Data Cleaning-Colab1

link to colab https://colab.research.google.com/drive/1gqyuClic-wTC2KnmkEdAQ7rURqj6ztHv

Presentation

The purpose of this notebook, is to get an overview of the data, and to make it ready and usable for true exploration and data manipulation. To do so, it will be a mix of studying the data, and cleaning it. As a rule, columns with almost no actual values, will be removed (full of NaN). Also, some lines of code, have been rendered inactive using the # sign. this is meerely done, so that the colab runs a bit more smoorth, but they where all part of the discovery process. given that the data originally contained approx 180.000 observations. is was determained that there is some place, to drop some where needed.

Firstly, we will have to get the data into the colab from kaggle. We opted to do this, by putting the data into a dropbox as a zip file (due to its size), and import it from there.

In [0]:

```
!wget https://www.dropbox.com/s/s8nl55go4o8powf/globalterrorismdb_0718dist.csv.zip
#Unzipping in order to get it to read as a csv
!unzip globalterrorismdb_0718dist.csv.zip
```

```
--2019-09-26 12:03:26--  https://www.dropbox.com/s/s8nl55go4o8powf/globalterrorismdb_0718
dist.csv.zip
Resolving www.dropbox.com (www.dropbox.com)... 162.125.65.1, 2620:100:6021:1::a27d:4101
Connecting to www.dropbox.com (www.dropbox.com)|162.125.65.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/s8nl55go4o8powf/globalterrorismdb_0718dist.csv.zip [following]
--2019-09-26 12:03:27--  https://www.dropbox.com/s/raw/s8nl55go4o8powf/globalterrorismdb_
0718dist.csv.zip
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc2b628c166050f00a364b415520.dl.dropboxusercontent.com/cd/0/inline/ApSK
XoYFjcbmS_H7rSi8plA6Y05mKDJlMh3_cp4lVUELArOvni1cAI5CYrEa5LIL8hkKdln2kc53Pk_cPcSpBA8HCRhSH
KRhJfBTB0Yo7g5DVv-nqa_EEOqo6FYjBR3QuCI/file# [following]
--2019-09-26 12:03:27--  https://uc2b628c166050f00a364b415520.dl.dropboxusercontent.com/c
d/0/inline/ApSKXoYFjcbmS_H7rSi8plA6Y05mKDJlMh3_cp4lVUELArOvni1cAI5CYrEa5LIL8hkKdln2kc53Pk
_cPcSpBA8HCRhSHKRhJfBTB0Yo7g5DVv-nqa_EEOqo6FYjBR3QuCI/file
Resolving uc2b628c166050f00a364b415520.dl.dropboxusercontent.com (uc2b628c166050f00a364b4
15520.dl.dropboxusercontent.com)... 162.125.65.6, 2620:100:6021:6::a27d:4106
Connecting to uc2b628c166050f00a364b415520.dl.dropboxusercontent.com (uc2b628c166050f00a3
64b415520.dl.dropboxusercontent.com)|162.125.65.6|:443... connected.
HTTP request sent, awaiting response... 302 FOUND
Location: /cd/0/inline2/ApRDfw4j1GPI1qrFgaDwJIALc-auzSBB6AyYE-x5t6LDW3qkhZbs3UVmF3dyQDfTz
GWtU0EtJEOvRcH110vunno2-vx9RqvhSrXG_d6oRX1BDGcutkXUO181INXXs4CUQw6j9hjkGNN2Ddcee-6pjdoHEh
PAeXylP8qzu_Q_uigvGk073Kh_gIUGRYtKq_ro5-lLZjGwEHNhBZYG534i524Rs02JqGWaJb8JeCINIesIKcD_Nlm
AFEwsCm_9NYuAB3IouezitY2dDVlp2ORwT-uOLmYklkUrkTXjwjAlrpn_xyk_LqcHSLbhzO9hSDAegW1izgG7utbh
L_fiiKcbXsj4ZKyWHVednzVQdz4rKz1O_w/file [following]
--2019-09-26 12:03:28--  https://uc2b628c166050f00a364b415520.dl.dropboxusercontent.com/c
d/0/inline2/ApRDfw4j1GPI1qrFgaDwJIALc-auzSBB6AyYE-x5t6LDW3qkhZbs3UVmF3dyQDfTzGWtU0EtJEOvR
cH110vunno2-vx9RqvhSrXG_d6oRX1BDGcutkXUO181INXXs4CUQw6j9hjkGNN2Ddcee-6pjdoHEhPAeXylP8qzu_
Q_uigvGk073Kh_gIUGRYtKq_ro5-lLZjGwEHNhBZYG534i524Rs02JqGWaJb8JeCINIesIKcD_NlmAFEwsCm_9NYu
AB3IouezitY2dDVlp2ORwT-uOLmYklkUrkTXjwjAlrpn_xyk_LqcHSLbhzO9hSDAegW1izgG7utbhL_fiiKcbXsj4
ZKyWHVednzVQdz4rKz1O_w/file
Reusing existing connection to uc2b628c166050f00a364b415520.dl.dropboxusercontent.com:443
.
HTTP request sent, awaiting response... 200 OK
Length: 29288124 (28M) [application/zip]
Saving to: 'globalterrorismdb_0718dist.csv.zip.1'

globalterrorismdb_0 100%[===================>]  27.93M  51.2MB/s    in 0.5s

2019-09-26 12:03:29 (51.2 MB/s) - 'globalterrorismdb_0718dist.csv.zip.1' saved [29288124/
29288124]
```

```
Archive:  globalterrorismdb_0718dist.csv.zip
replace globalterrorismdb_0718dist.csv? [y]es, [n]o, [A]ll, [N]one, [r]ename: n
replace __MACOSX/._globalterrorismdb_0718dist.csv? [y]es, [n]o, [A]ll, [N]one, [r]ename:
n
```

In [0]:

```
import numpy as np
import pandas as pd
full_data=pd.read_csv('globalterrorismdb_0718dist.csv', encoding="ISO-8859-1")
```

```
/usr/local/lib/python3.6/dist-packages/IPython/core/interactiveshell.py:2718: DtypeWarnin
g: Columns (4,6,31,33,61,62,63,76,79,90,92,94,96,114,115,121) have mixed types. Specify d
type option on import or set low_memory=False.
  interactivity=interactivity, compiler=compiler, result=result)
```

In [0]:

```
#full_data.head(2)
```

In [0]:

```
full_data.info(verbose=True, null_counts=True)
#In order to get the correct format on the .info function, we had to use the additional a
rguments. otherwise the number of actual values in a column wouldn't show
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 181691 entries, 0 to 181690
Data columns (total 135 columns):
eventid                 181691 non-null int64
iyear                   181691 non-null int64
imonth                  181691 non-null int64
iday                    181691 non-null int64
approxdate              9239 non-null object
extended                181691 non-null int64
resolution              2220 non-null object
country                 181691 non-null int64
country_txt             181691 non-null object
region                  181691 non-null int64
region_txt              181691 non-null object
provstate               181270 non-null object
city                    181257 non-null object
latitude                177135 non-null float64
longitude               177134 non-null float64
specificity             181685 non-null float64
vicinity                181691 non-null int64
location                55495 non-null object
summary                 115562 non-null object
crit1                   181691 non-null int64
crit2                   181691 non-null int64
crit3                   181691 non-null int64
doubtterr               181690 non-null float64
alternative             29011 non-null float64
alternative_txt         29011 non-null object
multiple                181690 non-null float64
success                 181691 non-null int64
suicide                 181691 non-null int64
attacktype1             181691 non-null int64
attacktype1_txt         181691 non-null object
attacktype2             6314 non-null float64
attacktype2_txt         6314 non-null object
attacktype3             428 non-null float64
attacktype3_txt         428 non-null object
targtype1               181691 non-null int64
targtype1_txt           181691 non-null object
targsubtype1            171318 non-null float64
targsubtype1_txt        171318 non-null object
corp1                   139141 non-null object
target1                 181055 non-null object
natlty1                 180132 non-null float64
natlty1_txt             180132 non-null object
```

```
targtype2              11144 non-null float64
targtype2_txt          11144 non-null object
targsubtype2           10685 non-null float64
targsubtype2_txt       10685 non-null object
corp2                  10117 non-null object
target2                11020 non-null object
natlty2                10828 non-null float64
natlty2_txt            10828 non-null object
targtype3              1176 non-null float64
targtype3_txt          1176 non-null object
targsubtype3           1097 non-null float64
targsubtype3_txt       1097 non-null object
corp3                  1026 non-null object
target3                1175 non-null object
natlty3                1147 non-null float64
natlty3_txt            1147 non-null object
gname                  181691 non-null object
gsubname               5890 non-null object
gname2                 2013 non-null object
gsubname2              160 non-null object
gname3                 324 non-null object
gsubname3              20 non-null object
motive                 50561 non-null object
guncertain1            181311 non-null float64
guncertain2            1955 non-null float64
guncertain3            320 non-null float64
individual             181691 non-null int64
nperps                 110576 non-null float64
nperpcap               112202 non-null float64
claimed                115571 non-null float64
claimmode              19083 non-null float64
claimmode_txt          19083 non-null object
claim2                 1890 non-null float64
claimmode2             616 non-null float64
claimmode2_txt         616 non-null object
claim3                 318 non-null float64
claimmode3             133 non-null float64
claimmode3_txt         133 non-null object
compclaim              4839 non-null float64
weaptype1              181691 non-null int64
weaptype1_txt          181691 non-null object
weapsubtype1           160923 non-null float64
weapsubtype1_txt       160923 non-null object
weaptype2              13127 non-null float64
weaptype2_txt          13127 non-null object
weapsubtype2           11542 non-null float64
weapsubtype2_txt       11542 non-null object
weaptype3              1863 non-null float64
weaptype3_txt          1863 non-null object
weapsubtype3           1693 non-null float64
weapsubtype3_txt       1693 non-null object
weaptype4              73 non-null float64
weaptype4_txt          73 non-null object
weapsubtype4           70 non-null float64
weapsubtype4_txt       70 non-null object
weapdetail             114021 non-null object
nkill                  171378 non-null float64
nkillus                117245 non-null float64
nkillter               114733 non-null float64
nwound                 165380 non-null float64
nwoundus               116989 non-null float64
nwoundte               112548 non-null float64
property               181691 non-null int64
propextent             64065 non-null float64
propextent_txt         64065 non-null object
propvalue              38989 non-null float64
propcomment            57959 non-null object
ishostkid              181513 non-null float64
nhostkid               13572 non-null float64
nhostkidus             13517 non-null float64
nhours                 4063 non-null float64
ndays                  8124 non-null float64
divert                 324 non-null object
```

```
divert                  324 non-null object
kidhijcountry           3305 non-null object
ransom                  77381 non-null float64
ransomamt               1350 non-null float64
ransomamtus             563 non-null float64
ransompaid              774 non-null float64
ransompaidus            552 non-null float64
ransomnote              514 non-null object
hostkidoutcome          10991 non-null float64
hostkidoutcome_txt      10991 non-null object
nreleased               10400 non-null float64
addnotes                28289 non-null object
scite1                  115500 non-null object
scite2                  76933 non-null object
scite3                  43516 non-null object
dbsource                181691 non-null object
INT_LOG                 181691 non-null int64
INT_IDEO                181691 non-null int64
INT_MISC                181691 non-null int64
INT_ANY                 181691 non-null int64
related                 25038 non-null object
dtypes: float64(55), int64(22), object(58)
memory usage: 187.1+ MB
```

Acutual cleaning

Based on the overview and info, gotten from the previous chapter, together with the definitions given in the data description, from the Kaggle creator(See the stakeholder report for more info). we decided, to augment the data to only contain the following columns.

after picking the columns these get put in to a new data frame, in order to have the original data ready at hand if needed

In [0]:

```
df=full_data.loc[:,('iyear','imonth','iday','extended','resolution','country_txt', 'regio
n_txt','latitude','longitude', 'success', 'nkill', 'nkillter', 'nwound','property', 'vic
inity', 'suicide', 'claimed','gname', 'individual', 'crit1','crit2', 'crit3','attacktype
1_txt','attacktype2_txt','attacktype3_txt','targtype1_txt','targtype2_txt','targtype3_txt
','weaptype1_txt','weaptype2_txt','weaptype3_txt')]
#df.head()
```

Timestamp

The first thing we decided, was important, was to get the three different columns iyear, imonth and iday. strung together into an actual datetime format that can be easier to read and use in the future.

In [0]:

```
#df.imonth.value_counts()
# 20 observations does not have month (month=0)
# 891 observations does not have day (day=0)
```

In [0]:

```
#In order to get only usable data, the 0's where replaced with nan values and dropped.
df['imonth']=df['imonth'].replace(0, np.nan)
df['iday']=df['iday'].replace(0, np.nan)
df.dropna(subset=['imonth', 'iday'],inplace=True)
```

In [0]:

```
date = pd.DataFrame({'year': df['iyear'], 'month':df['imonth'],'day': df['iday']})
df.insert(0,'timestamp',pd.to_datetime(date))
```

In [0]:

```
#After having converted the columns in to one datetime, we dropped the original in order, to not have redundant information
df.drop(columns=['iyear','imonth','iday'],inplace=True)
```

NaN and -9 (unknown)

Alot of the data in the CSV file. cointains data to varying degree, that are either NaN or -9/-99 the -9/-99 format is the publishers doing, for the places where they do not know or are uncertain.

We how ever wanted to get rid of those, in order to get a working data frame for later use.

This is done by, turning the -9/-99 data into NaN and dropping it

In [0]:

```
#print(df.nkill.isnull().sum()) 10313
#drop na in nkill
df.dropna(subset=['nkill'],inplace=True)
```

In [0]:

```
#print(df.nwound.isnull().sum()) 6561
#drop na in nwound
df.dropna(subset=['nwound'],inplace=True)
```

In [0]:

```
#print(df.property.value_counts())
df['property']=df['property'].replace(-9, np.nan)
#print(df.property.isnull().sum()) # 19248
df.dropna(subset=['property'],inplace=True)
```

In [0]:

```
#df.claimed.value_counts()
df['claimed']=df['claimed'].replace(-9, np.nan)
#print(df.claimed.isnull().sum()) 58458
# 66581 NaN   - we set these to 0
df['claimed']=df['claimed'].replace(np.nan, 0)
```

In [0]:

```
#print(df.vicinity.value_counts())
df['vicinity']=df['vicinity'].replace(-9, np.nan)
#print(df.vicinity.isnull().sum()) # 23
df.dropna(subset=['vicinity'],inplace=True)
```

In [0]:

```
#Replace nkiltter nan with 0
df['nkillter'].fillna(0, inplace=True)
```

In [0]:

```
df.dropna(subset=['latitude','longitude'],inplace=True)
```

Dummies

Some of the original data, was arranged in such a way, that it became unwieldy due to it being categorical data filling the same column in order to get around this, we opted to make them in to dummy variables, so only one thing, pr column could be true (1,0). this was done for all the different attack types, targettypes and weapontypes

attacktype 1-3

In [0]:

```
#First we look in the to different types, to see what simiarlarities that are between the
m
#print(df.attacktype1_txt.unique())
#print(df.attacktype2_txt.unique())
#print(df.attacktype3_txt.unique())
```

In [0]:

```
#here we create a different dateframe containing the columns now turned into dummies
df_dum=pd.get_dummies(df,columns=['attacktype1_txt','attacktype2_txt','attacktype3_txt']
)
```

In [0]:

```
#now in order to get a good overview of the data, and to reduce some of the dummies. All
the diffrent types of f.x Armed assault
#Gets melted together with eachother, and turned in to one column called Armed Assault.

df['Armed_Assault']=(df_dum['attacktype1_txt_Armed Assault']+df_dum['attacktype2_txt_Arm
ed Assault']+df_dum['attacktype3_txt_Armed Assault']).replace(2, 1).replace(3,1)
df['Bombing_Explosion']=(df_dum['attacktype1_txt_Bombing/Explosion']+df_dum['attacktype2_
txt_Bombing/Explosion']+df_dum['attacktype3_txt_Bombing/Explosion']).replace(2, 1).repla
ce(3,1)
df['Facility_Infrastructure_Attack']=(df_dum['attacktype1_txt_Facility/Infrastructure Att
ack']+df_dum['attacktype2_txt_Facility/Infrastructure Attack']+df_dum['attacktype3_txt_Fa
cility/Infrastructure Attack']).replace(2, 1).replace(3,1)
df['Hostage_Taking_Kidnapping']=(df_dum['attacktype1_txt_Hostage Taking (Kidnapping)']+d
f_dum['attacktype2_txt_Hostage Taking (Kidnapping)']+df_dum['attacktype3_txt_Hostage Taki
ng (Kidnapping)']).replace(2, 1).replace(3,1)
df['Unarmed_Assault']=(df_dum['attacktype1_txt_Unarmed Assault']+df_dum['attacktype2_txt
_Unarmed Assault']+df_dum['attacktype3_txt_Unarmed Assault']).replace(2, 1).replace(3,1)
df['Hostage_Taking_Barricade_Incident']=(df_dum['attacktype1_txt_Hostage Taking (Barricad
e Incident)']+df_dum['attacktype2_txt_Hostage Taking (Barricade Incident)']+df_dum['atta
cktype3_txt_Hostage Taking (Barricade Incident)']).replace(2, 1).replace(3,1)
df['Assassination']=(df_dum.attacktype1_txt_Assassination+df_dum.attacktype2_txt_Assassin
ation+df_dum.attacktype3_txt_Assassination).replace(2, 1).replace(3,1)
df['Hijacking']=(df_dum.attacktype1_txt_Hijacking+df_dum.attacktype2_txt_Hijacking+df_du
m.attacktype3_txt_Hijacking).replace(2, 1).replace(3,1)
df['Unknown']=(df_dum.attacktype1_txt_Unknown+df_dum.attacktype2_txt_Unknown).replace(2,
1)
```

In [0]:

```
#since we now have the data we need, in other columns we drop the old ones.
df.drop(columns=['attacktype1_txt', 'attacktype2_txt','attacktype3_txt'],inplace=True)
```

targettype 1-3

The Method from attack type gets replicated here, and will also be replicated for weapon types.

In [0]:

```
#print(df.targtype1_txt.unique())
#print(df.targtype2_txt.unique())
#print(df.targtype3_txt.unique())
```

In [0]:

```
df_dum=pd.get_dummies(df,columns=['targtype1_txt','targtype2_txt','targtype3_txt'])
```

In [0]:

```
df['Abortion_Related']=(df_dum['targtype1_txt_Abortion Related']+df_dum['targtype2_txt_Ab
ortion Related']).replace(2, 1).replace(3,1)
df['Airports_Aircraft']=(df_dum['targtype1_txt_Airports & Aircraft']+df_dum['targtype2_tx
t_Airports & Aircraft']+df_dum['targtype3_txt_Airports & Aircraft']).replace(2, 1).repla
```

```
ce(3,1)
df['Business']=(df_dum.targtype1_txt_Business+df_dum.targtype2_txt_Business+df_dum.targt
ype3_txt_Business).replace(2, 1).replace(3,1)
df['Educational_Institution']=(df_dum['targtype1_txt_Educational Institution']+df_dum['ta
rgtype2_txt_Educational Institution']+df_dum['targtype3_txt_Educational Institution']).re
place(2, 1).replace(3,1)
df['Food_Water_Supply']=(df_dum['targtype1_txt_Food or Water Supply']+df_dum['targtype2_t
xt_Food or Water Supply']).replace(2, 1)
df['Government_Diplomatic']=(df_dum['targtype1_txt_Government (Diplomatic)']+df_dum['targ
type2_txt_Government (Diplomatic)']+df_dum['targtype3_txt_Government (Diplomatic)']).repl
ace(2, 1).replace(3,1)
df['Government_General']=(df_dum['targtype1_txt_Government (General)']+df_dum['targtype2
_txt_Government (General)']+df_dum['targtype3_txt_Government (General)']).replace(2, 1).
replace(3,1)
df['Journalists_Media']=(df_dum['targtype1_txt_Journalists & Media']+df_dum['targtype2_t
xt_Journalists & Media']+df_dum['targtype3_txt_Journalists & Media']).replace(2, 1).repl
ace(3,1)
df['Maritime']=(df_dum.targtype1_txt_Maritime+df_dum.targtype2_txt_Maritime+df_dum.targt
ype3_txt_Maritime).replace(2, 1).replace(3,1)
df['Military']=(df_dum.targtype1_txt_Military+df_dum.targtype2_txt_Military+df_dum.targt
ype3_txt_Military).replace(2, 1).replace(3,1)
df['NGO']=(df_dum.targtype1_txt_NGO+df_dum.targtype2_txt_NGO+df_dum.targtype3_txt_NGO).r
eplace(2, 1).replace(3,1)
df['Other']=(df_dum.targtype1_txt_Other+df_dum.targtype2_txt_Other+df_dum.targtype3_txt_
Other).replace(2, 1).replace(3,1)
df['Police']=(df_dum.targtype1_txt_Police+df_dum.targtype2_txt_Police+df_dum.targtype3_t
xt_Police).replace(2, 1).replace(3,1)
df['Private_Citizens_Property']=(df_dum['targtype1_txt_Private Citizens & Property']+df_
dum['targtype2_txt_Private Citizens & Property']+df_dum['targtype3_txt_Private Citizens &
Property']).replace(2, 1).replace(3,1)
df['Religious_Figures_Institutions']=(df_dum['targtype1_txt_Religious Figures/Institution
s']+df_dum['targtype2_txt_Religious Figures/Institutions']+df_dum['targtype3_txt_Religiou
s Figures/Institutions']).replace(2, 1).replace(3,1)
df['Telecommunication']=(df_dum.targtype1_txt_Telecommunication+df_dum.targtype2_txt_Tele
communication+df_dum.targtype3_txt_Telecommunication).replace(2, 1).replace(3,1)
df['Terrorists_Non-State_Militia']=(df_dum['targtype1_txt_Terrorists/Non-State Militia']+
df_dum['targtype2_txt_Terrorists/Non-State Militia']+df_dum['targtype3_txt_Terrorists/Non
-State Militia']).replace(2, 1).replace(3,1)
df['Transportation']=(df_dum.targtype1_txt_Transportation+df_dum.targtype2_txt_Transporta
tion+df_dum.targtype3_txt_Transportation).replace(2, 1).replace(3,1)
df['Utilities']=(df_dum.targtype1_txt_Utilities+df_dum.targtype2_txt_Utilities+df_dum.tar
gtype3_txt_Utilities).replace(2, 1).replace(3,1)
df['Violent_Political_Party']=(df_dum['targtype1_txt_Violent Political Party']+df_dum['t
argtype2_txt_Violent Political Party']+df_dum['targtype3_txt_Violent Political Party']).
replace(2, 1).replace(3,1)
df['Tourists']=(df_dum.targtype1_txt_Tourists+df_dum.targtype2_txt_Tourists+df_dum.targt
ype3_txt_Tourists).replace(2, 1).replace(3,1)
df['Unknown']=(df_dum.targtype1_txt_Unknown+df_dum.targtype2_txt_Unknown).replace(2, 1)
```

In [0]:

```
df.drop(columns=['targtype1_txt', 'targtype2_txt','targtype3_txt'],inplace=True)
```

weapontype 1-3

See attack type for explanation.

In [0]:

```
#print(df.weaptype1_txt.unique())
#print(df.weaptype2_txt.unique())
#print(df.weaptype3_txt.unique())
```

In [0]:

```
df_dum=pd.get_dummies(df,columns=['weaptype1_txt','weaptype2_txt','weaptype3_txt'])
```

In [0]:

In [0]:

```
df['Firearms']=(df_dum.weaptype1_txt_Firearms+df_dum.weaptype2_txt_Firearms+df_dum.weaptype3_txt_Firearms).replace(2, 1).replace(3,1)
df['Explosives']=(df_dum.weaptype1_txt_Explosives+df_dum.weaptype2_txt_Explosives+df_dum.weaptype3_txt_Explosives).replace(2, 1).replace(3,1)
df['Incendiary']=(df_dum.weaptype1_txt_Incendiary+df_dum.weaptype2_txt_Incendiary+df_dum.weaptype3_txt_Incendiary).replace(2, 1).replace(3,1)
df['Chemical']=(df_dum.weaptype1_txt_Chemical+df_dum.weaptype2_txt_Chemical+df_dum.weaptype3_txt_Chemical).replace(2, 1).replace(3,1)
df['Melee']=(df_dum.weaptype1_txt_Melee+df_dum.weaptype2_txt_Melee+df_dum.weaptype3_txt_Melee).replace(2, 1).replace(3,1)
df['Sabotage_Equipment']=(df_dum['weaptype1_txt_Sabotage Equipment']+df_dum['weaptype2_txt_Sabotage Equipment']+df_dum['weaptype3_txt_Sabotage Equipment']).replace(2, 1).replace(3,1)
df['Vehicle']=(df_dum['weaptype1_txt_Vehicle (not to include vehicle-borne explosives, i.e., car or truck bombs)']+df_dum['weaptype2_txt_Vehicle (not to include vehicle-borne explosives, i.e., car or truck bombs)']+df_dum['weaptype3_txt_Vehicle (not to include vehicle-borne explosives, i.e., car or truck bombs)']).replace(2, 1).replace(3,1)
df['Fake_Weapons']=(df_dum['weaptype1_txt_Fake Weapons']+df_dum['weaptype2_txt_Fake Weapons']+df_dum['weaptype3_txt_Fake Weapons']).replace(2, 1).replace(3,1)
df['Biological']=(df_dum.weaptype1_txt_Biological+df_dum.weaptype2_txt_Biological).replace(2, 1)
df['Radiological']=df_dum.weaptype1_txt_Radiological
df['Other']=(df_dum.weaptype1_txt_Other+df_dum.weaptype2_txt_Other+df_dum.weaptype3_txt_Other).replace(2, 1).replace(3,1)
df['Unknown']=(df_dum.weaptype1_txt_Unknown+df_dum.weaptype2_txt_Unknown+df_dum.weaptype3_txt_Unknown).replace(2, 1).replace(3,1)
```

In [0]:

```
df.drop(columns=['weaptype1_txt', 'weaptype2_txt','weaptype3_txt'],inplace=True)
```

Region

In [0]:

```
#Turning the region into dummies in case we need it in a more wieldy manner.

#print(df.region_txt.unique())
df=pd.get_dummies(df,columns=['region_txt'])
```

Duration from resolution and extended

Some of the observations in the data seem to be taking place over an extended period of time, but only have noted the start date and resolution date. instead of this. we wanted to have a single column containing the duration of the observation.

in order to achive this, we first needed the data in the right format, and then getting an overview over it.

In [0]:

```
#sets the datetime format
df['resolution'] = df['resolution'].astype('datetime64[ns]')
#creates a new column containing the duration between the start and end date
df.insert(1,'duration',(df['resolution']-df['timestamp']).dt.days)
#going of the assumption the the missing duration will just be an example of an event that did not extend beyond a day, we fill NA with 0
df['duration'].fillna(0, inplace=True)
#now we make sure that the duration data is in a moldable format for os
df['duration'] = df['duration'].astype(int)
#Now we drop the ones where the duration is under 0 since this is wrong
df = df.drop(df[(df['duration']<=0)&(df['extended']==1)].index)
# Here we loose 3101 rows, checked df.shape before and after this chunck of code
```

Checking it works

In [0]:

```
df[df['extended']==1].head()
```

Out[0]:

	timestamp	duration	extended	resolution	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property
112	1970-03-06	2	1	1970-03-08	Guatemala	14.622869	-90.529068	1	0.0	0.0	0.0	0.0
123	1970-03-11	4	1	1970-03-15	Brazil	-23.550711	-46.633475	1	0.0	0.0	0.0	0.0
135	1970-03-14	1	1	1970-03-15	United States	33.766725	-118.192399	1	0.0	0.0	0.0	0.0
151	1970-03-24	2	1	1970-03-26	Dominican Republic	18.456792	-69.951164	1	0.0	0.0	0.0	0.0
152	1970-03-24	4	1	1970-03-28	Argentina	-27.583246	-56.683334	1	0.0	0.0	0.0	0.0

In [0]:

```
df[df['extended']==0].head()
```

Out[0]:

	timestamp	duration	extended	resolution	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	v
0	1970-07-02	0	0	NaT	Dominican Republic	18.456792	-69.951164	1	1.0	0.0	0.0	0.0	
5	1970-01-01	0	0	NaT	United States	37.005105	-89.176269	1	0.0	0.0	0.0	1.0	
6	1970-01-02	0	0	NaT	Uruguay	-34.891151	-56.187214	0	0.0	0.0	0.0	0.0	
7	1970-01-02	0	0	NaT	United States	37.791927	-122.225906	1	0.0	0.0	0.0	1.0	
8	1970-01-02	0	0	NaT	United States	43.076592	-89.412488	1	0.0	0.0	0.0	1.0	

In [0]:

```
df.drop(columns=['extended', 'resolution'],inplace=True)
```

In [0]:

```
df.isnull().sum()
```

Out[0]:

```
timestamp       0
duration        0
country_txt     0
latitude        0
longitude       0
success         0
nkill           0
```

```
nkillter                                    0
nwound                                      0
property                                    0
vicinity                                    0
suicide                                     0
claimed                                     0
gname                                       0
individual                                  0
crit1                                       0
crit2                                       0
crit3                                       0
Armed_Assault                               0
Bombing_Explosion                           0
Facility_Infrastructure_Attack              0
Hostage_Taking_Kidnapping                   0
Unarmed_Assault                             0
Hostage_Taking_Barricade_Incident           0
Assassination                               0
Hijacking                                   0
Unknown                                     0
Abortion_Related                            0
Airports_Aircraft                           0
Business                                    0
                                           ..
Private_Citizens_Property                   0
Religious_Figures_Institutions              0
Telecommunication                           0
Terrorists_Non-State_Militia                0
Transportation                              0
Utilities                                   0
Violent_Political_Party                     0
Tourists                                    0
Firearms                                    0
Explosives                                  0
Incendiary                                  0
Chemical                                    0
Melee                                       0
Sabotage_Equipment                          0
Vehicle                                     0
Fake_Weapons                                0
Biological                                  0
Radiological                                0
region_txt_Australasia & Oceania            0
region_txt_Central America & Caribbean      0
region_txt_Central Asia                     0
region_txt_East Asia                        0
region_txt_Eastern Europe                   0
region_txt_Middle East & North Africa       0
region_txt_North America                    0
region_txt_South America                    0
region_txt_South Asia                       0
region_txt_Southeast Asia                   0
region_txt_Sub-Saharan Africa               0
region_txt_Western Europe                   0
Length: 70, dtype: int64
```

Extreme values

In some instances the data cointains values that are considered to be extreme. either because they are outliers or appear to be untrue. for example: it is highly unlikely that there exsist a terrorist attack than has taken place over 3000 days even though there is a point in the original data the would make it seem so.

Duration

In [0]:

```
#Removing Outliers in the duration column
#the upper limit is chosen, as the 95 percentile of the attacks with a duration above 1
```

```
#This was done, in order to filter out the relevant outliers
#but since most of the data has a duration of 0 these where temporarely removed in order
to find the relevant number
df=df.drop(df[(df['duration']<0)|(df['duration'] >=97)].index)
df.duration.describe()
```

Out[0]:

```
count    138075.000000
mean          0.111273
std           2.007270
min           0.000000
25%           0.000000
50%           0.000000
75%           0.000000
max          95.000000
Name: duration, dtype: float64
```

nkill and nwound

In [0]:

```
#This removes outliers based upon the 99 percentile.
outlier_nwound  = np.percentile(df.nwound, [0, 99])
df_out1= df[(df.nwound  > outlier_nwound[0]) & (df.nwound < outlier_nwound[1])]
outlier_nkill  = np.percentile(df.nkill, [0, 99])
#Here we contruct a new data frame where the outliers are removed in order to still have
the data frame with the outliers available
df_out2 = df_out1[(df_out1.nkill  > outlier_nkill[0]) & (df_out1.nkill < outlier_nkill[1
])]
df_out2.describe()
```

Out[0]:

	duration	latitude	longitude	success	nkill	nkillter	nwound	property	266
count	26610.000000	26610.000000	26610.000000	26610.000000	26610.000000	26610.000000	26610.000000	26610.000000	
mean	0.019354	25.638468	42.691956	0.963097	3.615295	0.552574	6.656257	0.609320	
std	0.816582	14.733248	44.853101	0.188528	3.962386	1.869236	7.757622	0.487912	
min	0.000000	-37.818200	-157.858333	0.000000	1.000000	0.000000	1.000000	0.000000	
25%	0.000000	14.413989	35.364861	1.000000	1.000000	0.000000	2.000000	0.000000	
50%	0.000000	32.982933	44.371773	1.000000	2.000000	0.000000	4.000000	1.000000	
75%	0.000000	34.126450	69.147011	1.000000	4.000000	0.000000	8.000000	1.000000	
max	67.000000	61.250000	178.441900	1.000000	25.000000	25.000000	42.000000	1.000000	

Changeing type and z-score

In [0]:

```
#Here we ensure, that the dummy variables are set to be boolean values, in order to get t
he correct reading later.
df_out2.astype({'Armed_Assault':'bool','Bombing_Explosion':'bool','Facility_Infrastructur
e_Attack':'bool','Hostage_Taking_Kidnapping':'bool','Unarmed_Assault':'bool','Hostage_Ta
king_Barricade_Incident':'bool','Assassination':'bool','Hijacking':'bool','Unknown':'bool
','Abortion_Related':'bool','Airports_Aircraft':'bool','Business':'bool','Educational_Ins
titution':'bool','Food_Water_Supply':'bool','Government_Diplomatic':'bool','Government_Ge
neral':'bool','Journalists_Media':'bool','Maritime':'bool','Military':'bool','NGO':'bool
','Other':'bool','Police':'bool','Private_Citizens_Property':'bool','Religious_Figures_I
nstitutions':'bool','Telecommunication':'bool','Terrorists_Non-State_Militia':'bool','Tra
nsportation':'bool','Utilities':'bool','Violent_Political_Party':'bool','Tourists':'bool
','Unknown':'bool','Firearms':'bool','Explosives':'bool','Incendiary':'bool','Chemical':
'bool','Melee':'bool','Sabotage_Equipment':'bool','Vehicle':'bool','Fake_Weapons':'bool'
```

```
,'Biological':'bool','Radiological':'bool','Other':'bool','Unknown':'bool','property':'b
ool','vicinity':'bool','suicide':'bool','claimed':'bool','individual':'bool','crit1':'bo
ol','crit2':'bool','crit3':'bool','success':'bool'}).dtypes
```

Out[0]:

```
timestamp                                    datetime64[ns]
duration                                              int64
country_txt                                          object
latitude                                            float64
longitude                                           float64
success                                                bool
nkill                                               float64
nkillter                                            float64
nwound                                              float64
property                                               bool
vicinity                                               bool
suicide                                                bool
claimed                                                bool
gname                                                object
individual                                             bool
crit1                                                  bool
crit2                                                  bool
crit3                                                  bool
Armed_Assault                                          bool
Bombing_Explosion                                      bool
Facility_Infrastructure_Attack                         bool
Hostage_Taking_Kidnapping                              bool
Unarmed_Assault                                        bool
Hostage_Taking_Barricade_Incident                      bool
Assassination                                          bool
Hijacking                                              bool
Unknown                                                bool
Abortion_Related                                       bool
Airports_Aircraft                                      bool
Business                                               bool
                                                      ...
Private_Citizens_Property                              bool
Religious_Figures_Institutions                         bool
Telecommunication                                      bool
Terrorists_Non-State_Militia                           bool
Transportation                                         bool
Utilities                                              bool
Violent_Political_Party                                bool
Tourists                                               bool
Firearms                                               bool
Explosives                                             bool
Incendiary                                             bool
Chemical                                               bool
Melee                                                  bool
Sabotage_Equipment                                     bool
Vehicle                                                bool
Fake_Weapons                                           bool
Biological                                             bool
Radiological                                           bool
region_txt_Australasia & Oceania                      uint8
region_txt_Central America & Caribbean                uint8
region_txt_Central Asia                               uint8
region_txt_East Asia                                  uint8
region_txt_Eastern Europe                             uint8
region_txt_Middle East & North Africa                 uint8
region_txt_North America                              uint8
region_txt_South America                              uint8
region_txt_South Asia                                 uint8
region_txt_Southeast Asia                             uint8
region_txt_Sub-Saharan Africa                         uint8
region_txt_Western Europe                             uint8
Length: 70, dtype: object
```

In [0]:

```
#z-score.
```

```
#in order to see where the data has the largest variance. we calculate the Z-score. where the Z-score is above 3 the data is considered to have big variance
from scipy import stats
#The Z-score is only done on the numeric columns, so we pic those out
numeric_cols = df_out2.select_dtypes(include=[np.number]).columns
zscore_df=df_out2[numeric_cols].apply(stats.zscore)
for column in zscore_df:
 max=zscore_df.loc[:,column].max()
 min=zscore_df.loc[:,column].min()
 print(column,max,min,'\n')
```

```
duration 82.02719162365287 -0.02370122881590998

latitude 2.417131759894151 -4.307119678173532

longitude 3.026602239050187 -4.471353241960712

success 0.19574847450838098 -5.108596644298161

nkill 5.3970270388002195 -0.6600426725933422

nkillter 13.079082255983705 -0.2956206409569568

nwound 4.556087729702511 -0.7291362252731418

property 0.8007335972844873 -1.2488548043834817

vicinity 3.3072781602204757 -0.3023634395279702

suicide 2.981978086530849 -0.33534787009899597

claimed 2.251006766704243 -0.4442456658911452

individual 16.70644376155185 -0.05985714340363663

crit1 0.08767756626071627 -11.405426070181008

crit2 0.08321499904096441 -12.01706436970252

crit3 0.446850531904166 -2.2378847704146088

Armed_Assault 1.4140939924246783 -0.7071665712159265

Bombing_Explosion 0.8884755163714115 -1.1255234180048779

Facility_Infrastructure_Attack 7.915825104266751 -0.12632921860046967

Hostage_Taking_Kidnapping 11.608846028888875 -0.08614120624147116

Unarmed_Assault 21.77564169958193 -0.04592287170206326

Hostage_Taking_Barricade_Incident 17.262351057864155 -0.05792953675011916

Assassination 3.5097461900140745 -0.2849208876827613

Hijacking 26.443584437340128 -0.03781635588660714

Unknown 3.9963312256751347 -0.2502295088993935

Abortion_Related 72.94518489934752 -0.013708924055506019

Airports_Aircraft 17.665186767464753 -0.056608515560207504

Business 3.425209105480706 -0.2919529784035349

Educational_Institution 8.829576679113455 -0.11325571274164482

Food_Water_Supply 38.436094147732206 -0.026017211742598512

Government_Diplomatic 9.151241605920823 -0.10927478948353889

Government_General 3.265091704491307 -0.30627011137985705
```

Journalists_Media 13.900848054789165 -0.07193805702059138

Maritime 28.819481258343295 -0.03469875085661018

Military 1.8315138023097328 -0.5459964313339566

NGO 16.885764189341998 -0.05922148318470437

Other 57.664980707531655 -0.017341547464861787

Police 1.8794806793138776 -0.5320618674117256

Private_Citizens_Property 1.4237132401876156 -0.7023886354166524

Religious_Figures_Institutions 6.406084193323026 -0.1561016012000414

Telecommunication 34.76414035389707 -0.028765273348342692

Terrorists_Non-State_Militia 5.458810411720772 -0.18319009538284575

Transportation 4.59162145128137 -0.2177879885374552

Utilities 17.770360555872646 -0.056273478349291355

Violent_Political_Party 10.780754593418967 -0.09275788548330766

Tourists 18.562985093578444 -0.05387064607113934

Firearms 1.2508285611694205 -0.7994700721137064

Explosives 0.8146440259572406 -1.2275300230980746

Incendiary 7.160934184099029 -0.1396465844108044

Chemical 31.975952502803395 -0.03127350154502288

Melee 7.490193875451121 -0.13350789266983715

Sabotage_Equipment 72.94518489934754 -0.01370892405550602

Vehicle 20.86215492696575 -0.047933686788387914

Fake_Weapons 66.58828725834599 -0.015017656125021647

Biological 94.17536832951598 -0.010618487803530948

Radiological nan nan

region_txt_Australasia & Oceania 34.76414035389707 -0.028765273348342692

region_txt_Central America & Caribbean 6.06615986061573 -0.16484893622610491

region_txt_Central Asia 15.81258156813923 -0.0632407804943691

region_txt_East Asia 19.19852424884094 -0.05208733687227929

region_txt_Eastern Europe 6.55064050983634 -0.1526568277557615

region_txt_Middle East & North Africa 1.2740586925453918 -0.784893196719328

region_txt_North America 13.149964586547407 -0.07604583217075833

region_txt_South America 4.330705616392953 -0.23090925326688466

region_txt_South Asia 1.448498807376213 -0.6903699160176624

region_txt_Southeast Asia 3.9628690932320945 -0.2523424257712246

region_txt_Sub-Saharan Africa 2.9557661000491535 -0.3383217636819674

region_txt_Western Europe 6.941663439866879 -0.1440576900137321

```
/usr/local/lib/python3.6/dist-packages/scipy/stats/stats.py:2315: RuntimeWarning: invalid
value encountered in true_divide
  return (a - mns) / sstd
```

Duplicates

Now in this we want to look through the data and make sure that there are not any duplicates laying around.

