04s remaining: 10.2s
93: learn: 0.0668413 total: 1.05s remaining: 10.1s
94: learn: 0.0667053 total: 1.06s remaining: 10.1s
95: learn: 0.0665190 total: 1.08s remaining: 10.1s
96: learn: 0.0663895 total: 1.09s remaining: 10.1s
97: learn: 0.0662235 total: 1.1s remaining: 10.1s
98: learn: 0.0660811 total: 1.11s remaining: 10.1s
99: learn: 0.0659247 total: 1.12s remaining: 10.1s
100: learn: 0.0658061 total: 1.13s remaining: 10.1s
101: learn: 0.0656658 total: 1.14s remaining: 10s
102: learn: 0.0655726 total: 1.15s remaining: 10s
103: learn: 0.0653917 total: 1.16s remaining: 9.97s
104: learn: 0.0652847 total: 1.17s remaining: 9.95s
105: learn: 0.0651985 total: 1.18s remaining: 9.92s
106: learn: 0.0650969 total: 1.19s remaining: 9.9s
107: learn: 0.0649276 total: 1.2s remaining: 9.88s
108: learn: 0.0647871 total: 1.21s remaining: 9.86s
109: learn: 0.0646790 total: 1.22s remaining: 9.84s
110: learn: 0.0645804 total: 1.23s remaining: 9.82s
111: learn: 0.0644642 total: 1.24s remaining: 9.83s
112: learn: 0.0643291 total: 1.25s remaining: 9.81s
113: learn: 0.0642391 total: 1.26s remaining: 9.79s
114: learn: 0.0641321 total: 1.27s remaining: 9.77s
115: learn: 0.0640467 total: 1.28s remaining: 9.74s
116: learn: 0.0639810 total: 1.29s remaining: 9.72s
117: learn: 0.0638739 total: 1.3s remaining: 9.71s
118: learn: 0.0637463 total: 1.31s remaining: 9.69s
119: learn: 0.0636425 total: 1.32s remaining: 9.66s
120: learn: 0.0635513 total: 1.33s remaining: 9.64s
121: learn: 0.0634697 total: 1.34s remaining: 9.62s
122: learn: 0.0634138 total: 1.34s remaining: 9.59s
123: learn: 0.0633815 total: 1.35s remaining: 9.57s
124: learn: 0.0632858 total: 1.36s remaining: 9.55s
125: learn: 0.0631813 total: 1.37s remaining: 9.53s
126: learn: 0.0630655 total: 1.38s remaining: 9.51s
127: learn: 0.0629783 total: 1.39s remaining: 9.49s
128: learn: 0.0629210 total: 1.4s remaining: 9.47s
129: learn: 0.0628231 total: 1.41s remaining: 9.45s
130: learn: 0.0627454 total: 1.42s remaining: 9.42s
131: learn: 0.0626356 total: 1.43s remaining: 9.41s
132: learn: 0.0625288 total: 1.44s remaining: 9.4s
133: learn: 0.0624639 total: 1.45s remaining: 9.38s
134: learn: 0.0624212 total: 1.46s remaining: 9.38s
135: learn: 0.0623792 total: 1.47s remaining: 9.36s
136: learn: 0.0623147 total: 1.49s remaining: 9.36s
137: learn: 0.0621999 total: 1.5s remaining: 9.37s
138: learn: 0.0621319 total: 1.51s remaining: 9.35s
139: learn: 0.0620635 total: 1.52s remaining: 9.34s
140: learn: 0.0620176 total: 1.53s remaining: 9.32s
141: learn: 0.0619435 total: 1.54s remaining: 9.31s
```

```
142: learn: 0.0618405 total: 1.55s remaining: 9.29s
143: learn: 0.0617437 total: 1.56s remaining: 9.27s
144: learn: 0.0616501 total: 1.57s remaining: 9.26s
145: learn: 0.0615787 total: 1.58s remaining: 9.24s
146: learn: 0.0614925 total: 1.59s remaining: 9.22s
147: learn: 0.0613719 total: 1.6s remaining: 9.21s
148: learn: 0.0612863 total: 1.61s remaining: 9.19s
149: learn: 0.0612090 total: 1.62s remaining: 9.17s
150: learn: 0.0611375 total: 1.63s remaining: 9.15s
151: learn: 0.0610869 total: 1.64s remaining: 9.13s
152: learn: 0.0610468 total: 1.65s remaining: 9.14s
153: learn: 0.0609677 total: 1.66s remaining: 9.12s
154: learn: 0.0608472 total: 1.67s remaining: 9.1s
155: learn: 0.0607711 total: 1.68s remaining: 9.09s
156: learn: 0.0607071 total: 1.69s remaining: 9.07s
157: learn: 0.0606509 total: 1.7s remaining: 9.05s
158: learn: 0.0605775 total: 1.71s remaining: 9.03s
159: learn: 0.0605095 total: 1.72s remaining: 9.01s
160: learn: 0.0604524 total: 1.73s remaining: 8.99s
161: learn: 0.0603600 total: 1.74s remaining: 8.97s
162: learn: 0.0602416 total: 1.74s remaining: 8.96s
163: learn: 0.0601565 total: 1.76s remaining: 8.97s
164: learn: 0.0600737 total: 1.77s remaining: 8.96s
165: learn: 0.0599757 total: 1.78s remaining: 8.96s
166: learn: 0.0598774 total: 1.8s remaining: 8.98s
167: learn: 0.0598090 total: 1.81s remaining: 8.97s
168: learn: 0.0597292 total: 1.82s remaining: 8.95s
169: learn: 0.0597048 total: 1.83s remaining: 8.94s
170: learn: 0.0596417 total: 1.84s remaining: 8.92s
171: learn: 0.0595230 total: 1.85s remaining: 8.9s
172: learn: 0.0594493 total: 1.86s remaining: 8.9s
173: learn: 0.0593647 total: 1.87s remaining: 8.89s
174: learn: 0.0592992 total: 1.88s remaining: 8.87s
175: learn: 0.0592184 total: 1.89s remaining: 8.86s
176: learn: 0.0591575 total: 1.9s remaining: 8.84s
177: learn: 0.0590396 total: 1.91s remaining: 8.82s
178: learn: 0.0590012 total: 1.92s remaining: 8.8s
179: learn: 0.0589431 total: 1.93s remaining: 8.79s
180: learn: 0.0588748 total: 1.94s remaining: 8.77s
181: learn: 0.0588191 total: 1.95s remaining: 8.75s
182: learn: 0.0587697 total: 1.96s remaining: 8.74s
183: learn: 0.0587017 total: 1.97s remaining: 8.72s
184: learn: 0.0586149 total: 1.98s remaining: 8.71s
185: learn: 0.0585651 total: 1.98s remaining: 8.69s
186: learn: 0.0584982 total: 1.99s remaining: 8.67s
187: learn: 0.0584506 total: 2s remaining: 8.65s
188: learn: 0.0583928 total: 2.01s remaining: 8.64s
189: learn: 0.0583153 total: 2.02s remaining: 8.62s
190: learn: 0.0582791 total: 2.03s remaining: 8.61s
191: learn: 0.0582036 total: 2.04s remaining: 8.59s
192: learn: 0.0581398 total: 2.05s remaining: 8.58s
193: learn: 0.0580931 total: 2.07s remaining: 8.59s
194: learn: 0.0580537 total: 2.08s remaining: 8.59s
195: learn: 0.0579962 total: 2.1s remaining: 8.59s
196: learn: 0.0579248 total: 2.11s remaining: 8.59s
197: learn: 0.0578413 total: 2.12s remaining: 8.57s
198: learn: 0.0577983 total: 2.13s remaining: 8.56s
199: learn: 0.0577662 total: 2.14s remaining: 8.54s
200: learn: 0.0577006 total: 2.15s remaining: 8.53s
201: learn: 0.0576344 total: 2.15s remaining: 8.51s
202: learn: 0.0574890 total: 2.16s remaining: 8.49s
203: learn: 0.0574331 total: 2.17s remaining: 8.48s
204: learn: 0.0573965 total: 2.18s remaining: 8.46s
205: learn: 0.0573401 total: 2.19s remaining: 8.45s
206: learn: 0.0572865 total: 2.2s remaining: 8.44s
207: learn: 0.0572123 total: 2.21s remaining: 8.43s
208: learn: 0.0571316 total: 2.22s remaining: 8.41s
209: learn: 0.0571002 total: 2.23s remaining: 8.4s
210: learn: 0.0570155 total: 2.24s remaining: 8.38s
211: learn: 0.0569335 total: 2.25s remaining: 8.37s
212: learn: 0.0568750 total: 2.26s remaining: 8.35s
213: learn: 0.0568209 total: 2.27s remaining: 8.35s
```

```
214: learn: 0.0567788 total: 2.28s remaining: 8.33s
215: learn: 0.0567422 total: 2.29s remaining: 8.32s
216: learn: 0.0566924 total: 2.3s remaining: 8.3s
217: learn: 0.0566677 total: 2.31s remaining: 8.29s
218: learn: 0.0566126 total: 2.32s remaining: 8.28s
219: learn: 0.0565245 total: 2.33s remaining: 8.26s
220: learn: 0.0564503 total: 2.34s remaining: 8.26s
221: learn: 0.0564027 total: 2.36s remaining: 8.27s
222: learn: 0.0563400 total: 2.37s remaining: 8.25s
223: learn: 0.0562759 total: 2.38s remaining: 8.24s
224: learn: 0.0561628 total: 2.39s remaining: 8.23s
225: learn: 0.0561138 total: 2.4s remaining: 8.21s
226: learn: 0.0560414 total: 2.41s remaining: 8.2s
227: learn: 0.0559774 total: 2.42s remaining: 8.19s
228: learn: 0.0559042 total: 2.43s remaining: 8.17s
229: learn: 0.0558038 total: 2.44s remaining: 8.17s
230: learn: 0.0557489 total: 2.45s remaining: 8.15s
231: learn: 0.0556579 total: 2.46s remaining: 8.14s
232: learn: 0.0555848 total: 2.47s remaining: 8.13s
233: learn: 0.0555132 total: 2.48s remaining: 8.12s
234: learn: 0.0554620 total: 2.49s remaining: 8.11s
235: learn: 0.0553805 total: 2.5s remaining: 8.1s
236: learn: 0.0553218 total: 2.51s remaining: 8.08s
237: learn: 0.0552413 total: 2.52s remaining: 8.06s
238: learn: 0.0551815 total: 2.53s remaining: 8.05s
239: learn: 0.0551285 total: 2.54s remaining: 8.04s
240: learn: 0.0550769 total: 2.55s remaining: 8.02s
241: learn: 0.0550375 total: 2.56s remaining: 8.01s
242: learn: 0.0549879 total: 2.56s remaining: 7.99s
243: learn: 0.0549289 total: 2.58s remaining: 7.98s
244: learn: 0.0548667 total: 2.58s remaining: 7.96s
245: learn: 0.0547957 total: 2.59s remaining: 7.95s
246: learn: 0.0547550 total: 2.6s remaining: 7.94s
247: learn: 0.0547195 total: 2.61s remaining: 7.92s
248: learn: 0.0546618 total: 2.62s remaining: 7.91s
249: learn: 0.0545892 total: 2.63s remaining: 7.9s
250: learn: 0.0545383 total: 2.64s remaining: 7.88s
251: learn: 0.0544980 total: 2.65s remaining: 7.87s
252: learn: 0.0544452 total: 2.66s remaining: 7.86s
253: learn: 0.0544019 total: 2.67s remaining: 7.84s
254: learn: 0.0543697 total: 2.68s remaining: 7.83s
255: learn: 0.0542957 total: 2.69s remaining: 7.82s
256: learn: 0.0542681 total: 2.7s remaining: 7.81s
257: learn: 0.0542166 total: 2.71s remaining: 7.79s
258: learn: 0.0541624 total: 2.72s remaining: 7.78s
259: learn: 0.0540806 total: 2.73s remaining: 7.76s
260: learn: 0.0540259 total: 2.74s remaining: 7.76s
261: learn: 0.0539593 total: 2.75s remaining: 7.75s
262: learn: 0.0538859 total: 2.76s remaining: 7.74s
263: learn: 0.0538409 total: 2.77s remaining: 7.73s
264: learn: 0.0538043 total: 2.78s remaining: 7.71s
265: learn: 0.0537686 total: 2.79s remaining: 7.7s
266: learn: 0.0537351 total: 2.8s remaining: 7.68s
267: learn: 0.0537085 total: 2.81s remaining: 7.67s
268: learn: 0.0535994 total: 2.82s remaining: 7.66s
269: learn: 0.0535478 total: 2.83s remaining: 7.64s
270: learn: 0.0535053 total: 2.84s remaining: 7.63s
271: learn: 0.0534566 total: 2.85s remaining: 7.62s
272: learn: 0.0534085 total: 2.85s remaining: 7.6s
273: learn: 0.0533704 total: 2.86s remaining: 7.59s
274: learn: 0.0533148 total: 2.87s remaining: 7.58s
275: learn: 0.0532497 total: 2.88s remaining: 7.56s
276: learn: 0.0531711 total: 2.9s remaining: 7.56s
277: learn: 0.0531398 total: 2.9s remaining: 7.55s
278: learn: 0.0530959 total: 2.91s remaining: 7.53s
279: learn: 0.0530590 total: 2.92s remaining: 7.52s
280: learn: 0.0530283 total: 2.94s remaining: 7.51s
281: learn: 0.0529663 total: 2.94s remaining: 7.5s
282: learn: 0.0529415 total: 2.95s remaining: 7.49s
283: learn: 0.0528893 total: 2.96s remaining: 7.47s
284: learn: 0.0528374 total: 2.97s remaining: 7.46s
285: learn: 0.0527902 total: 2.98s remaining: 7.45s
```

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286: learn: 0.0527186 total: 2.99s remaining: 7.44s
287: learn: 0.0526566 total: 3s remaining: 7.42s
288: learn: 0.0526044 total: 3.02s remaining: 7.42s
289: learn: 0.0525635 total: 3.02s remaining: 7.41s
290: learn: 0.0525241 total: 3.04s remaining: 7.4s
291: learn: 0.0524968 total: 3.05s remaining: 7.39s
292: learn: 0.0524646 total: 3.06s remaining: 7.37s
293: learn: 0.0523916 total: 3.06s remaining: 7.36s
294: learn: 0.0523176 total: 3.08s remaining: 7.36s
295: learn: 0.0522541 total: 3.09s remaining: 7.35s
296: learn: 0.0522267 total: 3.1s remaining: 7.35s
297: learn: 0.0522080 total: 3.11s remaining: 7.34s
298: learn: 0.0521435 total: 3.12s remaining: 7.33s
299: learn: 0.0521167 total: 3.13s remaining: 7.31s
300: learn: 0.0520657 total: 3.14s remaining: 7.3s
301: learn: 0.0520229 total: 3.15s remaining: 7.29s
302: learn: 0.0519741 total: 3.16s remaining: 7.28s
303: learn: 0.0519264 total: 3.17s remaining: 7.26s
304: learn: 0.0518555 total: 3.18s remaining: 7.25s
305: learn: 0.0518352 total: 3.19s remaining: 7.24s
306: learn: 0.0517798 total: 3.2s remaining: 7.22s
307: learn: 0.0517155 total: 3.21s remaining: 7.21s
308: learn: 0.0516636 total: 3.22s remaining: 7.2s
309: learn: 0.0515413 total: 3.23s remaining: 7.19s
310: learn: 0.0514867 total: 3.24s remaining: 7.17s
311: learn: 0.0514464 total: 3.25s remaining: 7.16s
312: learn: 0.0513974 total: 3.26s remaining: 7.15s
313: learn: 0.0513688 total: 3.27s remaining: 7.14s
314: learn: 0.0513186 total: 3.28s remaining: 7.13s
315: learn: 0.0512734 total: 3.29s remaining: 7.12s
316: learn: 0.0512336 total: 3.3s remaining: 7.11s
317: learn: 0.0512015 total: 3.32s remaining: 7.12s
318: learn: 0.0511821 total: 3.33s remaining: 7.1s
319: learn: 0.0511012 total: 3.34s remaining: 7.09s
320: learn: 0.0510441 total: 3.35s remaining: 7.08s
321: learn: 0.0510222 total: 3.36s remaining: 7.07s
322: learn: 0.0509727 total: 3.37s remaining: 7.06s
323: learn: 0.0509448 total: 3.38s remaining: 7.05s
324: learn: 0.0508937 total: 3.39s remaining: 7.04s
325: learn: 0.0508539 total: 3.4s remaining: 7.03s
326: learn: 0.0508184 total: 3.41s remaining: 7.02s
327: learn: 0.0507719 total: 3.42s remaining: 7s
328: learn: 0.0506982 total: 3.43s remaining: 6.99s
329: learn: 0.0506580 total: 3.44s remaining: 6.98s
330: learn: 0.0505939 total: 3.45s remaining: 6.97s
331: learn: 0.0505615 total: 3.46s remaining: 6.96s
332: learn: 0.0505037 total: 3.47s remaining: 6.95s
333: learn: 0.0504644 total: 3.48s remaining: 6.93s
334: learn: 0.0504239 total: 3.49s remaining: 6.92s
335: learn: 0.0503776 total: 3.5s remaining: 6.91s
336: learn: 0.0503321 total: 3.51s remaining: 6.9s
337: learn: 0.0502975 total: 3.52s remaining: 6.89s
338: learn: 0.0502435 total: 3.53s remaining: 6.89s
339: learn: 0.0502010 total: 3.55s remaining: 6.89s
340: learn: 0.0501572 total: 3.56s remaining: 6.88s
341: learn: 0.0501261 total: 3.57s remaining: 6.87s
342: learn: 0.0500680 total: 3.58s remaining: 6.85s
343: learn: 0.0500403 total: 3.59s remaining: 6.84s
344: learn: 0.0500084 total: 3.6s remaining: 6.83s
345: learn: 0.0499835 total: 3.61s remaining: 6.82s
346: learn: 0.0499484 total: 3.62s remaining: 6.81s
347: learn: 0.0498737 total: 3.63s remaining: 6.8s
348: learn: 0.0498447 total: 3.64s remaining: 6.79s
349: learn: 0.0497929 total: 3.65s remaining: 6.78s
350: learn: 0.0497730 total: 3.66s remaining: 6.77s
351: learn: 0.0497612 total: 3.67s remaining: 6.76s
352: learn: 0.0497336 total: 3.68s remaining: 6.75s
353: learn: 0.0496942 total: 3.69s remaining: 6.74s
354: learn: 0.0496459 total: 3.7s remaining: 6.72s
355: learn: 0.0495931 total: 3.71s remaining: 6.71s
356: learn: 0.0495296 total: 3.72s remaining: 6.71s
357: learn: 0.0495076 total: 3.73s remaining: 6.7s
```