In [0]:

```
#First a quick look at the number of rows present
df.shape
```

Out[0]:

```
(138075, 70)
```

In [0]:

```
df.sort_values('nkill',ascending=False).head(5)
```

Out[0]:

	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	vicinity	suicide
73126	2001-09-11	0	United States	40.697132	-73.931351	1	1384.0	5.0	8190.0	1.0	0.0	1
73127	2001-09-11	0	United States	40.697132	-73.931351	1	1383.0	5.0	8191.0	1.0	0.0	1
55934	1994-04-13	0	Rwanda	-1.932787	30.332456	1	1180.0	0.0	0.0	1.0	0.0	0
133225	2014-06-10	0	Iraq	36.407394	42.964626	1	670.0	0.0	0.0	1.0	0.0	0
179671	2017-10-14	0	Somalia	2.059819	45.326115	1	588.0	1.0	316.0	1.0	0.0	1

In [0]:

```
#Here we check to see wheter or not there are any duplicates based upon those features.
#theese af been selected using the 9/11 data above
df.duplicated(subset=['timestamp','country_txt','latitude','longitude','gname']).sum()
```

Out[0]:

```
20883
```

In [0]:

```
#Here we drop the duplicates
df=df.drop_duplicates(subset=['timestamp','country_txt','latitude','longitude','gname'],
keep='first')
```

In [0]:

```
#checking to see if it worked
df.sort_values('nkill',ascending=False).head(5)
```

Out[0]:

	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	vicinity	suicide
73126	2001-09-11	0	United States	40.697132	-73.931351	1	1384.0	5.0	8190.0	1.0	0.0	1
55934	1994-04-13	0	Rwanda	-1.932787	30.332456	1	1180.0	0.0	0.0	1.0	0.0	0
133225	2014-06-10	0	Iraq	36.407394	42.964626	1	670.0	0.0	0.0	1.0	0.0	0
179671	2017-10-14	0	Somalia	2.059819	45.326115	1	588.0	1.0	316.0	1.0	0.0	1
76347	2004-03-21	0	Nepal	27.959441	84.895897	1	518.0	500.0	216.0	1.0	0.0	0

Now we do the same thing with the outlier data frame

In [0]:

```
#first check
df_out2.sort_values('nkill',ascending=False).head(5)
```

Out[0]:

	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	vicinity	suicide
45754	1991-03-10	0	Mozambique	-23.022193	32.718138	1	25.0	0.0	19.0	1.0	0.0	0
81904	2006-11-24	0	Iraq	33.303566	44.371773	1	25.0	0.0	14.0	1.0	0.0	0
151863	2015-08-15	0	Somalia	4.735380	45.202400	1	25.0	25.0	40.0	0.0	1.0	0
27076	1986-01-12	0	El Salvador	13.967553	-89.139633	1	25.0	0.0	13.0	1.0	0.0	0
99997	2011-01-24	0	Iraq	32.604393	44.007145	1	25.0	0.0	40.0	1.0	0.0	0

In [0]:

```
#Here we check to see wheter or not there are any duplicates based upon those features.
#theese af been selected using the 9/11 data above
df_out2.duplicated(subset=['timestamp','country_txt','latitude','longitude','gname']).sum()
```

Out[0]:

```
1826
```

In [0]:

```
#Here we drop the duplicates
df_outdup=df_out2.drop_duplicates(subset=['timestamp','country_txt','latitude','longitude
```

```
','gname'],keep='first')
```

In [0]:

```
#checking to see if it worked
df_out2.sort_values('nkill',ascending=False).head(5)
```

Out[0]:

	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	vicinity	suicide
45754	1991-03-10	0	Mozambique	-23.022193	32.718138	1	25.0	0.0	19.0	1.0	0.0	0
81904	2006-11-24	0	Iraq	33.303566	44.371773	1	25.0	0.0	14.0	1.0	0.0	0
151863	2015-08-15	0	Somalia	4.735380	45.202400	1	25.0	25.0	40.0	0.0	1.0	0
27076	1986-01-12	0	El Salvador	13.967553	-89.139633	1	25.0	0.0	13.0	1.0	0.0	0
99997	2011-01-24	0	Iraq	32.604393	44.007145	1	25.0	0.0	40.0	1.0	0.0	0

Save

lastly we save the data to a computer and transfer it to a dropbox in order to have it readily available to use in other colabs. where we perform the next steps of the analysis

In [0]:

```
df_out2.to_csv('clean_dataframe.csv')
from google.colab import files
files.download('clean_dataframe.csv')


df.to_csv('out_dataframe.csv')
from google.colab import files
files.download('out_dataframe.csv')
```

Data Exploration-colab 2

link to the colab https://colab.research.google.com/drive/1Npu6iR3X0U5bkurTj8O4BbgVof40vwtf

This colab will build and expand upon the work done in the data cleaning one

The goal of this colab is to, explore different part of the data, and try to gain some insight into what the data actually says.

Preparation

Before we start to explore the data we need to both get the correct files loaded into the colab, and to the relevant packages that we know we are going to be using.

In [0]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [0]:

```
!wget https://www.dropbox.com/s/s8nl55go4o8powf/globalterrorismdb_0718dist.csv.zip
!unzip globalterrorismdb_0718dist.csv.zip
!wget https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl=0 #with outliers
```

```
--2019-09-26 15:24:49--  https://www.dropbox.com/s/s8nl55go4o8powf/globalterrorismdb_0718
dist.csv.zip
Resolving www.dropbox.com (www.dropbox.com)... 162.125.1.1, 2620:100:6016:1::a27d:101
Connecting to www.dropbox.com (www.dropbox.com)|162.125.1.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/s8nl55go4o8powf/globalterrorismdb_0718dist.csv.zip [following]
--2019-09-26 15:24:50--  https://www.dropbox.com/s/raw/s8nl55go4o8powf/globalterrorismdb_
0718dist.csv.zip
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com/cd/0/inline/ApTz
jJUehdtFbe3-go5qXIm0Ej50mq7BTZWZ-ehD4Ryfi9AeZJpNeU4IPbZrwK5V3fuk5sRpwccJf8fQSNypqn0leIUU5
Dh-c8B0K4tyu04hrmDA53bI-IGhXMuju8mTjyI/file# [following]
--2019-09-26 15:24:50--  https://uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com/c
d/0/inline/ApTzjJUehdtFbe3-go5qXIm0Ej50mq7BTZWZ-ehD4Ryfi9AeZJpNeU4IPbZrwK5V3fuk5sRpwccJf8
fQSNypqn0leIUU5Dh-c8B0K4tyu04hrmDA53bI-IGhXMuju8mTjyI/file
Resolving uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com (uc793e2c6f5fbbf7b37e91f
63ff9.dl.dropboxusercontent.com)... 162.125.8.6, 2620:100:6016:6::a27d:106
Connecting to uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com (uc793e2c6f5fbbf7b37
e91f63ff9.dl.dropboxusercontent.com)|162.125.8.6|:443... connected.
HTTP request sent, awaiting response... 302 FOUND
Location: /cd/0/inline2/ApRJ4cfUNuTMGRtvKwoevb4sXVJSzr0_eqNMDbIP6XItKzcFwoxg34NFwNoHX0xSO
FXO8AS9-Gchk0tDxG-1Q6hFlywSoQfDPYADtbz9jOqNbDpbCWVBef7iJmVVk7bN0cs1txrbBWGX-V7JeN4LXe1CnP
ReiSaGKmK4IagaB-jw103DM3ct_wV0ZdNRhneF7aCJshRt85tBmuw48hLn3VtthC-nglxJdFy25UAUesk476-dTHI
Z5PSO03A6iz7y-LXa6lF1BudIwankf5P36oLjQ3zhWljfx5UGipHvJFs6oanYNZkor4R1r6901KSOhJ-J4nV1286J
kvUJ501BlU-3tmZwdDLKPsI5rYd3TCTkXQ/file [following]
--2019-09-26 15:24:51--  https://uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com/c
d/0/inline2/ApRJ4cfUNuTMGRtvKwoevb4sXVJSzr0_eqNMDbIP6XItKzcFwoxg34NFwNoHX0xSOFXO8AS9-Gchk
0tDxG-1Q6hFlywSoQfDPYADtbz9jOqNbDpbCWVBef7iJmVVk7bN0cs1txrbBWGX-V7JeN4LXe1CnPReiSaGKmK4Ia
gaB-jw103DM3ct_wV0ZdNRhneF7aCJshRt85tBmuw48hLn3VtthC-nglxJdFy25UAUesk476-dTHIZ5PSO03A6iz7
y-LXa6lF1BudIwankf5P36oLjQ3zhWljfx5UGipHvJFs6oanYNZkor4R1r6901KSOhJ-J4nV1286JkvUJ501BlU-3
tmZwdDLKPsI5rYd3TCTkXQ/file
Reusing existing connection to uc793e2c6f5fbbf7b37e91f63ff9.dl.dropboxusercontent.com:443
.
HTTP request sent, awaiting response... 200 OK
Length: 29288124 (28M) [application/zip]
Saving to: 'globalterrorismdb_0718dist.csv.zip'
```

```
globalterrorismdb_0 100%[===================>]  27.93M  44.7MB/s    in 0.6s

2019-09-26 15:24:52 (44.7 MB/s) - 'globalterrorismdb_0718dist.csv.zip' saved [29288124/29
288124]

Archive:  globalterrorismdb_0718dist.csv.zip
  inflating: globalterrorismdb_0718dist.csv
   creating: __MACOSX/
  inflating: __MACOSX/._globalterrorismdb_0718dist.csv
--2019-09-26 15:24:55--  https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl
=0
Resolving www.dropbox.com (www.dropbox.com)... 162.125.1.1, 2620:100:6016:1::a27d:101
Connecting to www.dropbox.com (www.dropbox.com)|162.125.1.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/jchj5huazph1htx/out_dataframe-8.csv [following]
--2019-09-26 15:24:55--  https://www.dropbox.com/s/raw/jchj5huazph1htx/out_dataframe-8.cs
v
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc8f5d93111c35166c5061095e52.dl.dropboxusercontent.com/cd/0/inline/ApRj
HvUWTjcxJCMuwdoWOzmQV5sCyPvW9gyIMGDzIfiZbxsgOiLMVDRoHHV2ffrms06vZgSZ-HF7WnwBankqiT2HppYHg
h3Aosc_ouQjqrLT9EQkwHDktD2LVAMosNhsHSU/file# [following]
--2019-09-26 15:24:56--  https://uc8f5d93111c35166c5061095e52.dl.dropboxusercontent.com/c
d/0/inline/ApRjHvUWTjcxJCMuwdoWOzmQV5sCyPvW9gyIMGDzIfiZbxsgOiLMVDRoHHV2ffrms06vZgSZ-HF7Wn
wBankqiT2HppYHgh3Aosc_ouQjqrLT9EQkwHDktD2LVAMosNhsHSU/file
Resolving uc8f5d93111c35166c5061095e52.dl.dropboxusercontent.com (uc8f5d93111c35166c50610
95e52.dl.dropboxusercontent.com)... 162.125.1.6, 2620:100:6016:6::a27d:106
Connecting to uc8f5d93111c35166c5061095e52.dl.dropboxusercontent.com (uc8f5d93111c35166c5
061095e52.dl.dropboxusercontent.com)|162.125.1.6|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24660479 (24M) [text/plain]
Saving to: 'out_dataframe-8.csv?dl=0'

out_dataframe-8.csv 100%[===================>]  23.52M  8.12MB/s    in 2.9s

2019-09-26 15:24:59 (8.12 MB/s) - 'out_dataframe-8.csv?dl=0' saved [24660479/24660479]
```

In [0]:

```
df_org=pd.read_csv('globalterrorismdb_0718dist.csv', encoding="ISO-8859-1", usecols=['iy
ear','imonth','iday','extended','resolution','country_txt','region_txt','provstate','succ
ess','suicide','attacktype1_txt','attacktype2_txt','attacktype3_txt','targtype1_txt','tar
gtype2_txt','targtype3_txt','natlty1_txt','gname','claimed','weaptype1_txt','weaptype2_tx
t','weaptype3_txt','nkill','nwound','property','crit1','crit2','crit3','individual','vic
inity','nkillter'])
df=pd.read_csv('out_dataframe-8.csv?dl=0', encoding="ISO-8859-1", index_col='Unnamed: 0')
```

```
/usr/local/lib/python3.6/dist-packages/IPython/core/interactiveshell.py:2718: DtypeWarnin
g: Columns (6,31,33,90) have mixed types. Specify dtype option on import or set low_memor
y=False.
  interactivity=interactivity, compiler=compiler, result=result)
```

The reason we also load the original dataset is to do data exploration on some of the variabels before we turn them in to dummies. So here we make a dataset with the original features instead of the dummies.

In [0]:

```
df_nodum1 = df.loc[:,'timestamp':'crit3']
df_nodum2 = df_org.loc[:,['attacktype1_txt','targtype1_txt','weaptype1_txt']]
df_nodum = pd.merge(df_nodum1, df_nodum2, how='left', left_index=True, right_index=True)
```

Exploration

Trough the exploration of the data we want to see, if there is any correlation between cosen features, and get some general looks into the data.

Correlation between the features

To gain insight into whether or not there is any correlation in the data, we run the .corr function.

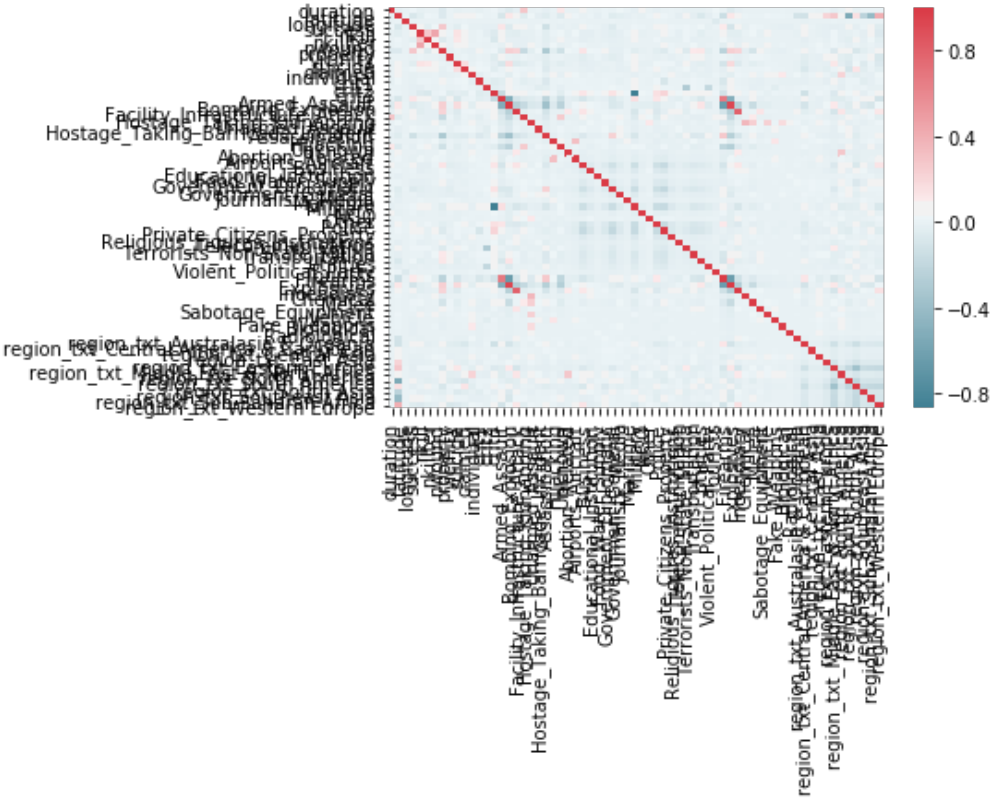
This is only used on the data not containing the dummies, as the inclusion of them makes the visualisation less readable, as illustated below.

In [0]:

```
#As you can see, this plot makes the data almost unreadable and factors in to many dummie
s that do not correlate with anything.
corr = df.loc[:,'timestamp':'region_txt_Western Europe'].corr()
sns.heatmap(corr, xticklabels=corr.columns, yticklabels=corr.columns, cmap=sns.diverging
_palette(220, 10, as_cmap=True))
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7e95aa7358>
```

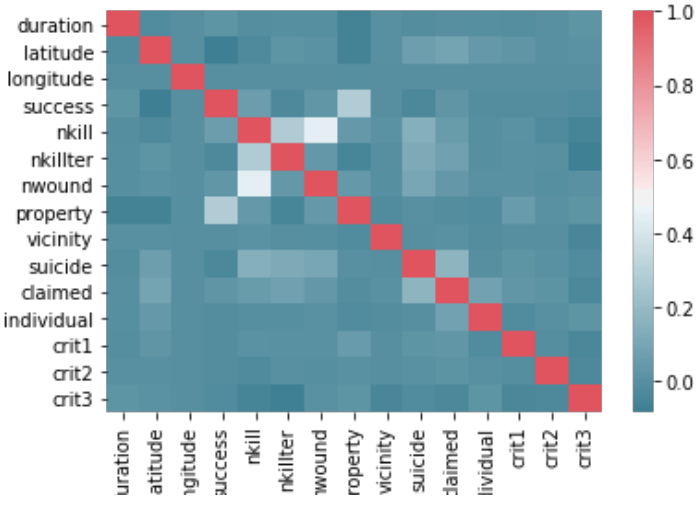


In [0]:

```
#Here the dummies are filtered out and the visualisation becomes readable.
corr = df_nodum1.corr()
sns.heatmap(corr, xticklabels=corr.columns, yticklabels=corr.columns, cmap=sns.diverging
_palette(220, 10, as_cmap=True),center=0.5)
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7e92007d68>
```



It can be seen above, that there aren't any strong correlations in the data, but that there are some like nkill and kwound.

Distribution of nkill and nwound

looking at the distribution of wounded or killed is intresting, since a lot of terrorist attacks appear to not inflict that many casualties.

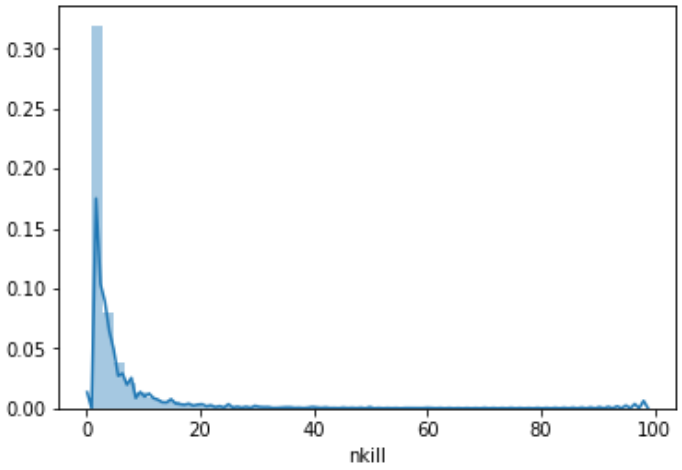
The two following plots have been limeted to being between 0 and 100, this is done, since a lot of attack don't have wounded/killed, and a few have so many, that it would skew the visualisation unnecessarily.

In [0]:

```
#The distribution of killed in tne attacks
killed=df[(df['nkill']>0)&(df['nkill']<100)]
sns.distplot(killed['nkill'])
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7e91fd3d68>
```

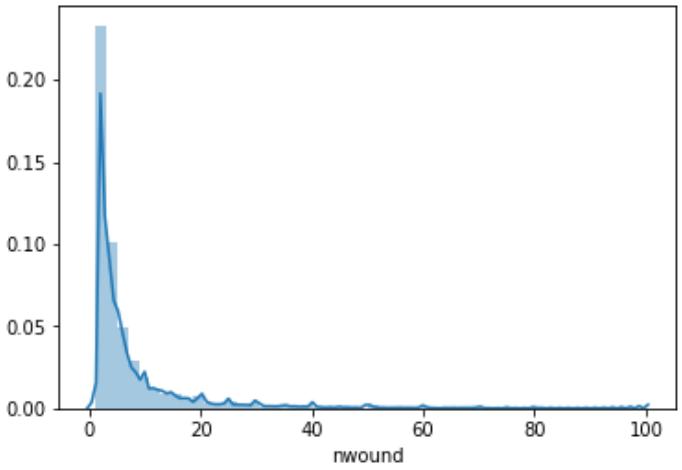


In [0]:

```
#The distribution of the wounded
wounded=df[(df['nwound']>0)&(df['nwound']<100)]
sns.distplot(wounded['nwound'])
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7e9073e7b8>
```



Top 10 countries with most people killed

It's also intresting to see which countries have the most killed from attacks

It's also intresting to see which countries have the most killed from attacks.

The choice of the barplot here, is made since it gives a good simple overview og the "top 10"

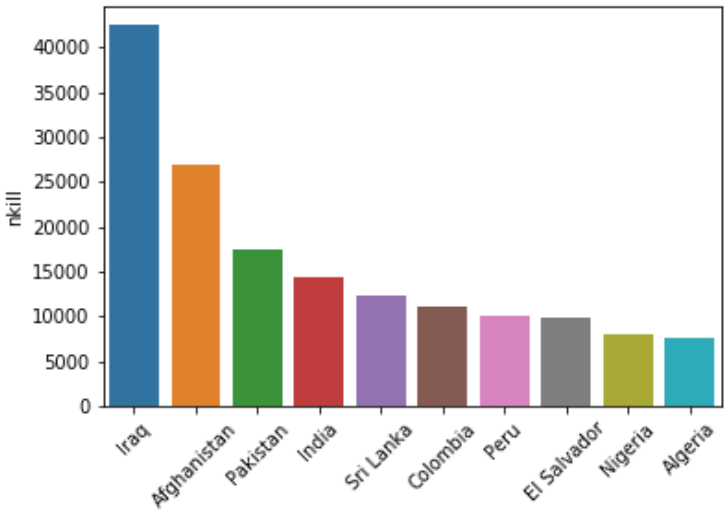
To little surprise the top 10 is filled almost exclusively with war torn countries.

In [0]:

```
top_10=df.groupby(['country_txt']).sum().sort_values('nkill', ascending=False).head(10)
sns.barplot(x=top_10.index.values ,y='nkill',data=top_10)
plt.xticks(rotation=45)
```

Out[0]:

```
(array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]), <a list of 10 Text xticklabel objects>)
```

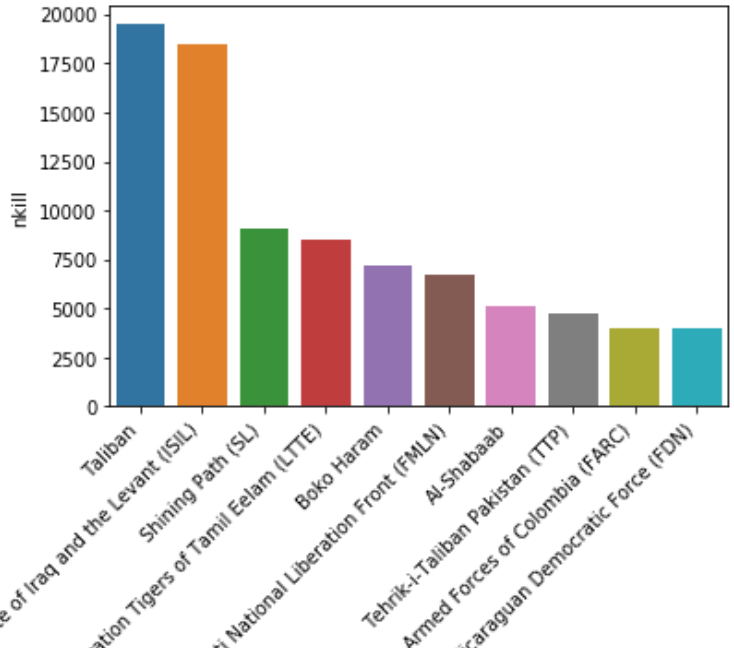


Worst terror groups

At the other end of the spectrum it is intresting to see if the groups that rack up the most kills, are also the groups that are known to operate in the same countries or regions as the countries that have the most killed.

In [0]:

```
top_10=df.groupby(['gname']).sum().sort_values('nkill', ascending=False).head(11)
top_10.drop('Unknown',inplace=True) #We are not interested in all the 'Unknown'
Plot=sns.barplot(x=top_10.index.values ,y='nkill',data=top_10)
plt.xticks(rotation=45)
Plot.set_xticklabels(Plot.get_xticklabels(), rotation=45, horizontalalignment='right')
print(' ') #Just so it doesnt plot some wiered stuff before
```



By comparing the terror groups and the contries in the "top 10" there is a clear connection.

5 most deadly attacks

Intrestingly engough it does not appear, as if the deadliest attacks took place in the top 10 countries. Only 1 attack out of the 5 the most deadly, appear to be in the top 10 deadly countries.

In [0]:

```
df.sort_values('nkill',ascending=False).head(5)
```

Out[0]:

	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound	property	vicinity	suicide
73126	2001-09-11	0	United States	40.697132	-73.931351	1	1384.0	5.0	8190.0	1.0	0.0	1
55934	1994-04-13	0	Rwanda	-1.932787	30.332456	1	1180.0	0.0	0.0	1.0	0.0	0
133225	2014-06-10	0	Iraq	36.407394	42.964626	1	670.0	0.0	0.0	1.0	0.0	0
179671	2017-10-14	0	Somalia	2.059819	45.326115	1	588.0	1.0	316.0	1.0	0.0	1
76347	2004-03-21	0	Nepal	27.959441	84.895897	1	518.0	500.0	216.0	1.0	0.0	0

There were 29 attacks in Denmark

It is interesting to see that even in Denmark 29 terror attacks are recorded in this dataset.

In [0]:

```
print(df[df['country_txt'] == 'Denmark'].shape[0])
```

```
29
```

Looking at attacktype

Trough this quick look at the preferred method of attack, it becomes clear, that terrorist through the last 50 years, prefer to use forms of attack that sow the most chaos and panic. In the second line of code we gain an insight into results of the different of attacks.

In [0]:

```
df_nodum.attacktype1_txt.value_counts()
```

Out[0]:

```
Bombing/Explosion                      55836
Armed Assault                          28878
Assassination                          14863
```

```
Facility/Infrastructure Attack          7294
Unknown                                 4414
Hostage Taking (Kidnapping)             4058
Unarmed Assault                          721
Hostage Taking (Barricade Incident)      651
Hijacking                                477
Name: attacktype1_txt, dtype: int64
```

In [0]:

```
#By looking at the mean of the attack types in the different columns we gain insight into the serverity of the different types
df_nodum.drop(columns=['country_txt','latitude','longitude']).groupby(by=['attacktype1_txt']).mean()
```

Out[0]:

attacktype1_txt	duration	success	nkill	nkillter	nwound	property	vicinity	suicide	claimed	individual	
Armed Assault	0.011566	0.937530	3.632419	0.412909	2.011739	0.515340	0.089722	0.001073	0.093670	0.005575	0
Assassination	0.007065	0.747763	1.299132	0.034919	0.756442	0.174796	0.043598	0.012514	0.059140	0.002220	0
Bombing/Explosion	0.001540	0.845745	1.823035	0.203632	4.595386	0.689573	0.072910	0.070761	0.112132	0.002060	0
Facility/Infrastructure Attack	0.004524	0.942418	0.315191	0.032218	0.417741	0.953112	0.058267	0.000137	0.116808	0.010831	0
Hijacking	0.335430	0.855346	4.534591	0.140461	18.379455	0.312369	0.098532	0.016771	0.094340	0.037736	0
Hostage Taking (Barricade Incident)	0.251920	0.992320	4.187404	0.385561	4.522273	0.760369	0.033794	0.058372	0.167435	0.024578	0
Hostage Taking (Kidnapping)	3.397979	0.949975	1.761705	0.049285	0.494579	0.088960	0.084771	0.001232	0.123213	0.002218	0
Unarmed Assault	0.012483	0.866852	0.872399	0.049931	18.110957	0.368932	0.069348	0.000000	0.117892	0.056865	0
Unknown	0.005211	0.806751	4.255097	1.305845	2.369053	0.426597	0.078614	0.000453	0.115541	0.000227	0

Regions

Due to the geo political enviroment that terrorist attacks exist in, we regonise that the classical traits of a terrorist attack might vary a lot between the world regions.

So by just choosing one world region we expect to see a higher correlation between the variables, or maybe just a different picture.

As showen in the 5 most deadly attacks, there are som extreame values in nkilled, and we have found that is also true in nwound and nkillter. So we have decided to study Western Europe, as it seem to be without so many extreme values.

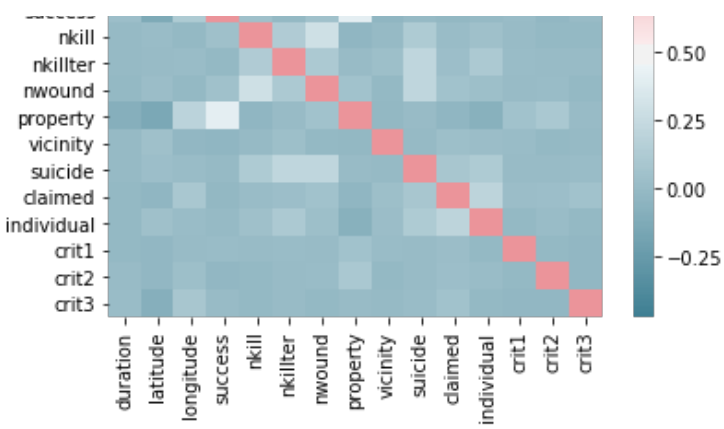
So first we look at the correlation tabel again.

In [16]:

```
df_west= df[ df['region_txt_Western Europe'] == 1 ]
df_west_nodum1 = df_west.loc[:,'timestamp':'crit3'] #Rand now removing the dummies for this data as well
corr = df_west_nodum1.corr()
sns.heatmap(corr, xticklabels=corr.columns, yticklabels=corr.columns,cmap=sns.diverging_palette(220, 10, as_cmap=True),center=0.5)
```

Out[16]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7e904fc6a0>
```



So just looking at Western Europe did not change too much on the pattern of the heatmap.

Colab 3

Link to colab https://colab.research.google.com/drive/1IQVKf8xx1GrAdql8N2O_ejgJsyCRLN7I

Unsupervised learning

Importing, Loading and Preperation

In [0]:

```
#Import most standard packages
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [0]:

```
#Load features
!wget https://www.dropbox.com/s/1wicz60figuzwpb/clean_dataframe-8.csv?dl=0 #without outl
iers
!wget https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl=0 #with outliers
```

```
--2019-09-26 18:12:57--  https://www.dropbox.com/s/1wicz60figuzwpb/clean_dataframe-8.csv?
dl=0
Resolving www.dropbox.com (www.dropbox.com)... 162.125.9.1, 2620:100:601f:1::a27d:901
Connecting to www.dropbox.com (www.dropbox.com)|162.125.9.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/1wicz60figuzwpb/clean_dataframe-8.csv [following]
--2019-09-26 18:12:58--  https://www.dropbox.com/s/raw/1wicz60figuzwpb/clean_dataframe-8.
csv
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc2d64c72a9a8f465070e73c00de.dl.dropboxusercontent.com/cd/0/inline/ApQZ
lBJ3JToouJBcMVXuEoZuIGeV3gGnPuPlQ2yQcF4xzcxHC3BPq-nTYGvtI-jAx8dESshXSLzJN3MD4q7fOtXI0aVc8
NlB1l_LvUpRoJ7HXFhhjMgBjZfqL8mGJ-YL-48/file# [following]
--2019-09-26 18:12:58--  https://uc2d64c72a9a8f465070e73c00de.dl.dropboxusercontent.com/c
d/0/inline/ApQZlBJ3JToouJBcMVXuEoZuIGeV3gGnPuPlQ2yQcF4xzcxHC3BPq-nTYGvtI-jAx8dESshXSLzJN3
MD4q7fOtXI0aVc8NlB1l_LvUpRoJ7HXFhhjMgBjZfqL8mGJ-YL-48/file
Resolving uc2d64c72a9a8f465070e73c00de.dl.dropboxusercontent.com (uc2d64c72a9a8f465070e73
c00de.dl.dropboxusercontent.com)... 162.125.9.6, 2620:100:601f:6::a27d:906
Connecting to uc2d64c72a9a8f465070e73c00de.dl.dropboxusercontent.com (uc2d64c72a9a8f46507
0e73c00de.dl.dropboxusercontent.com)|162.125.9.6|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 5187927 (4.9M) [text/plain]
Saving to: 'clean_dataframe-8.csv?dl=0.15'

clean_dataframe-8.c 100%[===================>]   4.95M  --.-KB/s    in 0.1s

2019-09-26 18:12:59 (33.7 MB/s) - 'clean_dataframe-8.csv?dl=0.15' saved [5187927/5187927]

--2019-09-26 18:13:07--  https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl
=0
Resolving www.dropbox.com (www.dropbox.com)... 162.125.9.1, 2620:100:601f:1::a27d:901
Connecting to www.dropbox.com (www.dropbox.com)|162.125.9.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/jchj5huazph1htx/out_dataframe-8.csv [following]
--2019-09-26 18:13:07--  https://www.dropbox.com/s/raw/jchj5huazph1htx/out_dataframe-8.cs
v
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com/cd/0/inline/ApTc
gE3-AZIKcGoF1UeC6xkFlRy0826qBCnRqYCb0HE4in6myo4GmczEepA8hzFmBpDP4wKLvyQcrU8YkjVjHmOQsRBcm
hz1CUWgzgLppbnd3Q2AvRULQWKNTbMEhT2FS3o/file# [following]
```

```
--2019-09-26 18:13:08--  https://ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com/cd/0/inline/ApTcgE3-AZIKcGoF1UeC6xkFlRy0826qBCnRqYCb0HE4in6myo4GmczEepA8hzFmBpDP4wKLvyQcrU8YkjVjHmOQsRBcmhz1CUWgzgLppbnd3Q2AvRULQWKNTbMEhT2FS3o/file
Resolving ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com (ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com)... 162.125.9.6, 2620:100:601f:6::a27d:906
Connecting to ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com (ucc55f76a1427302360bf417d539.dl.dropboxusercontent.com)|162.125.9.6|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24660479 (24M) [text/plain]
Saving to: 'out_dataframe-8.csv?dl=0.15'

out_dataframe-8.csv 100%[===================>]  23.52M  71.6MB/s    in 0.3s

2019-09-26 18:13:08 (71.6 MB/s) - 'out_dataframe-8.csv?dl=0.15' saved [24660479/24660479]
```

In [0]:

```
#Loadings csv files with and without out outliers so that the effects of the outliers can be seen.
df_clean2=pd.read_csv('clean_dataframe-8.csv?dl=0')  #without outliers
df_out2=pd.read_csv('out_dataframe-8.csv?dl=0')    #with outliers
```

Choose the dataset!!

In [0]:

```
#Save df_out as the df to make run the analysis on it.
#Filter for Western Europe due to the problems mentioned in the data exploration & stakeholder report
#The fact that many terrorist attacks in Asia, the Middle East, & Africa don't follow our difinition of a terrist attack)
df=df_out2[df_out2['region_txt_Western Europe']==1]
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 11058 entries, 8 to 117185
Data columns (total 71 columns):
Unnamed: 0                                  11058 non-null int64
timestamp                                   11058 non-null object
duration                                    11058 non-null int64
country_txt                                 11058 non-null object
latitude                                    11058 non-null float64
longitude                                   11058 non-null float64
success                                     11058 non-null int64
nkill                                       11058 non-null float64
nkillter                                    11058 non-null float64
nwound                                      11058 non-null float64
property                                    11058 non-null float64
vicinity                                    11058 non-null float64
suicide                                     11058 non-null int64
claimed                                     11058 non-null float64
gname                                       11058 non-null object
individual                                  11058 non-null int64
crit1                                       11058 non-null int64
crit2                                       11058 non-null int64
crit3                                       11058 non-null int64
Armed_Assault                               11058 non-null int64
Bombing_Explosion                           11058 non-null int64
Facility_Infrastructure_Attack              11058 non-null int64
Hostage_Taking_Kidnapping                   11058 non-null int64
Unarmed_Assault                             11058 non-null int64
Hostage_Taking_Barricade_Incident           11058 non-null int64
Assassination                               11058 non-null int64
Hijacking                                   11058 non-null int64
Unknown                                     11058 non-null int64
Abortion_Related                            11058 non-null int64
Airports_Aircraft                           11058 non-null int64
Business                                    11058 non-null int64
Educational_Institution                     11058 non-null int64
Food_Water_Supply                           11058 non-null int64
```

```
Government_Diplomatic                        11058 non-null int64
Government_General                           11058 non-null int64
Journalists_Media                            11058 non-null int64
Maritime                                     11058 non-null int64
Military                                     11058 non-null int64
NGO                                          11058 non-null int64
Other                                        11058 non-null int64
Police                                       11058 non-null int64
Private_Citizens_Property                    11058 non-null int64
Religious_Figures_Institutions               11058 non-null int64
Telecommunication                            11058 non-null int64
Terrorists_Non-State_Militia                 11058 non-null int64
Transportation                               11058 non-null int64
Utilities                                    11058 non-null int64
Violent_Political_Party                      11058 non-null int64
Tourists                                     11058 non-null int64
Firearms                                     11058 non-null int64
Explosives                                   11058 non-null int64
Incendiary                                   11058 non-null int64
Chemical                                     11058 non-null int64
Melee                                        11058 non-null int64
Sabotage_Equipment                           11058 non-null int64
Vehicle                                      11058 non-null int64
Fake_Weapons                                 11058 non-null int64
Biological                                   11058 non-null int64
Radiological                                 11058 non-null int64
region_txt_Australasia & Oceania             11058 non-null int64
region_txt_Central America & Caribbean       11058 non-null int64
region_txt_Central Asia                      11058 non-null int64
region_txt_East Asia                         11058 non-null int64
region_txt_Eastern Europe                    11058 non-null int64
region_txt_Middle East & North Africa        11058 non-null int64
region_txt_North America                     11058 non-null int64
region_txt_South America                     11058 non-null int64
region_txt_South Asia                        11058 non-null int64
region_txt_Southeast Asia                    11058 non-null int64
region_txt_Sub-Saharan Africa                11058 non-null int64
region_txt_Western Europe                    11058 non-null int64
dtypes: float64(8), int64(60), object(3)
memory usage: 6.1+ MB
```

Scaling and initialising

In [0]:

```
#Importing the MinMaxScaler and saving to MMscaler_reduced
from sklearn.preprocessing import MinMaxScaler
MMscaler_reduced = MinMaxScaler()
```

Reasons for choosing MinMaxScaler instead of Standard Scaler:

The reason for usings this scaler instead of the standard scaler is that we don't want to de-enthisise the more extreme values. Attacks such as the Madrid bomings, 11th of septmeber and other notable attacks don't follow the normal attack types, mentioned in the data exploration

The normal attacks, didn't kill or wound many people acording to our data exploration

In [0]:

```
#Saving the selected column names to a list we then use to create new data frame
features_dum=df.columns[6:58].tolist() #Armed_Assult : Radiological
features_nmf=df.columns[2:10].tolist() #Duration : Crit3
#We drop the data that we features for dum that aren't categorical, and drop the categori
cal variables from nmf-list.
features_dum.remove('gname')
features_dum.remove('nkill')
features_nmf.remove('nkill')
features_dum.remove('nkillter')
```

```
features_dum.remove('nwound')
features_nmf.remove('country_txt')
features_nmf.remove('success')
```

In [0]:

```
#We save the features into df_dum and df_nmf
#df_nmf contains the data we want to keep
#df_dum contain all our categorical variables
#We want first to redures our categorical variables into fewer and more usable features w
hich we do with Non-negative Matrix Factorization (NMF)
df_dum = df.loc[:,features_dum]
df_nmf = df.loc[:,features_nmf]
df_nmf.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 11058 entries, 8 to 117185
Data columns (total 6 columns):
duration     11058 non-null int64
latitude     11058 non-null float64
longitude    11058 non-null float64
nkill        11058 non-null float64
nkillter     11058 non-null float64
nwound       11058 non-null float64
dtypes: float64(5), int64(1)
memory usage: 604.7 KB
```

NMF

When reducing features, NMF is more suited for reducing categorical data, while keeping the patterns observed in them. After reducing the categorical data with NMF it become possible to viasulize it, and further reduce it with PCA.

PCA is usually used in language and image recognition. PCA creats Topics(new features) which are characterized by a pattern of the old features. We can then remove the old features without lossing information.

In [0]:

```
#Importing NMF, saving the model, specifying the desired number of components, and fittin
g the data
from sklearn.decomposition import NMF
model = NMF(n_components=7)
dummies_reduced = model.fit_transform(df_dum)
```

In [0]:

```
#Compressing the data into a data frame
dummies_reduced_components = pd.DataFrame(model.components_, columns=list(features_dum))
#Examining how the NMF grouped the observations into themes
#Thus we can redure 38 dummy variables into 7 features
for i in range(7):
  print("Most important features in component {}:" .format(i))
  print(dummies_reduced_components.iloc[i,:].nlargest())
```

```
Most important features in component 0:
Explosives           6.456892
Bombing_Explosion    6.422826
property             5.331915
crit1                4.963790
crit2                4.900358
Name: 0, dtype: float64
Most important features in component 1:
property                          4.202000
Incendiary                        4.181436
Facility_Infrastructure_Attack    3.835757
success                           3.821955
crit1                             3.395083
Name: 1, dtype: float64
Most important features in component 2:
```

```
Assassination    3.907799
crit1            3.137771
Firearms         3.053171
crit2            2.948409
success          2.783488
Name: 2, dtype: float64
Most important features in component 3:
Business    7.963511
crit3       2.744323
crit2       1.771894
crit1       1.652772
Unknown     0.672673
Name: 3, dtype: float64
Most important features in component 4:
Armed_Assault    3.524910
success          2.999794
Firearms         2.627024
crit1            2.182102
crit2            2.165704
Name: 4, dtype: float64
Most important features in component 5:
Private_Citizens_Property    7.005390
crit3                        3.143765
crit2                        2.214825
crit1                        1.965900
claimed                      0.571908
Name: 5, dtype: float64
Most important features in component 6:
Police        6.113036
crit3         2.787092
crit2         1.897408
crit1         1.770261
Explosives    0.613204
Name: 6, dtype: float64
```

PCA

To further reduce the the amount of features, we use Principal component analysis to find the most important features and kickout the less important ones.

In [0]:

```
#Importing PCA
from sklearn.decomposition import PCA
pca_reduced = PCA(n_components=13)
```

In [0]:

```
#We create a data frame with the new components from NMF
df_dummies_reduced = pd.DataFrame(data=dummies_reduced, columns=None)
df_nmf =df_nmf.reset_index(drop=True)
df_reduced = pd.merge(df_nmf, df_dummies_reduced, right_index=True, left_index=True)
```

In [0]:

```
#Scale the data set, using the fit transform method with the MinMax scaler
df_reduced_scaled = MMscaler_reduced.fit_transform(df_reduced)
```

In [0]:

```
#Fit our PCA model with the data from scaled combind dataframa
pca_data = pca_reduced.fit_transform(df_reduced_scaled)
pca_reduced.fit_transform(df_reduced_scaled)
```

Out[0]:

```
array([[ 3.99731786e-01, -2.15998904e-01, -2.50186749e-01, ...,
        -2.12735614e-03,  1.41408698e-03, -1.95509359e-03],
       [ 7.09171234e-01,  1.58584240e-01,  7.14074531e-01, ...,
```

```
        1.63338576e-02,  1.79846374e-02,  2.03334983e-02],
       [-5.19537540e-01, -4.91863521e-02,  1.27733233e-01, ...,
        -5.46357509e-03, -3.37204792e-03, -1.20727664e-04],
       ...,
       [ 4.87299806e-01, -4.35362002e-01,  2.84123580e-01, ...,
        -5.54354276e-03,  1.55214789e-04, -2.11724396e-03],
       [ 4.86709544e-01, -4.32522513e-01,  2.84356096e-01, ...,
        -4.19330857e-03,  1.91091179e-03, -2.66012906e-03],
       [ 7.01109116e-01,  1.70007572e-01,  7.04295319e-01, ...,
        -5.16998214e-04, -3.27103058e-04,  1.64781424e-04]])
```

In [0]:

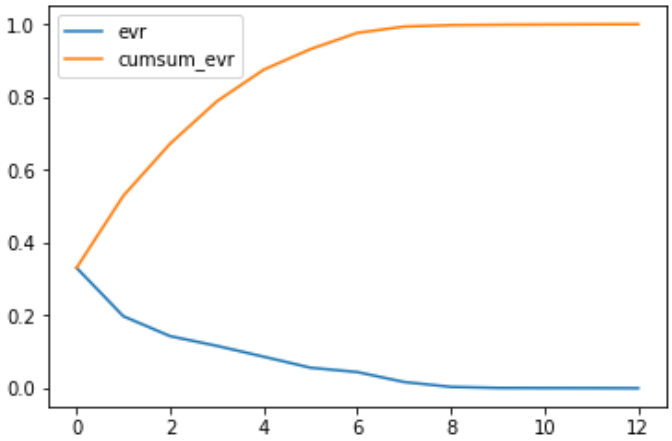
```
#Compute column names for visualizing PCA data
pca_features = range(pca_reduced.n_components_)
```

In [0]:

```
#Plot a graph showing how the explained variance by the number of components.
plot_data = pd.DataFrame({'evr': pca_reduced.explained_variance_ratio_, 'cumsum_evr': np
.cumsum(pca_reduced.explained_variance_ratio_)}).stack()
sns.lineplot(y = plot_data.values, x = plot_data.index.get_level_values(0), hue=plot_dat
a.index.get_level_values(1))
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fa0bdf34e10>
```



In [0]:

```
#Viewing the explained variance in numeric terms
np.cumsum(pca_reduced.explained_variance_ratio_)
```

Out[0]:

```
array([0.33098357, 0.52890614, 0.672118  , 0.78863349, 0.87534159,
       0.93184063, 0.97642074, 0.99362578, 0.99756882, 0.99859344,
       0.99927984, 0.99981529, 1.        ])
```

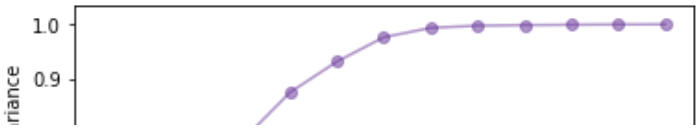
Here we can see how the first 5 features of the PCA explain 87% of the variation in the data.

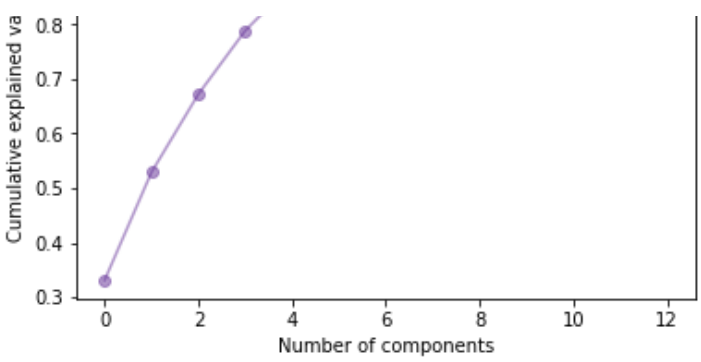
In [0]:

```
# The same as before but graphed
plt.plot(np.cumsum(pca_reduced.explained_variance_ratio_),'o-', c='#663399', alpha=.5)
plt.xlabel('Number of components')
plt.ylabel('Cumulative explained variance')
```

Out[0]:

```
Text(0, 0.5, 'Cumulative explained variance')
```





Clustering with K-means on reduced data

In [0]:

```
#Import and save KMeans to use for clustering the data
from sklearn.cluster import KMeans
kmeans = KMeans()
```

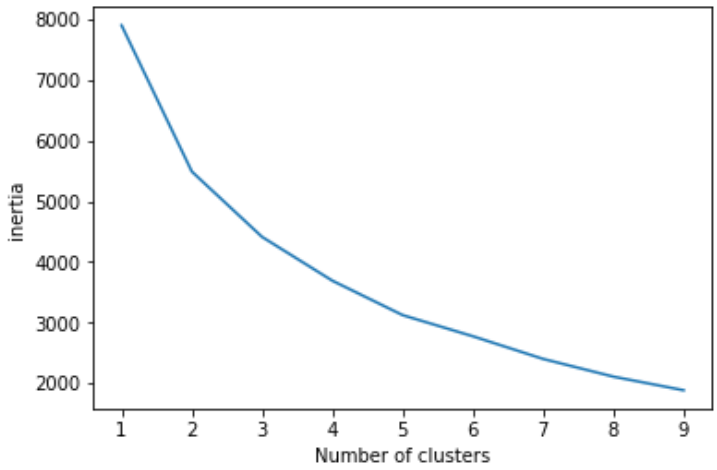
In [0]:

```
# Create a list inertia and a loop which fills out the list with  the .append function
# Then I map the inertia
inertia = []
for i in range(1,10):
  k_means = KMeans(n_clusters=i)
  inertia.append(k_means.fit(pca_data).inertia_)

sns.lineplot(y = inertia, x = range(1,10))
plt.ylabel('inertia')
plt.xlabel('Number of clusters')
```

Out[0]:

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



Using the graph of the Inertia we can use the elbow method so select the number of clusters.There's no clear elbow other than at 2, meaning at there are 3 clusters which expalin most of the variance before the effect of each cluster taper off

In [0]:

```
#select number of clusters
kmeans_NMF = KMeans(n_clusters=3)
kmeans_NMF.fit_transform(pca_data)
# I creatte a new label using the predict function
new_labels = kmeans_NMF.predict(pca_data)
#Saving the cluster in the original data frame for later analysis
df_reduced['clusters'] = new_labels
```

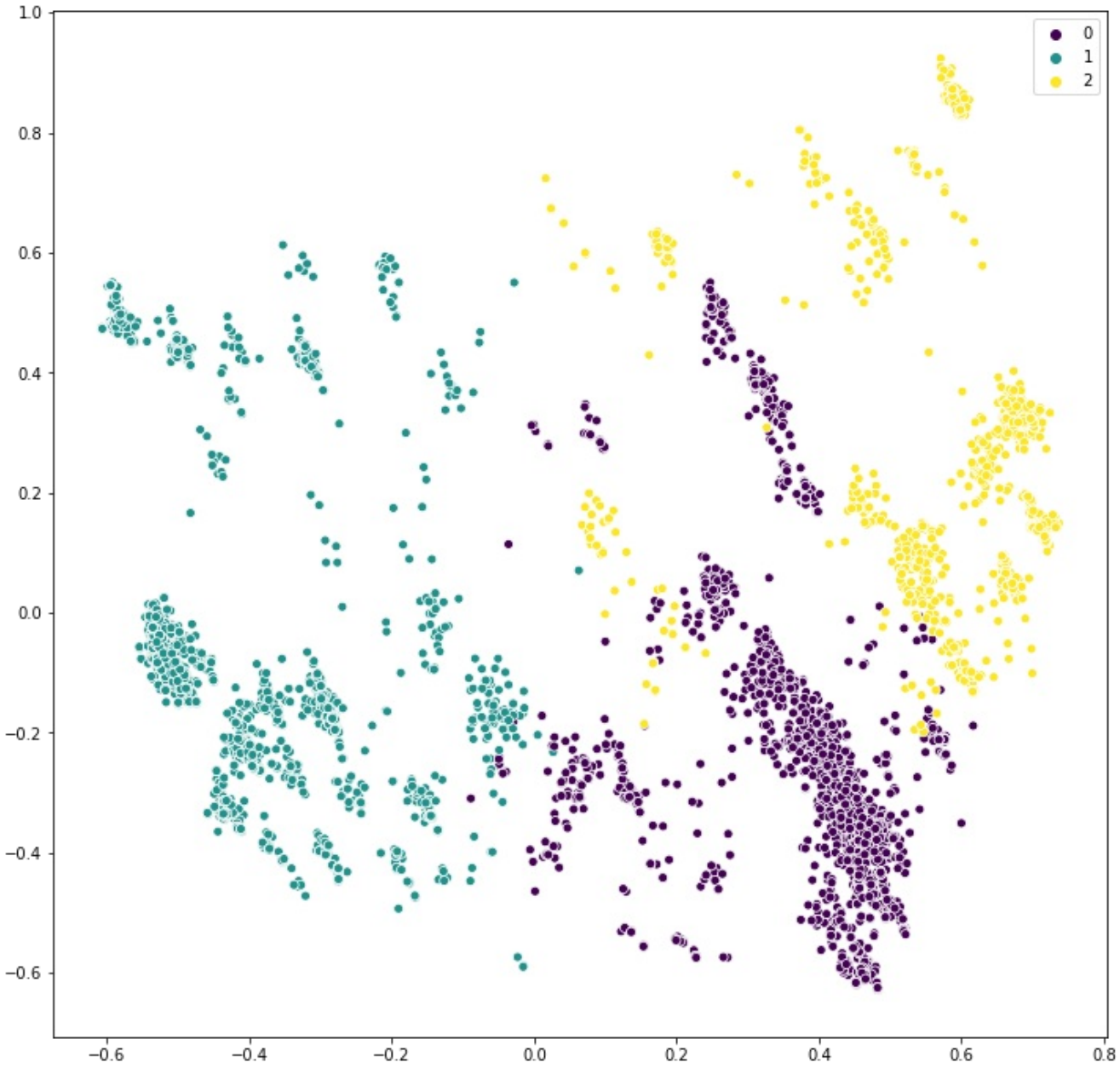
Saving the clusters in the data allows us to use the insights gained form PCA and K-means to as data in the

Saving the clusters in the data allows us to use the insigts gained form PCA, and K-means to as data in the supervised part of the analysis.

In [0]:

```
#The K-means view the how the is viewed,
kmeans_NMF.fit(pca_data)
plt.figure(figsize=(12,12))
g = sns.scatterplot(pca_data[:,0], pca_data[:,1], hue=kmeans_NMF.labels_,
                legend='full', palette='viridis')

legend = g.get_legend()
```



Data-exploration with new data and getting the data ready for exporting.

In [0]:

```
df_pca = pd.DataFrame(pca_data)
df_pca.head()
```

Out[0]:

	0	1	2	3	4	5	6	7	8	9	10	11	
0	**0.399732**	**-0.215999**	**-0.250187**	**-0.172903**	**-0.057803**	**0.283264**	**0.082644**	**-0.024978**	**0.040893**	**-0.005536**	**-0.002127**	**0.001414**	**0.**

1	0.709179	0.158584	0.714078	0.058314	0.087683	0.076783	0.170682	0.013326	0.036630	0.001149	0.016334	0.017985	0.
2	-0.519538	-0.049186	0.127733	0.099583	-0.106444	0.109760	-0.139881	-0.127097	-0.014958	0.003247	-0.005464	-0.003372	0.
3	-0.523817	-0.045627	0.121316	0.103489	-0.115272	0.140264	-0.101394	-0.076085	-0.012711	0.003249	0.030680	0.022381	0.
4	-0.500491	-0.098240	0.100876	0.098509	-0.081581	0.137787	0.108417	-0.029960	0.075687	-0.003089	-0.002610	-0.000553	0.

In [0]:

```
df_NMF = df_reduced
df_NMF.head()
```

Out[0]:

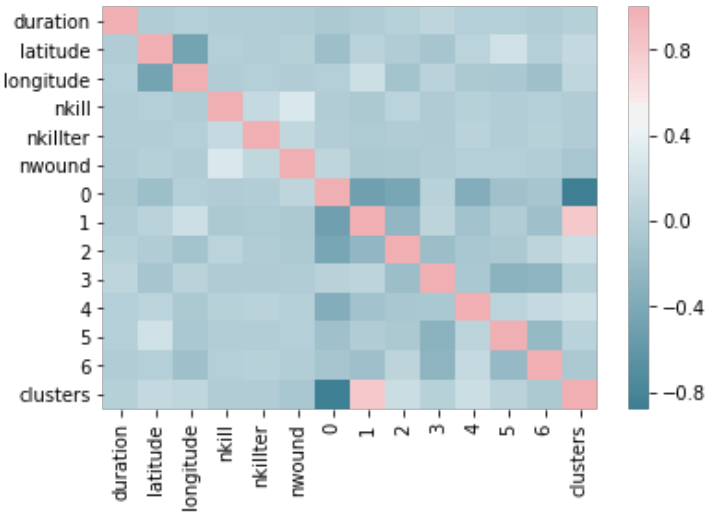
	duration	latitude	longitude	nkill	nkillter	nwound	0	1	2	3	4	5	
0	0	41.890961	12.490069	0.0	0.0	0.0	0.007111	0.018477	0.148493	0.015881	0.105200	0.020576	0.02341
1	0	48.139126	11.580186	7.0	0.0	9.0	0.000000	0.234118	0.000000	0.000000	0.000000	0.126214	0.00000
2	0	50.117970	8.644191	0.0	0.0	0.0	0.164973	0.021305	0.010729	0.006914	0.017171	0.007213	0.00845
3	0	47.368650	8.539182	47.0	0.0	0.0	0.164973	0.021305	0.010729	0.006914	0.017171	0.007213	0.00845
4	0	41.890961	12.490069	0.0	0.0	0.0	0.151800	0.000000	0.000000	0.009204	0.000000	0.023385	0.02771

In [0]:

```
#Heatmap showing correlation between the different new features.
corr = df_NMF.corr()
sns.heatmap(corr, xticklabels=corr.columns, yticklabels=corr.columns,cmap=sns.diverging_
palette(220, 10, as_cmap=True),center=0.5)
```

Out[0]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fa0b712a668>
```



In [0]:

```
df_NMF.groupby(['clusters']).mean()
```

Out[0]:

clusters	duration	latitude	longitude	nkill	nkillter	nwound	0	1	2	3	4	
0	0.005254	46.260375	3.381315	0.320665	0.012785	1.944834	0.147003	0.011745	0.011222	0.034895	0.012974	0.02
1	0.501916	47.783309	1.305224	0.674330	0.016603	0.782567	0.009918	0.016941	0.142244	0.022711	0.097498	0.03

Cluster 0 is characterized by having the largest amount of wounded with some people killed. The are also characterized by topic 0 which are include bomings and property damage.

Cluster 1 is characterized by having the largest amount of killed, with some wounded. Its is also characterized by topic 2 which include Succesful Assisinations and firearm attacks. This cluster also has the largest longest durations of the paterns seen in the data.

Cluster 2 is characterized by low killed and wounded. It is also characterized by a topic 1, which include sucessfull incindirary attack where faclilties were hit.

Supervised learning

link to colab https://colab.research.google.com/drive/1kZ-Zt13adsBDhupRH96XB1uGvUF5-LCN

In [0]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

This analasys is made to be run on either the dataset where we have reduced the data with NMF and PCA in the unsupervised notebook, or on the data that has noly been cleaned in the data cleaning notebook.

In [0]:

```
!wget https://www.dropbox.com/s/638sxxn26qi6sw4/Final_2.csv?dl=0            #Data that h
as been reduced with NMF
!wget https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl=0    #Data that h
as only been cleaned
```

```
--2019-09-26 19:14:19--  https://www.dropbox.com/s/638sxxn26qi6sw4/Final_2.csv?dl=0
Resolving www.dropbox.com (www.dropbox.com)... 162.125.81.1, 2620:100:6031:1::a27d:5101
Connecting to www.dropbox.com (www.dropbox.com)|162.125.81.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/638sxxn26qi6sw4/Final_2.csv [following]
--2019-09-26 19:14:20--  https://www.dropbox.com/s/raw/638sxxn26qi6sw4/Final_2.csv
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://uc6a06b13431d4b73d3bd42f0ab0.dl.dropboxusercontent.com/cd/0/inline/ApSD
GMehME0moA1hFTBHAXfGQjEXCwEZgvH4ZEnJphxPiCkElnnYHGyNsmRhqnknpDdOA5ywpxqRzI7zYdumgaSWU7t2a
okLm2TVoBw4MyVaqbh5cRqlGnqBg6sWVnLfjaM/file# [following]
--2019-09-26 19:14:20--  https://uc6a06b13431d4b73d3bd42f0ab0.dl.dropboxusercontent.com/c
d/0/inline/ApSDGMehME0moA1hFTBHAXfGQjEXCwEZgvH4ZEnJphxPiCkElnnYHGyNsmRhqnknpDdOA5ywpxqRzI
7zYdumgaSWU7t2aokLm2TVoBw4MyVaqbh5cRqlGnqBg6sWVnLfjaM/file
Resolving uc6a06b13431d4b73d3bd42f0ab0.dl.dropboxusercontent.com (uc6a06b13431d4b73d3bd42
f0ab0.dl.dropboxusercontent.com)... 162.125.81.6, 2620:100:6031:6::a27d:5106
Connecting to uc6a06b13431d4b73d3bd42f0ab0.dl.dropboxusercontent.com (uc6a06b13431d4b73d3
bd42f0ab0.dl.dropboxusercontent.com)|162.125.81.6|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1594855 (1.5M) [text/plain]
Saving to: 'Final_2.csv?dl=0'

Final_2.csv?dl=0    100%[===================>]   1.52M  --.-KB/s    in 0.04s

2019-09-26 19:14:21 (34.4 MB/s) - 'Final_2.csv?dl=0' saved [1594855/1594855]

--2019-09-26 19:14:23--  https://www.dropbox.com/s/jchj5huazph1htx/out_dataframe-8.csv?dl
=0
Resolving www.dropbox.com (www.dropbox.com)... 162.125.81.1, 2620:100:6031:1::a27d:5101
Connecting to www.dropbox.com (www.dropbox.com)|162.125.81.1|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: /s/raw/jchj5huazph1htx/out_dataframe-8.csv [following]
--2019-09-26 19:14:25--  https://www.dropbox.com/s/raw/jchj5huazph1htx/out_dataframe-8.cs
v
Reusing existing connection to www.dropbox.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://ucd96024414c676bfc0edc716bee.dl.dropboxusercontent.com/cd/0/inline/ApT5
_RcG4A9f2EeRSVYJCWBctMP5-Bv0y8bQWCsU3pfQamkXqznJyXsD6j91QL5gJboa5IKHLKunlA2DpTD-nV4cwAk6Y
KGZlxLRd8mmnG0RvUOv9dvt21yTKeRwgBhnaUk/file# [following]
--2019-09-26 19:14:25--  https://ucd96024414c676bfc0edc716bee.dl.dropboxusercontent.com/c
d/0/inline/ApT5_RcG4A9f2EeRSVYJCWBctMP5-Bv0y8bQWCsU3pfQamkXqznJyXsD6j91QL5gJboa5IKHLKunlA
2DpTD-nV4cwAk6YKGZlxLRd8mmnG0RvUOv9dvt21yTKeRwgBhnaUk/file
Resolving ucd96024414c676bfc0edc716bee.dl.dropboxusercontent.com (ucd96024414c676bfc0edc7
16bee.dl.dropboxusercontent.com)... 162.125.81.6, 2620:100:6031:6::a27d:5106
Connecting to ucd96024414c676bfc0edc716bee.dl.dropboxusercontent.com (ucd96024414c676bfc0
edc716bee.dl.dropboxusercontent.com)|162.125.81.6|:443... connected.
```

```
HTTP request sent, awaiting response... 200 OK
Length: 24660479 (24M) [text/plain]
Saving to: 'out_dataframe-8.csv?dl=0'

out_dataframe-8.csv 100%[===================>]  23.52M  13.2MB/s    in 1.8s

2019-09-26 19:14:27 (13.2 MB/s) - 'out_dataframe-8.csv?dl=0' saved [24660479/24660479]
```

Load the data that has been reduced with and PCA:

In [0]:

```
#Loading the data that has been reduced in the unsupervised part
df_sl=pd.read_csv('Final_2.csv?dl=0',index_col=0)
df_sl=df_sl.drop(columns=['clusters'])
```

OR load, select and scale the non-reduced data:

In [0]:

```
# #Loading the original data and scaling it with MinMaxScaler
# df_sl=pd.read_csv('out_dataframe-8.csv?dl=0',index_col=0)
# df_sl=df_sl.drop(columns=['timestamp','country_txt','gname'])
# from sklearn.preprocessing import MinMaxScaler
# MMscaler = MinMaxScaler()
# scale=MMscaler.fit_transform(df_sl)
# df_sl=pd.DataFrame(scale,columns=df_sl.columns)
```

Splitting the data

We do this to have seperate data to train/fit the models on and to test the models on.

In [0]:

```
from sklearn.model_selection import train_test_split
```

In [0]:

```
y=df_sl['nkill']
X=df_sl.drop(columns=['nkill'])
```

In [0]:

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.25, random_state
= 42)
```

Applying regression models

We import cross_validate to make the cross validation show both r^2 and mean squarred error. We are going to run k-fold cross validation on our models with 5 folds. We also import mean_squarred_error seperatly to find the mean squared error when we use the models to predict the test data.

In [0]:

```
from sklearn.model_selection import cross_validate
from sklearn.metrics import mean_squared_error
```

Linear Regression

The first model we will try to fit on the data is a simple linear regression, just to use it as a benchmark.

In [0]:

```
from sklearn.linear_model import LinearRegression
model_LR = LinearRegression()

#Fitting the model
model_LR.fit(X_train, y_train)

#Cross-validation scores for 5 folds
scores = cross_validate(model_LR, X_train, y_train, cv = 5, scoring=['r2','neg_mean_squa
red_error'])
print(pd.DataFrame(scores))
```

```
   fit_time  score_time   test_r2  test_neg_mean_squared_error
0  0.006093    0.003041 -0.024787                    -3.627635
1  0.005070    0.002688  0.052142                   -47.534986
2  0.004663    0.002756 -0.110571                    -0.563777
3  0.004732    0.002884  0.442119                    -4.052944
4  0.004503    0.002868  0.296717                    -2.947313
```

In [0]:

```
# Calculating performance on the test sample
r2_LR=model_LR.score(X_test, y_test)
mse_LR= mean_squared_error(y_test,model_LR.predict(X_test))

print('\n',"R2 for the Linear Regression performed on the test sample: ",r2_LR)
print("Mean squared error for the test sample is: ",mse_LR)
```

```
 R2 for the Linear Regression performed on the test sample:  0.005157111020433147
Mean squared error for the test sample is:  5.481745707104172
```

Reduced data: r2 at 0.005 is bad, so is a mse at 5.48.

Non-reduced data: r2 at 0.35 is not too great, a mse at 2.60e^-5 is in it self great but together with the low r2 it suggest there is a problem.

Catboost Regressor

Next, we are going to use a catboost regressor, in order to see whether a decision tree-based model yields a different result. The task is executed on GPU for computational power reasons. The optimal depth ranges from 4 to 10, according to the official documentation. A depth of 8 yielded slightly better results, so we decided to go with that.