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358: learn: 0.0494786 total: 3.74s remaining: 6.68s
359: learn: 0.0494582 total: 3.75s remaining: 6.67s
360: learn: 0.0494178 total: 3.76s remaining: 6.66s
361: learn: 0.0493803 total: 3.77s remaining: 6.65s
362: learn: 0.0493510 total: 3.78s remaining: 6.64s
363: learn: 0.0492889 total: 3.79s remaining: 6.63s
364: learn: 0.0492731 total: 3.8s remaining: 6.62s
365: learn: 0.0492361 total: 3.81s remaining: 6.6s
366: learn: 0.0492117 total: 3.82s remaining: 6.59s
367: learn: 0.0491694 total: 3.83s remaining: 6.58s
368: learn: 0.0491517 total: 3.84s remaining: 6.57s
369: learn: 0.0491246 total: 3.85s remaining: 6.55s
370: learn: 0.0490991 total: 3.86s remaining: 6.54s
371: learn: 0.0490656 total: 3.87s remaining: 6.53s
372: learn: 0.0490170 total: 3.88s remaining: 6.52s
373: learn: 0.0490036 total: 3.89s remaining: 6.51s
374: learn: 0.0489760 total: 3.9s remaining: 6.5s
375: learn: 0.0489419 total: 3.91s remaining: 6.49s
376: learn: 0.0489203 total: 3.92s remaining: 6.48s
377: learn: 0.0488714 total: 3.93s remaining: 6.47s
378: learn: 0.0488235 total: 3.94s remaining: 6.46s
379: learn: 0.0487990 total: 3.95s remaining: 6.45s
380: learn: 0.0487750 total: 3.96s remaining: 6.44s
381: learn: 0.0486893 total: 3.97s remaining: 6.42s
382: learn: 0.0486492 total: 3.98s remaining: 6.41s
383: learn: 0.0486300 total: 3.99s remaining: 6.4s
384: learn: 0.0485556 total: 4s remaining: 6.39s
385: learn: 0.0485139 total: 4.01s remaining: 6.38s
386: learn: 0.0485023 total: 4.02s remaining: 6.37s
387: learn: 0.0484675 total: 4.03s remaining: 6.36s
388: learn: 0.0484497 total: 4.04s remaining: 6.34s
389: learn: 0.0484025 total: 4.05s remaining: 6.33s
390: learn: 0.0483769 total: 4.06s remaining: 6.32s
391: learn: 0.0483509 total: 4.07s remaining: 6.32s
392: learn: 0.0482870 total: 4.09s remaining: 6.31s
393: learn: 0.0482572 total: 4.1s remaining: 6.3s
394: learn: 0.0482328 total: 4.11s remaining: 6.29s
395: learn: 0.0481951 total: 4.12s remaining: 6.28s
396: learn: 0.0481768 total: 4.14s remaining: 6.28s
397: learn: 0.0481639 total: 4.14s remaining: 6.27s
398: learn: 0.0481334 total: 4.16s remaining: 6.26s
399: learn: 0.0481172 total: 4.17s remaining: 6.25s
400: learn: 0.0480701 total: 4.18s remaining: 6.24s
401: learn: 0.0479996 total: 4.19s remaining: 6.23s
402: learn: 0.0479818 total: 4.2s remaining: 6.22s
403: learn: 0.0479549 total: 4.21s remaining: 6.2s
404: learn: 0.0479102 total: 4.21s remaining: 6.19s
405: learn: 0.0478902 total: 4.22s remaining: 6.18s
406: learn: 0.0478269 total: 4.23s remaining: 6.17s
407: learn: 0.0478167 total: 4.24s remaining: 6.16s
408: learn: 0.0478022 total: 4.25s remaining: 6.14s
409: learn: 0.0477702 total: 4.26s remaining: 6.13s
410: learn: 0.0477580 total: 4.27s remaining: 6.12s
411: learn: 0.0477131 total: 4.28s remaining: 6.11s
412: learn: 0.0476976 total: 4.29s remaining: 6.1s
413: learn: 0.0476543 total: 4.3s remaining: 6.09s
414: learn: 0.0476077 total: 4.31s remaining: 6.08s
415: learn: 0.0475902 total: 4.32s remaining: 6.07s
416: learn: 0.0475753 total: 4.33s remaining: 6.05s
417: learn: 0.0475357 total: 4.34s remaining: 6.05s
418: learn: 0.0475254 total: 4.35s remaining: 6.04s
419: learn: 0.0474783 total: 4.36s remaining: 6.02s
420: learn: 0.0474359 total: 4.37s remaining: 6.01s
421: learn: 0.0474159 total: 4.38s remaining: 6s
422: learn: 0.0473640 total: 4.39s remaining: 5.99s
423: learn: 0.0473257 total: 4.4s remaining: 5.98s
424: learn: 0.0473071 total: 4.41s remaining: 5.97s
425: learn: 0.0472927 total: 4.42s remaining: 5.95s
426: learn: 0.0472768 total: 4.43s remaining: 5.94s
427: learn: 0.0472329 total: 4.44s remaining: 5.93s
428: learn: 0.0472049 total: 4.45s remaining: 5.92s
429: learn: 0.0471629 total: 4.46s remaining: 5.91s
```

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430: learn: 0.0471205 total: 4.47s remaining: 5.9s
431: learn: 0.0470996 total: 4.47s remaining: 5.88s
432: learn: 0.0470727 total: 4.48s remaining: 5.87s
433: learn: 0.0470451 total: 4.49s remaining: 5.86s
434: learn: 0.0470000 total: 4.5s remaining: 5.85s
435: learn: 0.0469769 total: 4.51s remaining: 5.84s
436: learn: 0.0469268 total: 4.52s remaining: 5.83s
437: learn: 0.0469125 total: 4.53s remaining: 5.81s
438: learn: 0.0468862 total: 4.54s remaining: 5.8s
439: learn: 0.0468674 total: 4.55s remaining: 5.8s
440: learn: 0.0468340 total: 4.56s remaining: 5.79s
441: learn: 0.0467587 total: 4.57s remaining: 5.77s
442: learn: 0.0467351 total: 4.58s remaining: 5.76s
443: learn: 0.0466631 total: 4.59s remaining: 5.75s
444: learn: 0.0466529 total: 4.6s remaining: 5.74s
445: learn: 0.0466308 total: 4.61s remaining: 5.73s
446: learn: 0.0466210 total: 4.62s remaining: 5.71s
447: learn: 0.0465495 total: 4.63s remaining: 5.7s
448: learn: 0.0465012 total: 4.64s remaining: 5.69s
449: learn: 0.0464855 total: 4.65s remaining: 5.68s
450: learn: 0.0464466 total: 4.66s remaining: 5.67s
451: learn: 0.0464168 total: 4.67s remaining: 5.66s
452: learn: 0.0464039 total: 4.67s remaining: 5.64s
453: learn: 0.0463803 total: 4.68s remaining: 5.63s
454: learn: 0.0463428 total: 4.69s remaining: 5.62s
455: learn: 0.0463292 total: 4.7s remaining: 5.61s
456: learn: 0.0462700 total: 4.72s remaining: 5.61s
457: learn: 0.0462608 total: 4.73s remaining: 5.6s
458: learn: 0.0462090 total: 4.74s remaining: 5.58s
459: learn: 0.0461543 total: 4.75s remaining: 5.57s
460: learn: 0.0461301 total: 4.76s remaining: 5.57s
461: learn: 0.0460811 total: 4.77s remaining: 5.55s
462: learn: 0.0460184 total: 4.78s remaining: 5.54s
463: learn: 0.0459436 total: 4.79s remaining: 5.53s
464: learn: 0.0459017 total: 4.8s remaining: 5.52s
465: learn: 0.0458912 total: 4.81s remaining: 5.51s
466: learn: 0.0458404 total: 4.82s remaining: 5.5s
467: learn: 0.0458039 total: 4.83s remaining: 5.49s
468: learn: 0.0457589 total: 4.84s remaining: 5.47s
469: learn: 0.0457018 total: 4.84s remaining: 5.46s
470: learn: 0.0456789 total: 4.85s remaining: 5.45s
471: learn: 0.0456525 total: 4.86s remaining: 5.44s
472: learn: 0.0456170 total: 4.87s remaining: 5.43s
473: learn: 0.0455265 total: 4.88s remaining: 5.42s
474: learn: 0.0455171 total: 4.89s remaining: 5.41s
475: learn: 0.0454897 total: 4.9s remaining: 5.4s
476: learn: 0.0454444 total: 4.91s remaining: 5.38s
477: learn: 0.0453613 total: 4.92s remaining: 5.37s
478: learn: 0.0453534 total: 4.93s remaining: 5.36s
479: learn: 0.0453316 total: 4.94s remaining: 5.35s
480: learn: 0.0453111 total: 4.95s remaining: 5.34s
481: learn: 0.0452450 total: 4.96s remaining: 5.33s
482: learn: 0.0451962 total: 4.97s remaining: 5.32s
483: learn: 0.0451535 total: 4.98s remaining: 5.31s
484: learn: 0.0451017 total: 4.99s remaining: 5.3s
485: learn: 0.0450807 total: 5s remaining: 5.29s
486: learn: 0.0449881 total: 5.01s remaining: 5.28s
487: learn: 0.0449357 total: 5.02s remaining: 5.27s
488: learn: 0.0449156 total: 5.03s remaining: 5.26s
489: learn: 0.0448749 total: 5.04s remaining: 5.25s
490: learn: 0.0448101 total: 5.05s remaining: 5.24s
491: learn: 0.0447867 total: 5.06s remaining: 5.22s
492: learn: 0.0447403 total: 5.07s remaining: 5.22s
493: learn: 0.0446931 total: 5.09s remaining: 5.21s
494: learn: 0.0446489 total: 5.1s remaining: 5.2s
495: learn: 0.0445934 total: 5.11s remaining: 5.19s
496: learn: 0.0445670 total: 5.12s remaining: 5.18s
497: learn: 0.0445376 total: 5.12s remaining: 5.17s
498: learn: 0.0444904 total: 5.13s remaining: 5.15s
499: learn: 0.0444288 total: 5.14s remaining: 5.14s
500: learn: 0.0443941 total: 5.15s remaining: 5.13s
501: learn: 0.0443717 total: 5.16s remaining: 5.12s
```

```
502: learn: 0.0443217 total: 5.17s remaining: 5.11s
503: learn: 0.0443132 total: 5.18s remaining: 5.1s
504: learn: 0.0443044 total: 5.19s remaining: 5.09s
505: learn: 0.0442827 total: 5.2s remaining: 5.08s
506: learn: 0.0442630 total: 5.21s remaining: 5.07s
507: learn: 0.0442214 total: 5.22s remaining: 5.06s
508: learn: 0.0441889 total: 5.23s remaining: 5.04s
509: learn: 0.0441471 total: 5.24s remaining: 5.03s
510: learn: 0.0441280 total: 5.25s remaining: 5.02s
511: learn: 0.0441071 total: 5.26s remaining: 5.01s
512: learn: 0.0440576 total: 5.27s remaining: 5s
513: learn: 0.0440378 total: 5.28s remaining: 4.99s
514: learn: 0.0440044 total: 5.29s remaining: 4.98s
515: learn: 0.0439523 total: 5.29s remaining: 4.97s
516: learn: 0.0439103 total: 5.3s remaining: 4.96s
517: learn: 0.0438849 total: 5.31s remaining: 4.95s
518: learn: 0.0438546 total: 5.32s remaining: 4.93s
519: learn: 0.0437840 total: 5.33s remaining: 4.92s
520: learn: 0.0437353 total: 5.34s remaining: 4.91s
521: learn: 0.0436782 total: 5.35s remaining: 4.9s
522: learn: 0.0436540 total: 5.36s remaining: 4.89s
523: learn: 0.0436383 total: 5.37s remaining: 4.88s
524: learn: 0.0435980 total: 5.39s remaining: 4.87s
525: learn: 0.0435797 total: 5.4s remaining: 4.86s
526: learn: 0.0435478 total: 5.41s remaining: 4.85s
527: learn: 0.0435246 total: 5.42s remaining: 4.84s
528: learn: 0.0434973 total: 5.42s remaining: 4.83s
529: learn: 0.0434760 total: 5.43s remaining: 4.82s
530: learn: 0.0434393 total: 5.44s remaining: 4.81s
531: learn: 0.0434217 total: 5.45s remaining: 4.8s
532: learn: 0.0433905 total: 5.46s remaining: 4.79s
533: learn: 0.0433432 total: 5.47s remaining: 4.77s
534: learn: 0.0433112 total: 5.48s remaining: 4.76s
535: learn: 0.0432631 total: 5.49s remaining: 4.75s
536: learn: 0.0432373 total: 5.5s remaining: 4.74s
537: learn: 0.0431839 total: 5.51s remaining: 4.73s
538: learn: 0.0431333 total: 5.52s remaining: 4.72s
539: learn: 0.0431253 total: 5.53s remaining: 4.71s
540: learn: 0.0430951 total: 5.54s remaining: 4.7s
541: learn: 0.0430603 total: 5.55s remaining: 4.69s
542: learn: 0.0430500 total: 5.55s remaining: 4.67s
543: learn: 0.0430167 total: 5.56s remaining: 4.66s
544: learn: 0.0429911 total: 5.57s remaining: 4.65s
545: learn: 0.0429833 total: 5.58s remaining: 4.64s
546: learn: 0.0429316 total: 5.59s remaining: 4.63s
547: learn: 0.0429141 total: 5.61s remaining: 4.62s
548: learn: 0.0428861 total: 5.61s remaining: 4.61s
549: learn: 0.0428648 total: 5.62s remaining: 4.6s
550: learn: 0.0428274 total: 5.63s remaining: 4.59s
551: learn: 0.0427956 total: 5.64s remaining: 4.58s
552: learn: 0.0427594 total: 5.65s remaining: 4.57s
553: learn: 0.0427518 total: 5.66s remaining: 4.56s
554: learn: 0.0427473 total: 5.67s remaining: 4.54s
555: learn: 0.0427039 total: 5.68s remaining: 4.54s
556: learn: 0.0426560 total: 5.69s remaining: 4.52s
557: learn: 0.0426336 total: 5.7s remaining: 4.51s
558: learn: 0.0426262 total: 5.71s remaining: 4.5s
559: learn: 0.0426062 total: 5.72s remaining: 4.49s
560: learn: 0.0425773 total: 5.73s remaining: 4.48s
561: learn: 0.0425022 total: 5.74s remaining: 4.47s
562: learn: 0.0424500 total: 5.75s remaining: 4.46s
563: learn: 0.0424206 total: 5.75s remaining: 4.45s
564: learn: 0.0423940 total: 5.76s remaining: 4.44s
565: learn: 0.0423592 total: 5.77s remaining: 4.43s
566: learn: 0.0423209 total: 5.78s remaining: 4.42s
567: learn: 0.0422779 total: 5.79s remaining: 4.41s
568: learn: 0.0422477 total: 5.81s remaining: 4.4s
569: learn: 0.0422357 total: 5.82s remaining: 4.39s
570: learn: 0.0421990 total: 5.83s remaining: 4.38s
571: learn: 0.0421751 total: 5.84s remaining: 4.37s
572: learn: 0.0421324 total: 5.85s remaining: 4.36s
573: learn: 0.0420954 total: 5.86s remaining: 4.35s
```

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574: learn: 0.0420729 total: 5.87s remaining: 4.33s
575: learn: 0.0420468 total: 5.87s remaining: 4.32s
576: learn: 0.0420279 total: 5.88s remaining: 4.31s
577: learn: 0.0419641 total: 5.9s remaining: 4.31s
578: learn: 0.0419393 total: 5.91s remaining: 4.29s
579: learn: 0.0419050 total: 5.92s remaining: 4.28s
580: learn: 0.0418860 total: 5.92s remaining: 4.27s
581: learn: 0.0418553 total: 5.93s remaining: 4.26s
582: learn: 0.0418109 total: 5.94s remaining: 4.25s
583: learn: 0.0417302 total: 5.95s remaining: 4.24s
584: learn: 0.0416996 total: 5.96s remaining: 4.23s
585: learn: 0.0416671 total: 5.97s remaining: 4.22s
586: learn: 0.0416494 total: 5.98s remaining: 4.21s
587: learn: 0.0415898 total: 5.99s remaining: 4.2s
588: learn: 0.0415783 total: 6s remaining: 4.19s
589: learn: 0.0415686 total: 6.01s remaining: 4.18s
590: learn: 0.0415362 total: 6.02s remaining: 4.17s
591: learn: 0.0415239 total: 6.03s remaining: 4.16s
592: learn: 0.0414850 total: 6.04s remaining: 4.15s
593: learn: 0.0414573 total: 6.05s remaining: 4.14s
594: learn: 0.0414373 total: 6.06s remaining: 4.13s
595: learn: 0.0414169 total: 6.08s remaining: 4.12s
596: learn: 0.0414084 total: 6.09s remaining: 4.11s
597: learn: 0.0413864 total: 6.1s remaining: 4.1s
598: learn: 0.0413547 total: 6.11s remaining: 4.09s
599: learn: 0.0413485 total: 6.11s remaining: 4.08s
600: learn: 0.0412918 total: 6.12s remaining: 4.07s
601: learn: 0.0412267 total: 6.13s remaining: 4.05s
602: learn: 0.0411794 total: 6.14s remaining: 4.04s
603: learn: 0.0411577 total: 6.15s remaining: 4.03s
604: learn: 0.0411443 total: 6.16s remaining: 4.02s
605: learn: 0.0411383 total: 6.17s remaining: 4.01s
606: learn: 0.0411067 total: 6.18s remaining: 4s
607: learn: 0.0410928 total: 6.19s remaining: 3.99s
608: learn: 0.0410475 total: 6.2s remaining: 3.98s
609: learn: 0.0410058 total: 6.21s remaining: 3.97s
610: learn: 0.0409233 total: 6.22s remaining: 3.96s
611: learn: 0.0409076 total: 6.23s remaining: 3.95s
612: learn: 0.0408685 total: 6.24s remaining: 3.94s
613: learn: 0.0408437 total: 6.25s remaining: 3.93s
614: learn: 0.0408053 total: 6.26s remaining: 3.92s
615: learn: 0.0407959 total: 6.27s remaining: 3.91s
616: learn: 0.0407901 total: 6.28s remaining: 3.9s
617: learn: 0.0407471 total: 6.29s remaining: 3.89s
618: learn: 0.0407227 total: 6.3s remaining: 3.88s
619: learn: 0.0406946 total: 6.31s remaining: 3.87s
620: learn: 0.0406579 total: 6.32s remaining: 3.86s
621: learn: 0.0406179 total: 6.33s remaining: 3.85s
622: learn: 0.0405814 total: 6.34s remaining: 3.83s
623: learn: 0.0405482 total: 6.35s remaining: 3.82s
624: learn: 0.0405062 total: 6.36s remaining: 3.81s
625: learn: 0.0404416 total: 6.37s remaining: 3.8s
626: learn: 0.0404052 total: 6.38s remaining: 3.79s
627: learn: 0.0403461 total: 6.38s remaining: 3.78s
628: learn: 0.0403141 total: 6.39s remaining: 3.77s
629: learn: 0.0402734 total: 6.4s remaining: 3.76s
630: learn: 0.0402251 total: 6.41s remaining: 3.75s
631: learn: 0.0401760 total: 6.42s remaining: 3.74s
632: learn: 0.0401718 total: 6.44s remaining: 3.73s
633: learn: 0.0401316 total: 6.45s remaining: 3.72s
634: learn: 0.0400921 total: 6.46s remaining: 3.71s
635: learn: 0.0400526 total: 6.47s remaining: 3.7s
636: learn: 0.0399855 total: 6.48s remaining: 3.69s
637: learn: 0.0399094 total: 6.49s remaining: 3.68s
638: learn: 0.0398811 total: 6.5s remaining: 3.67s
639: learn: 0.0398504 total: 6.51s remaining: 3.66s
640: learn: 0.0398227 total: 6.52s remaining: 3.65s
641: learn: 0.0398007 total: 6.53s remaining: 3.64s
642: learn: 0.0397663 total: 6.54s remaining: 3.63s
643: learn: 0.0397408 total: 6.55s remaining: 3.62s
644: learn: 0.0397114 total: 6.56s remaining: 3.61s
645: learn: 0.0396842 total: 6.57s remaining: 3.6s
```

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646: learn: 0.0396712 total: 6.57s remaining: 3.59s
647: learn: 0.0396322 total: 6.58s remaining: 3.58s
648: learn: 0.0395498 total: 6.59s remaining: 3.56s
649: learn: 0.0395029 total: 6.6s remaining: 3.56s
650: learn: 0.0394803 total: 6.61s remaining: 3.54s
651: learn: 0.0394539 total: 6.62s remaining: 3.53s
652: learn: 0.0394029 total: 6.63s remaining: 3.52s
653: learn: 0.0393693 total: 6.64s remaining: 3.51s
654: learn: 0.0393138 total: 6.65s remaining: 3.5s
655: learn: 0.0392592 total: 6.66s remaining: 3.49s
656: learn: 0.0392232 total: 6.67s remaining: 3.48s
657: learn: 0.0391923 total: 6.68s remaining: 3.47s
658: learn: 0.0391869 total: 6.69s remaining: 3.46s
659: learn: 0.0391369 total: 6.7s remaining: 3.45s
660: learn: 0.0391136 total: 6.71s remaining: 3.44s
661: learn: 0.0390606 total: 6.72s remaining: 3.43s
662: learn: 0.0390506 total: 6.73s remaining: 3.42s
663: learn: 0.0390243 total: 6.74s remaining: 3.41s
664: learn: 0.0389909 total: 6.75s remaining: 3.4s
665: learn: 0.0389466 total: 6.76s remaining: 3.39s
666: learn: 0.0389110 total: 6.77s remaining: 3.38s
667: learn: 0.0388755 total: 6.78s remaining: 3.37s
668: learn: 0.0388384 total: 6.79s remaining: 3.36s
669: learn: 0.0388187 total: 6.8s remaining: 3.35s
670: learn: 0.0387877 total: 6.8s remaining: 3.34s
671: learn: 0.0387580 total: 6.82s remaining: 3.33s
672: learn: 0.0387342 total: 6.82s remaining: 3.31s
673: learn: 0.0387101 total: 6.84s remaining: 3.31s
674: learn: 0.0386723 total: 6.85s remaining: 3.3s
675: learn: 0.0386397 total: 6.86s remaining: 3.29s
676: learn: 0.0386214 total: 6.87s remaining: 3.28s
677: learn: 0.0385615 total: 6.88s remaining: 3.27s
678: learn: 0.0385360 total: 6.88s remaining: 3.25s
679: learn: 0.0385146 total: 6.89s remaining: 3.24s
680: learn: 0.0384802 total: 6.9s remaining: 3.23s
681: learn: 0.0384266 total: 6.91s remaining: 3.22s
682: learn: 0.0383935 total: 6.92s remaining: 3.21s
683: learn: 0.0383558 total: 6.93s remaining: 3.2s
684: learn: 0.0383327 total: 6.94s remaining: 3.19s
685: learn: 0.0382824 total: 6.95s remaining: 3.18s
686: learn: 0.0382347 total: 6.96s remaining: 3.17s
687: learn: 0.0381881 total: 6.97s remaining: 3.16s
688: learn: 0.0381633 total: 6.98s remaining: 3.15s
689: learn: 0.0381580 total: 6.99s remaining: 3.14s
690: learn: 0.0381312 total: 7s remaining: 3.13s
691: learn: 0.0380908 total: 7.01s remaining: 3.12s
692: learn: 0.0380568 total: 7.02s remaining: 3.11s
693: learn: 0.0380411 total: 7.03s remaining: 3.1s
694: learn: 0.0380193 total: 7.04s remaining: 3.09s
695: learn: 0.0379988 total: 7.05s remaining: 3.08s
696: learn: 0.0379636 total: 7.06s remaining: 3.07s
697: learn: 0.0379448 total: 7.08s remaining: 3.06s
698: learn: 0.0379208 total: 7.09s remaining: 3.05s
699: learn: 0.0378528 total: 7.1s remaining: 3.04s
700: learn: 0.0378031 total: 7.11s remaining: 3.03s
701: learn: 0.0377577 total: 7.12s remaining: 3.02s
702: learn: 0.0377122 total: 7.13s remaining: 3.01s
703: learn: 0.0376815 total: 7.14s remaining: 3s
704: learn: 0.0376513 total: 7.15s remaining: 2.99s
705: learn: 0.0376199 total: 7.16s remaining: 2.98s
706: learn: 0.0375734 total: 7.17s remaining: 2.97s
707: learn: 0.0375324 total: 7.18s remaining: 2.96s
708: learn: 0.0375276 total: 7.19s remaining: 2.95s
709: learn: 0.0375039 total: 7.2s remaining: 2.94s
710: learn: 0.0374426 total: 7.21s remaining: 2.93s
711: learn: 0.0374183 total: 7.22s remaining: 2.92s
712: learn: 0.0373952 total: 7.24s remaining: 2.91s
713: learn: 0.0373803 total: 7.25s remaining: 2.9s
714: learn: 0.0373313 total: 7.26s remaining: 2.89s
715: learn: 0.0373174 total: 7.27s remaining: 2.88s
716: learn: 0.0372850 total: 7.28s remaining: 2.87s
717: learn: 0.0372676 total: 7.29s remaining: 2.86s
```

```
718: learn: 0.0372244 total: 7.3s remaining: 2.85s
719: learn: 0.0372023 total: 7.31s remaining: 2.84s
720: learn: 0.0371874 total: 7.32s remaining: 2.83s
721: learn: 0.0371538 total: 7.33s remaining: 2.82s
722: learn: 0.0371396 total: 7.34s remaining: 2.81s
723: learn: 0.0370849 total: 7.34s remaining: 2.8s
724: learn: 0.0370410 total: 7.36s remaining: 2.79s
725: learn: 0.0370168 total: 7.37s remaining: 2.78s
726: learn: 0.0369811 total: 7.38s remaining: 2.77s
727: learn: 0.0369591 total: 7.38s remaining: 2.76s
728: learn: 0.0369314 total: 7.39s remaining: 2.75s
729: learn: 0.0369083 total: 7.41s remaining: 2.74s
730: learn: 0.0368877 total: 7.41s remaining: 2.73s
731: learn: 0.0368832 total: 7.42s remaining: 2.72s
732: learn: 0.0368632 total: 7.43s remaining: 2.71s
733: learn: 0.0368369 total: 7.44s remaining: 2.7s
734: learn: 0.0368037 total: 7.46s remaining: 2.69s
735: learn: 0.0367899 total: 7.47s remaining: 2.68s
736: learn: 0.0367617 total: 7.48s remaining: 2.67s
737: learn: 0.0367485 total: 7.49s remaining: 2.66s
738: learn: 0.0367263 total: 7.5s remaining: 2.65s
739: learn: 0.0367137 total: 7.51s remaining: 2.64s
740: learn: 0.0366714 total: 7.52s remaining: 2.63s
741: learn: 0.0366595 total: 7.53s remaining: 2.62s
742: learn: 0.0366530 total: 7.54s remaining: 2.61s
743: learn: 0.0366370 total: 7.54s remaining: 2.6s
744: learn: 0.0366087 total: 7.55s remaining: 2.58s
745: learn: 0.0365650 total: 7.56s remaining: 2.58s
746: learn: 0.0365337 total: 7.57s remaining: 2.56s
747: learn: 0.0365262 total: 7.58s remaining: 2.55s
748: learn: 0.0364916 total: 7.59s remaining: 2.54s
749: learn: 0.0364489 total: 7.6s remaining: 2.53s
750: learn: 0.0364191 total: 7.61s remaining: 2.52s
751: learn: 0.0364009 total: 7.62s remaining: 2.51s
752: learn: 0.0363884 total: 7.63s remaining: 2.5s
753: learn: 0.0363804 total: 7.64s remaining: 2.49s
754: learn: 0.0363714 total: 7.65s remaining: 2.48s
755: learn: 0.0363405 total: 7.67s remaining: 2.47s
756: learn: 0.0363177 total: 7.68s remaining: 2.46s
757: learn: 0.0363052 total: 7.69s remaining: 2.45s
758: learn: 0.0363010 total: 7.7s remaining: 2.44s
759: learn: 0.0362845 total: 7.71s remaining: 2.43s
760: learn: 0.0362681 total: 7.71s remaining: 2.42s
761: learn: 0.0362478 total: 7.72s remaining: 2.41s
762: learn: 0.0362392 total: 7.73s remaining: 2.4s
763: learn: 0.0362069 total: 7.74s remaining: 2.39s
764: learn: 0.0361804 total: 7.75s remaining: 2.38s
765: learn: 0.0361268 total: 7.76s remaining: 2.37s
766: learn: 0.0360758 total: 7.77s remaining: 2.36s
767: learn: 0.0360678 total: 7.78s remaining: 2.35s
768: learn: 0.0360238 total: 7.79s remaining: 2.34s
769: learn: 0.0359941 total: 7.8s remaining: 2.33s
770: learn: 0.0359755 total: 7.81s remaining: 2.32s
771: learn: 0.0359270 total: 7.82s remaining: 2.31s
772: learn: 0.0358993 total: 7.83s remaining: 2.3s
773: learn: 0.0358600 total: 7.84s remaining: 2.29s
774: learn: 0.0358560 total: 7.85s remaining: 2.28s
775: learn: 0.0358063 total: 7.86s remaining: 2.27s
776: learn: 0.0357718 total: 7.87s remaining: 2.26s
777: learn: 0.0357659 total: 7.88s remaining: 2.25s
778: learn: 0.0357433 total: 7.89s remaining: 2.24s
779: learn: 0.0357239 total: 7.9s remaining: 2.23s
780: learn: 0.0357071 total: 7.91s remaining: 2.22s
781: learn: 0.0356852 total: 7.92s remaining: 2.21s
782: learn: 0.0356548 total: 7.93s remaining: 2.2s
783: learn: 0.0356270 total: 7.94s remaining: 2.19s
784: learn: 0.0355902 total: 7.95s remaining: 2.18s
785: learn: 0.0355624 total: 7.96s remaining: 2.17s
786: learn: 0.0355531 total: 7.97s remaining: 2.16s
787: learn: 0.0355230 total: 7.98s remaining: 2.15s
788: learn: 0.0354941 total: 7.99s remaining: 2.13s
789: learn: 0.0354780 total: 8s remaining: 2.13s
```

```
790: learn: 0.0354431 total: 8.01s remaining: 2.12s
791: learn: 0.0354157 total: 8.01s remaining: 2.1s
792: learn: 0.0353879 total: 8.02s remaining: 2.09s
793: learn: 0.0353636 total: 8.03s remaining: 2.08s
794: learn: 0.0353370 total: 8.05s remaining: 2.07s
795: learn: 0.0353157 total: 8.05s remaining: 2.06s
796: learn: 0.0353008 total: 8.07s remaining: 2.06s
797: learn: 0.0352843 total: 8.09s remaining: 2.05s
798: learn: 0.0352804 total: 8.1s remaining: 2.04s
799: learn: 0.0352710 total: 8.11s remaining: 2.03s
800: learn: 0.0352462 total: 8.12s remaining: 2.02s
801: learn: 0.0352119 total: 8.13s remaining: 2.01s
802: learn: 0.0351562 total: 8.14s remaining: 2s
803: learn: 0.0351284 total: 8.15s remaining: 1.99s
804: learn: 0.0351246 total: 8.16s remaining: 1.98s
805: learn: 0.0350972 total: 8.17s remaining: 1.97s
806: learn: 0.0350822 total: 8.18s remaining: 1.96s
807: learn: 0.0350643 total: 8.19s remaining: 1.95s
808: learn: 0.0350489 total: 8.2s remaining: 1.94s
809: learn: 0.0350259 total: 8.21s remaining: 1.92s
810: learn: 0.0350124 total: 8.21s remaining: 1.91s
811: learn: 0.0349516 total: 8.22s remaining: 1.9s
812: learn: 0.0349257 total: 8.23s remaining: 1.89s
813: learn: 0.0348874 total: 8.24s remaining: 1.88s
814: learn: 0.0348718 total: 8.26s remaining: 1.87s
815: learn: 0.0348477 total: 8.27s remaining: 1.86s
816: learn: 0.0348287 total: 8.28s remaining: 1.85s
817: learn: 0.0348027 total: 8.29s remaining: 1.84s
818: learn: 0.0347558 total: 8.3s remaining: 1.83s
819: learn: 0.0347475 total: 8.31s remaining: 1.82s
820: learn: 0.0347344 total: 8.32s remaining: 1.81s
821: learn: 0.0346867 total: 8.33s remaining: 1.8s
822: learn: 0.0346715 total: 8.34s remaining: 1.79s
823: learn: 0.0346514 total: 8.35s remaining: 1.78s
824: learn: 0.0346297 total: 8.36s remaining: 1.77s
825: learn: 0.0345918 total: 8.36s remaining: 1.76s
826: learn: 0.0345653 total: 8.37s remaining: 1.75s
827: learn: 0.0345095 total: 8.38s remaining: 1.74s
828: learn: 0.0345058 total: 8.39s remaining: 1.73s
829: learn: 0.0344845 total: 8.4s remaining: 1.72s
830: learn: 0.0344581 total: 8.41s remaining: 1.71s
831: learn: 0.0344526 total: 8.42s remaining: 1.7s
832: learn: 0.0344451 total: 8.44s remaining: 1.69s
833: learn: 0.0344298 total: 8.45s remaining: 1.68s
834: learn: 0.0344089 total: 8.46s remaining: 1.67s
835: learn: 0.0343588 total: 8.47s remaining: 1.66s
836: learn: 0.0343289 total: 8.48s remaining: 1.65s
837: learn: 0.0342994 total: 8.49s remaining: 1.64s
838: learn: 0.0342769 total: 8.5s remaining: 1.63s
839: learn: 0.0342679 total: 8.51s remaining: 1.62s
840: learn: 0.0342609 total: 8.52s remaining: 1.61s
841: learn: 0.0342299 total: 8.53s remaining: 1.6s
842: learn: 0.0341896 total: 8.54s remaining: 1.59s
843: learn: 0.0341760 total: 8.55s remaining: 1.58s
844: learn: 0.0341501 total: 8.56s remaining: 1.57s
845: learn: 0.0341358 total: 8.57s remaining: 1.56s
846: learn: 0.0341053 total: 8.58s remaining: 1.55s
847: learn: 0.0340912 total: 8.59s remaining: 1.54s
848: learn: 0.0340721 total: 8.6s remaining: 1.53s
849: learn: 0.0340529 total: 8.61s remaining: 1.52s
850: learn: 0.0340344 total: 8.62s remaining: 1.51s
851: learn: 0.0340228 total: 8.63s remaining: 1.5s
852: learn: 0.0339963 total: 8.64s remaining: 1.49s
853: learn: 0.0339764 total: 8.65s remaining: 1.48s
854: learn: 0.0339261 total: 8.66s remaining: 1.47s
855: learn: 0.0339094 total: 8.67s remaining: 1.46s
856: learn: 0.0338752 total: 8.68s remaining: 1.45s
857: learn: 0.0338552 total: 8.69s remaining: 1.44s
858: learn: 0.0338518 total: 8.7s remaining: 1.43s
859: learn: 0.0338352 total: 8.71s remaining: 1.42s
860: learn: 0.0338136 total: 8.72s remaining: 1.41s
861: learn: 0.0337930 total: 8.73s remaining: 1.4s
```

```
862: learn: 0.0337724 total: 8.74s remaining: 1.39s
863: learn: 0.0337691 total: 8.75s remaining: 1.38s
864: learn: 0.0337558 total: 8.76s remaining: 1.37s
865: learn: 0.0337275 total: 8.77s remaining: 1.36s
866: learn: 0.0336918 total: 8.78s remaining: 1.35s
867: learn: 0.0336697 total: 8.79s remaining: 1.34s
868: learn: 0.0336489 total: 8.8s remaining: 1.33s
869: learn: 0.0335933 total: 8.81s remaining: 1.32s
870: learn: 0.0335701 total: 8.82s remaining: 1.3s
871: learn: 0.0335544 total: 8.83s remaining: 1.29s
872: learn: 0.0335270 total: 8.84s remaining: 1.28s
873: learn: 0.0335130 total: 8.85s remaining: 1.27s
874: learn: 0.0334975 total: 8.86s remaining: 1.26s
875: learn: 0.0334874 total: 8.86s remaining: 1.25s
876: learn: 0.0334716 total: 8.87s remaining: 1.24s
877: learn: 0.0334685 total: 8.88s remaining: 1.23s
878: learn: 0.0334193 total: 8.89s remaining: 1.22s
879: learn: 0.0333922 total: 8.9s remaining: 1.21s
880: learn: 0.0333763 total: 8.91s remaining: 1.2s
881: learn: 0.0333469 total: 8.93s remaining: 1.19s
882: learn: 0.0333046 total: 8.94s remaining: 1.18s
883: learn: 0.0332723 total: 8.94s remaining: 1.17s
884: learn: 0.0332492 total: 8.95s remaining: 1.16s
885: learn: 0.0332311 total: 8.96s remaining: 1.15s
886: learn: 0.0332085 total: 8.97s remaining: 1.14s
887: learn: 0.0331679 total: 8.98s remaining: 1.13s
888: learn: 0.0331358 total: 8.99s remaining: 1.12s
889: learn: 0.0331187 total: 9s remaining: 1.11s
890: learn: 0.0330982 total: 9.01s remaining: 1.1s
891: learn: 0.0330722 total: 9.02s remaining: 1.09s
892: learn: 0.0330551 total: 9.03s remaining: 1.08s
893: learn: 0.0330463 total: 9.04s remaining: 1.07s
894: learn: 0.0330163 total: 9.05s remaining: 1.06s
895: learn: 0.0329876 total: 9.06s remaining: 1.05s
896: learn: 0.0329780 total: 9.07s remaining: 1.04s
897: learn: 0.0329701 total: 9.08s remaining: 1.03s
898: learn: 0.0329529 total: 9.09s remaining: 1.02s
899: learn: 0.0329319 total: 9.1s remaining: 1.01s
900: learn: 0.0329034 total: 9.11s remaining: 1s
901: learn: 0.0328801 total: 9.12s remaining: 991ms
902: learn: 0.0328715 total: 9.13s remaining: 981ms
903: learn: 0.0328207 total: 9.15s remaining: 971ms
904: learn: 0.0327808 total: 9.15s remaining: 961ms
905: learn: 0.0327432 total: 9.17s remaining: 951ms
906: learn: 0.0327052 total: 9.18s remaining: 941ms
907: learn: 0.0326704 total: 9.19s remaining: 931ms
908: learn: 0.0326595 total: 9.19s remaining: 920ms
909: learn: 0.0326177 total: 9.2s remaining: 910ms
910: learn: 0.0325916 total: 9.21s remaining: 900ms
911: learn: 0.0325773 total: 9.22s remaining: 890ms
912: learn: 0.0325499 total: 9.23s remaining: 880ms
913: learn: 0.0325389 total: 9.24s remaining: 870ms
914: learn: 0.0325173 total: 9.25s remaining: 859ms
915: learn: 0.0325143 total: 9.26s remaining: 849ms
916: learn: 0.0324999 total: 9.27s remaining: 839ms
917: learn: 0.0324844 total: 9.28s remaining: 829ms
918: learn: 0.0324595 total: 9.29s remaining: 819ms
919: learn: 0.0324396 total: 9.3s remaining: 808ms
920: learn: 0.0324286 total: 9.31s remaining: 798ms
921: learn: 0.0324183 total: 9.31s remaining: 788ms
922: learn: 0.0324154 total: 9.32s remaining: 778ms
923: learn: 0.0323569 total: 9.34s remaining: 768ms
924: learn: 0.0322991 total: 9.35s remaining: 758ms
925: learn: 0.0322696 total: 9.36s remaining: 748ms
926: learn: 0.0322490 total: 9.37s remaining: 738ms
927: learn: 0.0322386 total: 9.38s remaining: 727ms
928: learn: 0.0322178 total: 9.38s remaining: 717ms
929: learn: 0.0322115 total: 9.39s remaining: 707ms
930: learn: 0.0321996 total: 9.4s remaining: 697ms
931: learn: 0.0321834 total: 9.41s remaining: 687ms
932: learn: 0.0321730 total: 9.42s remaining: 676ms
933: learn: 0.0321430 total: 9.43s remaining: 666ms
```