In [0]:

```
!pip install catboost

from catboost import CatBoostRegressor
model_CB = CatBoostRegressor(task_type = 'GPU',depth=8)

model_CB.fit(X_train, y_train)

scores = cross_validate(model_CB, X_train, y_train, cv = 5, scoring=['r2','neg_mean_squa
red_error'])
print(pd.DataFrame(scores))
```

```
Collecting catboost
  Downloading https://files.pythonhosted.org/packages/39/51/bfab1d94e2bed6302e3e58738b113
5994888b09f29c7cee8686d431b9281/catboost-0.17.3-cp36-none-manylinux1_x86_64.whl (62.5MB)
     |████████████████████████████████| 62.5MB 45.2MB/s
Requirement already satisfied: numpy>=1.16.0 in /usr/local/lib/python3.6/dist-packages (f
rom catboost) (1.16.5)
Requirement already satisfied: six in /usr/local/lib/python3.6/dist-packages (from catboo
st) (1.12.0)
Requirement already satisfied: graphviz in /usr/local/lib/python3.6/dist-packages (from c
atboost) (0.10.1)
Requirement already satisfied: plotly in /usr/local/lib/python3.6/dist-packages (from cat
boost) (4.1.1)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.6/dist-packages (from
```

```
catboost) (3.0.3)
Requirement already satisfied: scipy in /usr/local/lib/python3.6/dist-packages (from catb
oost) (1.3.1)
Requirement already satisfied: pandas>=0.24.0 in /usr/local/lib/python3.6/dist-packages (
from catboost) (0.24.2)
Requirement already satisfied: retrying>=1.3.3 in /usr/local/lib/python3.6/dist-packages
(from plotly->catboost) (1.3.3)
Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.6/dist-pack
ages (from matplotlib->catboost) (2.5.3)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.6/dist-packages (fr
om matplotlib->catboost) (0.10.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.6/dist-package
s (from matplotlib->catboost) (1.1.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /usr/local/lib
/python3.6/dist-packages (from matplotlib->catboost) (2.4.2)
Requirement already satisfied: pytz>=2011k in /usr/local/lib/python3.6/dist-packages (fro
m pandas>=0.24.0->catboost) (2018.9)
Requirement already satisfied: setuptools in /usr/local/lib/python3.6/dist-packages (from
kiwisolver>=1.0.1->matplotlib->catboost) (41.2.0)
Installing collected packages: catboost
Successfully installed catboost-0.17.3
0: learn: 3.6148610 total: 45.3ms remaining: 45.2s
1: learn: 3.6046009 total: 87.7ms remaining: 43.7s
2: learn: 3.5953134 total: 130ms remaining: 43.3s
3: learn: 3.5843608 total: 170ms remaining: 42.4s
4: learn: 3.5754745 total: 201ms remaining: 40s
5: learn: 3.5670151 total: 217ms remaining: 36s
6: learn: 3.5593258 total: 226ms remaining: 32s
7: learn: 3.5531163 total: 261ms remaining: 32.3s
8: learn: 3.5453373 total: 273ms remaining: 30.1s
9: learn: 3.5375187 total: 296ms remaining: 29.3s
10: learn: 3.5299406 total: 308ms remaining: 27.7s
11: learn: 3.5230849 total: 320ms remaining: 26.4s
12: learn: 3.5159927 total: 336ms remaining: 25.5s
13: learn: 3.5079276 total: 364ms remaining: 25.6s
14: learn: 3.5018967 total: 373ms remaining: 24.5s
15: learn: 3.4958170 total: 383ms remaining: 23.6s
16: learn: 3.4893620 total: 404ms remaining: 23.4s
17: learn: 3.4848404 total: 412ms remaining: 22.5s
18: learn: 3.4801533 total: 433ms remaining: 22.3s
19: learn: 3.4732640 total: 454ms remaining: 22.3s
20: learn: 3.4678606 total: 469ms remaining: 21.9s
21: learn: 3.4627313 total: 486ms remaining: 21.6s
22: learn: 3.4582563 total: 499ms remaining: 21.2s
23: learn: 3.4520750 total: 511ms remaining: 20.8s
24: learn: 3.4468986 total: 523ms remaining: 20.4s
25: learn: 3.4404146 total: 545ms remaining: 20.4s
26: learn: 3.4349639 total: 566ms remaining: 20.4s
27: learn: 3.4288354 total: 588ms remaining: 20.4s
28: learn: 3.4232961 total: 609ms remaining: 20.4s
29: learn: 3.4173397 total: 631ms remaining: 20.4s
30: learn: 3.4124284 total: 644ms remaining: 20.1s
31: learn: 3.4070559 total: 665ms remaining: 20.1s
32: learn: 3.4025351 total: 695ms remaining: 20.4s
33: learn: 3.3978359 total: 712ms remaining: 20.2s
34: learn: 3.3924021 total: 734ms remaining: 20.2s
35: learn: 3.3884716 total: 751ms remaining: 20.1s
36: learn: 3.3835171 total: 777ms remaining: 20.2s
37: learn: 3.3787005 total: 799ms remaining: 20.2s
38: learn: 3.3754411 total: 816ms remaining: 20.1s
39: learn: 3.3712235 total: 826ms remaining: 19.8s
40: learn: 3.3679020 total: 847ms remaining: 19.8s
41: learn: 3.3659581 total: 856ms remaining: 19.5s
42: learn: 3.3636623 total: 865ms remaining: 19.2s
43: learn: 3.3594037 total: 886ms remaining: 19.3s
44: learn: 3.3559768 total: 912ms remaining: 19.4s
45: learn: 3.3521248 total: 922ms remaining: 19.1s
46: learn: 3.3478132 total: 935ms remaining: 19s
47: learn: 3.3456610 total: 957ms remaining: 19s
48: learn: 3.3430549 total: 970ms remaining: 18.8s
49: learn: 3.3407200 total: 977ms remaining: 18.6s
50: learn: 3.3377921 total: 999ms remaining: 18.6s
```

```
51: learn: 3.3344124 total: 1.01s remaining: 18.4s
52: learn: 3.3311925 total: 1.03s remaining: 18.4s
53: learn: 3.3272964 total: 1.05s remaining: 18.4s
54: learn: 3.3241020 total: 1.07s remaining: 18.4s
55: learn: 3.3211449 total: 1.08s remaining: 18.2s
56: learn: 3.3181852 total: 1.09s remaining: 18.1s
57: learn: 3.2943414 total: 1.12s remaining: 18.1s
58: learn: 3.2915769 total: 1.14s remaining: 18.2s
59: learn: 3.2888266 total: 1.15s remaining: 18.1s
60: learn: 3.2868288 total: 1.16s remaining: 17.9s
61: learn: 3.2633309 total: 1.18s remaining: 17.9s
62: learn: 3.2604485 total: 1.19s remaining: 17.7s
63: learn: 3.2583639 total: 1.21s remaining: 17.6s
64: learn: 3.2570202 total: 1.22s remaining: 17.5s
65: learn: 3.2555504 total: 1.23s remaining: 17.4s
66: learn: 3.2530109 total: 1.24s remaining: 17.3s
67: learn: 3.2298797 total: 1.26s remaining: 17.3s
68: learn: 3.2283866 total: 1.27s remaining: 17.2s
69: learn: 3.2254732 total: 1.29s remaining: 17.2s
70: learn: 3.2233391 total: 1.3s remaining: 17.1s
71: learn: 3.2212393 total: 1.31s remaining: 16.9s
72: learn: 3.2189697 total: 1.33s remaining: 16.9s
73: learn: 3.2008067 total: 1.35s remaining: 17s
74: learn: 3.1994160 total: 1.36s remaining: 16.8s
75: learn: 3.1971948 total: 1.37s remaining: 16.7s
76: learn: 3.1750665 total: 1.4s remaining: 16.7s
77: learn: 3.1727953 total: 1.41s remaining: 16.6s
78: learn: 3.1703755 total: 1.43s remaining: 16.7s
79: learn: 3.1543601 total: 1.45s remaining: 16.7s
80: learn: 3.1522870 total: 1.47s remaining: 16.7s
81: learn: 3.1501631 total: 1.49s remaining: 16.6s
82: learn: 3.1488165 total: 1.51s remaining: 16.6s
83: learn: 3.1463426 total: 1.53s remaining: 16.7s
84: learn: 3.1442448 total: 1.55s remaining: 16.7s
85: learn: 3.1422594 total: 1.57s remaining: 16.7s
86: learn: 3.1406083 total: 1.59s remaining: 16.7s
87: learn: 3.1388024 total: 1.61s remaining: 16.7s
88: learn: 3.1367382 total: 1.63s remaining: 16.7s
89: learn: 3.1346953 total: 1.65s remaining: 16.7s
90: learn: 3.1332793 total: 1.66s remaining: 16.6s
91: learn: 3.1320588 total: 1.68s remaining: 16.6s
92: learn: 3.1306400 total: 1.7s remaining: 16.5s
93: learn: 3.1299409 total: 1.71s remaining: 16.4s
94: learn: 3.1281527 total: 1.72s remaining: 16.4s
95: learn: 3.1273922 total: 1.73s remaining: 16.3s
96: learn: 3.1261031 total: 1.75s remaining: 16.3s
97: learn: 3.1250491 total: 1.77s remaining: 16.3s
98: learn: 3.1232734 total: 1.79s remaining: 16.3s
99: learn: 3.1222341 total: 1.81s remaining: 16.3s
100: learn: 3.1195036 total: 1.83s remaining: 16.3s
101: learn: 3.1179315 total: 1.85s remaining: 16.3s
102: learn: 3.1167179 total: 1.87s remaining: 16.3s
103: learn: 3.1151311 total: 1.88s remaining: 16.2s
104: learn: 3.1136531 total: 1.89s remaining: 16.1s
105: learn: 3.0970798 total: 1.91s remaining: 16.1s
106: learn: 3.0955735 total: 1.92s remaining: 16s
107: learn: 3.0945135 total: 1.94s remaining: 16s
108: learn: 3.0932820 total: 1.96s remaining: 16s
109: learn: 3.0918675 total: 1.97s remaining: 15.9s
110: learn: 3.0913157 total: 1.98s remaining: 15.9s
111: learn: 3.0909719 total: 1.99s remaining: 15.8s
112: learn: 3.0892462 total: 2.01s remaining: 15.8s
113: learn: 3.0879109 total: 2.03s remaining: 15.8s
114: learn: 3.0866373 total: 2.06s remaining: 15.8s
115: learn: 3.0853964 total: 2.08s remaining: 15.8s
116: learn: 3.0840952 total: 2.09s remaining: 15.8s
117: learn: 3.0835149 total: 2.11s remaining: 15.8s
118: learn: 3.0829374 total: 2.12s remaining: 15.7s
119: learn: 3.0821204 total: 2.12s remaining: 15.6s
120: learn: 3.0658968 total: 2.15s remaining: 15.6s
121: learn: 3.0647351 total: 2.17s remaining: 15.6s
122: learn: 3.0457909 total: 2.19s remaining: 15.6s
```

```
123: learn: 3.0447032 total: 2.21s remaining: 15.6s
124: learn: 3.0439368 total: 2.22s remaining: 15.5s
125: learn: 3.0427375 total: 2.23s remaining: 15.5s
126: learn: 3.0419200 total: 2.25s remaining: 15.5s
127: learn: 3.0229048 total: 2.27s remaining: 15.5s
128: learn: 3.0222150 total: 2.28s remaining: 15.4s
129: learn: 3.0213184 total: 2.29s remaining: 15.4s
130: learn: 3.0203523 total: 2.31s remaining: 15.3s
131: learn: 3.0192130 total: 2.32s remaining: 15.3s
132: learn: 3.0185669 total: 2.35s remaining: 15.3s
133: learn: 3.0172846 total: 2.37s remaining: 15.3s
134: learn: 3.0162205 total: 2.39s remaining: 15.3s
135: learn: 3.0156875 total: 2.39s remaining: 15.2s
136: learn: 3.0146766 total: 2.41s remaining: 15.2s
137: learn: 3.0135500 total: 2.43s remaining: 15.2s
138: learn: 3.0119776 total: 2.45s remaining: 15.2s
139: learn: 3.0110684 total: 2.47s remaining: 15.2s
140: learn: 3.0105607 total: 2.48s remaining: 15.1s
141: learn: 3.0100370 total: 2.49s remaining: 15s
142: learn: 3.0093387 total: 2.51s remaining: 15s
143: learn: 3.0090618 total: 2.53s remaining: 15s
144: learn: 3.0086393 total: 2.54s remaining: 15s
145: learn: 3.0076797 total: 2.55s remaining: 14.9s
146: learn: 3.0065888 total: 2.57s remaining: 14.9s
147: learn: 3.0057958 total: 2.59s remaining: 14.9s
148: learn: 3.0051643 total: 2.6s remaining: 14.9s
149: learn: 3.0043343 total: 2.61s remaining: 14.8s
150: learn: 3.0032814 total: 2.63s remaining: 14.8s
151: learn: 3.0027069 total: 2.65s remaining: 14.8s
152: learn: 2.9932761 total: 2.67s remaining: 14.8s
153: learn: 2.9929846 total: 2.69s remaining: 14.8s
154: learn: 2.9925770 total: 2.69s remaining: 14.7s
155: learn: 2.9922148 total: 2.72s remaining: 14.7s
156: learn: 2.9917201 total: 2.73s remaining: 14.6s
157: learn: 2.9911314 total: 2.74s remaining: 14.6s
158: learn: 2.9903267 total: 2.75s remaining: 14.5s
159: learn: 2.9896063 total: 2.76s remaining: 14.5s
160: learn: 2.9891725 total: 2.79s remaining: 14.5s
161: learn: 2.9837412 total: 2.81s remaining: 14.5s
162: learn: 2.9832662 total: 2.82s remaining: 14.5s
163: learn: 2.9828101 total: 2.84s remaining: 14.5s
164: learn: 2.9819675 total: 2.86s remaining: 14.5s
165: learn: 2.9786261 total: 2.88s remaining: 14.5s
166: learn: 2.9778364 total: 2.9s remaining: 14.4s
167: learn: 2.9774099 total: 2.92s remaining: 14.4s
168: learn: 2.9773280 total: 2.93s remaining: 14.4s
169: learn: 2.9771207 total: 2.93s remaining: 14.3s
170: learn: 2.9761566 total: 2.96s remaining: 14.3s
171: learn: 2.9757252 total: 2.96s remaining: 14.3s
172: learn: 2.9755058 total: 2.99s remaining: 14.3s
173: learn: 2.9750771 total: 3.02s remaining: 14.3s
174: learn: 2.9743904 total: 3.04s remaining: 14.4s
175: learn: 2.9741991 total: 3.06s remaining: 14.3s
176: learn: 2.9740059 total: 3.07s remaining: 14.3s
177: learn: 2.9734686 total: 3.09s remaining: 14.3s
178: learn: 2.9611127 total: 3.11s remaining: 14.3s
179: learn: 2.9604735 total: 3.12s remaining: 14.2s
180: learn: 2.9425548 total: 3.15s remaining: 14.2s
181: learn: 2.9418296 total: 3.17s remaining: 14.2s
182: learn: 2.9412305 total: 3.18s remaining: 14.2s
183: learn: 2.9406690 total: 3.2s remaining: 14.2s
184: learn: 2.9406323 total: 3.21s remaining: 14.1s
185: learn: 2.9402485 total: 3.21s remaining: 14.1s
186: learn: 2.9399832 total: 3.23s remaining: 14s
187: learn: 2.9393639 total: 3.25s remaining: 14s
188: learn: 2.9391261 total: 3.27s remaining: 14s
189: learn: 2.9385250 total: 3.28s remaining: 14s
190: learn: 2.9383892 total: 3.28s remaining: 13.9s
191: learn: 2.9380898 total: 3.29s remaining: 13.9s
192: learn: 2.9374969 total: 3.31s remaining: 13.9s
193: learn: 2.9368953 total: 3.33s remaining: 13.8s
194: learn: 2.9367930 total: 3.34s remaining: 13.8s
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195: learn: 2.9365194 total: 3.36s remaining: 13.8s
196: learn: 2.9194857 total: 3.38s remaining: 13.8s
197: learn: 2.9188477 total: 3.4s remaining: 13.8s
198: learn: 2.9019915 total: 3.42s remaining: 13.8s
199: learn: 2.9014808 total: 3.44s remaining: 13.8s
200: learn: 2.9009187 total: 3.46s remaining: 13.8s
201: learn: 2.9008538 total: 3.47s remaining: 13.7s
202: learn: 2.9004300 total: 3.48s remaining: 13.7s
203: learn: 2.9001230 total: 3.5s remaining: 13.7s
204: learn: 2.8997969 total: 3.52s remaining: 13.6s
205: learn: 2.8993037 total: 3.52s remaining: 13.6s
206: learn: 2.8987247 total: 3.54s remaining: 13.6s
207: learn: 2.8975911 total: 3.56s remaining: 13.6s
208: learn: 2.8973630 total: 3.58s remaining: 13.5s
209: learn: 2.8973001 total: 3.59s remaining: 13.5s
210: learn: 2.8971834 total: 3.6s remaining: 13.5s
211: learn: 2.8965346 total: 3.63s remaining: 13.5s
212: learn: 2.8963416 total: 3.64s remaining: 13.4s
213: learn: 2.8798355 total: 3.66s remaining: 13.4s
214: learn: 2.8793263 total: 3.68s remaining: 13.4s
215: learn: 2.8792872 total: 3.69s remaining: 13.4s
216: learn: 2.8789845 total: 3.71s remaining: 13.4s
217: learn: 2.8788499 total: 3.72s remaining: 13.3s
218: learn: 2.8783938 total: 3.74s remaining: 13.3s
219: learn: 2.8782459 total: 3.76s remaining: 13.3s
220: learn: 2.8780659 total: 3.77s remaining: 13.3s
221: learn: 2.8778678 total: 3.78s remaining: 13.2s
222: learn: 2.8776624 total: 3.79s remaining: 13.2s
223: learn: 2.8774693 total: 3.8s remaining: 13.2s
224: learn: 2.8771618 total: 3.81s remaining: 13.1s
225: learn: 2.8767989 total: 3.82s remaining: 13.1s
226: learn: 2.8767365 total: 3.84s remaining: 13.1s
227: learn: 2.8763153 total: 3.85s remaining: 13s
228: learn: 2.8758825 total: 3.87s remaining: 13s
229: learn: 2.8757198 total: 3.88s remaining: 13s
230: learn: 2.8756399 total: 3.89s remaining: 13s
231: learn: 2.8755309 total: 3.9s remaining: 12.9s
232: learn: 2.8750829 total: 3.91s remaining: 12.9s
233: learn: 2.8750034 total: 3.92s remaining: 12.8s
234: learn: 2.8747726 total: 3.94s remaining: 12.8s
235: learn: 2.8744604 total: 3.95s remaining: 12.8s
236: learn: 2.8742590 total: 3.97s remaining: 12.8s
237: learn: 2.8741769 total: 3.98s remaining: 12.8s
238: learn: 2.8740271 total: 3.99s remaining: 12.7s
239: learn: 2.8736741 total: 4.01s remaining: 12.7s
240: learn: 2.8731772 total: 4.04s remaining: 12.7s
241: learn: 2.8730584 total: 4.05s remaining: 12.7s
242: learn: 2.8729593 total: 4.06s remaining: 12.7s
243: learn: 2.8726575 total: 4.08s remaining: 12.7s
244: learn: 2.8723179 total: 4.09s remaining: 12.6s
245: learn: 2.8562411 total: 4.11s remaining: 12.6s
246: learn: 2.8562147 total: 4.13s remaining: 12.6s
247: learn: 2.8561473 total: 4.14s remaining: 12.6s
248: learn: 2.8558884 total: 4.15s remaining: 12.5s
249: learn: 2.8557457 total: 4.17s remaining: 12.5s
250: learn: 2.8556990 total: 4.17s remaining: 12.5s
251: learn: 2.8556114 total: 4.18s remaining: 12.4s
252: learn: 2.8555809 total: 4.19s remaining: 12.4s
253: learn: 2.8555758 total: 4.21s remaining: 12.4s
254: learn: 2.8554691 total: 4.23s remaining: 12.3s
255: learn: 2.8553411 total: 4.24s remaining: 12.3s
256: learn: 2.8550581 total: 4.25s remaining: 12.3s
257: learn: 2.8550385 total: 4.26s remaining: 12.2s
258: learn: 2.8550088 total: 4.27s remaining: 12.2s
259: learn: 2.8550065 total: 4.28s remaining: 12.2s
260: learn: 2.8484185 total: 4.3s remaining: 12.2s
261: learn: 2.8481427 total: 4.32s remaining: 12.2s
262: learn: 2.8477803 total: 4.34s remaining: 12.2s
263: learn: 2.8477279 total: 4.35s remaining: 12.1s
264: learn: 2.8476156 total: 4.36s remaining: 12.1s
265: learn: 2.8475027 total: 4.37s remaining: 12.1s
266: learn: 2.8473866 total: 4.39s remaining: 12.1s
```

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267: learn: 2.8473123 total: 4.4s remaining: 12s
268: learn: 2.8317534 total: 4.41s remaining: 12s
269: learn: 2.8317257 total: 4.42s remaining: 12s
270: learn: 2.8316792 total: 4.43s remaining: 11.9s
271: learn: 2.8316514 total: 4.45s remaining: 11.9s
272: learn: 2.8316341 total: 4.46s remaining: 11.9s
273: learn: 2.8313965 total: 4.47s remaining: 11.9s
274: learn: 2.8313821 total: 4.48s remaining: 11.8s
275: learn: 2.8313701 total: 4.49s remaining: 11.8s
276: learn: 2.8313673 total: 4.5s remaining: 11.7s
277: learn: 2.8309779 total: 4.52s remaining: 11.7s
278: learn: 2.8308500 total: 4.53s remaining: 11.7s
279: learn: 2.8305415 total: 4.55s remaining: 11.7s
280: learn: 2.8301789 total: 4.57s remaining: 11.7s
281: learn: 2.8299205 total: 4.59s remaining: 11.7s
282: learn: 2.8298415 total: 4.61s remaining: 11.7s
283: learn: 2.8295716 total: 4.61s remaining: 11.6s
284: learn: 2.8190701 total: 4.64s remaining: 11.6s
285: learn: 2.8190500 total: 4.65s remaining: 11.6s
286: learn: 2.8190454 total: 4.66s remaining: 11.6s
287: learn: 2.8189859 total: 4.68s remaining: 11.6s
288: learn: 2.8187202 total: 4.7s remaining: 11.6s
289: learn: 2.8161516 total: 4.72s remaining: 11.6s
290: learn: 2.8161273 total: 4.73s remaining: 11.5s
291: learn: 2.8161091 total: 4.74s remaining: 11.5s
292: learn: 2.8160464 total: 4.75s remaining: 11.5s
293: learn: 2.8159870 total: 4.76s remaining: 11.4s
294: learn: 2.8157767 total: 4.77s remaining: 11.4s
295: learn: 2.8157710 total: 4.78s remaining: 11.4s
296: learn: 2.8156477 total: 4.8s remaining: 11.4s
297: learn: 2.8155719 total: 4.81s remaining: 11.3s
298: learn: 2.8153125 total: 4.83s remaining: 11.3s
299: learn: 2.8152914 total: 4.85s remaining: 11.3s
300: learn: 2.8152050 total: 4.86s remaining: 11.3s
301: learn: 2.8023630 total: 4.88s remaining: 11.3s
302: learn: 2.8020657 total: 4.9s remaining: 11.3s
303: learn: 2.8020330 total: 4.91s remaining: 11.2s
304: learn: 2.7897571 total: 4.92s remaining: 11.2s
305: learn: 2.7896630 total: 4.94s remaining: 11.2s
306: learn: 2.7823466 total: 4.96s remaining: 11.2s
307: learn: 2.7822509 total: 4.98s remaining: 11.2s
308: learn: 2.7821729 total: 4.99s remaining: 11.2s
309: learn: 2.7821698 total: 5s remaining: 11.1s
310: learn: 2.7821496 total: 5s remaining: 11.1s
311: learn: 2.7820207 total: 5.03s remaining: 11.1s
312: learn: 2.7820117 total: 5.04s remaining: 11.1s
313: learn: 2.7819221 total: 5.06s remaining: 11.1s
314: learn: 2.7818675 total: 5.08s remaining: 11.1s
315: learn: 2.7816372 total: 5.1s remaining: 11s
316: learn: 2.7815821 total: 5.11s remaining: 11s
317: learn: 2.7813656 total: 5.13s remaining: 11s
318: learn: 2.7813388 total: 5.14s remaining: 11s
319: learn: 2.7798001 total: 5.16s remaining: 11s
320: learn: 2.7797920 total: 5.17s remaining: 10.9s
321: learn: 2.7797205 total: 5.18s remaining: 10.9s
322: learn: 2.7796552 total: 5.21s remaining: 10.9s
323: learn: 2.7795019 total: 5.22s remaining: 10.9s
324: learn: 2.7794777 total: 5.23s remaining: 10.9s
325: learn: 2.7793529 total: 5.25s remaining: 10.9s
326: learn: 2.7793526 total: 5.26s remaining: 10.8s
327: learn: 2.7792891 total: 5.27s remaining: 10.8s
328: learn: 2.7790784 total: 5.3s remaining: 10.8s
329: learn: 2.7789267 total: 5.31s remaining: 10.8s
330: learn: 2.7789162 total: 5.33s remaining: 10.8s
331: learn: 2.7789044 total: 5.34s remaining: 10.7s
332: learn: 2.7788739 total: 5.35s remaining: 10.7s
333: learn: 2.7786664 total: 5.36s remaining: 10.7s
334: learn: 2.7786406 total: 5.37s remaining: 10.7s
335: learn: 2.7783712 total: 5.38s remaining: 10.6s
336: learn: 2.7783542 total: 5.39s remaining: 10.6s
337: learn: 2.7664442 total: 5.41s remaining: 10.6s
338: learn: 2.7661705 total: 5.43s remaining: 10.6s
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339: learn: 2.7545539 total: 5.45s remaining: 10.6s
340: learn: 2.7545427 total: 5.46s remaining: 10.6s
341: learn: 2.7544557 total: 5.47s remaining: 10.5s
342: learn: 2.7544391 total: 5.48s remaining: 10.5s
343: learn: 2.7544152 total: 5.49s remaining: 10.5s
344: learn: 2.7541639 total: 5.52s remaining: 10.5s
345: learn: 2.7541115 total: 5.53s remaining: 10.5s
346: learn: 2.7538856 total: 5.55s remaining: 10.4s
347: learn: 2.7538390 total: 5.57s remaining: 10.4s
348: learn: 2.7538264 total: 5.58s remaining: 10.4s
349: learn: 2.7538260 total: 5.59s remaining: 10.4s
350: learn: 2.7538203 total: 5.6s remaining: 10.4s
351: learn: 2.7537645 total: 5.61s remaining: 10.3s
352: learn: 2.7537642 total: 5.62s remaining: 10.3s
353: learn: 2.7537239 total: 5.63s remaining: 10.3s
354: learn: 2.7536437 total: 5.64s remaining: 10.3s
355: learn: 2.7536366 total: 5.65s remaining: 10.2s
356: learn: 2.7536322 total: 5.66s remaining: 10.2s
357: learn: 2.7396851 total: 5.68s remaining: 10.2s
358: learn: 2.7396393 total: 5.69s remaining: 10.2s
359: learn: 2.7396278 total: 5.7s remaining: 10.1s
360: learn: 2.7395525 total: 5.72s remaining: 10.1s
361: learn: 2.7395467 total: 5.73s remaining: 10.1s
362: learn: 2.7395467 total: 5.74s remaining: 10.1s
363: learn: 2.7392928 total: 5.76s remaining: 10.1s
364: learn: 2.7392629 total: 5.78s remaining: 10.1s
365: learn: 2.7392595 total: 5.79s remaining: 10s
366: learn: 2.7391122 total: 5.8s remaining: 10s
367: learn: 2.7366180 total: 5.82s remaining: 10s
368: learn: 2.7366179 total: 5.83s remaining: 9.97s
369: learn: 2.7366003 total: 5.84s remaining: 9.94s
370: learn: 2.7365574 total: 5.85s remaining: 9.92s
371: learn: 2.7364763 total: 5.87s remaining: 9.92s
372: learn: 2.7364163 total: 5.89s remaining: 9.91s
373: learn: 2.7363631 total: 5.91s remaining: 9.88s
374: learn: 2.7356415 total: 5.93s remaining: 9.88s
375: learn: 2.7354426 total: 5.94s remaining: 9.87s
376: learn: 2.7354111 total: 5.96s remaining: 9.85s
377: learn: 2.7354054 total: 5.97s remaining: 9.82s
378: learn: 2.7352336 total: 5.98s remaining: 9.8s
379: learn: 2.7351855 total: 5.99s remaining: 9.78s
380: learn: 2.7351728 total: 6s remaining: 9.75s
381: learn: 2.7348266 total: 6.02s remaining: 9.74s
382: learn: 2.7348189 total: 6.05s remaining: 9.75s
383: learn: 2.7347124 total: 6.08s remaining: 9.74s
384: learn: 2.7346094 total: 6.1s remaining: 9.74s
385: learn: 2.7343100 total: 6.12s remaining: 9.74s
386: learn: 2.7343040 total: 6.13s remaining: 9.72s
387: learn: 2.7342911 total: 6.15s remaining: 9.71s
388: learn: 2.7342644 total: 6.17s remaining: 9.69s
389: learn: 2.7342578 total: 6.18s remaining: 9.68s
390: learn: 2.7342375 total: 6.2s remaining: 9.65s
391: learn: 2.7342343 total: 6.21s remaining: 9.63s
392: learn: 2.7342293 total: 6.21s remaining: 9.6s
393: learn: 2.7342111 total: 6.22s remaining: 9.57s
394: learn: 2.7342071 total: 6.23s remaining: 9.55s
395: learn: 2.7341735 total: 6.26s remaining: 9.54s
396: learn: 2.7341070 total: 6.28s remaining: 9.54s
397: learn: 2.7340601 total: 6.3s remaining: 9.53s
398: learn: 2.7340256 total: 6.31s remaining: 9.5s
399: learn: 2.7340232 total: 6.32s remaining: 9.47s
400: learn: 2.7339526 total: 6.34s remaining: 9.47s
401: learn: 2.7337783 total: 6.35s remaining: 9.45s
402: learn: 2.7337690 total: 6.36s remaining: 9.43s
403: learn: 2.7337222 total: 6.38s remaining: 9.42s
404: learn: 2.7337072 total: 6.39s remaining: 9.39s
405: learn: 2.7336852 total: 6.4s remaining: 9.37s
406: learn: 2.7336315 total: 6.42s remaining: 9.36s
407: learn: 2.7335933 total: 6.44s remaining: 9.34s
408: learn: 2.7335818 total: 6.45s remaining: 9.32s
409: learn: 2.7335228 total: 6.47s remaining: 9.31s
410: learn: 2.7335226 total: 6.47s remaining: 9.28s
```

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411: learn: 2.7335056 total: 6.48s remaining: 9.25s
412: learn: 2.7334855 total: 6.49s remaining: 9.23s
413: learn: 2.7334554 total: 6.5s remaining: 9.2s
414: learn: 2.7334105 total: 6.51s remaining: 9.18s
415: learn: 2.7334001 total: 6.52s remaining: 9.15s
416: learn: 2.7333332 total: 6.54s remaining: 9.15s
417: learn: 2.7333235 total: 6.56s remaining: 9.14s
418: learn: 2.7333185 total: 6.58s remaining: 9.12s
419: learn: 2.7332917 total: 6.59s remaining: 9.1s
420: learn: 2.7332774 total: 6.59s remaining: 9.07s
421: learn: 2.7332763 total: 6.6s remaining: 9.04s
422: learn: 2.7332134 total: 6.61s remaining: 9.02s
423: learn: 2.7331779 total: 6.63s remaining: 9s
424: learn: 2.7331232 total: 6.63s remaining: 8.98s
425: learn: 2.7331200 total: 6.64s remaining: 8.95s
426: learn: 2.7331075 total: 6.67s remaining: 8.95s
427: learn: 2.7331062 total: 6.67s remaining: 8.92s
428: learn: 2.7328761 total: 6.7s remaining: 8.91s
429: learn: 2.7326983 total: 6.71s remaining: 8.89s
430: learn: 2.7326923 total: 6.72s remaining: 8.87s
431: learn: 2.7326892 total: 6.72s remaining: 8.84s
432: learn: 2.7326709 total: 6.75s remaining: 8.84s
433: learn: 2.7324238 total: 6.77s remaining: 8.83s
434: learn: 2.7323272 total: 6.8s remaining: 8.83s
435: learn: 2.7323130 total: 6.82s remaining: 8.82s
436: learn: 2.7322411 total: 6.84s remaining: 8.81s
437: learn: 2.7322358 total: 6.85s remaining: 8.79s
438: learn: 2.7322349 total: 6.86s remaining: 8.76s
439: learn: 2.7273494 total: 6.88s remaining: 8.75s
440: learn: 2.7273003 total: 6.9s remaining: 8.74s
441: learn: 2.7272968 total: 6.91s remaining: 8.73s
442: learn: 2.7272767 total: 6.93s remaining: 8.71s
443: learn: 2.7272237 total: 6.94s remaining: 8.69s
444: learn: 2.7272205 total: 6.95s remaining: 8.66s
445: learn: 2.7272030 total: 6.97s remaining: 8.66s
446: learn: 2.7271842 total: 6.99s remaining: 8.64s
447: learn: 2.7271736 total: 7s remaining: 8.62s
448: learn: 2.7270390 total: 7.01s remaining: 8.6s
449: learn: 2.7270210 total: 7.03s remaining: 8.59s
450: learn: 2.7270210 total: 7.04s remaining: 8.57s
451: learn: 2.7270124 total: 7.06s remaining: 8.56s
452: learn: 2.7270060 total: 7.07s remaining: 8.54s
453: learn: 2.7269502 total: 7.08s remaining: 8.52s
454: learn: 2.7269425 total: 7.1s remaining: 8.5s
455: learn: 2.7269306 total: 7.11s remaining: 8.48s
456: learn: 2.7269302 total: 7.12s remaining: 8.45s
457: learn: 2.7269270 total: 7.13s remaining: 8.43s
458: learn: 2.7267452 total: 7.15s remaining: 8.42s
459: learn: 2.7267091 total: 7.17s remaining: 8.41s
460: learn: 2.7181279 total: 7.19s remaining: 8.41s
461: learn: 2.7181157 total: 7.21s remaining: 8.4s
462: learn: 2.7181139 total: 7.22s remaining: 8.37s
463: learn: 2.7180266 total: 7.24s remaining: 8.36s
464: learn: 2.7179844 total: 7.26s remaining: 8.35s
465: learn: 2.7179708 total: 7.27s remaining: 8.33s
466: learn: 2.7179439 total: 7.28s remaining: 8.31s
467: learn: 2.7178266 total: 7.29s remaining: 8.29s
468: learn: 2.7178050 total: 7.31s remaining: 8.28s
469: learn: 2.7178049 total: 7.32s remaining: 8.26s
470: learn: 2.7177500 total: 7.34s remaining: 8.24s
471: learn: 2.7177487 total: 7.34s remaining: 8.22s
472: learn: 2.7176155 total: 7.36s remaining: 8.2s
473: learn: 2.7175727 total: 7.38s remaining: 8.19s
474: learn: 2.7175553 total: 7.38s remaining: 8.16s
475: learn: 2.7174178 total: 7.42s remaining: 8.17s
476: learn: 2.7174154 total: 7.43s remaining: 8.14s
477: learn: 2.7174139 total: 7.44s remaining: 8.12s
478: learn: 2.7174071 total: 7.45s remaining: 8.1s
479: learn: 2.7174073 total: 7.45s remaining: 8.07s
480: learn: 2.7174050 total: 7.46s remaining: 8.05s
481: learn: 2.7173634 total: 7.48s remaining: 8.04s
482: learn: 2.7173478 total: 7.5s remaining: 8.03s
```

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483: learn: 2.7173480 total: 7.51s remaining: 8.01s
484: learn: 2.7172847 total: 7.53s remaining: 8s
485: learn: 2.7172674 total: 7.55s remaining: 7.99s
486: learn: 2.7171418 total: 7.57s remaining: 7.98s
487: learn: 2.7169702 total: 7.59s remaining: 7.97s
488: learn: 2.7169692 total: 7.6s remaining: 7.94s
489: learn: 2.7169178 total: 7.61s remaining: 7.92s
490: learn: 2.7168912 total: 7.62s remaining: 7.9s
491: learn: 2.7168772 total: 7.64s remaining: 7.89s
492: learn: 2.7166742 total: 7.67s remaining: 7.88s
493: learn: 2.7166594 total: 7.67s remaining: 7.86s
494: learn: 2.7165738 total: 7.69s remaining: 7.85s
495: learn: 2.7165681 total: 7.7s remaining: 7.83s
496: learn: 2.7165666 total: 7.71s remaining: 7.8s
497: learn: 2.7165118 total: 7.72s remaining: 7.79s
498: learn: 2.7162217 total: 7.75s remaining: 7.78s
499: learn: 2.7162029 total: 7.75s remaining: 7.75s
500: learn: 2.7161444 total: 7.78s remaining: 7.75s
501: learn: 2.7160759 total: 7.8s remaining: 7.74s
502: learn: 2.7159407 total: 7.82s remaining: 7.72s
503: learn: 2.7159215 total: 7.83s remaining: 7.71s
504: learn: 2.7159086 total: 7.84s remaining: 7.69s
505: learn: 2.7158700 total: 7.86s remaining: 7.68s
506: learn: 2.7158571 total: 7.88s remaining: 7.66s
507: learn: 2.7157347 total: 7.9s remaining: 7.65s
508: learn: 2.7156836 total: 7.92s remaining: 7.64s
509: learn: 2.7156822 total: 7.93s remaining: 7.62s
510: learn: 2.7156812 total: 7.94s remaining: 7.6s
511: learn: 2.7156800 total: 7.95s remaining: 7.57s
512: learn: 2.7152635 total: 7.97s remaining: 7.57s
513: learn: 2.7152344 total: 7.98s remaining: 7.54s
514: learn: 2.7152221 total: 7.99s remaining: 7.52s
515: learn: 2.7151661 total: 8.01s remaining: 7.51s
516: learn: 2.7151649 total: 8.02s remaining: 7.49s
517: learn: 2.7151537 total: 8.03s remaining: 7.47s
518: learn: 2.7151530 total: 8.04s remaining: 7.45s
519: learn: 2.7151481 total: 8.06s remaining: 7.44s
520: learn: 2.7151075 total: 8.07s remaining: 7.42s
521: learn: 2.7149636 total: 8.09s remaining: 7.41s
522: learn: 2.7129776 total: 8.11s remaining: 7.4s
523: learn: 2.7129409 total: 8.13s remaining: 7.39s
524: learn: 2.7129403 total: 8.14s remaining: 7.37s
525: learn: 2.7129343 total: 8.15s remaining: 7.35s
526: learn: 2.7128004 total: 8.17s remaining: 7.33s
527: learn: 2.7127945 total: 8.2s remaining: 7.33s
528: learn: 2.7122095 total: 8.22s remaining: 7.32s
529: learn: 2.7120709 total: 8.24s remaining: 7.31s
530: learn: 2.7120553 total: 8.25s remaining: 7.29s
531: learn: 2.7120296 total: 8.27s remaining: 7.28s
532: learn: 2.7119725 total: 8.29s remaining: 7.26s
533: learn: 2.7119227 total: 8.31s remaining: 7.25s
534: learn: 2.7119220 total: 8.32s remaining: 7.23s
535: learn: 2.7118637 total: 8.34s remaining: 7.22s
536: learn: 2.7117541 total: 8.36s remaining: 7.21s
537: learn: 2.7117538 total: 8.37s remaining: 7.18s
538: learn: 2.7116401 total: 8.39s remaining: 7.17s
539: learn: 2.7116311 total: 8.4s remaining: 7.15s
540: learn: 2.7115152 total: 8.42s remaining: 7.14s
541: learn: 2.7113554 total: 8.44s remaining: 7.13s
542: learn: 2.7113169 total: 8.46s remaining: 7.12s
543: learn: 2.7110636 total: 8.48s remaining: 7.11s
544: learn: 2.7110509 total: 8.49s remaining: 7.08s
545: learn: 2.7110365 total: 8.5s remaining: 7.07s
546: learn: 2.7110073 total: 8.52s remaining: 7.06s
547: learn: 2.7109837 total: 8.54s remaining: 7.04s
548: learn: 2.7109183 total: 8.56s remaining: 7.03s
549: learn: 2.7103595 total: 8.58s remaining: 7.02s
550: learn: 2.7103477 total: 8.61s remaining: 7.01s
551: learn: 2.7102523 total: 8.63s remaining: 7s
552: learn: 2.7102375 total: 8.65s remaining: 6.99s
553: learn: 2.7102369 total: 8.66s remaining: 6.97s
554: learn: 2.7102348 total: 8.67s remaining: 6.95s
```

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555: learn: 2.7102235 total: 8.69s remaining: 6.93s
556: learn: 2.7102233 total: 8.69s remaining: 6.91s
557: learn: 2.7102221 total: 8.7s remaining: 6.89s
558: learn: 2.7102157 total: 8.71s remaining: 6.87s
559: learn: 2.7102013 total: 8.73s remaining: 6.86s
560: learn: 2.7101354 total: 8.75s remaining: 6.85s
561: learn: 2.7100486 total: 8.77s remaining: 6.83s
562: learn: 2.7099786 total: 8.79s remaining: 6.82s
563: learn: 2.7098500 total: 8.81s remaining: 6.81s
564: learn: 2.7098360 total: 8.84s remaining: 6.8s
565: learn: 2.7096993 total: 8.86s remaining: 6.79s
566: learn: 2.7096891 total: 8.86s remaining: 6.77s
567: learn: 2.7096888 total: 8.87s remaining: 6.75s
568: learn: 2.7096363 total: 8.89s remaining: 6.74s
569: learn: 2.7095460 total: 8.91s remaining: 6.72s
570: learn: 2.7095008 total: 8.94s remaining: 6.71s
571: learn: 2.7074518 total: 8.96s remaining: 6.7s
572: learn: 2.7073884 total: 8.97s remaining: 6.69s
573: learn: 2.7073218 total: 8.99s remaining: 6.67s
574: learn: 2.7073077 total: 9.02s remaining: 6.66s
575: learn: 2.7072845 total: 9.04s remaining: 6.66s
576: learn: 2.7071993 total: 9.07s remaining: 6.65s
577: learn: 2.7071944 total: 9.09s remaining: 6.63s
578: learn: 2.7071743 total: 9.1s remaining: 6.62s
579: learn: 2.7071650 total: 9.12s remaining: 6.6s
580: learn: 2.7071560 total: 9.13s remaining: 6.58s
581: learn: 2.7071529 total: 9.15s remaining: 6.57s
582: learn: 2.7071285 total: 9.17s remaining: 6.56s
583: learn: 2.7071197 total: 9.18s remaining: 6.54s
584: learn: 2.7071074 total: 9.2s remaining: 6.53s
585: learn: 2.7070979 total: 9.21s remaining: 6.51s
586: learn: 2.7070933 total: 9.22s remaining: 6.49s
587: learn: 2.7028986 total: 9.24s remaining: 6.47s
588: learn: 2.7024534 total: 9.27s remaining: 6.46s
589: learn: 2.7024092 total: 9.29s remaining: 6.45s
590: learn: 2.7022983 total: 9.31s remaining: 6.44s
591: learn: 2.7022214 total: 9.33s remaining: 6.43s
592: learn: 2.7021849 total: 9.35s remaining: 6.42s
593: learn: 2.7021846 total: 9.36s remaining: 6.4s
594: learn: 2.7021689 total: 9.38s remaining: 6.38s
595: learn: 2.6888123 total: 9.4s remaining: 6.37s
596: learn: 2.6887948 total: 9.42s remaining: 6.36s
597: learn: 2.6887927 total: 9.43s remaining: 6.34s
598: learn: 2.6887909 total: 9.45s remaining: 6.33s
599: learn: 2.6887803 total: 9.46s remaining: 6.3s
600: learn: 2.6887196 total: 9.48s remaining: 6.29s
601: learn: 2.6887145 total: 9.49s remaining: 6.28s
602: learn: 2.6887085 total: 9.5s remaining: 6.25s
603: learn: 2.6886852 total: 9.51s remaining: 6.24s
604: learn: 2.6886836 total: 9.52s remaining: 6.22s
605: learn: 2.6886834 total: 9.53s remaining: 6.2s
606: learn: 2.6885767 total: 9.55s remaining: 6.18s
607: learn: 2.6885510 total: 9.57s remaining: 6.17s
608: learn: 2.6885420 total: 9.59s remaining: 6.16s
609: learn: 2.6884413 total: 9.62s remaining: 6.15s
610: learn: 2.6883878 total: 9.64s remaining: 6.13s
611: learn: 2.6883457 total: 9.66s remaining: 6.13s
612: learn: 2.6883197 total: 9.68s remaining: 6.11s
613: learn: 2.6883050 total: 9.7s remaining: 6.1s
614: learn: 2.6882884 total: 9.71s remaining: 6.08s
615: learn: 2.6881746 total: 9.74s remaining: 6.07s
616: learn: 2.6881517 total: 9.76s remaining: 6.06s
617: learn: 2.6881474 total: 9.77s remaining: 6.04s
618: learn: 2.6881100 total: 9.79s remaining: 6.03s
619: learn: 2.6881028 total: 9.81s remaining: 6.01s
620: learn: 2.6880986 total: 9.82s remaining: 6s
621: learn: 2.6880407 total: 9.85s remaining: 5.98s
622: learn: 2.6880062 total: 9.87s remaining: 5.97s
623: learn: 2.6879952 total: 9.88s remaining: 5.96s
624: learn: 2.6879327 total: 9.91s remaining: 5.94s
625: learn: 2.6879248 total: 9.93s remaining: 5.93s
626: learn: 2.6879012 total: 9.95s remaining: 5.92s
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627: learn: 2.6876990 total: 9.97s remaining: 5.91s
628: learn: 2.6876811 total: 9.98s remaining: 5.89s
629: learn: 2.6875623 total: 10s remaining: 5.87s
630: learn: 2.6873403 total: 10s remaining: 5.86s
631: learn: 2.6873289 total: 10.1s remaining: 5.85s
632: learn: 2.6873216 total: 10.1s remaining: 5.83s
633: learn: 2.6873211 total: 10.1s remaining: 5.82s
634: learn: 2.6873202 total: 10.1s remaining: 5.8s
635: learn: 2.6873066 total: 10.1s remaining: 5.78s
636: learn: 2.6871739 total: 10.1s remaining: 5.77s
637: learn: 2.6870888 total: 10.1s remaining: 5.76s
638: learn: 2.6870819 total: 10.2s remaining: 5.74s
639: learn: 2.6870752 total: 10.2s remaining: 5.72s
640: learn: 2.6870527 total: 10.2s remaining: 5.71s
641: learn: 2.6870191 total: 10.2s remaining: 5.7s
642: learn: 2.6870004 total: 10.2s remaining: 5.68s
643: learn: 2.6870002 total: 10.2s remaining: 5.67s
644: learn: 2.6869829 total: 10.3s remaining: 5.65s
645: learn: 2.6869652 total: 10.3s remaining: 5.64s
646: learn: 2.6869513 total: 10.3s remaining: 5.63s
647: learn: 2.6868936 total: 10.3s remaining: 5.61s
648: learn: 2.6868430 total: 10.3s remaining: 5.6s
649: learn: 2.6868048 total: 10.4s remaining: 5.58s
650: learn: 2.6867821 total: 10.4s remaining: 5.57s
651: learn: 2.6867746 total: 10.4s remaining: 5.55s
652: learn: 2.6867555 total: 10.4s remaining: 5.53s
653: learn: 2.6867448 total: 10.4s remaining: 5.52s
654: learn: 2.6867388 total: 10.4s remaining: 5.5s
655: learn: 2.6867330 total: 10.5s remaining: 5.48s
656: learn: 2.6867150 total: 10.5s remaining: 5.47s
657: learn: 2.6867146 total: 10.5s remaining: 5.45s
658: learn: 2.6735287 total: 10.5s remaining: 5.44s
659: learn: 2.6735168 total: 10.5s remaining: 5.42s
660: learn: 2.6735058 total: 10.5s remaining: 5.4s
661: learn: 2.6734965 total: 10.5s remaining: 5.38s
662: learn: 2.6734877 total: 10.6s remaining: 5.37s
663: learn: 2.6734862 total: 10.6s remaining: 5.35s
664: learn: 2.6734819 total: 10.6s remaining: 5.34s
665: learn: 2.6733948 total: 10.6s remaining: 5.32s
666: learn: 2.6733437 total: 10.6s remaining: 5.31s
667: learn: 2.6733385 total: 10.7s remaining: 5.29s
668: learn: 2.6733375 total: 10.7s remaining: 5.28s
669: learn: 2.6733317 total: 10.7s remaining: 5.26s
670: learn: 2.6733032 total: 10.7s remaining: 5.25s
671: learn: 2.6732938 total: 10.7s remaining: 5.24s
672: learn: 2.6732641 total: 10.8s remaining: 5.22s
673: learn: 2.6732590 total: 10.8s remaining: 5.21s
674: learn: 2.6732583 total: 10.8s remaining: 5.19s
675: learn: 2.6732481 total: 10.8s remaining: 5.17s
676: learn: 2.6732352 total: 10.8s remaining: 5.16s
677: learn: 2.6602793 total: 10.8s remaining: 5.15s
678: learn: 2.6602549 total: 10.9s remaining: 5.13s
679: learn: 2.6602537 total: 10.9s remaining: 5.11s
680: learn: 2.6601461 total: 10.9s remaining: 5.1s
681: learn: 2.6473873 total: 10.9s remaining: 5.09s
682: learn: 2.6473803 total: 10.9s remaining: 5.08s
683: learn: 2.6473795 total: 10.9s remaining: 5.06s
684: learn: 2.6473616 total: 11s remaining: 5.04s
685: learn: 2.6472911 total: 11s remaining: 5.02s
686: learn: 2.6472605 total: 11s remaining: 5.01s
687: learn: 2.6472603 total: 11s remaining: 4.99s
688: learn: 2.6472337 total: 11s remaining: 4.97s
689: learn: 2.6471735 total: 11s remaining: 4.96s
690: learn: 2.6471686 total: 11.1s remaining: 4.94s
691: learn: 2.6471685 total: 11.1s remaining: 4.92s
692: learn: 2.6471672 total: 11.1s remaining: 4.91s
693: learn: 2.6471639 total: 11.1s remaining: 4.89s
694: learn: 2.6471602 total: 11.1s remaining: 4.88s
695: learn: 2.6471529 total: 11.1s remaining: 4.86s
696: learn: 2.6471526 total: 11.1s remaining: 4.84s
697: learn: 2.6470454 total: 11.2s remaining: 4.83s
698: learn: 2.6470004 total: 11.2s remaining: 4.82s
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699: learn: 2.6469276 total: 11.2s remaining: 4.8s
700: learn: 2.6469190 total: 11.2s remaining: 4.79s
701: learn: 2.6469158 total: 11.2s remaining: 4.77s
702: learn: 2.6467723 total: 11.3s remaining: 4.76s
703: learn: 2.6467691 total: 11.3s remaining: 4.75s
704: learn: 2.6467057 total: 11.3s remaining: 4.73s
705: learn: 2.6466557 total: 11.3s remaining: 4.72s
706: learn: 2.6465270 total: 11.4s remaining: 4.71s
707: learn: 2.6465263 total: 11.4s remaining: 4.69s
708: learn: 2.6465210 total: 11.4s remaining: 4.67s
709: learn: 2.6465137 total: 11.4s remaining: 4.66s
710: learn: 2.6464883 total: 11.4s remaining: 4.64s
711: learn: 2.6464617 total: 11.4s remaining: 4.63s
712: learn: 2.6464066 total: 11.5s remaining: 4.62s
713: learn: 2.6463987 total: 11.5s remaining: 4.6s
714: learn: 2.6463891 total: 11.5s remaining: 4.58s
715: learn: 2.6462490 total: 11.5s remaining: 4.57s
716: learn: 2.6462460 total: 11.5s remaining: 4.55s
717: learn: 2.6461876 total: 11.6s remaining: 4.54s
718: learn: 2.6461833 total: 11.6s remaining: 4.53s
719: learn: 2.6461834 total: 11.6s remaining: 4.51s
720: learn: 2.6460432 total: 11.6s remaining: 4.49s
721: learn: 2.6460361 total: 11.6s remaining: 4.48s
722: learn: 2.6459805 total: 11.7s remaining: 4.46s
723: learn: 2.6459800 total: 11.7s remaining: 4.45s
724: learn: 2.6459227 total: 11.7s remaining: 4.43s
725: learn: 2.6459186 total: 11.7s remaining: 4.42s
726: learn: 2.6459084 total: 11.7s remaining: 4.4s
727: learn: 2.6459048 total: 11.7s remaining: 4.39s
728: learn: 2.6458982 total: 11.8s remaining: 4.37s
729: learn: 2.6458956 total: 11.8s remaining: 4.35s
730: learn: 2.6458773 total: 11.8s remaining: 4.34s
731: learn: 2.6458528 total: 11.8s remaining: 4.32s
732: learn: 2.6458250 total: 11.8s remaining: 4.31s
733: learn: 2.6457937 total: 11.8s remaining: 4.29s
734: learn: 2.6457894 total: 11.9s remaining: 4.27s
735: learn: 2.6457582 total: 11.9s remaining: 4.26s
736: learn: 2.6456926 total: 11.9s remaining: 4.24s
737: learn: 2.6456926 total: 11.9s remaining: 4.22s
738: learn: 2.6456798 total: 11.9s remaining: 4.21s
739: learn: 2.6456636 total: 11.9s remaining: 4.2s
740: learn: 2.6455994 total: 12s remaining: 4.18s
741: learn: 2.6455916 total: 12s remaining: 4.17s
742: learn: 2.6455881 total: 12s remaining: 4.15s
743: learn: 2.6455844 total: 12s remaining: 4.14s
744: learn: 2.6455216 total: 12.1s remaining: 4.13s
745: learn: 2.6455183 total: 12.1s remaining: 4.11s
746: learn: 2.6454679 total: 12.1s remaining: 4.09s
747: learn: 2.6454601 total: 12.1s remaining: 4.08s
748: learn: 2.6454545 total: 12.1s remaining: 4.06s
749: learn: 2.6452760 total: 12.1s remaining: 4.04s
750: learn: 2.6452643 total: 12.2s remaining: 4.03s
751: learn: 2.6452009 total: 12.2s remaining: 4.01s
752: learn: 2.6451739 total: 12.2s remaining: 4s
753: learn: 2.6451725 total: 12.2s remaining: 3.98s
754: learn: 2.6451698 total: 12.2s remaining: 3.97s
755: learn: 2.6451694 total: 12.2s remaining: 3.95s
756: learn: 2.6451693 total: 12.3s remaining: 3.93s
757: learn: 2.6451689 total: 12.3s remaining: 3.91s
758: learn: 2.6451586 total: 12.3s remaining: 3.9s
759: learn: 2.6451336 total: 12.3s remaining: 3.88s
760: learn: 2.6451332 total: 12.3s remaining: 3.87s
761: learn: 2.6450849 total: 12.3s remaining: 3.85s
762: learn: 2.6447661 total: 12.4s remaining: 3.84s
763: learn: 2.6447658 total: 12.4s remaining: 3.82s
764: learn: 2.6447657 total: 12.4s remaining: 3.8s
765: learn: 2.6446792 total: 12.4s remaining: 3.79s
766: learn: 2.6446550 total: 12.4s remaining: 3.77s
767: learn: 2.6446521 total: 12.4s remaining: 3.75s
768: learn: 2.6445752 total: 12.5s remaining: 3.74s
769: learn: 2.6445750 total: 12.5s remaining: 3.72s
770: learn: 2.6445650 total: 12.5s remaining: 3.71s
```