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934: learn: 0.0321230 total: 9.44s remaining: 656ms
935: learn: 0.0321016 total: 9.45s remaining: 646ms
936: learn: 0.0320867 total: 9.46s remaining: 636ms
937: learn: 0.0320682 total: 9.47s remaining: 626ms
938: learn: 0.0320287 total: 9.48s remaining: 616ms
939: learn: 0.0319927 total: 9.49s remaining: 606ms
940: learn: 0.0319765 total: 9.5s remaining: 596ms
941: learn: 0.0319574 total: 9.51s remaining: 585ms
942: learn: 0.0319351 total: 9.52s remaining: 575ms
943: learn: 0.0319248 total: 9.53s remaining: 565ms
944: learn: 0.0319047 total: 9.54s remaining: 555ms
945: learn: 0.0318487 total: 9.55s remaining: 545ms
946: learn: 0.0318382 total: 9.56s remaining: 535ms
947: learn: 0.0318263 total: 9.57s remaining: 525ms
948: learn: 0.0317797 total: 9.58s remaining: 515ms
949: learn: 0.0317505 total: 9.59s remaining: 505ms
950: learn: 0.0317409 total: 9.6s remaining: 494ms
951: learn: 0.0316877 total: 9.61s remaining: 484ms
952: learn: 0.0316604 total: 9.62s remaining: 474ms
953: learn: 0.0316469 total: 9.63s remaining: 464ms
954: learn: 0.0316375 total: 9.63s remaining: 454ms
955: learn: 0.0316188 total: 9.64s remaining: 444ms
956: learn: 0.0316014 total: 9.65s remaining: 434ms
957: learn: 0.0315616 total: 9.66s remaining: 424ms
958: learn: 0.0315521 total: 9.67s remaining: 414ms
959: learn: 0.0315332 total: 9.68s remaining: 403ms
960: learn: 0.0315252 total: 9.69s remaining: 393ms
961: learn: 0.0314880 total: 9.7s remaining: 383ms
962: learn: 0.0314708 total: 9.71s remaining: 373ms
963: learn: 0.0314617 total: 9.72s remaining: 363ms
964: learn: 0.0314539 total: 9.73s remaining: 353ms
965: learn: 0.0314023 total: 9.74s remaining: 343ms
966: learn: 0.0313930 total: 9.75s remaining: 333ms
967: learn: 0.0313438 total: 9.76s remaining: 323ms
968: learn: 0.0312963 total: 9.78s remaining: 313ms
969: learn: 0.0312527 total: 9.79s remaining: 303ms
970: learn: 0.0312067 total: 9.79s remaining: 293ms
971: learn: 0.0311658 total: 9.8s remaining: 282ms
972: learn: 0.0311401 total: 9.81s remaining: 272ms
973: learn: 0.0311311 total: 9.82s remaining: 262ms
974: learn: 0.0311189 total: 9.83s remaining: 252ms
975: learn: 0.0311038 total: 9.84s remaining: 242ms
976: learn: 0.0310877 total: 9.85s remaining: 232ms
977: learn: 0.0310712 total: 9.86s remaining: 222ms
978: learn: 0.0310267 total: 9.87s remaining: 212ms
979: learn: 0.0309913 total: 9.88s remaining: 202ms
980: learn: 0.0309631 total: 9.89s remaining: 192ms
981: learn: 0.0309056 total: 9.9s remaining: 181ms
982: learn: 0.0308749 total: 9.91s remaining: 171ms
983: learn: 0.0308545 total: 9.92s remaining: 161ms
984: learn: 0.0308462 total: 9.93s remaining: 151ms
985: learn: 0.0308433 total: 9.94s remaining: 141ms
986: learn: 0.0308316 total: 9.95s remaining: 131ms
987: learn: 0.0308216 total: 9.96s remaining: 121ms
988: learn: 0.0308061 total: 9.97s remaining: 111ms
989: learn: 0.0307679 total: 9.98s remaining: 101ms
990: learn: 0.0307540 total: 9.99s remaining: 90.7ms
991: learn: 0.0307255 total: 9.99s remaining: 80.6ms
992: learn: 0.0306821 total: 10s remaining: 70.5ms
993: learn: 0.0306407 total: 10s remaining: 60.5ms
994: learn: 0.0306237 total: 10s remaining: 50.4ms
995: learn: 0.0306159 total: 10s remaining: 40.3ms
996: learn: 0.0305981 total: 10s remaining: 30.2ms
997: learn: 0.0305820 total: 10.1s remaining: 20.1ms
998: learn: 0.0305422 total: 10.1s remaining: 10.1ms
999: learn: 0.0305058 total: 10.1s remaining: 0us
```

In [20]:

```
# y_pred_log = model.predict_proba(X_test)[:, 1]

# y_test = [(np.exp(x)) for x in [i for i in y_test]]
```

```
# y_pred = [(np.exp(x)) for x in [i for i in y_pred_log]]
```

In [21]:

```
score = roc_auc_score(y_test, y_pred)
print(f'ROC AUC score: {score}')

# Catboost - 0.9844663430122664
# XGBoost - 0.9859398915012213
```

```
ROC AUC score: 0.9852206595006601
```

In [22]:

```
# Submission File

# model = XGBClassifier()

model.fit(X, y)

y_pred = model.predict_proba(test)[:, 1]

submission = pd.DataFrame({'id':test_ID, 'target_class':y_pred})
submission.to_csv('Submission16.csv', index=False)
```

```
Learning rate set to 0.032099
0: learn: 0.6266480 total: 10.6ms remaining: 10.6s
1: learn: 0.5632994 total: 21ms remaining: 10.5s
2: learn: 0.5079051 total: 32ms remaining: 10.6s
3: learn: 0.4609377 total: 42.3ms remaining: 10.5s
4: learn: 0.4213618 total: 52.7ms remaining: 10.5s
5: learn: 0.3831279 total: 63.4ms remaining: 10.5s
6: learn: 0.3531351 total: 74.2ms remaining: 10.5s
7: learn: 0.3241655 total: 85ms remaining: 10.5s
8: learn: 0.2982538 total: 95.7ms remaining: 10.5s
9: learn: 0.2755899 total: 106ms remaining: 10.5s
10: learn: 0.2549486 total: 117ms remaining: 10.5s
11: learn: 0.2357562 total: 129ms remaining: 10.7s
12: learn: 0.2198307 total: 140ms remaining: 10.6s
13: learn: 0.2061490 total: 151ms remaining: 10.6s
14: learn: 0.1952241 total: 161ms remaining: 10.6s
15: learn: 0.1819512 total: 172ms remaining: 10.6s
16: learn: 0.1714911 total: 183ms remaining: 10.6s
17: learn: 0.1619001 total: 193ms remaining: 10.5s
18: learn: 0.1531004 total: 207ms remaining: 10.7s
19: learn: 0.1459806 total: 218ms remaining: 10.7s
20: learn: 0.1394892 total: 229ms remaining: 10.7s
21: learn: 0.1334574 total: 239ms remaining: 10.6s
22: learn: 0.1281959 total: 250ms remaining: 10.6s
23: learn: 0.1236230 total: 260ms remaining: 10.6s
24: learn: 0.1186740 total: 271ms remaining: 10.6s
25: learn: 0.1145924 total: 282ms remaining: 10.6s
26: learn: 0.1110898 total: 292ms remaining: 10.5s
27: learn: 0.1077525 total: 305ms remaining: 10.6s
28: learn: 0.1047822 total: 315ms remaining: 10.6s
29: learn: 0.1022224 total: 327ms remaining: 10.6s
30: learn: 0.0994193 total: 337ms remaining: 10.5s
31: learn: 0.0970987 total: 348ms remaining: 10.5s
32: learn: 0.0945540 total: 358ms remaining: 10.5s
33: learn: 0.0928274 total: 369ms remaining: 10.5s
34: learn: 0.0913800 total: 379ms remaining: 10.5s
35: learn: 0.0897441 total: 390ms remaining: 10.4s
36: learn: 0.0878530 total: 400ms remaining: 10.4s
37: learn: 0.0862143 total: 414ms remaining: 10.5s
38: learn: 0.0848901 total: 425ms remaining: 10.5s
39: learn: 0.0833609 total: 435ms remaining: 10.4s
40: learn: 0.0824966 total: 445ms remaining: 10.4s
41: learn: 0.0814190 total: 456ms remaining: 10.4s
42: learn: 0.0803312 total: 466ms remaining: 10.4s
43: learn: 0.0795010 total: 477ms remaining: 10.4s
44: learn: 0.0787472 total: 487ms remaining: 10.3s
```

```
45: learn: 0.0778639 total: 498ms remaining: 10.3s
46: learn: 0.0768653 total: 508ms remaining: 10.3s
47: learn: 0.0762456 total: 518ms remaining: 10.3s
48: learn: 0.0755945 total: 532ms remaining: 10.3s
49: learn: 0.0749218 total: 542ms remaining: 10.3s
50: learn: 0.0743303 total: 553ms remaining: 10.3s
51: learn: 0.0738705 total: 563ms remaining: 10.3s
52: learn: 0.0734208 total: 574ms remaining: 10.2s
53: learn: 0.0729793 total: 584ms remaining: 10.2s
54: learn: 0.0725785 total: 594ms remaining: 10.2s
55: learn: 0.0721732 total: 613ms remaining: 10.3s
56: learn: 0.0718006 total: 626ms remaining: 10.4s
57: learn: 0.0714007 total: 639ms remaining: 10.4s
58: learn: 0.0709543 total: 649ms remaining: 10.4s
59: learn: 0.0705503 total: 659ms remaining: 10.3s
60: learn: 0.0703442 total: 670ms remaining: 10.3s
61: learn: 0.0700855 total: 680ms remaining: 10.3s
62: learn: 0.0696545 total: 690ms remaining: 10.3s
63: learn: 0.0692917 total: 700ms remaining: 10.2s
64: learn: 0.0689355 total: 710ms remaining: 10.2s
65: learn: 0.0685731 total: 720ms remaining: 10.2s
66: learn: 0.0682800 total: 731ms remaining: 10.2s
67: learn: 0.0679881 total: 741ms remaining: 10.2s
68: learn: 0.0677727 total: 751ms remaining: 10.1s
69: learn: 0.0675667 total: 763ms remaining: 10.1s
70: learn: 0.0672933 total: 774ms remaining: 10.1s
71: learn: 0.0670567 total: 784ms remaining: 10.1s
72: learn: 0.0667825 total: 794ms remaining: 10.1s
73: learn: 0.0665372 total: 803ms remaining: 10.1s
74: learn: 0.0662908 total: 813ms remaining: 10s
75: learn: 0.0661208 total: 827ms remaining: 10.1s
76: learn: 0.0659482 total: 839ms remaining: 10.1s
77: learn: 0.0657690 total: 849ms remaining: 10s
78: learn: 0.0655886 total: 860ms remaining: 10s
79: learn: 0.0654026 total: 870ms remaining: 10s
80: learn: 0.0652646 total: 881ms remaining: 10s
81: learn: 0.0650993 total: 892ms remaining: 9.98s
82: learn: 0.0649162 total: 904ms remaining: 9.99s
83: learn: 0.0646924 total: 919ms remaining: 10s
84: learn: 0.0645140 total: 932ms remaining: 10s
85: learn: 0.0643593 total: 943ms remaining: 10s
86: learn: 0.0642596 total: 953ms remaining: 10s
87: learn: 0.0640468 total: 964ms remaining: 9.99s
88: learn: 0.0639250 total: 975ms remaining: 9.98s
89: learn: 0.0636809 total: 986ms remaining: 9.97s
90: learn: 0.0635013 total: 997ms remaining: 9.96s
91: learn: 0.0633897 total: 1.01s remaining: 9.95s
92: learn: 0.0633063 total: 1.02s remaining: 9.94s
93: learn: 0.0631678 total: 1.03s remaining: 9.97s
94: learn: 0.0630530 total: 1.04s remaining: 9.96s
95: learn: 0.0629052 total: 1.06s remaining: 9.95s
96: learn: 0.0627861 total: 1.07s remaining: 9.94s
97: learn: 0.0626191 total: 1.08s remaining: 9.93s
98: learn: 0.0625032 total: 1.09s remaining: 9.91s
99: learn: 0.0623891 total: 1.1s remaining: 9.89s
100: learn: 0.0622550 total: 1.11s remaining: 9.88s
101: learn: 0.0621471 total: 1.13s remaining: 9.93s
102: learn: 0.0620126 total: 1.14s remaining: 9.91s
103: learn: 0.0619164 total: 1.15s remaining: 9.9s
104: learn: 0.0618463 total: 1.16s remaining: 9.89s
105: learn: 0.0617528 total: 1.17s remaining: 9.88s
106: learn: 0.0616795 total: 1.18s remaining: 9.86s
107: learn: 0.0615682 total: 1.19s remaining: 9.85s
108: learn: 0.0615008 total: 1.2s remaining: 9.83s
109: learn: 0.0614019 total: 1.21s remaining: 9.81s
110: learn: 0.0612413 total: 1.22s remaining: 9.79s
111: learn: 0.0611106 total: 1.24s remaining: 9.81s
112: learn: 0.0609906 total: 1.25s remaining: 9.82s
113: learn: 0.0608835 total: 1.26s remaining: 9.83s
114: learn: 0.0607790 total: 1.27s remaining: 9.81s
115: learn: 0.0607006 total: 1.28s remaining: 9.79s
116: learn: 0.0606013 total: 1.29s remaining: 9.78s
```

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117: learn: 0.0605478 total: 1.31s remaining: 9.76s
118: learn: 0.0604595 total: 1.32s remaining: 9.75s
119: learn: 0.0603974 total: 1.33s remaining: 9.73s
120: learn: 0.0602773 total: 1.34s remaining: 9.71s
121: learn: 0.0602240 total: 1.35s remaining: 9.69s
122: learn: 0.0601206 total: 1.36s remaining: 9.67s
123: learn: 0.0600578 total: 1.37s remaining: 9.66s
124: learn: 0.0599554 total: 1.38s remaining: 9.63s
125: learn: 0.0598663 total: 1.39s remaining: 9.63s
126: learn: 0.0597706 total: 1.4s remaining: 9.61s
127: learn: 0.0597030 total: 1.41s remaining: 9.59s
128: learn: 0.0596021 total: 1.42s remaining: 9.6s
129: learn: 0.0595448 total: 1.43s remaining: 9.59s
130: learn: 0.0594709 total: 1.45s remaining: 9.6s
131: learn: 0.0593710 total: 1.46s remaining: 9.58s
132: learn: 0.0592849 total: 1.47s remaining: 9.57s
133: learn: 0.0592132 total: 1.48s remaining: 9.55s
134: learn: 0.0591541 total: 1.49s remaining: 9.53s
135: learn: 0.0591035 total: 1.5s remaining: 9.51s
136: learn: 0.0589975 total: 1.51s remaining: 9.5s
137: learn: 0.0589515 total: 1.52s remaining: 9.48s
138: learn: 0.0588872 total: 1.53s remaining: 9.46s
139: learn: 0.0587941 total: 1.54s remaining: 9.45s
140: learn: 0.0587096 total: 1.55s remaining: 9.43s
141: learn: 0.0586495 total: 1.56s remaining: 9.42s
142: learn: 0.0585704 total: 1.57s remaining: 9.42s
143: learn: 0.0584841 total: 1.58s remaining: 9.4s
144: learn: 0.0584343 total: 1.59s remaining: 9.39s
145: learn: 0.0583690 total: 1.61s remaining: 9.43s
146: learn: 0.0582905 total: 1.62s remaining: 9.42s
147: learn: 0.0581896 total: 1.63s remaining: 9.4s
148: learn: 0.0581313 total: 1.64s remaining: 9.39s
149: learn: 0.0580676 total: 1.66s remaining: 9.39s
150: learn: 0.0579914 total: 1.67s remaining: 9.38s
151: learn: 0.0579366 total: 1.68s remaining: 9.36s
152: learn: 0.0578558 total: 1.69s remaining: 9.35s
153: learn: 0.0578258 total: 1.7s remaining: 9.33s
154: learn: 0.0577404 total: 1.71s remaining: 9.32s
155: learn: 0.0576784 total: 1.72s remaining: 9.3s
156: learn: 0.0575811 total: 1.73s remaining: 9.29s
157: learn: 0.0575303 total: 1.74s remaining: 9.27s
158: learn: 0.0574694 total: 1.75s remaining: 9.27s
159: learn: 0.0573999 total: 1.76s remaining: 9.25s
160: learn: 0.0573743 total: 1.77s remaining: 9.23s
161: learn: 0.0573167 total: 1.78s remaining: 9.22s
162: learn: 0.0572456 total: 1.79s remaining: 9.21s
163: learn: 0.0571726 total: 1.8s remaining: 9.19s
164: learn: 0.0571251 total: 1.81s remaining: 9.18s
165: learn: 0.0570609 total: 1.82s remaining: 9.16s
166: learn: 0.0570100 total: 1.84s remaining: 9.17s
167: learn: 0.0569629 total: 1.85s remaining: 9.15s
168: learn: 0.0568755 total: 1.86s remaining: 9.16s
169: learn: 0.0568356 total: 1.87s remaining: 9.14s
170: learn: 0.0567956 total: 1.88s remaining: 9.12s
171: learn: 0.0567571 total: 1.89s remaining: 9.11s
172: learn: 0.0567088 total: 1.9s remaining: 9.09s
173: learn: 0.0566451 total: 1.91s remaining: 9.07s
174: learn: 0.0565844 total: 1.92s remaining: 9.06s
175: learn: 0.0564925 total: 1.93s remaining: 9.04s
176: learn: 0.0564281 total: 1.94s remaining: 9.03s
177: learn: 0.0563635 total: 1.95s remaining: 9.02s
178: learn: 0.0562975 total: 1.96s remaining: 9s
179: learn: 0.0562541 total: 1.97s remaining: 8.99s
180: learn: 0.0561778 total: 2s remaining: 9.03s
181: learn: 0.0561282 total: 2.01s remaining: 9.02s
182: learn: 0.0560821 total: 2.02s remaining: 9.01s
183: learn: 0.0560437 total: 2.03s remaining: 9s
184: learn: 0.0559570 total: 2.04s remaining: 8.99s
185: learn: 0.0558812 total: 2.05s remaining: 8.98s
186: learn: 0.0558404 total: 2.06s remaining: 8.98s
187: learn: 0.0557950 total: 2.08s remaining: 8.97s
188: learn: 0.0557172 total: 2.09s remaining: 8.96s
```

```
189: learn: 0.0555864 total: 2.1s remaining: 8.95s
190: learn: 0.0555671 total: 2.11s remaining: 8.94s
191: learn: 0.0555078 total: 2.12s remaining: 8.93s
192: learn: 0.0554418 total: 2.13s remaining: 8.92s
193: learn: 0.0553708 total: 2.14s remaining: 8.91s
194: learn: 0.0553399 total: 2.15s remaining: 8.9s
195: learn: 0.0552758 total: 2.17s remaining: 8.88s
196: learn: 0.0552203 total: 2.17s remaining: 8.87s
197: learn: 0.0551502 total: 2.19s remaining: 8.86s
198: learn: 0.0551125 total: 2.2s remaining: 8.84s
199: learn: 0.0550721 total: 2.21s remaining: 8.83s
200: learn: 0.0550215 total: 2.22s remaining: 8.81s
201: learn: 0.0549761 total: 2.23s remaining: 8.8s
202: learn: 0.0549113 total: 2.24s remaining: 8.78s
203: learn: 0.0548550 total: 2.25s remaining: 8.77s
204: learn: 0.0547729 total: 2.26s remaining: 8.75s
205: learn: 0.0547088 total: 2.27s remaining: 8.76s
206: learn: 0.0546587 total: 2.28s remaining: 8.74s
207: learn: 0.0545992 total: 2.29s remaining: 8.72s
208: learn: 0.0545678 total: 2.3s remaining: 8.71s
209: learn: 0.0544944 total: 2.31s remaining: 8.7s
210: learn: 0.0544435 total: 2.33s remaining: 8.69s
211: learn: 0.0543743 total: 2.33s remaining: 8.68s
212: learn: 0.0543168 total: 2.35s remaining: 8.67s
213: learn: 0.0542723 total: 2.36s remaining: 8.66s
214: learn: 0.0542022 total: 2.37s remaining: 8.64s
215: learn: 0.0541503 total: 2.38s remaining: 8.63s
216: learn: 0.0540705 total: 2.39s remaining: 8.62s
217: learn: 0.0540011 total: 2.4s remaining: 8.6s
218: learn: 0.0539697 total: 2.41s remaining: 8.59s
219: learn: 0.0539080 total: 2.42s remaining: 8.58s
220: learn: 0.0538523 total: 2.43s remaining: 8.56s
221: learn: 0.0537791 total: 2.44s remaining: 8.55s
222: learn: 0.0537472 total: 2.45s remaining: 8.53s
223: learn: 0.0536995 total: 2.46s remaining: 8.52s
224: learn: 0.0536319 total: 2.47s remaining: 8.51s
225: learn: 0.0535966 total: 2.48s remaining: 8.5s
226: learn: 0.0535302 total: 2.49s remaining: 8.48s
227: learn: 0.0534459 total: 2.5s remaining: 8.47s
228: learn: 0.0533984 total: 2.51s remaining: 8.46s
229: learn: 0.0533338 total: 2.52s remaining: 8.45s
230: learn: 0.0532908 total: 2.53s remaining: 8.43s
231: learn: 0.0532412 total: 2.54s remaining: 8.42s
232: learn: 0.0531716 total: 2.55s remaining: 8.4s
233: learn: 0.0531367 total: 2.56s remaining: 8.39s
234: learn: 0.0530947 total: 2.57s remaining: 8.37s
235: learn: 0.0530030 total: 2.58s remaining: 8.37s
236: learn: 0.0529506 total: 2.6s remaining: 8.38s
237: learn: 0.0528536 total: 2.62s remaining: 8.38s
238: learn: 0.0527966 total: 2.63s remaining: 8.37s
239: learn: 0.0527454 total: 2.64s remaining: 8.36s
240: learn: 0.0527081 total: 2.65s remaining: 8.34s
241: learn: 0.0526200 total: 2.66s remaining: 8.33s
242: learn: 0.0525665 total: 2.67s remaining: 8.32s
243: learn: 0.0525116 total: 2.68s remaining: 8.31s
244: learn: 0.0524438 total: 2.69s remaining: 8.3s
245: learn: 0.0524122 total: 2.7s remaining: 8.29s
246: learn: 0.0523883 total: 2.71s remaining: 8.27s
247: learn: 0.0523451 total: 2.72s remaining: 8.26s
248: learn: 0.0522955 total: 2.73s remaining: 8.25s
249: learn: 0.0522196 total: 2.74s remaining: 8.23s
250: learn: 0.0521616 total: 2.75s remaining: 8.22s
251: learn: 0.0521051 total: 2.76s remaining: 8.21s
252: learn: 0.0520668 total: 2.77s remaining: 8.19s
253: learn: 0.0520256 total: 2.79s remaining: 8.18s
254: learn: 0.0519836 total: 2.79s remaining: 8.17s
255: learn: 0.0519434 total: 2.81s remaining: 8.15s
256: learn: 0.0518957 total: 2.81s remaining: 8.14s
257: learn: 0.0518503 total: 2.83s remaining: 8.13s
258: learn: 0.0517827 total: 2.83s remaining: 8.11s
259: learn: 0.0517135 total: 2.85s remaining: 8.1s
260: learn: 0.0516653 total: 2.86s remaining: 8.09s
```