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771: learn: 2.6445627 total: 12.5s remaining: 3.69s
772: learn: 2.6445544 total: 12.5s remaining: 3.67s
773: learn: 2.6445347 total: 12.5s remaining: 3.66s
774: learn: 2.6443992 total: 12.6s remaining: 3.65s
775: learn: 2.6443732 total: 12.6s remaining: 3.63s
776: learn: 2.6443700 total: 12.6s remaining: 3.61s
777: learn: 2.6443682 total: 12.6s remaining: 3.6s
778: learn: 2.6442301 total: 12.6s remaining: 3.58s
779: learn: 2.6440682 total: 12.6s remaining: 3.57s
780: learn: 2.6440579 total: 12.7s remaining: 3.55s
781: learn: 2.6440576 total: 12.7s remaining: 3.53s
782: learn: 2.6440362 total: 12.7s remaining: 3.52s
783: learn: 2.6440342 total: 12.7s remaining: 3.5s
784: learn: 2.6440033 total: 12.7s remaining: 3.48s
785: learn: 2.6440009 total: 12.7s remaining: 3.47s
786: learn: 2.6439793 total: 12.8s remaining: 3.46s
787: learn: 2.6439479 total: 12.8s remaining: 3.44s
788: learn: 2.6439477 total: 12.8s remaining: 3.42s
789: learn: 2.6439434 total: 12.8s remaining: 3.41s
790: learn: 2.6439419 total: 12.8s remaining: 3.39s
791: learn: 2.6439208 total: 12.9s remaining: 3.38s
792: learn: 2.6438685 total: 12.9s remaining: 3.36s
793: learn: 2.6438665 total: 12.9s remaining: 3.35s
794: learn: 2.6437365 total: 12.9s remaining: 3.33s
795: learn: 2.6437362 total: 12.9s remaining: 3.31s
796: learn: 2.6437134 total: 13s remaining: 3.3s
797: learn: 2.6436804 total: 13s remaining: 3.28s
798: learn: 2.6436795 total: 13s remaining: 3.26s
799: learn: 2.6436591 total: 13s remaining: 3.25s
800: learn: 2.6436579 total: 13s remaining: 3.23s
801: learn: 2.6436576 total: 13s remaining: 3.22s
802: learn: 2.6436378 total: 13.1s remaining: 3.2s
803: learn: 2.6436361 total: 13.1s remaining: 3.19s
804: learn: 2.6434521 total: 13.1s remaining: 3.17s
805: learn: 2.6434495 total: 13.1s remaining: 3.15s
806: learn: 2.6434227 total: 13.1s remaining: 3.14s
807: learn: 2.6434147 total: 13.1s remaining: 3.12s
808: learn: 2.6433936 total: 13.2s remaining: 3.11s
809: learn: 2.6433856 total: 13.2s remaining: 3.09s
810: learn: 2.6433831 total: 13.2s remaining: 3.07s
811: learn: 2.6433829 total: 13.2s remaining: 3.06s
812: learn: 2.6433829 total: 13.2s remaining: 3.04s
813: learn: 2.6433821 total: 13.2s remaining: 3.02s
814: learn: 2.6433642 total: 13.2s remaining: 3s
815: learn: 2.6433449 total: 13.3s remaining: 2.99s
816: learn: 2.6433434 total: 13.3s remaining: 2.98s
817: learn: 2.6432885 total: 13.3s remaining: 2.96s
818: learn: 2.6432858 total: 13.3s remaining: 2.94s
819: learn: 2.6432842 total: 13.4s remaining: 2.93s
820: learn: 2.6432831 total: 13.4s remaining: 2.92s
821: learn: 2.6432435 total: 13.4s remaining: 2.9s
822: learn: 2.6432434 total: 13.4s remaining: 2.88s
823: learn: 2.6432423 total: 13.4s remaining: 2.87s
824: learn: 2.6432420 total: 13.4s remaining: 2.85s
825: learn: 2.6431958 total: 13.5s remaining: 2.83s
826: learn: 2.6431927 total: 13.5s remaining: 2.82s
827: learn: 2.6431911 total: 13.5s remaining: 2.8s
828: learn: 2.6431381 total: 13.5s remaining: 2.79s
829: learn: 2.6431208 total: 13.5s remaining: 2.77s
830: learn: 2.6431038 total: 13.6s remaining: 2.76s
831: learn: 2.6430938 total: 13.6s remaining: 2.74s
832: learn: 2.6430582 total: 13.6s remaining: 2.73s
833: learn: 2.6430551 total: 13.6s remaining: 2.71s
834: learn: 2.6430540 total: 13.6s remaining: 2.69s
835: learn: 2.6430393 total: 13.7s remaining: 2.68s
836: learn: 2.6430381 total: 13.7s remaining: 2.66s
837: learn: 2.6430350 total: 13.7s remaining: 2.65s
838: learn: 2.6430342 total: 13.7s remaining: 2.63s
839: learn: 2.6430330 total: 13.7s remaining: 2.61s
840: learn: 2.6430323 total: 13.7s remaining: 2.6s
841: learn: 2.6430322 total: 13.7s remaining: 2.58s
842: learn: 2.6430314 total: 13.8s remaining: 2.56s
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843: learn: 2.6430133 total: 13.8s remaining: 2.55s
844: learn: 2.6430120 total: 13.8s remaining: 2.53s
845: learn: 2.6429684 total: 13.8s remaining: 2.52s
846: learn: 2.6429550 total: 13.8s remaining: 2.5s
847: learn: 2.6429548 total: 13.9s remaining: 2.48s
848: learn: 2.6429540 total: 13.9s remaining: 2.47s
849: learn: 2.6429092 total: 13.9s remaining: 2.45s
850: learn: 2.6429091 total: 13.9s remaining: 2.43s
851: learn: 2.6427545 total: 13.9s remaining: 2.42s
852: learn: 2.6427543 total: 13.9s remaining: 2.4s
853: learn: 2.6427534 total: 14s remaining: 2.38s
854: learn: 2.6427398 total: 14s remaining: 2.37s
855: learn: 2.6427307 total: 14s remaining: 2.35s
856: learn: 2.6427297 total: 14s remaining: 2.34s
857: learn: 2.6427287 total: 14s remaining: 2.32s
858: learn: 2.6427198 total: 14s remaining: 2.31s
859: learn: 2.6427189 total: 14.1s remaining: 2.29s
860: learn: 2.6427189 total: 14.1s remaining: 2.27s
861: learn: 2.6427187 total: 14.1s remaining: 2.26s
862: learn: 2.6427051 total: 14.1s remaining: 2.24s
863: learn: 2.6427050 total: 14.1s remaining: 2.23s
864: learn: 2.6427050 total: 14.1s remaining: 2.21s
865: learn: 2.6426928 total: 14.2s remaining: 2.19s
866: learn: 2.6426782 total: 14.2s remaining: 2.18s
867: learn: 2.6426173 total: 14.2s remaining: 2.16s
868: learn: 2.6424341 total: 14.2s remaining: 2.15s
869: learn: 2.6424221 total: 14.3s remaining: 2.13s
870: learn: 2.6423973 total: 14.3s remaining: 2.11s
871: learn: 2.6423957 total: 14.3s remaining: 2.1s
872: learn: 2.6423653 total: 14.3s remaining: 2.08s
873: learn: 2.6423653 total: 14.3s remaining: 2.06s
874: learn: 2.6423644 total: 14.3s remaining: 2.05s
875: learn: 2.6423640 total: 14.3s remaining: 2.03s
876: learn: 2.6423631 total: 14.4s remaining: 2.01s
877: learn: 2.6423616 total: 14.4s remaining: 2s
878: learn: 2.6423508 total: 14.4s remaining: 1.98s
879: learn: 2.6423481 total: 14.4s remaining: 1.97s
880: learn: 2.6423011 total: 14.4s remaining: 1.95s
881: learn: 2.6423010 total: 14.4s remaining: 1.93s
882: learn: 2.6423009 total: 14.4s remaining: 1.91s
883: learn: 2.6423007 total: 14.5s remaining: 1.9s
884: learn: 2.6423003 total: 14.5s remaining: 1.88s
885: learn: 2.6423001 total: 14.5s remaining: 1.86s
886: learn: 2.6422994 total: 14.5s remaining: 1.85s
887: learn: 2.6422975 total: 14.5s remaining: 1.83s
888: learn: 2.6421655 total: 14.5s remaining: 1.81s
889: learn: 2.6421635 total: 14.6s remaining: 1.8s
890: learn: 2.6421627 total: 14.6s remaining: 1.78s
891: learn: 2.6421621 total: 14.6s remaining: 1.77s
892: learn: 2.6421158 total: 14.6s remaining: 1.75s
893: learn: 2.6421065 total: 14.6s remaining: 1.74s
894: learn: 2.6420949 total: 14.7s remaining: 1.72s
895: learn: 2.6420945 total: 14.7s remaining: 1.7s
896: learn: 2.6420938 total: 14.7s remaining: 1.69s
897: learn: 2.6420825 total: 14.7s remaining: 1.67s
898: learn: 2.6420825 total: 14.7s remaining: 1.66s
899: learn: 2.6420726 total: 14.8s remaining: 1.64s
900: learn: 2.6420544 total: 14.8s remaining: 1.62s
901: learn: 2.6420453 total: 14.8s remaining: 1.61s
902: learn: 2.6420357 total: 14.8s remaining: 1.59s
903: learn: 2.6420354 total: 14.8s remaining: 1.57s
904: learn: 2.6420286 total: 14.8s remaining: 1.56s
905: learn: 2.6420286 total: 14.8s remaining: 1.54s
906: learn: 2.6420220 total: 14.9s remaining: 1.52s
907: learn: 2.6420217 total: 14.9s remaining: 1.51s
908: learn: 2.6420132 total: 14.9s remaining: 1.49s
909: learn: 2.6420048 total: 14.9s remaining: 1.47s
910: learn: 2.6420046 total: 14.9s remaining: 1.46s
911: learn: 2.6420045 total: 14.9s remaining: 1.44s
912: learn: 2.6420043 total: 14.9s remaining: 1.42s
913: learn: 2.6419951 total: 14.9s remaining: 1.41s
914: learn: 2.6419945 total: 15s remaining: 1.39s
```

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915: learn: 2.6419936 total: 15s remaining: 1.37s
916: learn: 2.6416586 total: 15s remaining: 1.36s
917: learn: 2.6416562 total: 15s remaining: 1.34s
918: learn: 2.6416560 total: 15s remaining: 1.32s
919: learn: 2.6416558 total: 15s remaining: 1.31s
920: learn: 2.6416495 total: 15.1s remaining: 1.29s
921: learn: 2.6416493 total: 15.1s remaining: 1.27s
922: learn: 2.6416455 total: 15.1s remaining: 1.26s
923: learn: 2.6416451 total: 15.1s remaining: 1.24s
924: learn: 2.6416448 total: 15.1s remaining: 1.23s
925: learn: 2.6416412 total: 15.1s remaining: 1.21s
926: learn: 2.6416261 total: 15.2s remaining: 1.19s
927: learn: 2.6416178 total: 15.2s remaining: 1.18s
928: learn: 2.6415656 total: 15.2s remaining: 1.16s
929: learn: 2.6415566 total: 15.2s remaining: 1.15s
930: learn: 2.6415560 total: 15.2s remaining: 1.13s
931: learn: 2.6415559 total: 15.2s remaining: 1.11s
932: learn: 2.6415557 total: 15.3s remaining: 1.09s
933: learn: 2.6415534 total: 15.3s remaining: 1.08s
934: learn: 2.6415441 total: 15.3s remaining: 1.06s
935: learn: 2.6415182 total: 15.3s remaining: 1.05s
936: learn: 2.6415101 total: 15.3s remaining: 1.03s
937: learn: 2.6414960 total: 15.4s remaining: 1.01s
938: learn: 2.6414955 total: 15.4s remaining: 999ms
939: learn: 2.6414806 total: 15.4s remaining: 982ms
940: learn: 2.6414804 total: 15.4s remaining: 965ms
941: learn: 2.6414729 total: 15.4s remaining: 949ms
942: learn: 2.6414729 total: 15.4s remaining: 932ms
943: learn: 2.6414484 total: 15.4s remaining: 916ms
944: learn: 2.6414236 total: 15.5s remaining: 900ms
945: learn: 2.6414211 total: 15.5s remaining: 884ms
946: learn: 2.6414206 total: 15.5s remaining: 868ms
947: learn: 2.6414196 total: 15.5s remaining: 851ms
948: learn: 2.6414194 total: 15.5s remaining: 834ms
949: learn: 2.6414189 total: 15.5s remaining: 818ms
950: learn: 2.6413730 total: 15.6s remaining: 802ms
951: learn: 2.6413276 total: 15.6s remaining: 786ms
952: learn: 2.6413268 total: 15.6s remaining: 769ms
953: learn: 2.6413269 total: 15.6s remaining: 752ms
954: learn: 2.6413187 total: 15.6s remaining: 736ms
955: learn: 2.6413187 total: 15.6s remaining: 719ms
956: learn: 2.6413182 total: 15.6s remaining: 703ms
957: learn: 2.6413176 total: 15.6s remaining: 686ms
958: learn: 2.6413117 total: 15.7s remaining: 670ms
959: learn: 2.6413111 total: 15.7s remaining: 654ms
960: learn: 2.6411545 total: 15.7s remaining: 638ms
961: learn: 2.6411542 total: 15.7s remaining: 621ms
962: learn: 2.6411541 total: 15.7s remaining: 604ms
963: learn: 2.6351082 total: 15.8s remaining: 588ms
964: learn: 2.6351081 total: 15.8s remaining: 572ms
965: learn: 2.6351079 total: 15.8s remaining: 555ms
966: learn: 2.6350641 total: 15.8s remaining: 539ms
967: learn: 2.6350538 total: 15.8s remaining: 523ms
968: learn: 2.6350320 total: 15.8s remaining: 507ms
969: learn: 2.6350317 total: 15.9s remaining: 490ms
970: learn: 2.6350221 total: 15.9s remaining: 474ms
971: learn: 2.6349521 total: 15.9s remaining: 458ms
972: learn: 2.6349388 total: 15.9s remaining: 442ms
973: learn: 2.6349371 total: 15.9s remaining: 425ms
974: learn: 2.6348929 total: 15.9s remaining: 409ms
975: learn: 2.6348840 total: 16s remaining: 393ms
976: learn: 2.6348837 total: 16s remaining: 376ms
977: learn: 2.6348835 total: 16s remaining: 360ms
978: learn: 2.6347581 total: 16s remaining: 344ms
979: learn: 2.6347499 total: 16s remaining: 327ms
980: learn: 2.6347498 total: 16.1s remaining: 311ms
981: learn: 2.6347499 total: 16.1s remaining: 295ms
982: learn: 2.6347454 total: 16.1s remaining: 278ms
983: learn: 2.6347383 total: 16.1s remaining: 262ms
984: learn: 2.6347303 total: 16.1s remaining: 245ms
985: learn: 2.6347223 total: 16.1s remaining: 229ms
986: learn: 2.6346924 total: 16.2s remaining: 213ms
```