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261: learn: 0.0516055 total: 2.87s remaining: 8.07s
262: learn: 0.0515612 total: 2.88s remaining: 8.06s
263: learn: 0.0515039 total: 2.89s remaining: 8.06s
264: learn: 0.0514667 total: 2.91s remaining: 8.06s
265: learn: 0.0514460 total: 2.92s remaining: 8.05s
266: learn: 0.0513791 total: 2.93s remaining: 8.04s
267: learn: 0.0513545 total: 2.94s remaining: 8.03s
268: learn: 0.0512924 total: 2.95s remaining: 8.02s
269: learn: 0.0512433 total: 2.96s remaining: 8s
270: learn: 0.0511820 total: 2.97s remaining: 7.99s
271: learn: 0.0511341 total: 2.98s remaining: 7.97s
272: learn: 0.0510945 total: 2.99s remaining: 7.96s
273: learn: 0.0510463 total: 3s remaining: 7.95s
274: learn: 0.0509952 total: 3.01s remaining: 7.94s
275: learn: 0.0509621 total: 3.02s remaining: 7.92s
276: learn: 0.0509145 total: 3.03s remaining: 7.91s
277: learn: 0.0508740 total: 3.04s remaining: 7.9s
278: learn: 0.0508433 total: 3.05s remaining: 7.89s
279: learn: 0.0508124 total: 3.06s remaining: 7.88s
280: learn: 0.0507416 total: 3.07s remaining: 7.86s
281: learn: 0.0506964 total: 3.08s remaining: 7.86s
282: learn: 0.0506713 total: 3.1s remaining: 7.85s
283: learn: 0.0506231 total: 3.11s remaining: 7.84s
284: learn: 0.0505753 total: 3.12s remaining: 7.83s
285: learn: 0.0505329 total: 3.13s remaining: 7.82s
286: learn: 0.0504648 total: 3.14s remaining: 7.8s
287: learn: 0.0504249 total: 3.15s remaining: 7.79s
288: learn: 0.0503887 total: 3.16s remaining: 7.78s
289: learn: 0.0503334 total: 3.17s remaining: 7.76s
290: learn: 0.0502546 total: 3.18s remaining: 7.75s
291: learn: 0.0502008 total: 3.19s remaining: 7.74s
292: learn: 0.0501747 total: 3.21s remaining: 7.74s
293: learn: 0.0501145 total: 3.22s remaining: 7.73s
294: learn: 0.0500460 total: 3.23s remaining: 7.72s
295: learn: 0.0499982 total: 3.24s remaining: 7.71s
296: learn: 0.0499600 total: 3.25s remaining: 7.7s
297: learn: 0.0499291 total: 3.26s remaining: 7.68s
298: learn: 0.0498968 total: 3.27s remaining: 7.67s
299: learn: 0.0498367 total: 3.28s remaining: 7.66s
300: learn: 0.0498057 total: 3.29s remaining: 7.65s
301: learn: 0.0497507 total: 3.31s remaining: 7.65s
302: learn: 0.0497233 total: 3.32s remaining: 7.63s
303: learn: 0.0496771 total: 3.33s remaining: 7.62s
304: learn: 0.0496413 total: 3.34s remaining: 7.61s
305: learn: 0.0495891 total: 3.35s remaining: 7.6s
306: learn: 0.0495316 total: 3.36s remaining: 7.58s
307: learn: 0.0494523 total: 3.37s remaining: 7.57s
308: learn: 0.0494047 total: 3.38s remaining: 7.56s
309: learn: 0.0493251 total: 3.39s remaining: 7.55s
310: learn: 0.0492909 total: 3.4s remaining: 7.54s
311: learn: 0.0492541 total: 3.41s remaining: 7.52s
312: learn: 0.0492164 total: 3.42s remaining: 7.51s
313: learn: 0.0491489 total: 3.43s remaining: 7.5s
314: learn: 0.0490986 total: 3.44s remaining: 7.49s
315: learn: 0.0490658 total: 3.45s remaining: 7.47s
316: learn: 0.0490173 total: 3.46s remaining: 7.46s
317: learn: 0.0489744 total: 3.48s remaining: 7.46s
318: learn: 0.0489480 total: 3.49s remaining: 7.44s
319: learn: 0.0488977 total: 3.51s remaining: 7.46s
320: learn: 0.0488665 total: 3.54s remaining: 7.48s
321: learn: 0.0488253 total: 3.54s remaining: 7.47s
322: learn: 0.0487970 total: 3.56s remaining: 7.45s
323: learn: 0.0487698 total: 3.57s remaining: 7.44s
324: learn: 0.0487388 total: 3.58s remaining: 7.43s
325: learn: 0.0486969 total: 3.59s remaining: 7.42s
326: learn: 0.0486500 total: 3.61s remaining: 7.42s
327: learn: 0.0486120 total: 3.62s remaining: 7.41s
328: learn: 0.0485731 total: 3.63s remaining: 7.4s
329: learn: 0.0485229 total: 3.64s remaining: 7.39s
330: learn: 0.0484791 total: 3.65s remaining: 7.37s
331: learn: 0.0484391 total: 3.66s remaining: 7.36s
332: learn: 0.0483901 total: 3.67s remaining: 7.35s
```

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333: learn: 0.0483623 total: 3.68s remaining: 7.33s
334: learn: 0.0483000 total: 3.69s remaining: 7.32s
335: learn: 0.0482672 total: 3.7s remaining: 7.31s
336: learn: 0.0482479 total: 3.71s remaining: 7.31s
337: learn: 0.0482062 total: 3.72s remaining: 7.29s
338: learn: 0.0481451 total: 3.73s remaining: 7.28s
339: learn: 0.0480975 total: 3.74s remaining: 7.27s
340: learn: 0.0480374 total: 3.75s remaining: 7.26s
341: learn: 0.0479859 total: 3.77s remaining: 7.24s
342: learn: 0.0479433 total: 3.77s remaining: 7.23s
343: learn: 0.0478930 total: 3.79s remaining: 7.22s
344: learn: 0.0478515 total: 3.8s remaining: 7.21s
345: learn: 0.0478074 total: 3.81s remaining: 7.2s
346: learn: 0.0477626 total: 3.82s remaining: 7.18s
347: learn: 0.0476864 total: 3.83s remaining: 7.17s
348: learn: 0.0476443 total: 3.84s remaining: 7.16s
349: learn: 0.0476050 total: 3.85s remaining: 7.15s
350: learn: 0.0475748 total: 3.86s remaining: 7.14s
351: learn: 0.0475495 total: 3.87s remaining: 7.13s
352: learn: 0.0475199 total: 3.88s remaining: 7.12s
353: learn: 0.0474832 total: 3.89s remaining: 7.1s
354: learn: 0.0474299 total: 3.9s remaining: 7.09s
355: learn: 0.0474055 total: 3.91s remaining: 7.08s
356: learn: 0.0473304 total: 3.93s remaining: 7.07s
357: learn: 0.0472901 total: 3.94s remaining: 7.06s
358: learn: 0.0472494 total: 3.95s remaining: 7.05s
359: learn: 0.0472073 total: 3.96s remaining: 7.04s
360: learn: 0.0471548 total: 3.97s remaining: 7.03s
361: learn: 0.0471027 total: 3.98s remaining: 7.01s
362: learn: 0.0470590 total: 3.99s remaining: 7s
363: learn: 0.0470013 total: 4s remaining: 6.99s
364: learn: 0.0469683 total: 4.01s remaining: 6.98s
365: learn: 0.0469109 total: 4.02s remaining: 6.97s
366: learn: 0.0468862 total: 4.04s remaining: 6.96s
367: learn: 0.0468631 total: 4.04s remaining: 6.95s
368: learn: 0.0467860 total: 4.06s remaining: 6.94s
369: learn: 0.0467648 total: 4.07s remaining: 6.93s
370: learn: 0.0467307 total: 4.08s remaining: 6.91s
371: learn: 0.0466911 total: 4.09s remaining: 6.9s
372: learn: 0.0466614 total: 4.1s remaining: 6.89s
373: learn: 0.0466269 total: 4.11s remaining: 6.88s
374: learn: 0.0465906 total: 4.12s remaining: 6.86s
375: learn: 0.0465558 total: 4.13s remaining: 6.86s
376: learn: 0.0464986 total: 4.14s remaining: 6.85s
377: learn: 0.0464726 total: 4.16s remaining: 6.84s
378: learn: 0.0464510 total: 4.17s remaining: 6.83s
379: learn: 0.0463934 total: 4.18s remaining: 6.82s
380: learn: 0.0463721 total: 4.19s remaining: 6.81s
381: learn: 0.0463325 total: 4.2s remaining: 6.8s
382: learn: 0.0462892 total: 4.21s remaining: 6.79s
383: learn: 0.0462358 total: 4.22s remaining: 6.77s
384: learn: 0.0461834 total: 4.23s remaining: 6.76s
385: learn: 0.0461517 total: 4.24s remaining: 6.75s
386: learn: 0.0461305 total: 4.25s remaining: 6.74s
387: learn: 0.0460972 total: 4.26s remaining: 6.73s
388: learn: 0.0460501 total: 4.28s remaining: 6.71s
389: learn: 0.0460186 total: 4.29s remaining: 6.7s
390: learn: 0.0459711 total: 4.29s remaining: 6.69s
391: learn: 0.0459438 total: 4.3s remaining: 6.68s
392: learn: 0.0459137 total: 4.32s remaining: 6.67s
393: learn: 0.0458787 total: 4.33s remaining: 6.65s
394: learn: 0.0458331 total: 4.34s remaining: 6.65s
395: learn: 0.0457692 total: 4.35s remaining: 6.63s
396: learn: 0.0457223 total: 4.36s remaining: 6.62s
397: learn: 0.0456728 total: 4.37s remaining: 6.61s
398: learn: 0.0455990 total: 4.38s remaining: 6.6s
399: learn: 0.0455689 total: 4.39s remaining: 6.59s
400: learn: 0.0455499 total: 4.4s remaining: 6.58s
401: learn: 0.0455238 total: 4.41s remaining: 6.56s
402: learn: 0.0454290 total: 4.42s remaining: 6.55s
403: learn: 0.0454028 total: 4.43s remaining: 6.54s
404: learn: 0.0453829 total: 4.44s remaining: 6.53s
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405: learn: 0.0453111 total: 4.45s remaining: 6.52s
406: learn: 0.0452883 total: 4.47s remaining: 6.51s
407: learn: 0.0452707 total: 4.48s remaining: 6.5s
408: learn: 0.0452425 total: 4.49s remaining: 6.49s
409: learn: 0.0451544 total: 4.51s remaining: 6.48s
410: learn: 0.0451231 total: 4.52s remaining: 6.47s
411: learn: 0.0450786 total: 4.53s remaining: 6.46s
412: learn: 0.0450620 total: 4.54s remaining: 6.45s
413: learn: 0.0450254 total: 4.55s remaining: 6.44s
414: learn: 0.0450019 total: 4.56s remaining: 6.43s
415: learn: 0.0449867 total: 4.57s remaining: 6.42s
416: learn: 0.0449587 total: 4.58s remaining: 6.41s
417: learn: 0.0449230 total: 4.61s remaining: 6.41s
418: learn: 0.0448617 total: 4.62s remaining: 6.4s
419: learn: 0.0448019 total: 4.63s remaining: 6.39s
420: learn: 0.0447016 total: 4.64s remaining: 6.38s
421: learn: 0.0446831 total: 4.65s remaining: 6.37s
422: learn: 0.0446061 total: 4.66s remaining: 6.35s
423: learn: 0.0445760 total: 4.67s remaining: 6.34s
424: learn: 0.0445070 total: 4.68s remaining: 6.33s
425: learn: 0.0444650 total: 4.69s remaining: 6.32s
426: learn: 0.0444450 total: 4.7s remaining: 6.31s
427: learn: 0.0443902 total: 4.71s remaining: 6.29s
428: learn: 0.0443609 total: 4.72s remaining: 6.28s
429: learn: 0.0443420 total: 4.73s remaining: 6.27s
430: learn: 0.0443266 total: 4.74s remaining: 6.26s
431: learn: 0.0442901 total: 4.75s remaining: 6.25s
432: learn: 0.0442363 total: 4.76s remaining: 6.24s
433: learn: 0.0441716 total: 4.78s remaining: 6.23s
434: learn: 0.0441096 total: 4.79s remaining: 6.22s
435: learn: 0.0440840 total: 4.8s remaining: 6.21s
436: learn: 0.0440443 total: 4.81s remaining: 6.2s
437: learn: 0.0440162 total: 4.82s remaining: 6.19s
438: learn: 0.0439987 total: 4.83s remaining: 6.17s
439: learn: 0.0439581 total: 4.84s remaining: 6.16s
440: learn: 0.0439339 total: 4.85s remaining: 6.15s
441: learn: 0.0439031 total: 4.86s remaining: 6.14s
442: learn: 0.0438796 total: 4.87s remaining: 6.13s
443: learn: 0.0438384 total: 4.88s remaining: 6.12s
444: learn: 0.0437585 total: 4.89s remaining: 6.1s
445: learn: 0.0436959 total: 4.9s remaining: 6.09s
446: learn: 0.0436724 total: 4.91s remaining: 6.08s
447: learn: 0.0436276 total: 4.92s remaining: 6.07s
448: learn: 0.0435821 total: 4.93s remaining: 6.06s
449: learn: 0.0435537 total: 4.95s remaining: 6.04s
450: learn: 0.0435388 total: 4.96s remaining: 6.03s
451: learn: 0.0434972 total: 4.97s remaining: 6.03s
452: learn: 0.0434672 total: 4.98s remaining: 6.01s
453: learn: 0.0434507 total: 4.99s remaining: 6s
454: learn: 0.0434008 total: 5s remaining: 5.99s
455: learn: 0.0433708 total: 5.01s remaining: 5.98s
456: learn: 0.0432921 total: 5.02s remaining: 5.97s
457: learn: 0.0432292 total: 5.03s remaining: 5.96s
458: learn: 0.0431998 total: 5.04s remaining: 5.94s
459: learn: 0.0431491 total: 5.05s remaining: 5.93s
460: learn: 0.0431362 total: 5.07s remaining: 5.92s
461: learn: 0.0430893 total: 5.08s remaining: 5.91s
462: learn: 0.0430273 total: 5.08s remaining: 5.9s
463: learn: 0.0430147 total: 5.09s remaining: 5.89s
464: learn: 0.0429775 total: 5.11s remaining: 5.88s
465: learn: 0.0429487 total: 5.12s remaining: 5.86s
466: learn: 0.0429126 total: 5.13s remaining: 5.85s
467: learn: 0.0428828 total: 5.14s remaining: 5.84s
468: learn: 0.0428375 total: 5.15s remaining: 5.83s
469: learn: 0.0427926 total: 5.16s remaining: 5.82s
470: learn: 0.0427623 total: 5.17s remaining: 5.81s
471: learn: 0.0427174 total: 5.18s remaining: 5.8s
472: learn: 0.0426584 total: 5.2s remaining: 5.79s
473: learn: 0.0426310 total: 5.21s remaining: 5.78s
474: learn: 0.0426149 total: 5.22s remaining: 5.76s
475: learn: 0.0425696 total: 5.23s remaining: 5.75s
476: learn: 0.0425575 total: 5.24s remaining: 5.74s
```