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987: learn: 2.6346919 total: 16.2s remaining: 196ms
988: learn: 2.6346550 total: 16.2s remaining: 180ms
989: learn: 2.6346549 total: 16.2s remaining: 164ms
990: learn: 2.6346529 total: 16.2s remaining: 147ms
991: learn: 2.6346094 total: 16.2s remaining: 131ms
992: learn: 2.6346093 total: 16.3s remaining: 115ms
993: learn: 2.6346015 total: 16.3s remaining: 98.2ms
994: learn: 2.6345941 total: 16.3s remaining: 81.9ms
995: learn: 2.6345868 total: 16.3s remaining: 65.5ms
996: learn: 2.6345866 total: 16.3s remaining: 49.1ms
997: learn: 2.6345640 total: 16.3s remaining: 32.7ms
998: learn: 2.6345636 total: 16.4s remaining: 16.4ms
999: learn: 2.6345637 total: 16.4s remaining: 0us
0: learn: 3.9277574 total: 22.2ms remaining: 22.2s
1: learn: 3.9183049 total: 43.2ms remaining: 21.6s
2: learn: 3.9087189 total: 60.1ms remaining: 20s
3: learn: 3.8989065 total: 69.7ms remaining: 17.3s
4: learn: 3.8888311 total: 91.1ms remaining: 18.1s
5: learn: 3.8818824 total: 101ms remaining: 16.7s
6: learn: 3.8739988 total: 113ms remaining: 16s
7: learn: 3.8657745 total: 125ms remaining: 15.5s
8: learn: 3.8580668 total: 133ms remaining: 14.7s
9: learn: 3.8487185 total: 154ms remaining: 15.3s
10: learn: 3.8415180 total: 162ms remaining: 14.6s
11: learn: 3.8342466 total: 172ms remaining: 14.2s
12: learn: 3.8284856 total: 180ms remaining: 13.6s
13: learn: 3.8220041 total: 196ms remaining: 13.8s
14: learn: 3.7913523 total: 217ms remaining: 14.2s
15: learn: 3.7850094 total: 242ms remaining: 14.9s
16: learn: 3.7790728 total: 263ms remaining: 15.2s
17: learn: 3.7717063 total: 281ms remaining: 15.3s
18: learn: 3.7644819 total: 302ms remaining: 15.6s
19: learn: 3.7590645 total: 311ms remaining: 15.2s
20: learn: 3.7518872 total: 327ms remaining: 15.3s
21: learn: 3.7465468 total: 344ms remaining: 15.3s
22: learn: 3.7409374 total: 356ms remaining: 15.1s
23: learn: 3.7340649 total: 380ms remaining: 15.5s
24: learn: 3.7301511 total: 393ms remaining: 15.3s
25: learn: 3.7248055 total: 414ms remaining: 15.5s
26: learn: 3.7184953 total: 434ms remaining: 15.7s
27: learn: 3.7152300 total: 447ms remaining: 15.5s
28: learn: 3.7109399 total: 461ms remaining: 15.4s
29: learn: 3.7057908 total: 471ms remaining: 15.2s
30: learn: 3.7014016 total: 481ms remaining: 15s
31: learn: 3.6974970 total: 490ms remaining: 14.8s
32: learn: 3.6919988 total: 502ms remaining: 14.7s
33: learn: 3.6889046 total: 512ms remaining: 14.5s
34: learn: 3.6829839 total: 533ms remaining: 14.7s
35: learn: 3.6784863 total: 541ms remaining: 14.5s
36: learn: 3.6743984 total: 553ms remaining: 14.4s
37: learn: 3.6705122 total: 565ms remaining: 14.3s
38: learn: 3.6665281 total: 586ms remaining: 14.4s
39: learn: 3.6616614 total: 595ms remaining: 14.3s
40: learn: 3.6574539 total: 618ms remaining: 14.4s
41: learn: 3.6547239 total: 626ms remaining: 14.3s
42: learn: 3.6512651 total: 636ms remaining: 14.1s
43: learn: 3.6473523 total: 658ms remaining: 14.3s
44: learn: 3.6448847 total: 669ms remaining: 14.2s
45: learn: 3.6417113 total: 690ms remaining: 14.3s
46: learn: 3.6381149 total: 702ms remaining: 14.2s
47: learn: 3.6358686 total: 718ms remaining: 14.2s
48: learn: 3.6333410 total: 727ms remaining: 14.1s
49: learn: 3.6312477 total: 735ms remaining: 14s
50: learn: 3.6032515 total: 756ms remaining: 14.1s
51: learn: 3.6009620 total: 764ms remaining: 13.9s
52: learn: 3.5981061 total: 773ms remaining: 13.8s
53: learn: 3.5941527 total: 804ms remaining: 14.1s
54: learn: 3.5927459 total: 811ms remaining: 13.9s
55: learn: 3.5899028 total: 819ms remaining: 13.8s
56: learn: 3.5871768 total: 827ms remaining: 13.7s
57: learn: 3.5855163 total: 836ms remaining: 13.6s
58: learn: 3.5832192 total: 846ms remaining: 13.5s
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59: learn: 3.5812479 total: 875ms remaining: 13.7s
60: learn: 3.5794393 total: 885ms remaining: 13.6s
61: learn: 3.5766937 total: 902ms remaining: 13.6s
62: learn: 3.5752495 total: 911ms remaining: 13.6s
63: learn: 3.5726086 total: 928ms remaining: 13.6s
64: learn: 3.5684662 total: 945ms remaining: 13.6s
65: learn: 3.5676698 total: 953ms remaining: 13.5s
66: learn: 3.5644690 total: 974ms remaining: 13.6s
67: learn: 3.5634010 total: 984ms remaining: 13.5s
68: learn: 3.5619191 total: 993ms remaining: 13.4s
69: learn: 3.5597888 total: 1s remaining: 13.3s
70: learn: 3.5581611 total: 1.01s remaining: 13.2s
71: learn: 3.5573058 total: 1.02s remaining: 13.1s
72: learn: 3.5562963 total: 1.03s remaining: 13.1s
73: learn: 3.5552342 total: 1.04s remaining: 13s
74: learn: 3.5545329 total: 1.05s remaining: 13s
75: learn: 3.5525098 total: 1.07s remaining: 13s
76: learn: 3.5508715 total: 1.09s remaining: 13.1s
77: learn: 3.5474427 total: 1.11s remaining: 13.1s
78: learn: 3.5465226 total: 1.11s remaining: 13s
79: learn: 3.5454899 total: 1.13s remaining: 12.9s
80: learn: 3.5443366 total: 1.14s remaining: 12.9s
81: learn: 3.5436225 total: 1.15s remaining: 12.8s
82: learn: 3.5416337 total: 1.16s remaining: 12.8s
83: learn: 3.5408443 total: 1.17s remaining: 12.8s
84: learn: 3.5390146 total: 1.18s remaining: 12.7s
85: learn: 3.5167459 total: 1.2s remaining: 12.7s
86: learn: 3.5153754 total: 1.21s remaining: 12.7s
87: learn: 3.5144039 total: 1.22s remaining: 12.6s
88: learn: 3.5133623 total: 1.24s remaining: 12.7s
89: learn: 3.5127309 total: 1.25s remaining: 12.6s
90: learn: 3.5108601 total: 1.26s remaining: 12.6s
91: learn: 3.5095728 total: 1.28s remaining: 12.6s
92: learn: 3.5079508 total: 1.3s remaining: 12.7s
93: learn: 3.5075308 total: 1.3s remaining: 12.6s
94: learn: 3.5071301 total: 1.31s remaining: 12.5s
95: learn: 3.5049645 total: 1.33s remaining: 12.6s
96: learn: 3.5034307 total: 1.34s remaining: 12.5s
97: learn: 3.5025914 total: 1.35s remaining: 12.5s
98: learn: 3.5022392 total: 1.36s remaining: 12.4s
99: learn: 3.5006241 total: 1.38s remaining: 12.4s
100: learn: 3.4990830 total: 1.39s remaining: 12.4s
101: learn: 3.4986212 total: 1.4s remaining: 12.3s
102: learn: 3.4972336 total: 1.41s remaining: 12.2s
103: learn: 3.4966512 total: 1.41s remaining: 12.2s
104: learn: 3.4703432 total: 1.43s remaining: 12.2s
105: learn: 3.4699076 total: 1.44s remaining: 12.2s
106: learn: 3.4684969 total: 1.45s remaining: 12.1s
107: learn: 3.4679485 total: 1.46s remaining: 12.1s
108: learn: 3.4675586 total: 1.47s remaining: 12s
109: learn: 3.4671932 total: 1.48s remaining: 11.9s
110: learn: 3.4667463 total: 1.48s remaining: 11.9s
111: learn: 3.4648141 total: 1.49s remaining: 11.8s
112: learn: 3.4644577 total: 1.5s remaining: 11.8s
113: learn: 3.4641208 total: 1.51s remaining: 11.7s
114: learn: 3.4636654 total: 1.52s remaining: 11.7s
115: learn: 3.4623888 total: 1.53s remaining: 11.7s
116: learn: 3.4622041 total: 1.54s remaining: 11.6s
117: learn: 3.4612878 total: 1.55s remaining: 11.6s
118: learn: 3.4608579 total: 1.56s remaining: 11.5s
119: learn: 3.4605324 total: 1.56s remaining: 11.5s
120: learn: 3.4601154 total: 1.57s remaining: 11.4s
121: learn: 3.4593109 total: 1.58s remaining: 11.4s
122: learn: 3.4589168 total: 1.59s remaining: 11.3s
123: learn: 3.4575495 total: 1.6s remaining: 11.3s
124: learn: 3.4565000 total: 1.61s remaining: 11.2s
125: learn: 3.4553816 total: 1.61s remaining: 11.2s
126: learn: 3.4294069 total: 1.64s remaining: 11.2s
127: learn: 3.4287084 total: 1.64s remaining: 11.2s
128: learn: 3.4279173 total: 1.65s remaining: 11.2s
129: learn: 3.4029831 total: 1.67s remaining: 11.2s
130: learn: 3.4021193 total: 1.68s remaining: 11.1s
```

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131: learn: 3.4013168 total: 1.7s remaining: 11.2s
132: learn: 3.4010857 total: 1.71s remaining: 11.2s
133: learn: 3.4000140 total: 1.72s remaining: 11.1s
134: learn: 3.3987385 total: 1.74s remaining: 11.2s
135: learn: 3.3981187 total: 1.75s remaining: 11.1s
136: learn: 3.3968331 total: 1.77s remaining: 11.2s
137: learn: 3.3965054 total: 1.78s remaining: 11.1s
138: learn: 3.3959121 total: 1.79s remaining: 11.1s
139: learn: 3.3953822 total: 1.79s remaining: 11s
140: learn: 3.3948265 total: 1.8s remaining: 11s
141: learn: 3.3944642 total: 1.81s remaining: 11s
142: learn: 3.3935440 total: 1.83s remaining: 11s
143: learn: 3.3932119 total: 1.83s remaining: 10.9s
144: learn: 3.3927249 total: 1.84s remaining: 10.9s
145: learn: 3.3922155 total: 1.85s remaining: 10.8s
146: learn: 3.3907059 total: 1.88s remaining: 10.9s
147: learn: 3.3905324 total: 1.88s remaining: 10.8s
148: learn: 3.3897636 total: 1.89s remaining: 10.8s
149: learn: 3.3887525 total: 1.92s remaining: 10.9s
150: learn: 3.3880089 total: 1.93s remaining: 10.8s
151: learn: 3.3866343 total: 1.94s remaining: 10.8s
152: learn: 3.3864738 total: 1.95s remaining: 10.8s
153: learn: 3.3852909 total: 1.96s remaining: 10.8s
154: learn: 3.3849881 total: 1.97s remaining: 10.7s
155: learn: 3.3840806 total: 1.98s remaining: 10.7s
156: learn: 3.3838398 total: 1.99s remaining: 10.7s
157: learn: 3.3834827 total: 1.99s remaining: 10.6s
158: learn: 3.3828373 total: 2s remaining: 10.6s
159: learn: 3.3825150 total: 2.01s remaining: 10.6s
160: learn: 3.3822380 total: 2.02s remaining: 10.5s
161: learn: 3.3813073 total: 2.03s remaining: 10.5s
162: learn: 3.3807420 total: 2.05s remaining: 10.5s
163: learn: 3.3805929 total: 2.06s remaining: 10.5s
164: learn: 3.3795373 total: 2.07s remaining: 10.5s
165: learn: 3.3792769 total: 2.08s remaining: 10.4s
166: learn: 3.3788125 total: 2.09s remaining: 10.4s
167: learn: 3.3785232 total: 2.1s remaining: 10.4s
168: learn: 3.3780471 total: 2.1s remaining: 10.3s
169: learn: 3.3778473 total: 2.11s remaining: 10.3s
170: learn: 3.3773386 total: 2.13s remaining: 10.3s
171: learn: 3.3532381 total: 2.15s remaining: 10.3s
172: learn: 3.3531210 total: 2.16s remaining: 10.3s
173: learn: 3.3529317 total: 2.16s remaining: 10.3s
174: learn: 3.3527015 total: 2.17s remaining: 10.2s
175: learn: 3.3515044 total: 2.19s remaining: 10.3s
176: learn: 3.3514863 total: 2.2s remaining: 10.2s
177: learn: 3.3511946 total: 2.21s remaining: 10.2s
178: learn: 3.3505135 total: 2.22s remaining: 10.2s
179: learn: 3.3487873 total: 2.24s remaining: 10.2s
180: learn: 3.3486290 total: 2.25s remaining: 10.2s
181: learn: 3.3482212 total: 2.28s remaining: 10.2s
182: learn: 3.3479585 total: 2.28s remaining: 10.2s
183: learn: 3.3477460 total: 2.3s remaining: 10.2s
184: learn: 3.3475434 total: 2.31s remaining: 10.2s
185: learn: 3.3470888 total: 2.33s remaining: 10.2s
186: learn: 3.3466404 total: 2.34s remaining: 10.2s
187: learn: 3.3462033 total: 2.36s remaining: 10.2s
188: learn: 3.3460472 total: 2.37s remaining: 10.2s
189: learn: 3.3459742 total: 2.38s remaining: 10.2s
190: learn: 3.3459115 total: 2.39s remaining: 10.1s
191: learn: 3.3455849 total: 2.4s remaining: 10.1s
192: learn: 3.3452165 total: 2.41s remaining: 10.1s
193: learn: 3.3451213 total: 2.42s remaining: 10s
194: learn: 3.3451153 total: 2.42s remaining: 10s
195: learn: 3.3447675 total: 2.43s remaining: 9.98s
196: learn: 3.3446391 total: 2.45s remaining: 9.97s
197: learn: 3.3439334 total: 2.47s remaining: 9.99s
198: learn: 3.3437519 total: 2.48s remaining: 9.97s
199: learn: 3.3202509 total: 2.5s remaining: 9.99s
200: learn: 3.2971769 total: 2.52s remaining: 10s
201: learn: 3.2964858 total: 2.53s remaining: 9.99s
202: learn: 3.2963940 total: 2.54s remaining: 9.98s
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203: learn: 3.2960709 total: 2.55s remaining: 9.95s
204: learn: 3.2957264 total: 2.56s remaining: 9.92s
205: learn: 3.2945227 total: 2.58s remaining: 9.94s
206: learn: 3.2717180 total: 2.6s remaining: 9.97s
207: learn: 3.2706922 total: 2.62s remaining: 9.97s
208: learn: 3.2705649 total: 2.63s remaining: 9.94s
209: learn: 3.2689474 total: 2.65s remaining: 9.96s
210: learn: 3.2688440 total: 2.66s remaining: 9.94s
211: learn: 3.2682423 total: 2.67s remaining: 9.91s
212: learn: 3.2677222 total: 2.67s remaining: 9.88s
213: learn: 3.2676456 total: 2.68s remaining: 9.85s
214: learn: 3.2674984 total: 2.69s remaining: 9.82s
215: learn: 3.2668503 total: 2.7s remaining: 9.79s
216: learn: 3.2663502 total: 2.7s remaining: 9.76s
217: learn: 3.2660811 total: 2.73s remaining: 9.79s
218: learn: 3.2658191 total: 2.74s remaining: 9.76s
219: learn: 3.2647545 total: 2.76s remaining: 9.78s
220: learn: 3.2644754 total: 2.77s remaining: 9.75s
221: learn: 3.2644403 total: 2.77s remaining: 9.72s
222: learn: 3.2619065 total: 2.79s remaining: 9.74s
223: learn: 3.2612909 total: 2.81s remaining: 9.75s
224: learn: 3.2612501 total: 2.82s remaining: 9.73s
225: learn: 3.2609442 total: 2.83s remaining: 9.71s
226: learn: 3.2608093 total: 2.84s remaining: 9.68s
227: learn: 3.2606784 total: 2.85s remaining: 9.65s
228: learn: 3.2597780 total: 2.87s remaining: 9.65s
229: learn: 3.2591297 total: 2.88s remaining: 9.63s
230: learn: 3.2588536 total: 2.89s remaining: 9.61s
231: learn: 3.2569861 total: 2.91s remaining: 9.63s
232: learn: 3.2558551 total: 2.92s remaining: 9.61s
233: learn: 3.2557724 total: 2.93s remaining: 9.58s
234: learn: 3.2553094 total: 2.94s remaining: 9.59s
235: learn: 3.2551198 total: 2.95s remaining: 9.56s
236: learn: 3.2547072 total: 2.97s remaining: 9.55s
237: learn: 3.2543582 total: 2.99s remaining: 9.56s
238: learn: 3.2542567 total: 2.99s remaining: 9.53s
239: learn: 3.2534378 total: 3.01s remaining: 9.55s
240: learn: 3.2531956 total: 3.02s remaining: 9.53s
241: learn: 3.2517622 total: 3.04s remaining: 9.53s
242: learn: 3.2514978 total: 3.06s remaining: 9.53s
243: learn: 3.2298124 total: 3.08s remaining: 9.54s
244: learn: 3.2297136 total: 3.09s remaining: 9.51s
245: learn: 3.2296177 total: 3.09s remaining: 9.49s
246: learn: 3.2081257 total: 3.12s remaining: 9.5s
247: learn: 3.1868920 total: 3.14s remaining: 9.51s
248: learn: 3.1866858 total: 3.16s remaining: 9.54s
249: learn: 3.1863739 total: 3.17s remaining: 9.53s
250: learn: 3.1863129 total: 3.18s remaining: 9.49s
251: learn: 3.1856315 total: 3.2s remaining: 9.49s
252: learn: 3.1851427 total: 3.21s remaining: 9.48s
253: learn: 3.1842810 total: 3.22s remaining: 9.46s
254: learn: 3.1842310 total: 3.23s remaining: 9.45s
255: learn: 3.1840946 total: 3.24s remaining: 9.42s
256: learn: 3.1823517 total: 3.27s remaining: 9.45s
257: learn: 3.1820329 total: 3.29s remaining: 9.45s
258: learn: 3.1817692 total: 3.3s remaining: 9.44s
259: learn: 3.1813145 total: 3.31s remaining: 9.42s
260: learn: 3.1797834 total: 3.33s remaining: 9.44s
261: learn: 3.1793917 total: 3.35s remaining: 9.45s
262: learn: 3.1792439 total: 3.37s remaining: 9.43s
263: learn: 3.1790530 total: 3.37s remaining: 9.41s
264: learn: 3.1788344 total: 3.39s remaining: 9.41s
265: learn: 3.1786227 total: 3.4s remaining: 9.39s
266: learn: 3.1768540 total: 3.42s remaining: 9.4s
267: learn: 3.1762835 total: 3.44s remaining: 9.41s
268: learn: 3.1760814 total: 3.46s remaining: 9.39s
269: learn: 3.1757453 total: 3.46s remaining: 9.36s
270: learn: 3.1757178 total: 3.47s remaining: 9.34s
271: learn: 3.1550492 total: 3.49s remaining: 9.35s
272: learn: 3.1532911 total: 3.51s remaining: 9.34s
273: learn: 3.1532263 total: 3.51s remaining: 9.31s
274: learn: 3.1522749 total: 3.53s remaining: 9.31s
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275: learn: 3.1517630 total: 3.55s remaining: 9.31s
276: learn: 3.1514751 total: 3.57s remaining: 9.32s
277: learn: 3.1510882 total: 3.58s remaining: 9.3s
278: learn: 3.1508596 total: 3.59s remaining: 9.28s
279: learn: 3.1504845 total: 3.6s remaining: 9.26s
280: learn: 3.1501539 total: 3.62s remaining: 9.26s
281: learn: 3.1499481 total: 3.63s remaining: 9.23s
282: learn: 3.1496034 total: 3.63s remaining: 9.21s
283: learn: 3.1492865 total: 3.64s remaining: 9.19s
284: learn: 3.1489314 total: 3.65s remaining: 9.17s
285: learn: 3.1487313 total: 3.67s remaining: 9.16s
286: learn: 3.1486135 total: 3.68s remaining: 9.14s
287: learn: 3.1485596 total: 3.69s remaining: 9.11s
288: learn: 3.1484456 total: 3.69s remaining: 9.09s
289: learn: 3.1479804 total: 3.71s remaining: 9.09s
290: learn: 3.1276021 total: 3.73s remaining: 9.09s
291: learn: 3.1274019 total: 3.74s remaining: 9.07s
292: learn: 3.1272503 total: 3.75s remaining: 9.04s
293: learn: 3.1272441 total: 3.76s remaining: 9.02s
294: learn: 3.1268845 total: 3.77s remaining: 9.01s
295: learn: 3.1267534 total: 3.78s remaining: 8.98s
296: learn: 3.1260557 total: 3.79s remaining: 8.98s
297: learn: 3.1260335 total: 3.8s remaining: 8.96s
298: learn: 3.1236658 total: 3.83s remaining: 8.97s
299: learn: 3.1232273 total: 3.85s remaining: 8.97s
300: learn: 3.1230273 total: 3.86s remaining: 8.96s
301: learn: 3.1228663 total: 3.87s remaining: 8.94s
302: learn: 3.1224344 total: 3.88s remaining: 8.93s
303: learn: 3.1223515 total: 3.9s remaining: 8.93s
304: learn: 3.1220308 total: 3.91s remaining: 8.92s
305: learn: 3.1217605 total: 3.92s remaining: 8.9s
306: learn: 3.1214514 total: 3.93s remaining: 8.88s
307: learn: 3.1203348 total: 3.95s remaining: 8.88s
308: learn: 3.1201189 total: 3.96s remaining: 8.87s
309: learn: 3.1003898 total: 3.99s remaining: 8.88s
310: learn: 3.1002778 total: 4s remaining: 8.86s
311: learn: 3.0996764 total: 4s remaining: 8.83s
312: learn: 3.0994021 total: 4.03s remaining: 8.84s
313: learn: 3.0980230 total: 4.05s remaining: 8.84s
314: learn: 3.0974421 total: 4.06s remaining: 8.83s
315: learn: 3.0973030 total: 4.07s remaining: 8.81s
316: learn: 3.0971095 total: 4.08s remaining: 8.79s
317: learn: 3.0970747 total: 4.09s remaining: 8.77s
318: learn: 3.0964453 total: 4.11s remaining: 8.78s
319: learn: 3.0962480 total: 4.12s remaining: 8.76s
320: learn: 3.0954423 total: 4.14s remaining: 8.77s
321: learn: 3.0953643 total: 4.15s remaining: 8.74s
322: learn: 3.0951437 total: 4.17s remaining: 8.75s
323: learn: 3.0951132 total: 4.18s remaining: 8.72s
324: learn: 3.0949842 total: 4.2s remaining: 8.73s
325: learn: 3.0948832 total: 4.21s remaining: 8.71s
326: learn: 3.0948538 total: 4.22s remaining: 8.69s
327: learn: 3.0946749 total: 4.23s remaining: 8.67s
328: learn: 3.0945867 total: 4.25s remaining: 8.66s
329: learn: 3.0945576 total: 4.25s remaining: 8.64s
330: learn: 3.0942717 total: 4.29s remaining: 8.66s
331: learn: 3.0942135 total: 4.29s remaining: 8.64s
332: learn: 3.0941378 total: 4.31s remaining: 8.63s
333: learn: 3.0752449 total: 4.33s remaining: 8.63s
334: learn: 3.0563021 total: 4.35s remaining: 8.63s
335: learn: 3.0557762 total: 4.36s remaining: 8.61s
336: learn: 3.0557071 total: 4.37s remaining: 8.59s
337: learn: 3.0551083 total: 4.39s remaining: 8.6s
338: learn: 3.0545248 total: 4.42s remaining: 8.62s
339: learn: 3.0539677 total: 4.43s remaining: 8.6s
340: learn: 3.0534183 total: 4.45s remaining: 8.61s
341: learn: 3.0533332 total: 4.47s remaining: 8.61s
342: learn: 3.0531913 total: 4.48s remaining: 8.59s
343: learn: 3.0526505 total: 4.49s remaining: 8.57s
344: learn: 3.0526406 total: 4.5s remaining: 8.54s
345: learn: 3.0526003 total: 4.51s remaining: 8.52s
346: learn: 3.0523386 total: 4.53s remaining: 8.53s
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347: learn: 3.0521604 total: 4.54s remaining: 8.51s
348: learn: 3.0520930 total: 4.56s remaining: 8.51s
349: learn: 3.0519095 total: 4.57s remaining: 8.48s
350: learn: 3.0517284 total: 4.58s remaining: 8.47s
351: learn: 3.0517094 total: 4.59s remaining: 8.45s
352: learn: 3.0516913 total: 4.59s remaining: 8.42s
353: learn: 3.0516734 total: 4.6s remaining: 8.4s
354: learn: 3.0514429 total: 4.63s remaining: 8.41s
355: learn: 3.0513406 total: 4.64s remaining: 8.4s
356: learn: 3.0513142 total: 4.66s remaining: 8.38s
357: learn: 3.0512652 total: 4.66s remaining: 8.36s
358: learn: 3.0506269 total: 4.68s remaining: 8.37s
359: learn: 3.0505889 total: 4.69s remaining: 8.35s
360: learn: 3.0503929 total: 4.71s remaining: 8.34s
361: learn: 3.0502723 total: 4.73s remaining: 8.34s
362: learn: 3.0500828 total: 4.75s remaining: 8.34s
363: learn: 3.0500427 total: 4.77s remaining: 8.33s
364: learn: 3.0500356 total: 4.77s remaining: 8.3s
365: learn: 3.0495301 total: 4.78s remaining: 8.29s
366: learn: 3.0495140 total: 4.79s remaining: 8.26s
367: learn: 3.0494795 total: 4.8s remaining: 8.25s
368: learn: 3.0313799 total: 4.82s remaining: 8.25s
369: learn: 3.0301500 total: 4.85s remaining: 8.26s
370: learn: 3.0301433 total: 4.86s remaining: 8.23s
371: learn: 3.0294926 total: 4.88s remaining: 8.24s
372: learn: 3.0292124 total: 4.9s remaining: 8.24s
373: learn: 3.0282737 total: 4.92s remaining: 8.24s
374: learn: 3.0279578 total: 4.94s remaining: 8.24s
375: learn: 3.0268647 total: 4.96s remaining: 8.24s
376: learn: 3.0268371 total: 4.97s remaining: 8.22s
377: learn: 3.0267037 total: 4.99s remaining: 8.2s
378: learn: 3.0266721 total: 5s remaining: 8.19s
379: learn: 3.0259991 total: 5.02s remaining: 8.19s
380: learn: 3.0255596 total: 5.04s remaining: 8.18s
381: learn: 3.0250706 total: 5.05s remaining: 8.16s
382: learn: 3.0246474 total: 5.05s remaining: 8.14s
383: learn: 3.0241247 total: 5.07s remaining: 8.13s
384: learn: 3.0241131 total: 5.08s remaining: 8.11s
385: learn: 3.0063787 total: 5.1s remaining: 8.11s
386: learn: 3.0059677 total: 5.11s remaining: 8.1s
387: learn: 3.0058095 total: 5.13s remaining: 8.09s
388: learn: 3.0057971 total: 5.15s remaining: 8.09s
389: learn: 3.0057577 total: 5.16s remaining: 8.08s
390: learn: 3.0056124 total: 5.17s remaining: 8.06s
391: learn: 3.0052192 total: 5.19s remaining: 8.04s
392: learn: 3.0052091 total: 5.2s remaining: 8.03s
393: learn: 3.0048580 total: 5.21s remaining: 8.01s
394: learn: 3.0048031 total: 5.22s remaining: 8s
395: learn: 3.0043795 total: 5.24s remaining: 7.99s
396: learn: 3.0043708 total: 5.26s remaining: 7.99s
397: learn: 3.0043622 total: 5.28s remaining: 7.98s
398: learn: 3.0042524 total: 5.3s remaining: 7.98s
399: learn: 3.0041093 total: 5.32s remaining: 7.98s
400: learn: 3.0036587 total: 5.34s remaining: 7.98s
401: learn: 3.0032621 total: 5.36s remaining: 7.98s
402: learn: 3.0032293 total: 5.37s remaining: 7.96s
403: learn: 3.0030859 total: 5.38s remaining: 7.94s
404: learn: 3.0027293 total: 5.4s remaining: 7.93s
405: learn: 3.0026773 total: 5.41s remaining: 7.92s
406: learn: 3.0025552 total: 5.43s remaining: 7.92s
407: learn: 3.0022295 total: 5.46s remaining: 7.92s
408: learn: 3.0019393 total: 5.48s remaining: 7.92s
409: learn: 3.0017608 total: 5.5s remaining: 7.92s
410: learn: 3.0014173 total: 5.52s remaining: 7.92s
411: learn: 3.0014154 total: 5.53s remaining: 7.89s
412: learn: 3.0013660 total: 5.55s remaining: 7.88s
413: learn: 3.0010514 total: 5.57s remaining: 7.88s
414: learn: 3.0009396 total: 5.58s remaining: 7.87s
415: learn: 3.0009178 total: 5.6s remaining: 7.86s
416: learn: 3.0004449 total: 5.62s remaining: 7.86s
417: learn: 3.0003335 total: 5.64s remaining: 7.85s
418: learn: 3.0003116 total: 5.65s remaining: 7.84s
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419: learn: 3.0003049 total: 5.66s remaining: 7.82s
420: learn: 3.0001969 total: 5.67s remaining: 7.8s
421: learn: 3.0001906 total: 5.68s remaining: 7.79s
422: learn: 3.0001193 total: 5.71s remaining: 7.78s
423: learn: 3.0001045 total: 5.72s remaining: 7.76s
424: learn: 3.0000988 total: 5.72s remaining: 7.74s
425: learn: 3.0000890 total: 5.73s remaining: 7.72s
426: learn: 3.0000715 total: 5.75s remaining: 7.71s
427: learn: 3.0000575 total: 5.75s remaining: 7.69s
428: learn: 3.0000518 total: 5.76s remaining: 7.67s
429: learn: 3.0000331 total: 5.77s remaining: 7.65s
430: learn: 3.0000193 total: 5.78s remaining: 7.63s
431: learn: 3.0000049 total: 5.79s remaining: 7.61s
432: learn: 3.0000038 total: 5.8s remaining: 7.59s
433: learn: 2.9998454 total: 5.82s remaining: 7.59s
434: learn: 2.9998401 total: 5.83s remaining: 7.57s
435: learn: 2.9998270 total: 5.84s remaining: 7.55s
436: learn: 2.9998185 total: 5.85s remaining: 7.54s
437: learn: 2.9994959 total: 5.87s remaining: 7.53s
438: learn: 2.9994802 total: 5.88s remaining: 7.52s
439: learn: 2.9993664 total: 5.9s remaining: 7.51s
440: learn: 2.9993482 total: 5.92s remaining: 7.5s
441: learn: 2.9993435 total: 5.93s remaining: 7.48s
442: learn: 2.9993391 total: 5.93s remaining: 7.46s
443: learn: 2.9993345 total: 5.94s remaining: 7.44s
444: learn: 2.9992362 total: 5.95s remaining: 7.42s
445: learn: 2.9992125 total: 5.96s remaining: 7.41s
446: learn: 2.9816444 total: 5.99s remaining: 7.41s
447: learn: 2.9643972 total: 6.01s remaining: 7.4s
448: learn: 2.9474610 total: 6.03s remaining: 7.4s
449: learn: 2.9471317 total: 6.05s remaining: 7.39s
450: learn: 2.9471221 total: 6.07s remaining: 7.39s
451: learn: 2.9470840 total: 6.1s remaining: 7.39s
452: learn: 2.9470733 total: 6.11s remaining: 7.38s
453: learn: 2.9468067 total: 6.13s remaining: 7.37s
454: learn: 2.9465595 total: 6.15s remaining: 7.37s
455: learn: 2.9462708 total: 6.17s remaining: 7.36s
456: learn: 2.9461415 total: 6.19s remaining: 7.35s
457: learn: 2.9461334 total: 6.21s remaining: 7.35s
458: learn: 2.9459754 total: 6.23s remaining: 7.34s
459: learn: 2.9456957 total: 6.26s remaining: 7.34s
460: learn: 2.9454468 total: 6.28s remaining: 7.34s
461: learn: 2.9453803 total: 6.29s remaining: 7.33s
462: learn: 2.9453682 total: 6.31s remaining: 7.32s
463: learn: 2.9450967 total: 6.32s remaining: 7.31s
464: learn: 2.9448294 total: 6.34s remaining: 7.3s
465: learn: 2.9448161 total: 6.37s remaining: 7.29s
466: learn: 2.9446328 total: 6.39s remaining: 7.29s
467: learn: 2.9445008 total: 6.41s remaining: 7.29s
468: learn: 2.9441684 total: 6.43s remaining: 7.28s
469: learn: 2.9441604 total: 6.44s remaining: 7.26s
470: learn: 2.9439029 total: 6.45s remaining: 7.25s
471: learn: 2.9438951 total: 6.46s remaining: 7.23s
472: learn: 2.9436842 total: 6.49s remaining: 7.23s
473: learn: 2.9433479 total: 6.52s remaining: 7.23s
474: learn: 2.9431547 total: 6.54s remaining: 7.23s
475: learn: 2.9429082 total: 6.55s remaining: 7.21s
476: learn: 2.9426799 total: 6.57s remaining: 7.2s
477: learn: 2.9426651 total: 6.57s remaining: 7.18s
478: learn: 2.9260787 total: 6.6s remaining: 7.17s
479: learn: 2.9258450 total: 6.61s remaining: 7.16s
480: learn: 2.9258388 total: 6.63s remaining: 7.15s
481: learn: 2.9258329 total: 6.64s remaining: 7.13s
482: learn: 2.9258270 total: 6.65s remaining: 7.12s
483: learn: 2.9258212 total: 6.66s remaining: 7.1s
484: learn: 2.9257265 total: 6.69s remaining: 7.11s
485: learn: 2.9255119 total: 6.71s remaining: 7.1s
486: learn: 2.9254647 total: 6.74s remaining: 7.1s
487: learn: 2.9254519 total: 6.76s remaining: 7.09s
488: learn: 2.9252279 total: 6.78s remaining: 7.08s
489: learn: 2.9252226 total: 6.79s remaining: 7.07s
490: learn: 2.9251222 total: 6.81s remaining: 7.06s
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491: learn: 2.9250449 total: 6.83s remaining: 7.05s
492: learn: 2.9248418 total: 6.85s remaining: 7.04s
493: learn: 2.9244181 total: 6.87s remaining: 7.04s
494: learn: 2.9243455 total: 6.88s remaining: 7.02s
495: learn: 2.9243406 total: 6.91s remaining: 7.02s
496: learn: 2.9243316 total: 6.93s remaining: 7.02s
497: learn: 2.9241254 total: 6.95s remaining: 7s
498: learn: 2.9240845 total: 6.97s remaining: 6.99s
499: learn: 2.9237000 total: 6.99s remaining: 6.99s
500: learn: 2.9236919 total: 7s remaining: 6.98s
501: learn: 2.9236780 total: 7.03s remaining: 6.97s
502: learn: 2.9236709 total: 7.04s remaining: 6.95s
503: learn: 2.9236513 total: 7.06s remaining: 6.94s
504: learn: 2.9235019 total: 7.08s remaining: 6.94s
505: learn: 2.9234978 total: 7.09s remaining: 6.92s
506: learn: 2.9234414 total: 7.1s remaining: 6.9s
507: learn: 2.9233046 total: 7.12s remaining: 6.89s
508: learn: 2.9228852 total: 7.14s remaining: 6.89s
509: learn: 2.9219295 total: 7.16s remaining: 6.88s
510: learn: 2.9217540 total: 7.18s remaining: 6.87s
511: learn: 2.9217503 total: 7.19s remaining: 6.85s
512: learn: 2.9217470 total: 7.2s remaining: 6.83s
513: learn: 2.9217436 total: 7.21s remaining: 6.82s
514: learn: 2.9217404 total: 7.22s remaining: 6.8s
515: learn: 2.9217371 total: 7.23s remaining: 6.78s
516: learn: 2.9216857 total: 7.25s remaining: 6.77s
517: learn: 2.9216370 total: 7.26s remaining: 6.76s
518: learn: 2.9216340 total: 7.28s remaining: 6.74s
519: learn: 2.9216310 total: 7.29s remaining: 6.73s
520: learn: 2.9214712 total: 7.31s remaining: 6.72s
521: learn: 2.9052396 total: 7.33s remaining: 6.71s
522: learn: 2.8892614 total: 7.36s remaining: 6.71s
523: learn: 2.8890467 total: 7.38s remaining: 6.7s
524: learn: 2.8890276 total: 7.4s remaining: 6.69s
525: learn: 2.8890248 total: 7.41s remaining: 6.68s
526: learn: 2.8888469 total: 7.43s remaining: 6.67s
527: learn: 2.8888441 total: 7.44s remaining: 6.65s
528: learn: 2.8885380 total: 7.46s remaining: 6.65s
529: learn: 2.8885321 total: 7.47s remaining: 6.63s
530: learn: 2.8883751 total: 7.5s remaining: 6.62s
531: learn: 2.8879459 total: 7.52s remaining: 6.61s
532: learn: 2.8877966 total: 7.54s remaining: 6.61s
533: learn: 2.8876280 total: 7.56s remaining: 6.6s
534: learn: 2.8876238 total: 7.57s remaining: 6.58s
535: learn: 2.8875929 total: 7.59s remaining: 6.57s
536: learn: 2.8874272 total: 7.61s remaining: 6.56s
537: learn: 2.8872729 total: 7.63s remaining: 6.55s
538: learn: 2.8872486 total: 7.65s remaining: 6.54s
539: learn: 2.8867307 total: 7.67s remaining: 6.53s
540: learn: 2.8865745 total: 7.69s remaining: 6.53s
541: learn: 2.8862669 total: 7.71s remaining: 6.52s
542: learn: 2.8862164 total: 7.73s remaining: 6.51s
543: learn: 2.8706577 total: 7.75s remaining: 6.5s
544: learn: 2.8706555 total: 7.77s remaining: 6.49s
545: learn: 2.8705615 total: 7.79s remaining: 6.48s
546: learn: 2.8704115 total: 7.81s remaining: 6.46s
547: learn: 2.8703118 total: 7.82s remaining: 6.45s
548: learn: 2.8701661 total: 7.84s remaining: 6.44s
549: learn: 2.8700580 total: 7.87s remaining: 6.43s
550: learn: 2.8546601 total: 7.89s remaining: 6.43s
551: learn: 2.8545260 total: 7.9s remaining: 6.41s
552: learn: 2.8393962 total: 7.92s remaining: 6.41s
553: learn: 2.8392595 total: 7.94s remaining: 6.39s
554: learn: 2.8390895 total: 7.96s remaining: 6.38s
555: learn: 2.8390509 total: 7.98s remaining: 6.38s
556: learn: 2.8389178 total: 8s remaining: 6.36s
557: learn: 2.8389157 total: 8.01s remaining: 6.35s
558: learn: 2.8387369 total: 8.04s remaining: 6.34s
559: learn: 2.8386029 total: 8.05s remaining: 6.32s
560: learn: 2.8237600 total: 8.07s remaining: 6.32s
561: learn: 2.8237246 total: 8.09s remaining: 6.3s
562: learn: 2.8236782 total: 8.11s remaining: 6.3s
```

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563: learn: 2.8234541 total: 8.13s remaining: 6.29s
564: learn: 2.8234484 total: 8.15s remaining: 6.28s
565: learn: 2.8231240 total: 8.17s remaining: 6.27s
566: learn: 2.8086532 total: 8.2s remaining: 6.26s
567: learn: 2.8085012 total: 8.22s remaining: 6.25s
568: learn: 2.8080288 total: 8.24s remaining: 6.24s
569: learn: 2.8075088 total: 8.27s remaining: 6.24s
570: learn: 2.8071922 total: 8.29s remaining: 6.23s
571: learn: 2.8070733 total: 8.31s remaining: 6.22s
572: learn: 2.8069775 total: 8.33s remaining: 6.21s
573: learn: 2.8068617 total: 8.36s remaining: 6.2s
574: learn: 2.8068597 total: 8.37s remaining: 6.18s
575: learn: 2.8066641 total: 8.39s remaining: 6.17s
576: learn: 2.8065513 total: 8.41s remaining: 6.17s
577: learn: 2.8064234 total: 8.44s remaining: 6.16s
578: learn: 2.8063199 total: 8.46s remaining: 6.15s
579: learn: 2.8063175 total: 8.48s remaining: 6.14s
580: learn: 2.8062161 total: 8.5s remaining: 6.13s
581: learn: 2.8061257 total: 8.52s remaining: 6.12s
582: learn: 2.8060656 total: 8.54s remaining: 6.11s
583: learn: 2.8060525 total: 8.55s remaining: 6.09s
584: learn: 2.7918015 total: 8.58s remaining: 6.08s
585: learn: 2.7911978 total: 8.6s remaining: 6.07s
586: learn: 2.7907138 total: 8.62s remaining: 6.07s
587: learn: 2.7906359 total: 8.64s remaining: 6.05s
588: learn: 2.7904861 total: 8.66s remaining: 6.04s
589: learn: 2.7903843 total: 8.68s remaining: 6.03s
590: learn: 2.7902999 total: 8.7s remaining: 6.02s
591: learn: 2.7902023 total: 8.72s remaining: 6.01s
592: learn: 2.7901166 total: 8.74s remaining: 6s
593: learn: 2.7900489 total: 8.77s remaining: 5.99s
594: learn: 2.7900469 total: 8.78s remaining: 5.97s
595: learn: 2.7899555 total: 8.8s remaining: 5.96s
596: learn: 2.7894290 total: 8.83s remaining: 5.96s
597: learn: 2.7894244 total: 8.84s remaining: 5.94s
598: learn: 2.7893718 total: 8.86s remaining: 5.93s
599: learn: 2.7893691 total: 8.88s remaining: 5.92s
600: learn: 2.7892778 total: 8.9s remaining: 5.91s
601: learn: 2.7892757 total: 8.91s remaining: 5.89s
602: learn: 2.7887502 total: 8.94s remaining: 5.88s
603: learn: 2.7886753 total: 8.96s remaining: 5.87s
604: learn: 2.7886443 total: 8.98s remaining: 5.86s
605: learn: 2.7886365 total: 9s remaining: 5.85s
606: learn: 2.7886328 total: 9.02s remaining: 5.84s
607: learn: 2.7886141 total: 9.04s remaining: 5.83s
608: learn: 2.7885683 total: 9.06s remaining: 5.82s
609: learn: 2.7881647 total: 9.08s remaining: 5.81s
610: learn: 2.7881628 total: 9.09s remaining: 5.79s
611: learn: 2.7881609 total: 9.1s remaining: 5.77s
612: learn: 2.7740739 total: 9.13s remaining: 5.76s
613: learn: 2.7740133 total: 9.15s remaining: 5.75s
614: learn: 2.7740113 total: 9.16s remaining: 5.73s
615: learn: 2.7739446 total: 9.18s remaining: 5.72s
616: learn: 2.7739229 total: 9.2s remaining: 5.71s
617: learn: 2.7739195 total: 9.21s remaining: 5.69s
618: learn: 2.7738558 total: 9.23s remaining: 5.68s
619: learn: 2.7737357 total: 9.25s remaining: 5.67s
620: learn: 2.7737341 total: 9.26s remaining: 5.65s
621: learn: 2.7737074 total: 9.29s remaining: 5.65s
622: learn: 2.7736549 total: 9.31s remaining: 5.63s
623: learn: 2.7597486 total: 9.33s remaining: 5.62s
624: learn: 2.7597386 total: 9.35s remaining: 5.61s
625: learn: 2.7597103 total: 9.37s remaining: 5.6s
626: learn: 2.7592880 total: 9.39s remaining: 5.59s
627: learn: 2.7589055 total: 9.41s remaining: 5.58s
628: learn: 2.7589040 total: 9.42s remaining: 5.56s
629: learn: 2.7588226 total: 9.44s remaining: 5.54s
630: learn: 2.7584121 total: 9.46s remaining: 5.53s
631: learn: 2.7584108 total: 9.47s remaining: 5.52s
632: learn: 2.7583820 total: 9.49s remaining: 5.5s
633: learn: 2.7583691 total: 9.52s remaining: 5.49s
634: learn: 2.7582825 total: 9.53s remaining: 5.48s
```

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635: learn: 2.7581979 total: 9.55s remaining: 5.46s
636: learn: 2.7581706 total: 9.57s remaining: 5.45s
637: learn: 2.7580981 total: 9.59s remaining: 5.44s
638: learn: 2.7580233 total: 9.61s remaining: 5.43s
639: learn: 2.7579401 total: 9.63s remaining: 5.42s
640: learn: 2.7579311 total: 9.64s remaining: 5.4s
641: learn: 2.7579146 total: 9.66s remaining: 5.39s
642: learn: 2.7579130 total: 9.67s remaining: 5.37s
643: learn: 2.7442383 total: 9.7s remaining: 5.36s
644: learn: 2.7441591 total: 9.71s remaining: 5.35s
645: learn: 2.7441548 total: 9.72s remaining: 5.33s
646: learn: 2.7440885 total: 9.74s remaining: 5.31s
647: learn: 2.7438265 total: 9.76s remaining: 5.3s
648: learn: 2.7438265 total: 9.77s remaining: 5.29s
649: learn: 2.7438178 total: 9.78s remaining: 5.27s
650: learn: 2.7434741 total: 9.8s remaining: 5.26s
651: learn: 2.7434615 total: 9.83s remaining: 5.24s
652: learn: 2.7434600 total: 9.83s remaining: 5.22s
653: learn: 2.7434023 total: 9.86s remaining: 5.21s
654: learn: 2.7432419 total: 9.88s remaining: 5.2s
655: learn: 2.7432403 total: 9.89s remaining: 5.18s
656: learn: 2.7432370 total: 9.9s remaining: 5.17s
657: learn: 2.7432349 total: 9.91s remaining: 5.15s
658: learn: 2.7431936 total: 9.93s remaining: 5.14s
659: learn: 2.7431296 total: 9.95s remaining: 5.13s
660: learn: 2.7431295 total: 9.96s remaining: 5.11s
661: learn: 2.7431271 total: 9.97s remaining: 5.09s
662: learn: 2.7430330 total: 9.99s remaining: 5.08s
663: learn: 2.7430313 total: 10s remaining: 5.06s
664: learn: 2.7430231 total: 10s remaining: 5.04s
665: learn: 2.7429514 total: 10s remaining: 5.03s
666: learn: 2.7429433 total: 10s remaining: 5.01s
667: learn: 2.7429209 total: 10.1s remaining: 5s
668: learn: 2.7428880 total: 10.1s remaining: 4.98s
669: learn: 2.7426868 total: 10.1s remaining: 4.97s
670: learn: 2.7292243 total: 10.1s remaining: 4.96s
671: learn: 2.7292164 total: 10.1s remaining: 4.94s
672: learn: 2.7292145 total: 10.1s remaining: 4.92s
673: learn: 2.7291994 total: 10.2s remaining: 4.91s
674: learn: 2.7291575 total: 10.2s remaining: 4.9s
675: learn: 2.7159953 total: 10.2s remaining: 4.89s
676: learn: 2.7159842 total: 10.2s remaining: 4.88s
677: learn: 2.7158535 total: 10.2s remaining: 4.86s
678: learn: 2.7157949 total: 10.3s remaining: 4.85s
679: learn: 2.7157868 total: 10.3s remaining: 4.84s
680: learn: 2.7157869 total: 10.3s remaining: 4.82s
681: learn: 2.7157373 total: 10.3s remaining: 4.81s
682: learn: 2.7156806 total: 10.3s remaining: 4.79s
683: learn: 2.7156783 total: 10.3s remaining: 4.78s
684: learn: 2.7156784 total: 10.4s remaining: 4.76s
685: learn: 2.7156741 total: 10.4s remaining: 4.74s
686: learn: 2.7156741 total: 10.4s remaining: 4.72s
687: learn: 2.7156741 total: 10.4s remaining: 4.71s
688: learn: 2.7155631 total: 10.4s remaining: 4.69s
689: learn: 2.7155535 total: 10.4s remaining: 4.67s
690: learn: 2.7155495 total: 10.4s remaining: 4.66s
691: learn: 2.7155456 total: 10.4s remaining: 4.64s
692: learn: 2.7155433 total: 10.4s remaining: 4.62s
693: learn: 2.7155356 total: 10.4s remaining: 4.61s
694: learn: 2.7154261 total: 10.5s remaining: 4.59s
695: learn: 2.7154239 total: 10.5s remaining: 4.58s
696: learn: 2.7153686 total: 10.5s remaining: 4.56s
697: learn: 2.7153315 total: 10.5s remaining: 4.55s
698: learn: 2.7152779 total: 10.5s remaining: 4.54s
699: learn: 2.7150403 total: 10.6s remaining: 4.52s
700: learn: 2.7149353 total: 10.6s remaining: 4.51s
701: learn: 2.7149319 total: 10.6s remaining: 4.5s
702: learn: 2.7148266 total: 10.6s remaining: 4.48s
703: learn: 2.7148263 total: 10.6s remaining: 4.46s
704: learn: 2.7147737 total: 10.6s remaining: 4.45s
705: learn: 2.7147721 total: 10.7s remaining: 4.44s
706: learn: 2.7147708 total: 10.7s remaining: 4.42s
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707: learn: 2.7147694 total: 10.7s remaining: 4.4s
708: learn: 2.7147658 total: 10.7s remaining: 4.38s
709: learn: 2.7017326 total: 10.7s remaining: 4.37s
710: learn: 2.7013609 total: 10.7s remaining: 4.36s
711: learn: 2.7013594 total: 10.7s remaining: 4.34s
712: learn: 2.6885619 total: 10.8s remaining: 4.33s
713: learn: 2.6884507 total: 10.8s remaining: 4.32s
714: learn: 2.6884330 total: 10.8s remaining: 4.3s
715: learn: 2.6883173 total: 10.8s remaining: 4.29s
716: learn: 2.6883089 total: 10.8s remaining: 4.28s
717: learn: 2.6882517 total: 10.9s remaining: 4.26s
718: learn: 2.6881652 total: 10.9s remaining: 4.25s
719: learn: 2.6881419 total: 10.9s remaining: 4.23s
720: learn: 2.6881306 total: 10.9s remaining: 4.21s
721: learn: 2.6879389 total: 10.9s remaining: 4.2s
722: learn: 2.6876568 total: 10.9s remaining: 4.19s
723: learn: 2.6875136 total: 11s remaining: 4.18s
724: learn: 2.6875134 total: 11s remaining: 4.16s
725: learn: 2.6874675 total: 11s remaining: 4.15s
726: learn: 2.6872268 total: 11s remaining: 4.13s
727: learn: 2.6871129 total: 11s remaining: 4.12s
728: learn: 2.6870212 total: 11.1s remaining: 4.11s
729: learn: 2.6869950 total: 11.1s remaining: 4.09s
730: learn: 2.6869937 total: 11.1s remaining: 4.08s
731: learn: 2.6868203 total: 11.1s remaining: 4.06s
732: learn: 2.6867760 total: 11.1s remaining: 4.05s
733: learn: 2.6866048 total: 11.1s remaining: 4.04s
734: learn: 2.6865954 total: 11.2s remaining: 4.02s
735: learn: 2.6865926 total: 11.2s remaining: 4.01s
736: learn: 2.6864612 total: 11.2s remaining: 3.99s
737: learn: 2.6863870 total: 11.2s remaining: 3.98s
738: learn: 2.6766855 total: 11.2s remaining: 3.97s
739: learn: 2.6764836 total: 11.3s remaining: 3.95s
740: learn: 2.6764530 total: 11.3s remaining: 3.94s
741: learn: 2.6764490 total: 11.3s remaining: 3.92s
742: learn: 2.6764454 total: 11.3s remaining: 3.91s
743: learn: 2.6764423 total: 11.3s remaining: 3.9s
744: learn: 2.6764125 total: 11.3s remaining: 3.88s
745: learn: 2.6764097 total: 11.4s remaining: 3.86s
746: learn: 2.6763720 total: 11.4s remaining: 3.85s
747: learn: 2.6763168 total: 11.4s remaining: 3.84s
748: learn: 2.6763140 total: 11.4s remaining: 3.82s
749: learn: 2.6762858 total: 11.4s remaining: 3.81s
750: learn: 2.6761414 total: 11.4s remaining: 3.8s
751: learn: 2.6759211 total: 11.5s remaining: 3.78s
752: learn: 2.6759000 total: 11.5s remaining: 3.77s
753: learn: 2.6758565 total: 11.5s remaining: 3.76s
754: learn: 2.6650863 total: 11.5s remaining: 3.74s
755: learn: 2.6650512 total: 11.6s remaining: 3.73s
756: learn: 2.6649881 total: 11.6s remaining: 3.71s
757: learn: 2.6649609 total: 11.6s remaining: 3.7s
758: learn: 2.6649344 total: 11.6s remaining: 3.69s
759: learn: 2.6648746 total: 11.6s remaining: 3.67s
760: learn: 2.6648094 total: 11.7s remaining: 3.66s
761: learn: 2.6646837 total: 11.7s remaining: 3.65s
762: learn: 2.6646583 total: 11.7s remaining: 3.63s
763: learn: 2.6646525 total: 11.7s remaining: 3.61s
764: learn: 2.6645824 total: 11.7s remaining: 3.6s
765: learn: 2.6644520 total: 11.7s remaining: 3.59s
766: learn: 2.6643392 total: 11.8s remaining: 3.57s
767: learn: 2.6643143 total: 11.8s remaining: 3.56s
768: learn: 2.6642143 total: 11.8s remaining: 3.55s
769: learn: 2.6552299 total: 11.8s remaining: 3.53s
770: learn: 2.6551787 total: 11.9s remaining: 3.52s
771: learn: 2.6551753 total: 11.9s remaining: 3.5s
772: learn: 2.6551637 total: 11.9s remaining: 3.49s
773: learn: 2.6551569 total: 11.9s remaining: 3.47s
774: learn: 2.6551535 total: 11.9s remaining: 3.46s
775: learn: 2.6550612 total: 11.9s remaining: 3.44s
776: learn: 2.6550577 total: 11.9s remaining: 3.43s
777: learn: 2.6550157 total: 12s remaining: 3.41s
778: learn: 2.6549671 total: 12s remaining: 3.4s
```

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779: learn: 2.6549621 total: 12s remaining: 3.38s
780: learn: 2.6547982 total: 12s remaining: 3.37s
781: learn: 2.6546855 total: 12s remaining: 3.36s
782: learn: 2.6545200 total: 12.1s remaining: 3.34s
783: learn: 2.6540764 total: 12.1s remaining: 3.33s
784: learn: 2.6539906 total: 12.1s remaining: 3.32s
785: learn: 2.6539599 total: 12.1s remaining: 3.3s
786: learn: 2.6539371 total: 12.1s remaining: 3.29s
787: learn: 2.6538347 total: 12.2s remaining: 3.27s
788: learn: 2.6412662 total: 12.2s remaining: 3.26s
789: learn: 2.6412344 total: 12.2s remaining: 3.25s
790: learn: 2.6412053 total: 12.2s remaining: 3.23s
791: learn: 2.6412044 total: 12.3s remaining: 3.22s
792: learn: 2.6410656 total: 12.3s remaining: 3.2s
793: learn: 2.6409840 total: 12.3s remaining: 3.19s
794: learn: 2.6408826 total: 12.3s remaining: 3.18s
795: learn: 2.6285164 total: 12.3s remaining: 3.16s
796: learn: 2.6284774 total: 12.4s remaining: 3.15s
797: learn: 2.6281597 total: 12.4s remaining: 3.13s
798: learn: 2.6281397 total: 12.4s remaining: 3.12s
799: learn: 2.6281185 total: 12.4s remaining: 3.11s
800: learn: 2.6279552 total: 12.5s remaining: 3.09s
801: learn: 2.6278471 total: 12.5s remaining: 3.08s
802: learn: 2.6278414 total: 12.5s remaining: 3.06s
803: learn: 2.6278244 total: 12.5s remaining: 3.05s
804: learn: 2.6275946 total: 12.5s remaining: 3.04s
805: learn: 2.6172647 total: 12.6s remaining: 3.02s
806: learn: 2.6171623 total: 12.6s remaining: 3.01s
807: learn: 2.6170626 total: 12.6s remaining: 2.99s
808: learn: 2.6169102 total: 12.6s remaining: 2.98s
809: learn: 2.6168073 total: 12.6s remaining: 2.96s
810: learn: 2.6166716 total: 12.7s remaining: 2.95s
811: learn: 2.6163852 total: 12.7s remaining: 2.94s
812: learn: 2.6162495 total: 12.7s remaining: 2.92s
813: learn: 2.6162464 total: 12.7s remaining: 2.91s
814: learn: 2.6161331 total: 12.7s remaining: 2.89s
815: learn: 2.6161281 total: 12.8s remaining: 2.88s
816: learn: 2.6160299 total: 12.8s remaining: 2.86s
817: learn: 2.6159636 total: 12.8s remaining: 2.85s
818: learn: 2.6159603 total: 12.8s remaining: 2.83s
819: learn: 2.6159555 total: 12.8s remaining: 2.82s
820: learn: 2.6157888 total: 12.9s remaining: 2.81s
821: learn: 2.6157856 total: 12.9s remaining: 2.79s
822: learn: 2.6157826 total: 12.9s remaining: 2.77s
823: learn: 2.6157776 total: 12.9s remaining: 2.76s
824: learn: 2.6157595 total: 12.9s remaining: 2.74s
825: learn: 2.6157371 total: 12.9s remaining: 2.73s
826: learn: 2.6156976 total: 13s remaining: 2.71s
827: learn: 2.6156915 total: 13s remaining: 2.7s
828: learn: 2.6156869 total: 13s remaining: 2.68s
829: learn: 2.6156708 total: 13s remaining: 2.67s
830: learn: 2.6156613 total: 13s remaining: 2.65s
831: learn: 2.6156347 total: 13.1s remaining: 2.64s
832: learn: 2.6156303 total: 13.1s remaining: 2.62s
833: learn: 2.6156277 total: 13.1s remaining: 2.61s
834: learn: 2.6155089 total: 13.1s remaining: 2.59s
835: learn: 2.6155051 total: 13.1s remaining: 2.58s
836: learn: 2.6153588 total: 13.2s remaining: 2.56s
837: learn: 2.6153394 total: 13.2s remaining: 2.55s
838: learn: 2.6153370 total: 13.2s remaining: 2.53s
839: learn: 2.6153328 total: 13.2s remaining: 2.52s
840: learn: 2.6153286 total: 13.2s remaining: 2.5s
841: learn: 2.6152023 total: 13.2s remaining: 2.48s
842: learn: 2.6150268 total: 13.3s remaining: 2.47s
843: learn: 2.6150230 total: 13.3s remaining: 2.46s
844: learn: 2.6148821 total: 13.3s remaining: 2.44s
845: learn: 2.6148781 total: 13.3s remaining: 2.43s
846: learn: 2.6148757 total: 13.3s remaining: 2.41s
847: learn: 2.6148611 total: 13.4s remaining: 2.4s
848: learn: 2.6146763 total: 13.4s remaining: 2.38s
849: learn: 2.6146725 total: 13.4s remaining: 2.37s
850: learn: 2.6146717 total: 13.4s remaining: 2.35s
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851: learn: 2.6145424 total: 13.4s remaining: 2.33s
852: learn: 2.6144967 total: 13.5s remaining: 2.32s
853: learn: 2.6144178 total: 13.5s remaining: 2.3s
854: learn: 2.6143831 total: 13.5s remaining: 2.29s
855: learn: 2.6143430 total: 13.5s remaining: 2.27s
856: learn: 2.6143392 total: 13.5s remaining: 2.26s
857: learn: 2.6143356 total: 13.6s remaining: 2.24s
858: learn: 2.6142937 total: 13.6s remaining: 2.23s
859: learn: 2.6019402 total: 13.6s remaining: 2.21s
860: learn: 2.6019358 total: 13.6s remaining: 2.2s
861: learn: 2.6018367 total: 13.6s remaining: 2.18s
862: learn: 2.5918973 total: 13.7s remaining: 2.17s
863: learn: 2.5917483 total: 13.7s remaining: 2.15s
864: learn: 2.5916194 total: 13.7s remaining: 2.14s
865: learn: 2.5915268 total: 13.7s remaining: 2.12s
866: learn: 2.5915243 total: 13.7s remaining: 2.11s
867: learn: 2.5914018 total: 13.8s remaining: 2.09s
868: learn: 2.5914010 total: 13.8s remaining: 2.08s
869: learn: 2.5797434 total: 13.8s remaining: 2.06s
870: learn: 2.5796185 total: 13.8s remaining: 2.04s
871: learn: 2.5796146 total: 13.8s remaining: 2.03s
872: learn: 2.5796121 total: 13.8s remaining: 2.01s
873: learn: 2.5795330 total: 13.9s remaining: 2s
874: learn: 2.5794305 total: 13.9s remaining: 1.98s
875: learn: 2.5794284 total: 13.9s remaining: 1.97s
876: learn: 2.5794142 total: 13.9s remaining: 1.95s
877: learn: 2.5793504 total: 13.9s remaining: 1.94s
878: learn: 2.5793487 total: 14s remaining: 1.92s
879: learn: 2.5792250 total: 14s remaining: 1.91s
880: learn: 2.5792071 total: 14s remaining: 1.89s
881: learn: 2.5791340 total: 14s remaining: 1.88s
882: learn: 2.5790664 total: 14s remaining: 1.86s
883: learn: 2.5790626 total: 14.1s remaining: 1.84s
884: learn: 2.5790607 total: 14.1s remaining: 1.83s
885: learn: 2.5790588 total: 14.1s remaining: 1.81s
886: learn: 2.5790471 total: 14.1s remaining: 1.8s
887: learn: 2.5789833 total: 14.1s remaining: 1.78s
888: learn: 2.5789817 total: 14.1s remaining: 1.76s
889: learn: 2.5789531 total: 14.2s remaining: 1.75s
890: learn: 2.5789493 total: 14.2s remaining: 1.73s
891: learn: 2.5789383 total: 14.2s remaining: 1.72s
892: learn: 2.5789335 total: 14.2s remaining: 1.7s
893: learn: 2.5789087 total: 14.2s remaining: 1.69s
894: learn: 2.5788746 total: 14.2s remaining: 1.67s
895: learn: 2.5788093 total: 14.3s remaining: 1.66s
896: learn: 2.5788061 total: 14.3s remaining: 1.64s
897: learn: 2.5788027 total: 14.3s remaining: 1.63s
898: learn: 2.5787446 total: 14.3s remaining: 1.61s
899: learn: 2.5787428 total: 14.4s remaining: 1.59s
900: learn: 2.5787299 total: 14.4s remaining: 1.58s
901: learn: 2.5787153 total: 14.4s remaining: 1.56s
902: learn: 2.5786166 total: 14.4s remaining: 1.55s
903: learn: 2.5785471 total: 14.4s remaining: 1.53s
904: learn: 2.5785465 total: 14.4s remaining: 1.51s
905: learn: 2.5785424 total: 14.4s remaining: 1.5s
906: learn: 2.5784740 total: 14.5s remaining: 1.48s
907: learn: 2.5784174 total: 14.5s remaining: 1.47s
908: learn: 2.5784059 total: 14.5s remaining: 1.45s
909: learn: 2.5784018 total: 14.5s remaining: 1.44s
910: learn: 2.5783965 total: 14.5s remaining: 1.42s
911: learn: 2.5783419 total: 14.6s remaining: 1.41s
912: learn: 2.5782676 total: 14.6s remaining: 1.39s
913: learn: 2.5782453 total: 14.6s remaining: 1.37s
914: learn: 2.5782448 total: 14.6s remaining: 1.36s
915: learn: 2.5782432 total: 14.6s remaining: 1.34s
916: learn: 2.5782397 total: 14.6s remaining: 1.32s
917: learn: 2.5782381 total: 14.6s remaining: 1.31s
918: learn: 2.5782349 total: 14.7s remaining: 1.29s
919: learn: 2.5781781 total: 14.7s remaining: 1.28s
920: learn: 2.5781749 total: 14.7s remaining: 1.26s
921: learn: 2.5781585 total: 14.7s remaining: 1.24s
922: learn: 2.5781583 total: 14.7s remaining: 1.23s
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923: learn: 2.5781057 total: 14.7s remaining: 1.21s
924: learn: 2.5781024 total: 14.8s remaining: 1.2s
925: learn: 2.5780949 total: 14.8s remaining: 1.18s
926: learn: 2.5780947 total: 14.8s remaining: 1.16s
927: learn: 2.5779990 total: 14.8s remaining: 1.15s
928: learn: 2.5778626 total: 14.8s remaining: 1.13s
929: learn: 2.5778400 total: 14.8s remaining: 1.12s
930: learn: 2.5777518 total: 14.9s remaining: 1.1s
931: learn: 2.5775734 total: 14.9s remaining: 1.08s
932: learn: 2.5775730 total: 14.9s remaining: 1.07s
933: learn: 2.5775714 total: 14.9s remaining: 1.05s
934: learn: 2.5775554 total: 14.9s remaining: 1.04s
935: learn: 2.5775521 total: 14.9s remaining: 1.02s
936: learn: 2.5775451 total: 15s remaining: 1.01s
937: learn: 2.5774954 total: 15s remaining: 990ms
938: learn: 2.5774518 total: 15s remaining: 975ms
939: learn: 2.5774505 total: 15s remaining: 959ms
940: learn: 2.5774463 total: 15s remaining: 942ms
941: learn: 2.5774432 total: 15s remaining: 926ms
942: learn: 2.5774250 total: 15.1s remaining: 911ms
943: learn: 2.5774234 total: 15.1s remaining: 894ms
944: learn: 2.5773988 total: 15.1s remaining: 879ms
945: learn: 2.5773985 total: 15.1s remaining: 862ms
946: learn: 2.5773984 total: 15.1s remaining: 846ms
947: learn: 2.5773969 total: 15.1s remaining: 830ms
948: learn: 2.5773940 total: 15.1s remaining: 814ms
949: learn: 2.5771323 total: 15.2s remaining: 798ms
950: learn: 2.5771309 total: 15.2s remaining: 782ms
951: learn: 2.5771223 total: 15.2s remaining: 766ms
952: learn: 2.5771037 total: 15.2s remaining: 750ms
953: learn: 2.5770507 total: 15.2s remaining: 734ms
954: learn: 2.5770244 total: 15.2s remaining: 718ms
955: learn: 2.5770213 total: 15.3s remaining: 702ms
956: learn: 2.5769069 total: 15.3s remaining: 687ms
957: learn: 2.5768631 total: 15.3s remaining: 671ms
958: learn: 2.5768629 total: 15.3s remaining: 655ms
959: learn: 2.5768207 total: 15.3s remaining: 639ms
960: learn: 2.5768207 total: 15.3s remaining: 623ms
961: learn: 2.5767801 total: 15.4s remaining: 607ms
962: learn: 2.5767800 total: 15.4s remaining: 591ms
963: learn: 2.5767799 total: 15.4s remaining: 575ms
964: learn: 2.5767787 total: 15.4s remaining: 559ms
965: learn: 2.5767741 total: 15.4s remaining: 543ms
966: learn: 2.5767588 total: 15.4s remaining: 526ms
967: learn: 2.5767586 total: 15.4s remaining: 510ms
968: learn: 2.5767506 total: 15.4s remaining: 494ms
969: learn: 2.5767012 total: 15.5s remaining: 478ms
970: learn: 2.5766916 total: 15.5s remaining: 462ms
971: learn: 2.5766546 total: 15.5s remaining: 447ms
972: learn: 2.5766546 total: 15.5s remaining: 430ms
973: learn: 2.5766339 total: 15.5s remaining: 414ms
974: learn: 2.5766338 total: 15.5s remaining: 398ms
975: learn: 2.5764921 total: 15.6s remaining: 382ms
976: learn: 2.5764910 total: 15.6s remaining: 366ms
977: learn: 2.5764834 total: 15.6s remaining: 350ms
978: learn: 2.5764833 total: 15.6s remaining: 334ms
979: learn: 2.5764832 total: 15.6s remaining: 318ms
980: learn: 2.5764658 total: 15.6s remaining: 302ms
981: learn: 2.5764648 total: 15.6s remaining: 286ms
982: learn: 2.5764591 total: 15.6s remaining: 270ms
983: learn: 2.5764579 total: 15.6s remaining: 254ms
984: learn: 2.5764577 total: 15.6s remaining: 238ms
985: learn: 2.5763670 total: 15.7s remaining: 222ms
986: learn: 2.5763390 total: 15.7s remaining: 207ms
987: learn: 2.5763209 total: 15.7s remaining: 191ms
988: learn: 2.5762851 total: 15.7s remaining: 175ms
989: learn: 2.5762784 total: 15.7s remaining: 159ms
990: learn: 2.5762784 total: 15.7s remaining: 143ms
991: learn: 2.5762694 total: 15.7s remaining: 127ms
992: learn: 2.5762349 total: 15.8s remaining: 111ms
993: learn: 2.5762347 total: 15.8s remaining: 95.2ms
994: learn: 2.5762184 total: 15.8s remaining: 79.3ms
```

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995: learn: 2.5762028 total: 15.8s remaining: 63.5ms
996: learn: 2.5761693 total: 15.8s remaining: 47.6ms
997: learn: 2.5761684 total: 15.8s remaining: 31.7ms
998: learn: 2.5761673 total: 15.8s remaining: 15.9ms
999: learn: 2.5761648 total: 15.9s remaining: 0us
0: learn: 1.9551093 total: 30.2ms remaining: 30.2s
1: learn: 1.9381471 total: 52.8ms remaining: 26.4s
2: learn: 1.9285280 total: 63.3ms remaining: 21s
3: learn: 1.9205605 total: 72.8ms remaining: 18.1s
4: learn: 1.9074678 total: 94.1ms remaining: 18.7s
5: learn: 1.8953498 total: 115ms remaining: 19.1s
6: learn: 1.8840171 total: 125ms remaining: 17.7s
7: learn: 1.8705198 total: 146ms remaining: 18.1s
8: learn: 1.8568280 total: 163ms remaining: 17.9s
9: learn: 1.8446773 total: 180ms remaining: 17.8s
10: learn: 1.8316965 total: 201ms remaining: 18.1s
11: learn: 1.8167522 total: 210ms remaining: 17.3s
12: learn: 1.8113679 total: 218ms remaining: 16.5s
13: learn: 1.7969793 total: 244ms remaining: 17.2s
14: learn: 1.7866166 total: 257ms remaining: 16.9s
15: learn: 1.7777348 total: 282ms remaining: 17.3s
16: learn: 1.7689508 total: 303ms remaining: 17.5s
17: learn: 1.7632088 total: 320ms remaining: 17.4s
18: learn: 1.7519727 total: 341ms remaining: 17.6s
19: learn: 1.7403666 total: 362ms remaining: 17.8s
20: learn: 1.7296556 total: 384ms remaining: 17.9s
21: learn: 1.7206008 total: 405ms remaining: 18s
22: learn: 1.7133494 total: 422ms remaining: 17.9s
23: learn: 1.7036261 total: 432ms remaining: 17.6s
24: learn: 1.6991139 total: 441ms remaining: 17.2s
25: learn: 1.6932481 total: 451ms remaining: 16.9s
26: learn: 1.6817336 total: 473ms remaining: 17s
27: learn: 1.6758065 total: 483ms remaining: 16.8s
28: learn: 1.6701474 total: 494ms remaining: 16.5s
29: learn: 1.6650768 total: 507ms remaining: 16.4s
30: learn: 1.6569068 total: 529ms remaining: 16.5s
31: learn: 1.6469503 total: 551ms remaining: 16.7s
32: learn: 1.6369961 total: 562ms remaining: 16.5s
33: learn: 1.6331924 total: 575ms remaining: 16.3s
34: learn: 1.6287590 total: 597ms remaining: 16.4s
35: learn: 1.6211615 total: 605ms remaining: 16.2s
36: learn: 1.6118170 total: 627ms remaining: 16.3s
37: learn: 1.6094088 total: 643ms remaining: 16.3s
38: learn: 1.6009752 total: 665ms remaining: 16.4s
39: learn: 1.5964340 total: 682ms remaining: 16.4s
40: learn: 1.5921600 total: 703ms remaining: 16.4s
41: learn: 1.5852059 total: 724ms remaining: 16.5s
42: learn: 1.5751480 total: 746ms remaining: 16.6s
43: learn: 1.5689340 total: 763ms remaining: 16.6s
44: learn: 1.5649969 total: 771ms remaining: 16.4s
45: learn: 1.5612960 total: 788ms remaining: 16.3s
46: learn: 1.5569713 total: 809ms remaining: 16.4s
47: learn: 1.5486842 total: 830ms remaining: 16.5s
48: learn: 1.5417489 total: 846ms remaining: 16.4s
49: learn: 1.5346585 total: 868ms remaining: 16.5s
50: learn: 1.5258615 total: 889ms remaining: 16.5s
51: learn: 1.5219718 total: 902ms remaining: 16.4s
52: learn: 1.5195977 total: 923ms remaining: 16.5s
53: learn: 1.5131448 total: 944ms remaining: 16.5s
54: learn: 1.5086024 total: 965ms remaining: 16.6s
55: learn: 1.5059284 total: 977ms remaining: 16.5s
56: learn: 1.5039426 total: 987ms remaining: 16.3s
57: learn: 1.4957655 total: 1.01s remaining: 16.5s
58: learn: 1.4874944 total: 1.04s remaining: 16.5s
59: learn: 1.4839668 total: 1.05s remaining: 16.5s
60: learn: 1.4815465 total: 1.07s remaining: 16.5s
61: learn: 1.4792740 total: 1.09s remaining: 16.5s
62: learn: 1.4730892 total: 1.1s remaining: 16.4s
63: learn: 1.4674680 total: 1.12s remaining: 16.4s
64: learn: 1.4599298 total: 1.14s remaining: 16.4s
65: learn: 1.4555730 total: 1.15s remaining: 16.3s
66: learn: 1.4508240 total: 1.17s remaining: 16.3s
```

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67: learn: 1.4486751 total: 1.18s remaining: 16.2s
68: learn: 1.4470293 total: 1.2s remaining: 16.2s
69: learn: 1.4397539 total: 1.22s remaining: 16.2s
70: learn: 1.4338245 total: 1.24s remaining: 16.3s
71: learn: 1.4303419 total: 1.27s remaining: 16.4s
72: learn: 1.4289426 total: 1.28s remaining: 16.2s
73: learn: 1.4255724 total: 1.29s remaining: 16.2s
74: learn: 1.4186763 total: 1.31s remaining: 16.2s
75: learn: 1.4137750 total: 1.33s remaining: 16.2s
76: learn: 1.4123496 total: 1.35s remaining: 16.3s
77: learn: 1.4075431 total: 1.37s remaining: 16.2s
78: learn: 1.4062870 total: 1.39s remaining: 16.2s
79: learn: 1.4037973 total: 1.41s remaining: 16.2s
80: learn: 1.4028711 total: 1.42s remaining: 16.1s
81: learn: 1.3986900 total: 1.44s remaining: 16.1s
82: learn: 1.3937394 total: 1.46s remaining: 16.2s
83: learn: 1.3868523 total: 1.49s remaining: 16.2s
84: learn: 1.3857723 total: 1.5s remaining: 16.2s
85: learn: 1.3847065 total: 1.51s remaining: 16.1s
86: learn: 1.3832221 total: 1.53s remaining: 16.1s
87: learn: 1.3804619 total: 1.55s remaining: 16.1s
88: learn: 1.3798692 total: 1.56s remaining: 16s
89: learn: 1.3737738 total: 1.57s remaining: 15.9s
90: learn: 1.3688831 total: 1.59s remaining: 15.9s
91: learn: 1.3680351 total: 1.6s remaining: 15.8s
92: learn: 1.3675312 total: 1.61s remaining: 15.7s
93: learn: 1.3627093 total: 1.63s remaining: 15.7s
94: learn: 1.3587006 total: 1.64s remaining: 15.6s
95: learn: 1.3581670 total: 1.66s remaining: 15.7s
96: learn: 1.3572314 total: 1.68s remaining: 15.6s
97: learn: 1.3558551 total: 1.7s remaining: 15.7s
98: learn: 1.3553379 total: 1.71s remaining: 15.6s
99: learn: 1.3513521 total: 1.73s remaining: 15.6s
100: learn: 1.3507966 total: 1.75s remaining: 15.6s
101: learn: 1.3448624 total: 1.77s remaining: 15.6s
102: learn: 1.3440235 total: 1.78s remaining: 15.5s
103: learn: 1.3435923 total: 1.79s remaining: 15.4s
104: learn: 1.3428057 total: 1.8s remaining: 15.4s
105: learn: 1.3425134 total: 1.81s remaining: 15.3s
106: learn: 1.3421661 total: 1.82s remaining: 15.2s
107: learn: 1.3414228 total: 1.85s remaining: 15.3s
108: learn: 1.3409894 total: 1.86s remaining: 15.2s
109: learn: 1.3374159 total: 1.87s remaining: 15.1s
110: learn: 1.3337912 total: 1.89s remaining: 15.1s
111: learn: 1.3332396 total: 1.89s remaining: 15s
112: learn: 1.3325691 total: 1.92s remaining: 15.1s
113: learn: 1.3318999 total: 1.93s remaining: 15s
114: learn: 1.3313748 total: 1.94s remaining: 14.9s
115: learn: 1.3286592 total: 1.96s remaining: 14.9s
116: learn: 1.3278896 total: 1.98s remaining: 15s
117: learn: 1.3274068 total: 1.99s remaining: 14.9s
118: learn: 1.3236461 total: 2.02s remaining: 14.9s
119: learn: 1.3233453 total: 2.03s remaining: 14.9s
120: learn: 1.3196114 total: 2.05s remaining: 14.9s
121: learn: 1.3137065 total: 2.07s remaining: 14.9s
122: learn: 1.3133451 total: 2.08s remaining: 14.9s
123: learn: 1.3131864 total: 2.09s remaining: 14.8s
124: learn: 1.3129335 total: 2.1s remaining: 14.7s
125: learn: 1.3127142 total: 2.12s remaining: 14.7s
126: learn: 1.3124744 total: 2.13s remaining: 14.7s
127: learn: 1.3120020 total: 2.15s remaining: 14.6s
128: learn: 1.3080298 total: 2.17s remaining: 14.7s
129: learn: 1.3078064 total: 2.18s remaining: 14.6s
130: learn: 1.3077077 total: 2.18s remaining: 14.5s
131: learn: 1.3074706 total: 2.19s remaining: 14.4s
132: learn: 1.3023046 total: 2.21s remaining: 14.4s
133: learn: 1.2998574 total: 2.23s remaining: 14.4s
134: learn: 1.2997747 total: 2.24s remaining: 14.4s
135: learn: 1.2995839 total: 2.25s remaining: 14.3s
136: learn: 1.2990869 total: 2.26s remaining: 14.3s
137: learn: 1.2962820 total: 2.27s remaining: 14.2s
138: learn: 1.2908118 total: 2.3s remaining: 14.2s
```

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139: learn: 1.2892731 total: 2.33s remaining: 14.3s
140: learn: 1.2861819 total: 2.35s remaining: 14.3s
141: learn: 1.2858621 total: 2.37s remaining: 14.3s
142: learn: 1.2857208 total: 2.39s remaining: 14.3s
143: learn: 1.2837122 total: 2.41s remaining: 14.3s
144: learn: 1.2833933 total: 2.42s remaining: 14.3s
145: learn: 1.2832653 total: 2.43s remaining: 14.2s
146: learn: 1.2830946 total: 2.44s remaining: 14.2s
147: learn: 1.2779926 total: 2.46s remaining: 14.2s
148: learn: 1.2730873 total: 2.48s remaining: 14.2s
149: learn: 1.2697405 total: 2.5s remaining: 14.2s
150: learn: 1.2692182 total: 2.51s remaining: 14.1s
151: learn: 1.2691232 total: 2.52s remaining: 14.1s
152: learn: 1.2689903 total: 2.53s remaining: 14s
153: learn: 1.2688945 total: 2.54s remaining: 14s
154: learn: 1.2686294 total: 2.56s remaining: 14s
155: learn: 1.2676765 total: 2.58s remaining: 14s
156: learn: 1.2675922 total: 2.59s remaining: 13.9s
157: learn: 1.2628690 total: 2.61s remaining: 13.9s
158: learn: 1.2626954 total: 2.62s remaining: 13.9s
159: learn: 1.2625773 total: 2.64s remaining: 13.9s
160: learn: 1.2621111 total: 2.66s remaining: 13.8s
161: learn: 1.2575049 total: 2.68s remaining: 13.8s
162: learn: 1.2574597 total: 2.68s remaining: 13.8s
163: learn: 1.2573904 total: 2.69s remaining: 13.7s
164: learn: 1.2565606 total: 2.7s remaining: 13.7s
165: learn: 1.2520713 total: 2.72s remaining: 13.7s
166: learn: 1.2476509 total: 2.75s remaining: 13.7s
167: learn: 1.2474094 total: 2.77s remaining: 13.7s
168: learn: 1.2471899 total: 2.79s remaining: 13.7s
169: learn: 1.2471356 total: 2.81s remaining: 13.7s
170: learn: 1.2470624 total: 2.83s remaining: 13.7s
171: learn: 1.2469460 total: 2.83s remaining: 13.7s
172: learn: 1.2451560 total: 2.85s remaining: 13.6s
173: learn: 1.2431158 total: 2.87s remaining: 13.6s
174: learn: 1.2430637 total: 2.87s remaining: 13.5s
175: learn: 1.2425462 total: 2.89s remaining: 13.5s
176: learn: 1.2389700 total: 2.91s remaining: 13.6s
177: learn: 1.2345046 total: 2.94s remaining: 13.6s
178: learn: 1.2322541 total: 2.96s remaining: 13.6s
179: learn: 1.2280455 total: 2.98s remaining: 13.6s
180: learn: 1.2247730 total: 3s remaining: 13.6s
181: learn: 1.2220993 total: 3.03s remaining: 13.6s
182: learn: 1.2219482 total: 3.04s remaining: 13.6s
183: learn: 1.2203709 total: 3.05s remaining: 13.5s
184: learn: 1.2172530 total: 3.07s remaining: 13.5s
185: learn: 1.2170088 total: 3.08s remaining: 13.5s
186: learn: 1.2161543 total: 3.09s remaining: 13.4s
187: learn: 1.2160230 total: 3.1s remaining: 13.4s
188: learn: 1.2142816 total: 3.11s remaining: 13.4s
189: learn: 1.2141901 total: 3.13s remaining: 13.3s
190: learn: 1.2140101 total: 3.14s remaining: 13.3s
191: learn: 1.2131761 total: 3.15s remaining: 13.3s
192: learn: 1.2094593 total: 3.18s remaining: 13.3s
193: learn: 1.2087909 total: 3.2s remaining: 13.3s
194: learn: 1.2081575 total: 3.23s remaining: 13.3s
195: learn: 1.2081349 total: 3.25s remaining: 13.3s
196: learn: 1.2069791 total: 3.27s remaining: 13.3s
197: learn: 1.2067864 total: 3.29s remaining: 13.3s
198: learn: 1.2047985 total: 3.31s remaining: 13.3s
199: learn: 1.2030426 total: 3.34s remaining: 13.3s
200: learn: 1.2015168 total: 3.36s remaining: 13.3s
201: learn: 1.2013965 total: 3.37s remaining: 13.3s
202: learn: 1.2011931 total: 3.4s remaining: 13.3s
203: learn: 1.1989170 total: 3.42s remaining: 13.4s
204: learn: 1.1989039 total: 3.43s remaining: 13.3s
205: learn: 1.1987506 total: 3.44s remaining: 13.3s
206: learn: 1.1952012 total: 3.46s remaining: 13.3s
207: learn: 1.1926359 total: 3.48s remaining: 13.3s
208: learn: 1.1926255 total: 3.49s remaining: 13.2s
209: learn: 1.1924668 total: 3.51s remaining: 13.2s
210: learn: 1.1924170 total: 3.52s remaining: 13.2s
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211: learn: 1.1915206 total: 3.54s remaining: 13.2s
212: learn: 1.1878464 total: 3.56s remaining: 13.2s
213: learn: 1.1875450 total: 3.58s remaining: 13.2s
214: learn: 1.1875363 total: 3.59s remaining: 13.1s
215: learn: 1.1875301 total: 3.59s remaining: 13s
216: learn: 1.1847059 total: 3.61s remaining: 13s
217: learn: 1.1846979 total: 3.61s remaining: 13s
218: learn: 1.1846879 total: 3.62s remaining: 12.9s
219: learn: 1.1811089 total: 3.64s remaining: 12.9s
220: learn: 1.1810998 total: 3.65s remaining: 12.9s
221: learn: 1.1805521 total: 3.67s remaining: 12.9s
222: learn: 1.1805162 total: 3.68s remaining: 12.8s
223: learn: 1.1805026 total: 3.7s remaining: 12.8s
224: learn: 1.1787050 total: 3.72s remaining: 12.8s
225: learn: 1.1775008 total: 3.73s remaining: 12.8s
226: learn: 1.1774943 total: 3.74s remaining: 12.7s
227: learn: 1.1754268 total: 3.76s remaining: 12.7s
228: learn: 1.1751529 total: 3.78s remaining: 12.7s
229: learn: 1.1750843 total: 3.8s remaining: 12.7s
230: learn: 1.1737629 total: 3.82s remaining: 12.7s
231: learn: 1.1719848 total: 3.84s remaining: 12.7s
232: learn: 1.1708388 total: 3.86s remaining: 12.7s
233: learn: 1.1695681 total: 3.88s remaining: 12.7s
234: learn: 1.1695609 total: 3.89s remaining: 12.7s
235: learn: 1.1662165 total: 3.91s remaining: 12.7s
236: learn: 1.1641221 total: 3.94s remaining: 12.7s
237: learn: 1.1641203 total: 3.94s remaining: 12.6s
238: learn: 1.1641165 total: 3.96s remaining: 12.6s
239: learn: 1.1609460 total: 3.98s remaining: 12.6s
240: learn: 1.1593012 total: 4s remaining: 12.6s
241: learn: 1.1592895 total: 4.01s remaining: 12.6s
242: learn: 1.1592112 total: 4.02s remaining: 12.5s
243: learn: 1.1568030 total: 4.05s remaining: 12.5s
244: learn: 1.1568004 total: 4.06s remaining: 12.5s
245: learn: 1.1557444 total: 4.07s remaining: 12.5s
246: learn: 1.1556787 total: 4.09s remaining: 12.5s
247: learn: 1.1539009 total: 4.11s remaining: 12.5s
248: learn: 1.1528795 total: 4.13s remaining: 12.5s
249: learn: 1.1526127 total: 4.14s remaining: 12.4s
250: learn: 1.1491179 total: 4.16s remaining: 12.4s
251: learn: 1.1471069 total: 4.18s remaining: 12.4s
252: learn: 1.1453291 total: 4.2s remaining: 12.4s
253: learn: 1.1450090 total: 4.22s remaining: 12.4s
254: learn: 1.1446807 total: 4.24s remaining: 12.4s
255: learn: 1.1445478 total: 4.25s remaining: 12.4s
256: learn: 1.1430268 total: 4.28s remaining: 12.4s
257: learn: 1.1430249 total: 4.29s remaining: 12.3s
258: learn: 1.1417374 total: 4.31s remaining: 12.3s
259: learn: 1.1417107 total: 4.33s remaining: 12.3s
260: learn: 1.1386910 total: 4.36s remaining: 12.3s
261: learn: 1.1377633 total: 4.37s remaining: 12.3s
262: learn: 1.1365455 total: 4.39s remaining: 12.3s
263: learn: 1.1362376 total: 4.4s remaining: 12.3s
264: learn: 1.1360632 total: 4.41s remaining: 12.2s
265: learn: 1.1360289 total: 4.42s remaining: 12.2s
266: learn: 1.1357989 total: 4.44s remaining: 12.2s
267: learn: 1.1357654 total: 4.45s remaining: 12.2s
268: learn: 1.1327379 total: 4.47s remaining: 12.2s
269: learn: 1.1308073 total: 4.49s remaining: 12.2s
270: learn: 1.1307360 total: 4.51s remaining: 12.1s
271: learn: 1.1296316 total: 4.53s remaining: 12.1s
272: learn: 1.1296259 total: 4.54s remaining: 12.1s
273: learn: 1.1284039 total: 4.56s remaining: 12.1s
274: learn: 1.1283852 total: 4.57s remaining: 12.1s
275: learn: 1.1273767 total: 4.59s remaining: 12s
276: learn: 1.1271569 total: 4.6s remaining: 12s
277: learn: 1.1241888 total: 4.63s remaining: 12s
278: learn: 1.1230965 total: 4.64s remaining: 12s
279: learn: 1.1230805 total: 4.65s remaining: 12s
280: learn: 1.1230623 total: 4.67s remaining: 11.9s
281: learn: 1.1204932 total: 4.69s remaining: 11.9s
282: learn: 1.1203694 total: 4.71s remaining: 11.9s
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283: learn: 1.1177108 total: 4.73s remaining: 11.9s
284: learn: 1.1177035 total: 4.74s remaining: 11.9s
285: learn: 1.1166313 total: 4.76s remaining: 11.9s
286: learn: 1.1166209 total: 4.77s remaining: 11.9s
287: learn: 1.1164251 total: 4.78s remaining: 11.8s
288: learn: 1.1164127 total: 4.79s remaining: 11.8s
289: learn: 1.1148954 total: 4.81s remaining: 11.8s
290: learn: 1.1148813 total: 4.82s remaining: 11.7s
291: learn: 1.1148674 total: 4.83s remaining: 11.7s
292: learn: 1.1140827 total: 4.86s remaining: 11.7s
293: learn: 1.1123589 total: 4.88s remaining: 11.7s
294: learn: 1.1104803 total: 4.9s remaining: 11.7s
295: learn: 1.1072352 total: 4.91s remaining: 11.7s
296: learn: 1.1064453 total: 4.93s remaining: 11.7s
297: learn: 1.1063761 total: 4.94s remaining: 11.6s
298: learn: 1.1057446 total: 4.96s remaining: 11.6s
299: learn: 1.1032160 total: 4.99s remaining: 11.6s
300: learn: 1.1021304 total: 5s remaining: 11.6s
301: learn: 1.1007503 total: 5.03s remaining: 11.6s
302: learn: 1.1006990 total: 5.05s remaining: 11.6s
303: learn: 1.1002446 total: 5.07s remaining: 11.6s
304: learn: 1.1001384 total: 5.08s remaining: 11.6s
305: learn: 1.0993399 total: 5.1s remaining: 11.6s
306: learn: 1.0993306 total: 5.11s remaining: 11.5s
307: learn: 1.0992987 total: 5.12s remaining: 11.5s
308: learn: 1.0972282 total: 5.14s remaining: 11.5s
309: learn: 1.0960879 total: 5.16s remaining: 11.5s
310: learn: 1.0960828 total: 5.17s remaining: 11.5s
311: learn: 1.0957856 total: 5.19s remaining: 11.5s
312: learn: 1.0952983 total: 5.21s remaining: 11.4s
313: learn: 1.0952664 total: 5.24s remaining: 11.4s
314: learn: 1.0944918 total: 5.26s remaining: 11.4s
315: learn: 1.0944866 total: 5.28s remaining: 11.4s
316: learn: 1.0939875 total: 5.29s remaining: 11.4s
317: learn: 1.0938782 total: 5.3s remaining: 11.4s
318: learn: 1.0938729 total: 5.32s remaining: 11.3s
319: learn: 1.0934037 total: 5.34s remaining: 11.3s
320: learn: 1.0933947 total: 5.34s remaining: 11.3s
321: learn: 1.0929796 total: 5.36s remaining: 11.3s
322: learn: 1.0920912 total: 5.38s remaining: 11.3s
323: learn: 1.0917215 total: 5.39s remaining: 11.2s
324: learn: 1.0917050 total: 5.4s remaining: 11.2s
325: learn: 1.0911221 total: 5.42s remaining: 11.2s
326: learn: 1.0903040 total: 5.44s remaining: 11.2s
327: learn: 1.0886767 total: 5.47s remaining: 11.2s
328: learn: 1.0884591 total: 5.48s remaining: 11.2s
329: learn: 1.0863190 total: 5.5s remaining: 11.2s
330: learn: 1.0862346 total: 5.52s remaining: 11.1s
331: learn: 1.0862311 total: 5.53s remaining: 11.1s
332: learn: 1.0862165 total: 5.54s remaining: 11.1s
333: learn: 1.0854355 total: 5.55s remaining: 11.1s
334: learn: 1.0848361 total: 5.57s remaining: 11.1s
335: learn: 1.0844390 total: 5.59s remaining: 11.1s
336: learn: 1.0835372 total: 5.61s remaining: 11s
337: learn: 1.0835062 total: 5.62s remaining: 11s
338: learn: 1.0825471 total: 5.65s remaining: 11s
339: learn: 1.0825293 total: 5.66s remaining: 11s
340: learn: 1.0825104 total: 5.67s remaining: 11s
341: learn: 1.0805520 total: 5.7s remaining: 11s
342: learn: 1.0794549 total: 5.72s remaining: 10.9s
343: learn: 1.0793743 total: 5.72s remaining: 10.9s
344: learn: 1.0790801 total: 5.75s remaining: 10.9s
345: learn: 1.0777867 total: 5.77s remaining: 10.9s
346: learn: 1.0771235 total: 5.79s remaining: 10.9s
347: learn: 1.0751735 total: 5.81s remaining: 10.9s
348: learn: 1.0734408 total: 5.83s remaining: 10.9s
349: learn: 1.0714663 total: 5.85s remaining: 10.9s
350: learn: 1.0714644 total: 5.86s remaining: 10.8s
351: learn: 1.0712635 total: 5.87s remaining: 10.8s
352: learn: 1.0706249 total: 5.89s remaining: 10.8s
353: learn: 1.0706151 total: 5.91s remaining: 10.8s
354: learn: 1.0706051 total: 5.93s remaining: 10.8s
```