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477: learn: 0.0425355 total: 5.25s remaining: 5.73s
478: learn: 0.0425027 total: 5.26s remaining: 5.72s
479: learn: 0.0424769 total: 5.27s remaining: 5.71s
480: learn: 0.0424592 total: 5.28s remaining: 5.7s
481: learn: 0.0424297 total: 5.29s remaining: 5.69s
482: learn: 0.0423839 total: 5.3s remaining: 5.67s
483: learn: 0.0423599 total: 5.31s remaining: 5.66s
484: learn: 0.0423095 total: 5.32s remaining: 5.65s
485: learn: 0.0422377 total: 5.33s remaining: 5.64s
486: learn: 0.0422230 total: 5.34s remaining: 5.63s
487: learn: 0.0422017 total: 5.35s remaining: 5.62s
488: learn: 0.0421544 total: 5.36s remaining: 5.61s
489: learn: 0.0421309 total: 5.38s remaining: 5.6s
490: learn: 0.0421171 total: 5.39s remaining: 5.59s
491: learn: 0.0420997 total: 5.4s remaining: 5.57s
492: learn: 0.0420803 total: 5.41s remaining: 5.56s
493: learn: 0.0420530 total: 5.42s remaining: 5.55s
494: learn: 0.0420356 total: 5.43s remaining: 5.54s
495: learn: 0.0420147 total: 5.44s remaining: 5.53s
496: learn: 0.0419708 total: 5.45s remaining: 5.51s
497: learn: 0.0419353 total: 5.46s remaining: 5.51s
498: learn: 0.0419220 total: 5.47s remaining: 5.5s
499: learn: 0.0419092 total: 5.49s remaining: 5.49s
500: learn: 0.0418857 total: 5.5s remaining: 5.47s
501: learn: 0.0418342 total: 5.5s remaining: 5.46s
502: learn: 0.0418146 total: 5.51s remaining: 5.45s
503: learn: 0.0417904 total: 5.52s remaining: 5.44s
504: learn: 0.0417697 total: 5.53s remaining: 5.42s
505: learn: 0.0417552 total: 5.54s remaining: 5.41s
506: learn: 0.0417139 total: 5.55s remaining: 5.4s
507: learn: 0.0416622 total: 5.57s remaining: 5.39s
508: learn: 0.0415975 total: 5.58s remaining: 5.38s
509: learn: 0.0415893 total: 5.59s remaining: 5.37s
510: learn: 0.0415255 total: 5.61s remaining: 5.36s
511: learn: 0.0414781 total: 5.62s remaining: 5.35s
512: learn: 0.0414624 total: 5.63s remaining: 5.34s
513: learn: 0.0414372 total: 5.64s remaining: 5.33s
514: learn: 0.0413896 total: 5.65s remaining: 5.32s
515: learn: 0.0413409 total: 5.66s remaining: 5.31s
516: learn: 0.0413257 total: 5.67s remaining: 5.29s
517: learn: 0.0413067 total: 5.68s remaining: 5.29s
518: learn: 0.0412876 total: 5.69s remaining: 5.27s
519: learn: 0.0412743 total: 5.7s remaining: 5.26s
520: learn: 0.0412589 total: 5.71s remaining: 5.25s
521: learn: 0.0412305 total: 5.72s remaining: 5.24s
522: learn: 0.0412097 total: 5.73s remaining: 5.23s
523: learn: 0.0411915 total: 5.74s remaining: 5.21s
524: learn: 0.0411701 total: 5.75s remaining: 5.2s
525: learn: 0.0411239 total: 5.76s remaining: 5.19s
526: learn: 0.0411055 total: 5.77s remaining: 5.18s
527: learn: 0.0410905 total: 5.79s remaining: 5.17s
528: learn: 0.0410352 total: 5.8s remaining: 5.17s
529: learn: 0.0410047 total: 5.81s remaining: 5.15s
530: learn: 0.0409489 total: 5.82s remaining: 5.14s
531: learn: 0.0409239 total: 5.83s remaining: 5.13s
532: learn: 0.0409069 total: 5.84s remaining: 5.12s
533: learn: 0.0408760 total: 5.86s remaining: 5.11s
534: learn: 0.0408517 total: 5.87s remaining: 5.1s
535: learn: 0.0408099 total: 5.88s remaining: 5.09s
536: learn: 0.0407861 total: 5.89s remaining: 5.08s
537: learn: 0.0407419 total: 5.9s remaining: 5.07s
538: learn: 0.0406966 total: 5.91s remaining: 5.05s
539: learn: 0.0406836 total: 5.92s remaining: 5.04s
540: learn: 0.0406697 total: 5.93s remaining: 5.03s
541: learn: 0.0406571 total: 5.94s remaining: 5.02s
542: learn: 0.0406232 total: 5.95s remaining: 5.01s
543: learn: 0.0406133 total: 5.96s remaining: 4.99s
544: learn: 0.0405811 total: 5.97s remaining: 4.98s
545: learn: 0.0405170 total: 5.98s remaining: 4.97s
546: learn: 0.0404971 total: 5.99s remaining: 4.96s
547: learn: 0.0404835 total: 6s remaining: 4.95s
548: learn: 0.0404676 total: 6.01s remaining: 4.94s
```

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549: learn: 0.0404531 total: 6.02s remaining: 4.93s
550: learn: 0.0404359 total: 6.03s remaining: 4.92s
551: learn: 0.0404099 total: 6.04s remaining: 4.91s
552: learn: 0.0403946 total: 6.05s remaining: 4.89s
553: learn: 0.0403726 total: 6.06s remaining: 4.88s
554: learn: 0.0403345 total: 6.07s remaining: 4.87s
555: learn: 0.0403239 total: 6.08s remaining: 4.86s
556: learn: 0.0403080 total: 6.09s remaining: 4.85s
557: learn: 0.0402475 total: 6.11s remaining: 4.84s
558: learn: 0.0402120 total: 6.12s remaining: 4.83s
559: learn: 0.0401914 total: 6.13s remaining: 4.82s
560: learn: 0.0401317 total: 6.14s remaining: 4.81s
561: learn: 0.0400756 total: 6.15s remaining: 4.8s
562: learn: 0.0400636 total: 6.16s remaining: 4.79s
563: learn: 0.0400396 total: 6.17s remaining: 4.77s
564: learn: 0.0400084 total: 6.19s remaining: 4.76s
565: learn: 0.0399650 total: 6.2s remaining: 4.75s
566: learn: 0.0399038 total: 6.21s remaining: 4.74s
567: learn: 0.0398677 total: 6.22s remaining: 4.73s
568: learn: 0.0398531 total: 6.23s remaining: 4.72s
569: learn: 0.0398273 total: 6.24s remaining: 4.71s
570: learn: 0.0398027 total: 6.25s remaining: 4.7s
571: learn: 0.0397682 total: 6.26s remaining: 4.69s
572: learn: 0.0397561 total: 6.27s remaining: 4.67s
573: learn: 0.0397437 total: 6.28s remaining: 4.66s
574: learn: 0.0397266 total: 6.29s remaining: 4.65s
575: learn: 0.0397148 total: 6.3s remaining: 4.64s
576: learn: 0.0396836 total: 6.31s remaining: 4.63s
577: learn: 0.0396579 total: 6.33s remaining: 4.62s
578: learn: 0.0396443 total: 6.33s remaining: 4.61s
579: learn: 0.0396190 total: 6.34s remaining: 4.59s
580: learn: 0.0395714 total: 6.36s remaining: 4.58s
581: learn: 0.0395547 total: 6.37s remaining: 4.57s
582: learn: 0.0394936 total: 6.38s remaining: 4.56s
583: learn: 0.0394521 total: 6.39s remaining: 4.55s
584: learn: 0.0394153 total: 6.4s remaining: 4.54s
585: learn: 0.0393570 total: 6.41s remaining: 4.53s
586: learn: 0.0393409 total: 6.42s remaining: 4.52s
587: learn: 0.0392833 total: 6.43s remaining: 4.51s
588: learn: 0.0392583 total: 6.45s remaining: 4.5s
589: learn: 0.0392165 total: 6.46s remaining: 4.49s
590: learn: 0.0391710 total: 6.47s remaining: 4.48s
591: learn: 0.0391413 total: 6.48s remaining: 4.46s
592: learn: 0.0391210 total: 6.49s remaining: 4.45s
593: learn: 0.0391057 total: 6.5s remaining: 4.44s
594: learn: 0.0390927 total: 6.51s remaining: 4.43s
595: learn: 0.0390821 total: 6.52s remaining: 4.42s
596: learn: 0.0390658 total: 6.53s remaining: 4.41s
597: learn: 0.0390092 total: 6.54s remaining: 4.4s
598: learn: 0.0389967 total: 6.55s remaining: 4.38s
599: learn: 0.0389572 total: 6.56s remaining: 4.37s
600: learn: 0.0389365 total: 6.57s remaining: 4.36s
601: learn: 0.0389029 total: 6.58s remaining: 4.35s
602: learn: 0.0388808 total: 6.59s remaining: 4.34s
603: learn: 0.0388506 total: 6.61s remaining: 4.33s
604: learn: 0.0388237 total: 6.62s remaining: 4.32s
605: learn: 0.0387983 total: 6.63s remaining: 4.31s
606: learn: 0.0387698 total: 6.64s remaining: 4.3s
607: learn: 0.0387477 total: 6.65s remaining: 4.29s
608: learn: 0.0387132 total: 6.67s remaining: 4.28s
609: learn: 0.0386962 total: 6.68s remaining: 4.27s
610: learn: 0.0386863 total: 6.69s remaining: 4.26s
611: learn: 0.0386534 total: 6.7s remaining: 4.25s
612: learn: 0.0385832 total: 6.71s remaining: 4.24s
613: learn: 0.0385452 total: 6.72s remaining: 4.22s
614: learn: 0.0385244 total: 6.73s remaining: 4.21s
615: learn: 0.0384709 total: 6.74s remaining: 4.2s
616: learn: 0.0384402 total: 6.75s remaining: 4.19s
617: learn: 0.0384090 total: 6.77s remaining: 4.18s
618: learn: 0.0383982 total: 6.78s remaining: 4.17s
619: learn: 0.0383921 total: 6.79s remaining: 4.16s
620: learn: 0.0383745 total: 6.8s remaining: 4.15s
```

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621: learn: 0.0383468 total: 6.81s remaining: 4.14s
622: learn: 0.0383367 total: 6.82s remaining: 4.13s
623: learn: 0.0383283 total: 6.83s remaining: 4.12s
624: learn: 0.0382868 total: 6.84s remaining: 4.11s
625: learn: 0.0382519 total: 6.86s remaining: 4.1s
626: learn: 0.0382255 total: 6.87s remaining: 4.08s
627: learn: 0.0381886 total: 6.88s remaining: 4.07s
628: learn: 0.0381706 total: 6.89s remaining: 4.06s
629: learn: 0.0381603 total: 6.9s remaining: 4.05s
630: learn: 0.0381289 total: 6.91s remaining: 4.04s
631: learn: 0.0380960 total: 6.92s remaining: 4.03s
632: learn: 0.0380859 total: 6.93s remaining: 4.02s
633: learn: 0.0380680 total: 6.94s remaining: 4.01s
634: learn: 0.0380011 total: 6.95s remaining: 4s
635: learn: 0.0379791 total: 6.96s remaining: 3.98s
636: learn: 0.0379283 total: 6.97s remaining: 3.97s
637: learn: 0.0379131 total: 6.98s remaining: 3.96s
638: learn: 0.0378882 total: 6.99s remaining: 3.95s
639: learn: 0.0378521 total: 7s remaining: 3.94s
640: learn: 0.0378285 total: 7.01s remaining: 3.93s
641: learn: 0.0377950 total: 7.02s remaining: 3.92s
642: learn: 0.0377769 total: 7.03s remaining: 3.9s
643: learn: 0.0377502 total: 7.05s remaining: 3.9s
644: learn: 0.0377336 total: 7.06s remaining: 3.88s
645: learn: 0.0377102 total: 7.07s remaining: 3.87s
646: learn: 0.0376512 total: 7.08s remaining: 3.86s
647: learn: 0.0376348 total: 7.09s remaining: 3.85s
648: learn: 0.0375806 total: 7.1s remaining: 3.84s
649: learn: 0.0375521 total: 7.11s remaining: 3.83s
650: learn: 0.0375205 total: 7.12s remaining: 3.82s
651: learn: 0.0374813 total: 7.13s remaining: 3.81s
652: learn: 0.0374519 total: 7.14s remaining: 3.8s
653: learn: 0.0374315 total: 7.15s remaining: 3.78s
654: learn: 0.0374113 total: 7.16s remaining: 3.77s
655: learn: 0.0373810 total: 7.17s remaining: 3.76s
656: learn: 0.0373568 total: 7.18s remaining: 3.75s
657: learn: 0.0373156 total: 7.19s remaining: 3.74s
658: learn: 0.0373012 total: 7.2s remaining: 3.73s
659: learn: 0.0372751 total: 7.21s remaining: 3.72s
660: learn: 0.0372677 total: 7.22s remaining: 3.71s
661: learn: 0.0372369 total: 7.23s remaining: 3.69s
662: learn: 0.0372212 total: 7.24s remaining: 3.68s
663: learn: 0.0371956 total: 7.26s remaining: 3.67s
664: learn: 0.0371575 total: 7.27s remaining: 3.66s
665: learn: 0.0371113 total: 7.28s remaining: 3.65s
666: learn: 0.0370899 total: 7.29s remaining: 3.64s
667: learn: 0.0370814 total: 7.3s remaining: 3.63s
668: learn: 0.0370535 total: 7.31s remaining: 3.62s
669: learn: 0.0370269 total: 7.32s remaining: 3.6s
670: learn: 0.0369968 total: 7.33s remaining: 3.59s
671: learn: 0.0369591 total: 7.34s remaining: 3.58s
672: learn: 0.0369445 total: 7.35s remaining: 3.57s
673: learn: 0.0368799 total: 7.37s remaining: 3.56s
674: learn: 0.0368480 total: 7.39s remaining: 3.56s
675: learn: 0.0368238 total: 7.4s remaining: 3.54s
676: learn: 0.0368158 total: 7.41s remaining: 3.53s
677: learn: 0.0368045 total: 7.42s remaining: 3.52s
678: learn: 0.0367549 total: 7.43s remaining: 3.51s
679: learn: 0.0367161 total: 7.44s remaining: 3.5s
680: learn: 0.0366945 total: 7.45s remaining: 3.49s
681: learn: 0.0366476 total: 7.47s remaining: 3.48s
682: learn: 0.0366122 total: 7.48s remaining: 3.47s
683: learn: 0.0365889 total: 7.49s remaining: 3.46s
684: learn: 0.0365742 total: 7.5s remaining: 3.45s
685: learn: 0.0365479 total: 7.51s remaining: 3.44s
686: learn: 0.0365253 total: 7.52s remaining: 3.43s
687: learn: 0.0364792 total: 7.53s remaining: 3.42s
688: learn: 0.0364133 total: 7.54s remaining: 3.4s
689: learn: 0.0363788 total: 7.55s remaining: 3.39s
690: learn: 0.0363669 total: 7.56s remaining: 3.38s
691: learn: 0.0363535 total: 7.57s remaining: 3.37s
692: learn: 0.0363290 total: 7.58s remaining: 3.36s
```

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693: learn: 0.0363148 total: 7.6s remaining: 3.35s
694: learn: 0.0362878 total: 7.61s remaining: 3.34s
695: learn: 0.0362530 total: 7.62s remaining: 3.33s
696: learn: 0.0362322 total: 7.63s remaining: 3.32s
697: learn: 0.0362168 total: 7.64s remaining: 3.31s
698: learn: 0.0362022 total: 7.65s remaining: 3.3s
699: learn: 0.0361940 total: 7.67s remaining: 3.29s
700: learn: 0.0361838 total: 7.68s remaining: 3.27s
701: learn: 0.0361530 total: 7.69s remaining: 3.26s
702: learn: 0.0361298 total: 7.7s remaining: 3.25s
703: learn: 0.0361055 total: 7.71s remaining: 3.24s
704: learn: 0.0360829 total: 7.72s remaining: 3.23s
705: learn: 0.0360704 total: 7.73s remaining: 3.22s
706: learn: 0.0360607 total: 7.74s remaining: 3.21s
707: learn: 0.0360548 total: 7.75s remaining: 3.2s
708: learn: 0.0360315 total: 7.76s remaining: 3.19s
709: learn: 0.0360093 total: 7.78s remaining: 3.18s
710: learn: 0.0359877 total: 7.79s remaining: 3.17s
711: learn: 0.0359682 total: 7.8s remaining: 3.15s
712: learn: 0.0359566 total: 7.81s remaining: 3.14s
713: learn: 0.0359325 total: 7.82s remaining: 3.13s
714: learn: 0.0359254 total: 7.83s remaining: 3.12s
715: learn: 0.0358941 total: 7.84s remaining: 3.11s
716: learn: 0.0358884 total: 7.85s remaining: 3.1s
717: learn: 0.0358671 total: 7.86s remaining: 3.09s
718: learn: 0.0358438 total: 7.87s remaining: 3.08s
719: learn: 0.0358181 total: 7.88s remaining: 3.06s
720: learn: 0.0358055 total: 7.89s remaining: 3.05s
721: learn: 0.0357968 total: 7.9s remaining: 3.04s
722: learn: 0.0357645 total: 7.91s remaining: 3.03s
723: learn: 0.0357343 total: 7.92s remaining: 3.02s
724: learn: 0.0357028 total: 7.93s remaining: 3.01s
725: learn: 0.0356891 total: 7.94s remaining: 3s
726: learn: 0.0356634 total: 7.95s remaining: 2.98s
727: learn: 0.0356460 total: 7.96s remaining: 2.97s
728: learn: 0.0356161 total: 7.97s remaining: 2.96s
729: learn: 0.0356067 total: 7.98s remaining: 2.95s
730: learn: 0.0355786 total: 7.99s remaining: 2.94s
731: learn: 0.0355647 total: 8s remaining: 2.93s
732: learn: 0.0355467 total: 8.01s remaining: 2.92s
733: learn: 0.0355339 total: 8.02s remaining: 2.91s
734: learn: 0.0355022 total: 8.03s remaining: 2.9s
735: learn: 0.0354949 total: 8.04s remaining: 2.88s
736: learn: 0.0354590 total: 8.05s remaining: 2.87s
737: learn: 0.0354383 total: 8.06s remaining: 2.86s
738: learn: 0.0354181 total: 8.07s remaining: 2.85s
739: learn: 0.0354096 total: 8.08s remaining: 2.84s
740: learn: 0.0353741 total: 8.1s remaining: 2.83s
741: learn: 0.0353608 total: 8.11s remaining: 2.82s
742: learn: 0.0353403 total: 8.12s remaining: 2.81s
743: learn: 0.0353320 total: 8.13s remaining: 2.8s
744: learn: 0.0353032 total: 8.14s remaining: 2.79s
745: learn: 0.0352837 total: 8.15s remaining: 2.77s
746: learn: 0.0352703 total: 8.16s remaining: 2.76s
747: learn: 0.0352609 total: 8.17s remaining: 2.75s
748: learn: 0.0352393 total: 8.18s remaining: 2.74s
749: learn: 0.0352112 total: 8.19s remaining: 2.73s
750: learn: 0.0352015 total: 8.2s remaining: 2.72s
751: learn: 0.0351742 total: 8.21s remaining: 2.71s
752: learn: 0.0351268 total: 8.22s remaining: 2.7s
753: learn: 0.0351072 total: 8.23s remaining: 2.69s
754: learn: 0.0350819 total: 8.24s remaining: 2.67s
755: learn: 0.0350738 total: 8.26s remaining: 2.66s
756: learn: 0.0350499 total: 8.27s remaining: 2.65s
757: learn: 0.0350083 total: 8.28s remaining: 2.64s
758: learn: 0.0349817 total: 8.29s remaining: 2.63s
759: learn: 0.0349688 total: 8.3s remaining: 2.62s
760: learn: 0.0349453 total: 8.31s remaining: 2.61s
761: learn: 0.0349338 total: 8.32s remaining: 2.6s
762: learn: 0.0349210 total: 8.33s remaining: 2.59s
763: learn: 0.0349140 total: 8.34s remaining: 2.58s
764: learn: 0.0349014 total: 8.35s remaining: 2.56s
```

```
765: learn: 0.0348827 total: 8.36s remaining: 2.55s
766: learn: 0.0348764 total: 8.37s remaining: 2.54s
767: learn: 0.0348584 total: 8.38s remaining: 2.53s
768: learn: 0.0348350 total: 8.39s remaining: 2.52s
769: learn: 0.0348060 total: 8.4s remaining: 2.51s
770: learn: 0.0347834 total: 8.41s remaining: 2.5s
771: learn: 0.0347766 total: 8.42s remaining: 2.49s
772: learn: 0.0347568 total: 8.44s remaining: 2.48s
773: learn: 0.0347477 total: 8.44s remaining: 2.46s
774: learn: 0.0347213 total: 8.46s remaining: 2.45s
775: learn: 0.0346985 total: 8.46s remaining: 2.44s
776: learn: 0.0346915 total: 8.47s remaining: 2.43s
777: learn: 0.0346724 total: 8.48s remaining: 2.42s
778: learn: 0.0346613 total: 8.5s remaining: 2.41s
779: learn: 0.0346168 total: 8.51s remaining: 2.4s
780: learn: 0.0345753 total: 8.52s remaining: 2.39s
781: learn: 0.0345465 total: 8.53s remaining: 2.38s
782: learn: 0.0345262 total: 8.54s remaining: 2.37s
783: learn: 0.0345019 total: 8.55s remaining: 2.36s
784: learn: 0.0344887 total: 8.56s remaining: 2.34s
785: learn: 0.0344766 total: 8.57s remaining: 2.33s
786: learn: 0.0344376 total: 8.58s remaining: 2.32s
787: learn: 0.0344149 total: 8.6s remaining: 2.31s
788: learn: 0.0344085 total: 8.61s remaining: 2.3s
789: learn: 0.0343776 total: 8.62s remaining: 2.29s
790: learn: 0.0343699 total: 8.63s remaining: 2.28s
791: learn: 0.0343467 total: 8.64s remaining: 2.27s
792: learn: 0.0343401 total: 8.65s remaining: 2.26s
793: learn: 0.0343154 total: 8.66s remaining: 2.25s
794: learn: 0.0342913 total: 8.67s remaining: 2.24s
795: learn: 0.0342851 total: 8.68s remaining: 2.23s
796: learn: 0.0342764 total: 8.69s remaining: 2.21s
797: learn: 0.0342607 total: 8.71s remaining: 2.2s
798: learn: 0.0342320 total: 8.72s remaining: 2.19s
799: learn: 0.0341902 total: 8.73s remaining: 2.18s
800: learn: 0.0341443 total: 8.74s remaining: 2.17s
801: learn: 0.0341112 total: 8.76s remaining: 2.16s
802: learn: 0.0340579 total: 8.77s remaining: 2.15s
803: learn: 0.0340371 total: 8.78s remaining: 2.14s
804: learn: 0.0340180 total: 8.79s remaining: 2.13s
805: learn: 0.0339930 total: 8.8s remaining: 2.12s
806: learn: 0.0339683 total: 8.81s remaining: 2.11s
807: learn: 0.0339558 total: 8.82s remaining: 2.1s
808: learn: 0.0339443 total: 8.83s remaining: 2.08s
809: learn: 0.0339247 total: 8.84s remaining: 2.07s
810: learn: 0.0338958 total: 8.85s remaining: 2.06s
811: learn: 0.0338885 total: 8.86s remaining: 2.05s
812: learn: 0.0338669 total: 8.87s remaining: 2.04s
813: learn: 0.0338289 total: 8.88s remaining: 2.03s
814: learn: 0.0337809 total: 8.89s remaining: 2.02s
815: learn: 0.0337631 total: 8.9s remaining: 2.01s
816: learn: 0.0337570 total: 8.91s remaining: 2s
817: learn: 0.0337470 total: 8.92s remaining: 1.99s
818: learn: 0.0337049 total: 8.94s remaining: 1.97s
819: learn: 0.0336939 total: 8.95s remaining: 1.96s
820: learn: 0.0336714 total: 8.96s remaining: 1.95s
821: learn: 0.0336592 total: 8.97s remaining: 1.94s
822: learn: 0.0336374 total: 8.98s remaining: 1.93s
823: learn: 0.0336031 total: 8.99s remaining: 1.92s
824: learn: 0.0335769 total: 9s remaining: 1.91s
825: learn: 0.0335591 total: 9.01s remaining: 1.9s
826: learn: 0.0335416 total: 9.02s remaining: 1.89s
827: learn: 0.0335149 total: 9.03s remaining: 1.88s
828: learn: 0.0334950 total: 9.04s remaining: 1.86s
829: learn: 0.0334697 total: 9.05s remaining: 1.85s
830: learn: 0.0334305 total: 9.06s remaining: 1.84s
831: learn: 0.0334038 total: 9.07s remaining: 1.83s
832: learn: 0.0333839 total: 9.09s remaining: 1.82s
833: learn: 0.0333769 total: 9.1s remaining: 1.81s
834: learn: 0.0333690 total: 9.11s remaining: 1.8s
835: learn: 0.0333191 total: 9.12s remaining: 1.79s
836: learn: 0.0332951 total: 9.14s remaining: 1.78s
```

```
837: learn: 0.0332847 total: 9.15s remaining: 1.77s
838: learn: 0.0332629 total: 9.16s remaining: 1.76s
839: learn: 0.0332338 total: 9.17s remaining: 1.75s
840: learn: 0.0332193 total: 9.18s remaining: 1.74s
841: learn: 0.0331824 total: 9.19s remaining: 1.72s
842: learn: 0.0331642 total: 9.2s remaining: 1.71s
843: learn: 0.0331363 total: 9.21s remaining: 1.7s
844: learn: 0.0330864 total: 9.22s remaining: 1.69s
845: learn: 0.0330514 total: 9.23s remaining: 1.68s
846: learn: 0.0330285 total: 9.24s remaining: 1.67s
847: learn: 0.0330067 total: 9.25s remaining: 1.66s
848: learn: 0.0329799 total: 9.26s remaining: 1.65s
849: learn: 0.0329542 total: 9.27s remaining: 1.64s
850: learn: 0.0329282 total: 9.28s remaining: 1.63s
851: learn: 0.0328852 total: 9.29s remaining: 1.61s
852: learn: 0.0328689 total: 9.3s remaining: 1.6s
853: learn: 0.0328583 total: 9.31s remaining: 1.59s
854: learn: 0.0328358 total: 9.32s remaining: 1.58s
855: learn: 0.0328214 total: 9.34s remaining: 1.57s
856: learn: 0.0327992 total: 9.35s remaining: 1.56s
857: learn: 0.0327937 total: 9.36s remaining: 1.55s
858: learn: 0.0327596 total: 9.37s remaining: 1.54s
859: learn: 0.0327428 total: 9.38s remaining: 1.53s
860: learn: 0.0326908 total: 9.39s remaining: 1.51s
861: learn: 0.0326554 total: 9.4s remaining: 1.5s
862: learn: 0.0326500 total: 9.41s remaining: 1.49s
863: learn: 0.0326392 total: 9.42s remaining: 1.48s
864: learn: 0.0326297 total: 9.43s remaining: 1.47s
865: learn: 0.0325878 total: 9.45s remaining: 1.46s
866: learn: 0.0325667 total: 9.46s remaining: 1.45s
867: learn: 0.0325461 total: 9.47s remaining: 1.44s
868: learn: 0.0325359 total: 9.48s remaining: 1.43s
869: learn: 0.0325169 total: 9.49s remaining: 1.42s
870: learn: 0.0324432 total: 9.5s remaining: 1.41s
871: learn: 0.0324097 total: 9.51s remaining: 1.4s
872: learn: 0.0324002 total: 9.52s remaining: 1.38s
873: learn: 0.0323950 total: 9.53s remaining: 1.37s
874: learn: 0.0323751 total: 9.54s remaining: 1.36s
875: learn: 0.0323567 total: 9.56s remaining: 1.35s
876: learn: 0.0323411 total: 9.57s remaining: 1.34s
877: learn: 0.0323278 total: 9.58s remaining: 1.33s
878: learn: 0.0323065 total: 9.6s remaining: 1.32s
879: learn: 0.0322923 total: 9.61s remaining: 1.31s
880: learn: 0.0322820 total: 9.62s remaining: 1.3s
881: learn: 0.0322599 total: 9.63s remaining: 1.29s
882: learn: 0.0322549 total: 9.64s remaining: 1.28s
883: learn: 0.0322357 total: 9.65s remaining: 1.27s
884: learn: 0.0322258 total: 9.66s remaining: 1.25s
885: learn: 0.0322027 total: 9.67s remaining: 1.24s
886: learn: 0.0321920 total: 9.68s remaining: 1.23s
887: learn: 0.0321849 total: 9.69s remaining: 1.22s
888: learn: 0.0321553 total: 9.7s remaining: 1.21s
889: learn: 0.0321344 total: 9.71s remaining: 1.2s
890: learn: 0.0321244 total: 9.72s remaining: 1.19s
891: learn: 0.0321041 total: 9.73s remaining: 1.18s
892: learn: 0.0320594 total: 9.74s remaining: 1.17s
893: learn: 0.0320423 total: 9.76s remaining: 1.16s
894: learn: 0.0320374 total: 9.77s remaining: 1.15s
895: learn: 0.0320220 total: 9.78s remaining: 1.14s
896: learn: 0.0319825 total: 9.79s remaining: 1.12s
897: learn: 0.0319133 total: 9.8s remaining: 1.11s
898: learn: 0.0318646 total: 9.81s remaining: 1.1s
899: learn: 0.0318471 total: 9.82s remaining: 1.09s
900: learn: 0.0318330 total: 9.84s remaining: 1.08s
901: learn: 0.0318081 total: 9.85s remaining: 1.07s
902: learn: 0.0317953 total: 9.86s remaining: 1.06s
903: learn: 0.0317796 total: 9.87s remaining: 1.05s
904: learn: 0.0317581 total: 9.88s remaining: 1.04s
905: learn: 0.0317455 total: 9.89s remaining: 1.02s
906: learn: 0.0317076 total: 9.9s remaining: 1.01s
907: learn: 0.0316860 total: 9.91s remaining: 1s
908: learn: 0.0316664 total: 9.92s remaining: 993ms
```

```
909: learn: 0.0316465 total: 9.93s remaining: 982ms
910: learn: 0.0316216 total: 9.94s remaining: 971ms
911: learn: 0.0316005 total: 9.95s remaining: 961ms
912: learn: 0.0315769 total: 9.96s remaining: 950ms
913: learn: 0.0315569 total: 9.98s remaining: 939ms
914: learn: 0.0315212 total: 9.99s remaining: 928ms
915: learn: 0.0314938 total: 10s remaining: 917ms
916: learn: 0.0314747 total: 10s remaining: 906ms
917: learn: 0.0314563 total: 10s remaining: 895ms
918: learn: 0.0314368 total: 10s remaining: 884ms
919: learn: 0.0313900 total: 10s remaining: 873ms
920: learn: 0.0313641 total: 10s remaining: 862ms
921: learn: 0.0313526 total: 10.1s remaining: 851ms
922: learn: 0.0313380 total: 10.1s remaining: 840ms
923: learn: 0.0312986 total: 10.1s remaining: 830ms
924: learn: 0.0312899 total: 10.1s remaining: 819ms
925: learn: 0.0312842 total: 10.1s remaining: 808ms
926: learn: 0.0312591 total: 10.1s remaining: 797ms
927: learn: 0.0312399 total: 10.1s remaining: 786ms
928: learn: 0.0312261 total: 10.1s remaining: 775ms
929: learn: 0.0312177 total: 10.1s remaining: 764ms
930: learn: 0.0311997 total: 10.2s remaining: 753ms
931: learn: 0.0311929 total: 10.2s remaining: 742ms
932: learn: 0.0311823 total: 10.2s remaining: 731ms
933: learn: 0.0311629 total: 10.2s remaining: 720ms
934: learn: 0.0311482 total: 10.2s remaining: 709ms
935: learn: 0.0311398 total: 10.2s remaining: 699ms
936: learn: 0.0311204 total: 10.2s remaining: 688ms
937: learn: 0.0310999 total: 10.2s remaining: 677ms
938: learn: 0.0310761 total: 10.2s remaining: 666ms
939: learn: 0.0310566 total: 10.3s remaining: 655ms
940: learn: 0.0310393 total: 10.3s remaining: 644ms
941: learn: 0.0310097 total: 10.3s remaining: 633ms
942: learn: 0.0310016 total: 10.3s remaining: 622ms
943: learn: 0.0309949 total: 10.3s remaining: 611ms
944: learn: 0.0309860 total: 10.3s remaining: 600ms
945: learn: 0.0309725 total: 10.3s remaining: 589ms
946: learn: 0.0309609 total: 10.3s remaining: 578ms
947: learn: 0.0309257 total: 10.3s remaining: 567ms
948: learn: 0.0309196 total: 10.4s remaining: 556ms
949: learn: 0.0308991 total: 10.4s remaining: 546ms
950: learn: 0.0308844 total: 10.4s remaining: 535ms
951: learn: 0.0308521 total: 10.4s remaining: 524ms
952: learn: 0.0308244 total: 10.4s remaining: 513ms
953: learn: 0.0308151 total: 10.4s remaining: 502ms
954: learn: 0.0308095 total: 10.4s remaining: 491ms
955: learn: 0.0307950 total: 10.4s remaining: 480ms
956: learn: 0.0307810 total: 10.4s remaining: 469ms
957: learn: 0.0307753 total: 10.5s remaining: 458ms
958: learn: 0.0307615 total: 10.5s remaining: 447ms
959: learn: 0.0307538 total: 10.5s remaining: 436ms
960: learn: 0.0307487 total: 10.5s remaining: 426ms
961: learn: 0.0307344 total: 10.5s remaining: 415ms
962: learn: 0.0307114 total: 10.5s remaining: 404ms
963: learn: 0.0306748 total: 10.5s remaining: 393ms
964: learn: 0.0306576 total: 10.5s remaining: 382ms
965: learn: 0.0306379 total: 10.5s remaining: 371ms
966: learn: 0.0306305 total: 10.5s remaining: 360ms
967: learn: 0.0306274 total: 10.6s remaining: 349ms
968: learn: 0.0306233 total: 10.6s remaining: 338ms
969: learn: 0.0306060 total: 10.6s remaining: 327ms
970: learn: 0.0305998 total: 10.6s remaining: 317ms
971: learn: 0.0305860 total: 10.6s remaining: 306ms
972: learn: 0.0305794 total: 10.6s remaining: 295ms
973: learn: 0.0305557 total: 10.6s remaining: 284ms
974: learn: 0.0305317 total: 10.6s remaining: 273ms
975: learn: 0.0305227 total: 10.7s remaining: 262ms
976: learn: 0.0305061 total: 10.7s remaining: 251ms
977: learn: 0.0304980 total: 10.7s remaining: 240ms
978: learn: 0.0304913 total: 10.7s remaining: 229ms
979: learn: 0.0304719 total: 10.7s remaining: 218ms
980: learn: 0.0304651 total: 10.7s remaining: 207ms
```

```
981: learn: 0.0304540 total: 10.7s remaining: 196ms
982: learn: 0.0304364 total: 10.7s remaining: 186ms
983: learn: 0.0304256 total: 10.7s remaining: 175ms
984: learn: 0.0303951 total: 10.8s remaining: 164ms
985: learn: 0.0303714 total: 10.8s remaining: 153ms
986: learn: 0.0303575 total: 10.8s remaining: 142ms
987: learn: 0.0303237 total: 10.8s remaining: 131ms
988: learn: 0.0303142 total: 10.8s remaining: 120ms
989: learn: 0.0302671 total: 10.8s remaining: 109ms
990: learn: 0.0302526 total: 10.8s remaining: 98.3ms
991: learn: 0.0302462 total: 10.8s remaining: 87.4ms
992: learn: 0.0302354 total: 10.8s remaining: 76.5ms
993: learn: 0.0302012 total: 10.9s remaining: 65.5ms
994: learn: 0.0301595 total: 10.9s remaining: 54.6ms
995: learn: 0.0301417 total: 10.9s remaining: 43.7ms
996: learn: 0.0301177 total: 10.9s remaining: 32.8ms
997: learn: 0.0301116 total: 10.9s remaining: 21.8ms
998: learn: 0.0300906 total: 10.9s remaining: 10.9ms
999: learn: 0.0300838 total: 10.9s remaining: 0us
```

In [ ]:

```
# Ensemble

read_1 = pd.read_csv('Submission16.csv')

read_2 = pd.read_csv('Submission17.csv')

new = (0.75 * read_1['target_class']) + (0.25 * read_2['target_class'])

file_out = pd.DataFrame({'id': read_2['id'], 'target_class':new})

file_out.to_csv('Submission18.csv', index=False)
```

In [ ]:

```
# # Submission File

# model = CatBoostClassifier()

# model.fit(X, y)

# y_pred_log = model.predict_proba(test)[:, 1]

# y_test = [(np.exp(x)) for x in [i for i in y_test]]

# y_pred = [(np.exp(x)) for x in [i for i in y_pred_log]]

# submission = pd.DataFrame({'id':test_ID, 'target_class':y_pred})
# submission.to_csv('Submission2.csv', index=False)
```

In [ ]:

```
submission.shape
```

Out[ ]:

```
(3580, 2)
```