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355: learn: 1.0704219 total: 5.94s remaining: 10.7s
356: learn: 1.0693322 total: 5.96s remaining: 10.7s
357: learn: 1.0693157 total: 5.97s remaining: 10.7s
358: learn: 1.0681683 total: 5.99s remaining: 10.7s
359: learn: 1.0674845 total: 6.01s remaining: 10.7s
360: learn: 1.0656485 total: 6.03s remaining: 10.7s
361: learn: 1.0637761 total: 6.06s remaining: 10.7s
362: learn: 1.0619405 total: 6.08s remaining: 10.7s
363: learn: 1.0606669 total: 6.1s remaining: 10.7s
364: learn: 1.0581283 total: 6.12s remaining: 10.7s
365: learn: 1.0564893 total: 6.15s remaining: 10.6s
366: learn: 1.0560578 total: 6.17s remaining: 10.6s
367: learn: 1.0560500 total: 6.18s remaining: 10.6s
368: learn: 1.0557048 total: 6.21s remaining: 10.6s
369: learn: 1.0555227 total: 6.23s remaining: 10.6s
370: learn: 1.0554890 total: 6.25s remaining: 10.6s
371: learn: 1.0554823 total: 6.25s remaining: 10.6s
372: learn: 1.0554808 total: 6.26s remaining: 10.5s
373: learn: 1.0554549 total: 6.28s remaining: 10.5s
374: learn: 1.0554525 total: 6.29s remaining: 10.5s
375: learn: 1.0554367 total: 6.31s remaining: 10.5s
376: learn: 1.0550730 total: 6.33s remaining: 10.5s
377: learn: 1.0550538 total: 6.34s remaining: 10.4s
378: learn: 1.0548330 total: 6.36s remaining: 10.4s
379: learn: 1.0542904 total: 6.38s remaining: 10.4s
380: learn: 1.0501478 total: 6.41s remaining: 10.4s
381: learn: 1.0484198 total: 6.43s remaining: 10.4s
382: learn: 1.0473551 total: 6.44s remaining: 10.4s
383: learn: 1.0473539 total: 6.45s remaining: 10.4s
384: learn: 1.0469275 total: 6.47s remaining: 10.3s
385: learn: 1.0454976 total: 6.5s remaining: 10.3s
386: learn: 1.0443252 total: 6.52s remaining: 10.3s
387: learn: 1.0441963 total: 6.53s remaining: 10.3s
388: learn: 1.0428646 total: 6.55s remaining: 10.3s
389: learn: 1.0427412 total: 6.57s remaining: 10.3s
390: learn: 1.0411758 total: 6.59s remaining: 10.3s
391: learn: 1.0395971 total: 6.61s remaining: 10.3s
392: learn: 1.0391696 total: 6.63s remaining: 10.2s
393: learn: 1.0388346 total: 6.65s remaining: 10.2s
394: learn: 1.0385586 total: 6.67s remaining: 10.2s
395: learn: 1.0384856 total: 6.69s remaining: 10.2s
396: learn: 1.0383161 total: 6.71s remaining: 10.2s
397: learn: 1.0382904 total: 6.72s remaining: 10.2s
398: learn: 1.0374918 total: 6.75s remaining: 10.2s
399: learn: 1.0374871 total: 6.76s remaining: 10.1s
400: learn: 1.0374749 total: 6.76s remaining: 10.1s
401: learn: 1.0374004 total: 6.77s remaining: 10.1s
402: learn: 1.0361204 total: 6.79s remaining: 10.1s
403: learn: 1.0354065 total: 6.82s remaining: 10.1s
404: learn: 1.0352592 total: 6.83s remaining: 10s
405: learn: 1.0351143 total: 6.85s remaining: 10s
406: learn: 1.0347387 total: 6.87s remaining: 10s
407: learn: 1.0347196 total: 6.88s remaining: 9.98s
408: learn: 1.0344604 total: 6.9s remaining: 9.97s
409: learn: 1.0343770 total: 6.92s remaining: 9.95s
410: learn: 1.0339904 total: 6.94s remaining: 9.95s
411: learn: 1.0329144 total: 6.96s remaining: 9.94s
412: learn: 1.0314635 total: 6.99s remaining: 9.93s
413: learn: 1.0294242 total: 7.01s remaining: 9.92s
414: learn: 1.0293455 total: 7.02s remaining: 9.89s
415: learn: 1.0292522 total: 7.03s remaining: 9.87s
416: learn: 1.0291714 total: 7.05s remaining: 9.85s
417: learn: 1.0281473 total: 7.07s remaining: 9.84s
418: learn: 1.0278264 total: 7.09s remaining: 9.83s
419: learn: 1.0277386 total: 7.1s remaining: 9.8s
420: learn: 1.0276190 total: 7.12s remaining: 9.79s
421: learn: 1.0275453 total: 7.13s remaining: 9.77s
422: learn: 1.0274940 total: 7.17s remaining: 9.79s
423: learn: 1.0271208 total: 7.2s remaining: 9.78s
424: learn: 1.0270759 total: 7.21s remaining: 9.75s
425: learn: 1.0270656 total: 7.22s remaining: 9.72s
426: learn: 1.0270500 total: 7.23s remaining: 9.7s
```

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427: learn: 1.0268020 total: 7.25s remaining: 9.69s
428: learn: 1.0267827 total: 7.26s remaining: 9.67s
429: learn: 1.0256365 total: 7.29s remaining: 9.66s
430: learn: 1.0252207 total: 7.31s remaining: 9.65s
431: learn: 1.0249450 total: 7.33s remaining: 9.64s
432: learn: 1.0247555 total: 7.35s remaining: 9.63s
433: learn: 1.0241619 total: 7.37s remaining: 9.61s
434: learn: 1.0238644 total: 7.4s remaining: 9.61s
435: learn: 1.0236810 total: 7.42s remaining: 9.6s
436: learn: 1.0230986 total: 7.44s remaining: 9.59s
437: learn: 1.0230770 total: 7.45s remaining: 9.56s
438: learn: 1.0194133 total: 7.47s remaining: 9.55s
439: learn: 1.0187741 total: 7.5s remaining: 9.54s
440: learn: 1.0186522 total: 7.51s remaining: 9.53s
441: learn: 1.0186474 total: 7.53s remaining: 9.5s
442: learn: 1.0181789 total: 7.55s remaining: 9.49s
443: learn: 1.0179464 total: 7.57s remaining: 9.48s
444: learn: 1.0171960 total: 7.59s remaining: 9.47s
445: learn: 1.0159135 total: 7.62s remaining: 9.46s
446: learn: 1.0155561 total: 7.64s remaining: 9.45s
447: learn: 1.0152934 total: 7.66s remaining: 9.44s
448: learn: 1.0152796 total: 7.67s remaining: 9.41s
449: learn: 1.0152097 total: 7.68s remaining: 9.38s
450: learn: 1.0151518 total: 7.68s remaining: 9.36s
451: learn: 1.0150945 total: 7.69s remaining: 9.33s
452: learn: 1.0149717 total: 7.72s remaining: 9.32s
453: learn: 1.0149416 total: 7.74s remaining: 9.3s
454: learn: 1.0149331 total: 7.75s remaining: 9.28s
455: learn: 1.0148290 total: 7.77s remaining: 9.27s
456: learn: 1.0146050 total: 7.8s remaining: 9.26s
457: learn: 1.0144860 total: 7.82s remaining: 9.25s
458: learn: 1.0144298 total: 7.83s remaining: 9.23s
459: learn: 1.0144178 total: 7.84s remaining: 9.2s
460: learn: 1.0141010 total: 7.86s remaining: 9.19s
461: learn: 1.0140124 total: 7.88s remaining: 9.18s
462: learn: 1.0137848 total: 7.9s remaining: 9.16s
463: learn: 1.0137604 total: 7.92s remaining: 9.15s
464: learn: 1.0125801 total: 7.94s remaining: 9.14s
465: learn: 1.0121805 total: 7.96s remaining: 9.13s
466: learn: 1.0118605 total: 7.98s remaining: 9.11s
467: learn: 1.0110798 total: 8.01s remaining: 9.1s
468: learn: 1.0108584 total: 8.03s remaining: 9.09s
469: learn: 1.0108530 total: 8.04s remaining: 9.07s
470: learn: 1.0100672 total: 8.07s remaining: 9.06s
471: learn: 1.0100101 total: 8.08s remaining: 9.04s
472: learn: 1.0099671 total: 8.09s remaining: 9.02s
473: learn: 1.0091063 total: 8.11s remaining: 9s
474: learn: 1.0068988 total: 8.13s remaining: 8.99s
475: learn: 1.0068881 total: 8.15s remaining: 8.97s
476: learn: 1.0068335 total: 8.16s remaining: 8.95s
477: learn: 1.0068185 total: 8.17s remaining: 8.92s
478: learn: 1.0067836 total: 8.19s remaining: 8.91s
479: learn: 1.0059581 total: 8.21s remaining: 8.9s
480: learn: 1.0057339 total: 8.24s remaining: 8.89s
481: learn: 1.0022088 total: 8.26s remaining: 8.88s
482: learn: 1.0021545 total: 8.27s remaining: 8.86s
483: learn: 1.0017797 total: 8.29s remaining: 8.84s
484: learn: 1.0017276 total: 8.3s remaining: 8.82s
485: learn: 1.0013727 total: 8.33s remaining: 8.81s
486: learn: 1.0011142 total: 8.35s remaining: 8.8s
487: learn: 1.0001897 total: 8.37s remaining: 8.78s
488: learn: 1.0001743 total: 8.38s remaining: 8.76s
489: learn: 0.9992546 total: 8.4s remaining: 8.74s
490: learn: 0.9992216 total: 8.42s remaining: 8.72s
491: learn: 0.9989813 total: 8.44s remaining: 8.71s
492: learn: 0.9989554 total: 8.46s remaining: 8.7s
493: learn: 0.9988672 total: 8.47s remaining: 8.68s
494: learn: 0.9981916 total: 8.49s remaining: 8.66s
495: learn: 0.9974238 total: 8.51s remaining: 8.65s
496: learn: 0.9972661 total: 8.53s remaining: 8.64s
497: learn: 0.9970473 total: 8.55s remaining: 8.62s
498: learn: 0.9969913 total: 8.57s remaining: 8.61s
```

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499: learn: 0.9969453 total: 8.58s remaining: 8.58s
500: learn: 0.9969068 total: 8.6s remaining: 8.57s
501: learn: 0.9968620 total: 8.62s remaining: 8.55s
502: learn: 0.9968494 total: 8.63s remaining: 8.53s
503: learn: 0.9964192 total: 8.65s remaining: 8.51s
504: learn: 0.9963757 total: 8.66s remaining: 8.49s
505: learn: 0.9963616 total: 8.67s remaining: 8.46s
506: learn: 0.9962204 total: 8.69s remaining: 8.45s
507: learn: 0.9961234 total: 8.71s remaining: 8.44s
508: learn: 0.9960925 total: 8.72s remaining: 8.41s
509: learn: 0.9958887 total: 8.74s remaining: 8.4s
510: learn: 0.9958474 total: 8.76s remaining: 8.38s
511: learn: 0.9958450 total: 8.76s remaining: 8.35s
512: learn: 0.9958331 total: 8.78s remaining: 8.33s
513: learn: 0.9956698 total: 8.8s remaining: 8.32s
514: learn: 0.9951544 total: 8.82s remaining: 8.31s
515: learn: 0.9951284 total: 8.84s remaining: 8.29s
516: learn: 0.9950818 total: 8.85s remaining: 8.27s
517: learn: 0.9950422 total: 8.86s remaining: 8.24s
518: learn: 0.9949477 total: 8.88s remaining: 8.23s
519: learn: 0.9948948 total: 8.9s remaining: 8.21s
520: learn: 0.9948628 total: 8.91s remaining: 8.2s
521: learn: 0.9947264 total: 8.94s remaining: 8.18s
522: learn: 0.9945034 total: 8.96s remaining: 8.17s
523: learn: 0.9945026 total: 8.96s remaining: 8.14s
524: learn: 0.9944641 total: 8.98s remaining: 8.12s
525: learn: 0.9944597 total: 8.99s remaining: 8.1s
526: learn: 0.9944557 total: 9s remaining: 8.08s
527: learn: 0.9944451 total: 9.01s remaining: 8.05s
528: learn: 0.9936775 total: 9.04s remaining: 8.04s
529: learn: 0.9936358 total: 9.06s remaining: 8.04s
530: learn: 0.9931465 total: 9.09s remaining: 8.02s
531: learn: 0.9922212 total: 9.11s remaining: 8.01s
532: learn: 0.9922175 total: 9.12s remaining: 7.99s
533: learn: 0.9918181 total: 9.14s remaining: 7.98s
534: learn: 0.9908408 total: 9.17s remaining: 7.97s
535: learn: 0.9906725 total: 9.19s remaining: 7.95s
536: learn: 0.9906622 total: 9.2s remaining: 7.93s
537: learn: 0.9906391 total: 9.21s remaining: 7.91s
538: learn: 0.9905017 total: 9.24s remaining: 7.9s
539: learn: 0.9896583 total: 9.26s remaining: 7.89s
540: learn: 0.9896559 total: 9.27s remaining: 7.86s
541: learn: 0.9890963 total: 9.29s remaining: 7.85s
542: learn: 0.9890612 total: 9.3s remaining: 7.82s
543: learn: 0.9890270 total: 9.3s remaining: 7.8s
544: learn: 0.9889934 total: 9.32s remaining: 7.78s
545: learn: 0.9889612 total: 9.33s remaining: 7.75s
546: learn: 0.9887178 total: 9.35s remaining: 7.74s
547: learn: 0.9879950 total: 9.37s remaining: 7.73s
548: learn: 0.9871475 total: 9.39s remaining: 7.71s
549: learn: 0.9871384 total: 9.4s remaining: 7.69s
550: learn: 0.9871351 total: 9.41s remaining: 7.67s
551: learn: 0.9871044 total: 9.42s remaining: 7.65s
552: learn: 0.9871013 total: 9.43s remaining: 7.62s
553: learn: 0.9868759 total: 9.46s remaining: 7.61s
554: learn: 0.9868447 total: 9.47s remaining: 7.59s
555: learn: 0.9863240 total: 9.49s remaining: 7.58s
556: learn: 0.9862957 total: 9.51s remaining: 7.56s
557: learn: 0.9855339 total: 9.53s remaining: 7.55s
558: learn: 0.9855192 total: 9.55s remaining: 7.54s
559: learn: 0.9846920 total: 9.57s remaining: 7.52s
560: learn: 0.9846895 total: 9.58s remaining: 7.5s
561: learn: 0.9841606 total: 9.6s remaining: 7.48s
562: learn: 0.9841332 total: 9.62s remaining: 7.47s
563: learn: 0.9840271 total: 9.64s remaining: 7.45s
564: learn: 0.9838366 total: 9.66s remaining: 7.44s
565: learn: 0.9838312 total: 9.67s remaining: 7.42s
566: learn: 0.9838035 total: 9.69s remaining: 7.4s
567: learn: 0.9837952 total: 9.71s remaining: 7.38s
568: learn: 0.9833240 total: 9.73s remaining: 7.37s
569: learn: 0.9833031 total: 9.75s remaining: 7.36s
570: learn: 0.9832487 total: 9.77s remaining: 7.34s
```

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571: learn: 0.9827133 total: 9.79s remaining: 7.33s
572: learn: 0.9820143 total: 9.81s remaining: 7.31s
573: learn: 0.9815363 total: 9.84s remaining: 7.3s
574: learn: 0.9813851 total: 9.86s remaining: 7.29s
575: learn: 0.9813740 total: 9.87s remaining: 7.27s
576: learn: 0.9810657 total: 9.89s remaining: 7.25s
577: learn: 0.9810620 total: 9.91s remaining: 7.24s
578: learn: 0.9810065 total: 9.93s remaining: 7.22s
579: learn: 0.9810006 total: 9.94s remaining: 7.2s
580: learn: 0.9809982 total: 9.95s remaining: 7.17s
581: learn: 0.9805017 total: 9.97s remaining: 7.16s
582: learn: 0.9804733 total: 9.99s remaining: 7.14s
583: learn: 0.9803375 total: 10s remaining: 7.13s
584: learn: 0.9802804 total: 10s remaining: 7.11s
585: learn: 0.9796856 total: 10s remaining: 7.1s
586: learn: 0.9793376 total: 10.1s remaining: 7.09s
587: learn: 0.9793143 total: 10.1s remaining: 7.07s
588: learn: 0.9787331 total: 10.1s remaining: 7.06s
589: learn: 0.9787307 total: 10.1s remaining: 7.04s
590: learn: 0.9783976 total: 10.1s remaining: 7.02s
591: learn: 0.9779963 total: 10.2s remaining: 7.01s
592: learn: 0.9779740 total: 10.2s remaining: 7s
593: learn: 0.9774612 total: 10.2s remaining: 6.98s
594: learn: 0.9768251 total: 10.2s remaining: 6.96s
595: learn: 0.9768027 total: 10.3s remaining: 6.95s
596: learn: 0.9767766 total: 10.3s remaining: 6.94s
597: learn: 0.9763835 total: 10.3s remaining: 6.93s
598: learn: 0.9761352 total: 10.3s remaining: 6.91s
599: learn: 0.9758041 total: 10.3s remaining: 6.9s
600: learn: 0.9757825 total: 10.4s remaining: 6.88s
601: learn: 0.9757731 total: 10.4s remaining: 6.86s
602: learn: 0.9757609 total: 10.4s remaining: 6.84s
603: learn: 0.9757467 total: 10.4s remaining: 6.82s
604: learn: 0.9755698 total: 10.4s remaining: 6.8s
605: learn: 0.9755610 total: 10.4s remaining: 6.79s
606: learn: 0.9755386 total: 10.5s remaining: 6.77s
607: learn: 0.9754090 total: 10.5s remaining: 6.76s
608: learn: 0.9749989 total: 10.5s remaining: 6.74s
609: learn: 0.9745405 total: 10.5s remaining: 6.73s
610: learn: 0.9744873 total: 10.5s remaining: 6.71s
611: learn: 0.9744423 total: 10.6s remaining: 6.69s
612: learn: 0.9744069 total: 10.6s remaining: 6.67s
613: learn: 0.9743913 total: 10.6s remaining: 6.66s
614: learn: 0.9741833 total: 10.6s remaining: 6.64s
615: learn: 0.9741625 total: 10.6s remaining: 6.62s
616: learn: 0.9740813 total: 10.6s remaining: 6.61s
617: learn: 0.9737444 total: 10.7s remaining: 6.59s
618: learn: 0.9737053 total: 10.7s remaining: 6.58s
619: learn: 0.9736896 total: 10.7s remaining: 6.57s
620: learn: 0.9732549 total: 10.7s remaining: 6.55s
621: learn: 0.9727008 total: 10.7s remaining: 6.53s
622: learn: 0.9726942 total: 10.8s remaining: 6.51s
623: learn: 0.9726665 total: 10.8s remaining: 6.5s
624: learn: 0.9724531 total: 10.8s remaining: 6.48s
625: learn: 0.9722479 total: 10.8s remaining: 6.46s
626: learn: 0.9720055 total: 10.8s remaining: 6.45s
627: learn: 0.9719945 total: 10.9s remaining: 6.43s
628: learn: 0.9719593 total: 10.9s remaining: 6.42s
629: learn: 0.9719453 total: 10.9s remaining: 6.41s
630: learn: 0.9714888 total: 10.9s remaining: 6.39s
631: learn: 0.9714390 total: 11s remaining: 6.38s
632: learn: 0.9710772 total: 11s remaining: 6.36s
633: learn: 0.9708559 total: 11s remaining: 6.35s
634: learn: 0.9708375 total: 11s remaining: 6.33s
635: learn: 0.9708052 total: 11s remaining: 6.32s
636: learn: 0.9707692 total: 11.1s remaining: 6.3s
637: learn: 0.9703474 total: 11.1s remaining: 6.29s
638: learn: 0.9703128 total: 11.1s remaining: 6.27s
639: learn: 0.9702722 total: 11.1s remaining: 6.26s
640: learn: 0.9702700 total: 11.1s remaining: 6.24s
641: learn: 0.9701994 total: 11.2s remaining: 6.22s
642: learn: 0.9694832 total: 11.2s remaining: 6.21s
```

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643: learn: 0.9694770 total: 11.2s remaining: 6.19s
644: learn: 0.9692728 total: 11.2s remaining: 6.17s
645: learn: 0.9686768 total: 11.2s remaining: 6.16s
646: learn: 0.9686749 total: 11.3s remaining: 6.14s
647: learn: 0.9685255 total: 11.3s remaining: 6.12s
648: learn: 0.9684716 total: 11.3s remaining: 6.11s
649: learn: 0.9684706 total: 11.3s remaining: 6.08s
650: learn: 0.9684698 total: 11.3s remaining: 6.06s
651: learn: 0.9683206 total: 11.3s remaining: 6.05s
652: learn: 0.9682552 total: 11.4s remaining: 6.03s
653: learn: 0.9682239 total: 11.4s remaining: 6.02s
654: learn: 0.9682011 total: 11.4s remaining: 6s
655: learn: 0.9676560 total: 11.4s remaining: 5.99s
656: learn: 0.9676418 total: 11.4s remaining: 5.97s
657: learn: 0.9674580 total: 11.5s remaining: 5.96s
658: learn: 0.9674550 total: 11.5s remaining: 5.94s
659: learn: 0.9674373 total: 11.5s remaining: 5.92s
660: learn: 0.9674048 total: 11.5s remaining: 5.91s
661: learn: 0.9672393 total: 11.5s remaining: 5.9s
662: learn: 0.9671720 total: 11.6s remaining: 5.88s
663: learn: 0.9667860 total: 11.6s remaining: 5.87s
664: learn: 0.9667797 total: 11.6s remaining: 5.84s
665: learn: 0.9667740 total: 11.6s remaining: 5.82s
666: learn: 0.9666726 total: 11.6s remaining: 5.81s
667: learn: 0.9665955 total: 11.7s remaining: 5.79s
668: learn: 0.9665268 total: 11.7s remaining: 5.78s
669: learn: 0.9661898 total: 11.7s remaining: 5.76s
670: learn: 0.9661847 total: 11.7s remaining: 5.74s
671: learn: 0.9639452 total: 11.7s remaining: 5.72s
672: learn: 0.9639402 total: 11.7s remaining: 5.71s
673: learn: 0.9637207 total: 11.8s remaining: 5.69s
674: learn: 0.9636462 total: 11.8s remaining: 5.67s
675: learn: 0.9636244 total: 11.8s remaining: 5.66s
676: learn: 0.9633555 total: 11.8s remaining: 5.64s
677: learn: 0.9633307 total: 11.8s remaining: 5.63s
678: learn: 0.9632886 total: 11.9s remaining: 5.61s
679: learn: 0.9631083 total: 11.9s remaining: 5.6s
680: learn: 0.9630959 total: 11.9s remaining: 5.58s
681: learn: 0.9630516 total: 11.9s remaining: 5.56s
682: learn: 0.9630468 total: 11.9s remaining: 5.54s
683: learn: 0.9628247 total: 12s remaining: 5.53s
684: learn: 0.9627421 total: 12s remaining: 5.51s
685: learn: 0.9627180 total: 12s remaining: 5.5s
686: learn: 0.9626883 total: 12s remaining: 5.48s
687: learn: 0.9625742 total: 12.1s remaining: 5.46s
688: learn: 0.9625698 total: 12.1s remaining: 5.45s
689: learn: 0.9625314 total: 12.1s remaining: 5.43s
690: learn: 0.9624873 total: 12.1s remaining: 5.42s
691: learn: 0.9624775 total: 12.1s remaining: 5.4s
692: learn: 0.9624372 total: 12.2s remaining: 5.38s
693: learn: 0.9624276 total: 12.2s remaining: 5.37s
694: learn: 0.9624235 total: 12.2s remaining: 5.35s
695: learn: 0.9624014 total: 12.2s remaining: 5.33s
696: learn: 0.9623700 total: 12.2s remaining: 5.32s
697: learn: 0.9623482 total: 12.3s remaining: 5.3s
698: learn: 0.9622738 total: 12.3s remaining: 5.29s
699: learn: 0.9618772 total: 12.3s remaining: 5.27s
700: learn: 0.9618525 total: 12.3s remaining: 5.25s
701: learn: 0.9613917 total: 12.3s remaining: 5.24s
702: learn: 0.9613602 total: 12.4s remaining: 5.22s
703: learn: 0.9612512 total: 12.4s remaining: 5.21s
704: learn: 0.9612313 total: 12.4s remaining: 5.19s
705: learn: 0.9612072 total: 12.4s remaining: 5.17s
706: learn: 0.9606523 total: 12.4s remaining: 5.16s
707: learn: 0.9603466 total: 12.5s remaining: 5.14s
708: learn: 0.9603115 total: 12.5s remaining: 5.12s
709: learn: 0.9602626 total: 12.5s remaining: 5.11s
710: learn: 0.9602576 total: 12.5s remaining: 5.09s
711: learn: 0.9601261 total: 12.5s remaining: 5.07s
712: learn: 0.9600990 total: 12.5s remaining: 5.05s
713: learn: 0.9596755 total: 12.6s remaining: 5.03s
714: learn: 0.9596521 total: 12.6s remaining: 5.02s
```

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715: learn: 0.9596218 total: 12.6s remaining: 5s
716: learn: 0.9594675 total: 12.6s remaining: 4.99s
717: learn: 0.9594222 total: 12.7s remaining: 4.97s
718: learn: 0.9594188 total: 12.7s remaining: 4.95s
719: learn: 0.9594150 total: 12.7s remaining: 4.93s
720: learn: 0.9593863 total: 12.7s remaining: 4.91s
721: learn: 0.9590874 total: 12.7s remaining: 4.89s
722: learn: 0.9590759 total: 12.7s remaining: 4.88s
723: learn: 0.9590749 total: 12.8s remaining: 4.86s
724: learn: 0.9563346 total: 12.8s remaining: 4.84s
725: learn: 0.9562703 total: 12.8s remaining: 4.83s
726: learn: 0.9562668 total: 12.8s remaining: 4.81s
727: learn: 0.9562488 total: 12.8s remaining: 4.79s
728: learn: 0.9562422 total: 12.8s remaining: 4.77s
729: learn: 0.9532236 total: 12.9s remaining: 4.76s
730: learn: 0.9531057 total: 12.9s remaining: 4.74s
731: learn: 0.9530795 total: 12.9s remaining: 4.72s
732: learn: 0.9530543 total: 12.9s remaining: 4.71s
733: learn: 0.9527125 total: 12.9s remaining: 4.69s
734: learn: 0.9525750 total: 13s remaining: 4.68s
735: learn: 0.9522562 total: 13s remaining: 4.66s
736: learn: 0.9522345 total: 13s remaining: 4.64s
737: learn: 0.9522310 total: 13s remaining: 4.63s
738: learn: 0.9522276 total: 13.1s remaining: 4.61s
739: learn: 0.9522255 total: 13.1s remaining: 4.59s
740: learn: 0.9521495 total: 13.1s remaining: 4.58s
741: learn: 0.9520873 total: 13.1s remaining: 4.56s
742: learn: 0.9520625 total: 13.1s remaining: 4.54s
743: learn: 0.9520384 total: 13.2s remaining: 4.53s
744: learn: 0.9520293 total: 13.2s remaining: 4.51s
745: learn: 0.9519994 total: 13.2s remaining: 4.49s
746: learn: 0.9518871 total: 13.2s remaining: 4.48s
747: learn: 0.9518532 total: 13.2s remaining: 4.46s
748: learn: 0.9517301 total: 13.3s remaining: 4.45s
749: learn: 0.9517107 total: 13.3s remaining: 4.43s
750: learn: 0.9517076 total: 13.3s remaining: 4.41s
751: learn: 0.9517036 total: 13.3s remaining: 4.39s
752: learn: 0.9517004 total: 13.3s remaining: 4.37s
753: learn: 0.9516997 total: 13.3s remaining: 4.35s
754: learn: 0.9516966 total: 13.4s remaining: 4.33s
755: learn: 0.9516578 total: 13.4s remaining: 4.32s
756: learn: 0.9516359 total: 13.4s remaining: 4.3s
757: learn: 0.9515396 total: 13.4s remaining: 4.28s
758: learn: 0.9515084 total: 13.4s remaining: 4.27s
759: learn: 0.9509019 total: 13.5s remaining: 4.25s
760: learn: 0.9508959 total: 13.5s remaining: 4.24s
761: learn: 0.9507716 total: 13.5s remaining: 4.22s
762: learn: 0.9505927 total: 13.5s remaining: 4.2s
763: learn: 0.9505572 total: 13.5s remaining: 4.18s
764: learn: 0.9501943 total: 13.6s remaining: 4.17s
765: learn: 0.9501257 total: 13.6s remaining: 4.15s
766: learn: 0.9499451 total: 13.6s remaining: 4.13s
767: learn: 0.9499400 total: 13.6s remaining: 4.12s
768: learn: 0.9499371 total: 13.6s remaining: 4.1s
769: learn: 0.9493924 total: 13.7s remaining: 4.08s
770: learn: 0.9490845 total: 13.7s remaining: 4.07s
771: learn: 0.9490440 total: 13.7s remaining: 4.05s
772: learn: 0.9490339 total: 13.7s remaining: 4.03s
773: learn: 0.9490252 total: 13.7s remaining: 4.01s
774: learn: 0.9489691 total: 13.8s remaining: 4s
775: learn: 0.9489545 total: 13.8s remaining: 3.98s
776: learn: 0.9483646 total: 13.8s remaining: 3.96s
777: learn: 0.9483620 total: 13.8s remaining: 3.94s
778: learn: 0.9483579 total: 13.8s remaining: 3.93s
779: learn: 0.9482789 total: 13.9s remaining: 3.91s
780: learn: 0.9469807 total: 13.9s remaining: 3.89s
781: learn: 0.9469587 total: 13.9s remaining: 3.88s
782: learn: 0.9469579 total: 13.9s remaining: 3.85s
783: learn: 0.9469548 total: 13.9s remaining: 3.83s
784: learn: 0.9469226 total: 13.9s remaining: 3.82s
785: learn: 0.9465323 total: 14s remaining: 3.8s
786: learn: 0.9465132 total: 14s remaining: 3.79s
```

```
787: learn: 0.9464845 total: 14s remaining: 3.77s
788: learn: 0.9464822 total: 14s remaining: 3.75s
789: learn: 0.9464530 total: 14s remaining: 3.73s
790: learn: 0.9464188 total: 14.1s remaining: 3.71s
791: learn: 0.9461884 total: 14.1s remaining: 3.7s
792: learn: 0.9460812 total: 14.1s remaining: 3.68s
793: learn: 0.9460129 total: 14.1s remaining: 3.67s
794: learn: 0.9460112 total: 14.1s remaining: 3.65s
795: learn: 0.9460095 total: 14.2s remaining: 3.63s
796: learn: 0.9459949 total: 14.2s remaining: 3.61s
797: learn: 0.9459903 total: 14.2s remaining: 3.59s
798: learn: 0.9459565 total: 14.2s remaining: 3.58s
799: learn: 0.9459524 total: 14.2s remaining: 3.56s
800: learn: 0.9459264 total: 14.3s remaining: 3.54s
801: learn: 0.9458507 total: 14.3s remaining: 3.53s
802: learn: 0.9458489 total: 14.3s remaining: 3.51s
803: learn: 0.9456544 total: 14.3s remaining: 3.49s
804: learn: 0.9456538 total: 14.3s remaining: 3.47s
805: learn: 0.9455917 total: 14.4s remaining: 3.45s
806: learn: 0.9452734 total: 14.4s remaining: 3.44s
807: learn: 0.9450980 total: 14.4s remaining: 3.42s
808: learn: 0.9448941 total: 14.4s remaining: 3.4s
809: learn: 0.9447481 total: 14.4s remaining: 3.38s
810: learn: 0.9445407 total: 14.4s remaining: 3.36s
811: learn: 0.9440621 total: 14.5s remaining: 3.35s
812: learn: 0.9439188 total: 14.5s remaining: 3.33s
813: learn: 0.9395325 total: 14.5s remaining: 3.31s
814: learn: 0.9392413 total: 14.5s remaining: 3.29s
815: learn: 0.9392378 total: 14.5s remaining: 3.27s
816: learn: 0.9391931 total: 14.5s remaining: 3.26s
817: learn: 0.9369622 total: 14.6s remaining: 3.24s
818: learn: 0.9369540 total: 14.6s remaining: 3.22s
819: learn: 0.9366041 total: 14.6s remaining: 3.21s
820: learn: 0.9363193 total: 14.6s remaining: 3.19s
821: learn: 0.9356954 total: 14.7s remaining: 3.17s
822: learn: 0.9356905 total: 14.7s remaining: 3.16s
823: learn: 0.9356868 total: 14.7s remaining: 3.14s
824: learn: 0.9356813 total: 14.7s remaining: 3.12s
825: learn: 0.9354384 total: 14.7s remaining: 3.1s
826: learn: 0.9354155 total: 14.8s remaining: 3.09s
827: learn: 0.9354084 total: 14.8s remaining: 3.07s
828: learn: 0.9354045 total: 14.8s remaining: 3.05s
829: learn: 0.9353974 total: 14.8s remaining: 3.03s
830: learn: 0.9352461 total: 14.8s remaining: 3.01s
831: learn: 0.9349044 total: 14.8s remaining: 3s
832: learn: 0.9347300 total: 14.9s remaining: 2.98s
833: learn: 0.9347228 total: 14.9s remaining: 2.96s
834: learn: 0.9347193 total: 14.9s remaining: 2.94s
835: learn: 0.9347123 total: 14.9s remaining: 2.92s
836: learn: 0.9345390 total: 14.9s remaining: 2.9s
837: learn: 0.9344880 total: 14.9s remaining: 2.89s
838: learn: 0.9344868 total: 14.9s remaining: 2.87s
839: learn: 0.9344524 total: 15s remaining: 2.85s
840: learn: 0.9338633 total: 15s remaining: 2.83s
841: learn: 0.9336136 total: 15s remaining: 2.82s
842: learn: 0.9336103 total: 15s remaining: 2.8s
843: learn: 0.9336084 total: 15s remaining: 2.78s
844: learn: 0.9336051 total: 15s remaining: 2.76s
845: learn: 0.9334869 total: 15.1s remaining: 2.74s
846: learn: 0.9334561 total: 15.1s remaining: 2.73s
847: learn: 0.9333544 total: 15.1s remaining: 2.71s
848: learn: 0.9330757 total: 15.1s remaining: 2.69s
849: learn: 0.9328592 total: 15.2s remaining: 2.68s
850: learn: 0.9322984 total: 15.2s remaining: 2.66s
851: learn: 0.9322952 total: 15.2s remaining: 2.64s
852: learn: 0.9322686 total: 15.2s remaining: 2.62s
853: learn: 0.9320053 total: 15.2s remaining: 2.61s
854: learn: 0.9319044 total: 15.3s remaining: 2.59s
855: learn: 0.9319002 total: 15.3s remaining: 2.57s
856: learn: 0.9318969 total: 15.3s remaining: 2.55s
857: learn: 0.9318948 total: 15.3s remaining: 2.54s
858: learn: 0.9318922 total: 15.3s remaining: 2.52s
```

```
859: learn: 0.9318522 total: 15.4s remaining: 2.5s
860: learn: 0.9318128 total: 15.4s remaining: 2.48s
861: learn: 0.9311443 total: 15.4s remaining: 2.46s
862: learn: 0.9306343 total: 15.4s remaining: 2.45s
863: learn: 0.9302310 total: 15.4s remaining: 2.43s
864: learn: 0.9300741 total: 15.4s remaining: 2.41s
865: learn: 0.9300701 total: 15.5s remaining: 2.39s
866: learn: 0.9298304 total: 15.5s remaining: 2.37s
867: learn: 0.9291408 total: 15.5s remaining: 2.36s
868: learn: 0.9291353 total: 15.5s remaining: 2.34s
869: learn: 0.9291154 total: 15.5s remaining: 2.32s
870: learn: 0.9291120 total: 15.6s remaining: 2.3s
871: learn: 0.9291093 total: 15.6s remaining: 2.29s
872: learn: 0.9290744 total: 15.6s remaining: 2.27s
873: learn: 0.9258921 total: 15.6s remaining: 2.25s
874: learn: 0.9258880 total: 15.6s remaining: 2.23s
875: learn: 0.9258755 total: 15.7s remaining: 2.21s
876: learn: 0.9258730 total: 15.7s remaining: 2.2s
877: learn: 0.9257145 total: 15.7s remaining: 2.18s
878: learn: 0.9255420 total: 15.7s remaining: 2.16s
879: learn: 0.9255388 total: 15.7s remaining: 2.15s
880: learn: 0.9253040 total: 15.8s remaining: 2.13s
881: learn: 0.9252946 total: 15.8s remaining: 2.11s
882: learn: 0.9251921 total: 15.8s remaining: 2.09s
883: learn: 0.9234116 total: 15.8s remaining: 2.08s
884: learn: 0.9233950 total: 15.9s remaining: 2.06s
885: learn: 0.9233906 total: 15.9s remaining: 2.04s
886: learn: 0.9231407 total: 15.9s remaining: 2.02s
887: learn: 0.9229942 total: 15.9s remaining: 2.01s
888: learn: 0.9226209 total: 15.9s remaining: 1.99s
889: learn: 0.9224805 total: 16s remaining: 1.97s
890: learn: 0.9224657 total: 16s remaining: 1.96s
891: learn: 0.9222666 total: 16s remaining: 1.94s
892: learn: 0.9221987 total: 16s remaining: 1.92s
893: learn: 0.9221956 total: 16s remaining: 1.9s
894: learn: 0.9221707 total: 16.1s remaining: 1.88s
895: learn: 0.9214834 total: 16.1s remaining: 1.87s
896: learn: 0.9214781 total: 16.1s remaining: 1.85s
897: learn: 0.9214724 total: 16.1s remaining: 1.83s
898: learn: 0.9213330 total: 16.2s remaining: 1.81s
899: learn: 0.9211601 total: 16.2s remaining: 1.8s
900: learn: 0.9210576 total: 16.2s remaining: 1.78s
901: learn: 0.9210562 total: 16.2s remaining: 1.76s
902: learn: 0.9210532 total: 16.2s remaining: 1.74s
903: learn: 0.9209999 total: 16.2s remaining: 1.72s
904: learn: 0.9209945 total: 16.3s remaining: 1.71s
905: learn: 0.9209905 total: 16.3s remaining: 1.69s
906: learn: 0.9209888 total: 16.3s remaining: 1.67s
907: learn: 0.9209117 total: 16.3s remaining: 1.65s
908: learn: 0.9209100 total: 16.3s remaining: 1.64s
909: learn: 0.9207178 total: 16.4s remaining: 1.62s
910: learn: 0.9207152 total: 16.4s remaining: 1.6s
911: learn: 0.9207113 total: 16.4s remaining: 1.58s
912: learn: 0.9207064 total: 16.4s remaining: 1.56s
913: learn: 0.9206075 total: 16.4s remaining: 1.55s
914: learn: 0.9206054 total: 16.4s remaining: 1.53s
915: learn: 0.9205951 total: 16.5s remaining: 1.51s
916: learn: 0.9204130 total: 16.5s remaining: 1.49s
917: learn: 0.9203200 total: 16.5s remaining: 1.47s
918: learn: 0.9203182 total: 16.5s remaining: 1.46s
919: learn: 0.9202915 total: 16.5s remaining: 1.44s
920: learn: 0.9202880 total: 16.5s remaining: 1.42s
921: learn: 0.9202836 total: 16.6s remaining: 1.4s
922: learn: 0.9202801 total: 16.6s remaining: 1.38s
923: learn: 0.9201557 total: 16.6s remaining: 1.36s
924: learn: 0.9201384 total: 16.6s remaining: 1.35s
925: learn: 0.9199747 total: 16.6s remaining: 1.33s
926: learn: 0.9197795 total: 16.7s remaining: 1.31s
927: learn: 0.9197720 total: 16.7s remaining: 1.29s
928: learn: 0.9197684 total: 16.7s remaining: 1.27s
929: learn: 0.9197684 total: 16.7s remaining: 1.26s
930: learn: 0.9197633 total: 16.7s remaining: 1.24s
```

```
931: learn: 0.9195310 total: 16.7s remaining: 1.22s
932: learn: 0.9194503 total: 16.8s remaining: 1.2s
933: learn: 0.9194491 total: 16.8s remaining: 1.19s
934: learn: 0.9194248 total: 16.8s remaining: 1.17s
935: learn: 0.9194097 total: 16.8s remaining: 1.15s
936: learn: 0.9193215 total: 16.8s remaining: 1.13s
937: learn: 0.9193181 total: 16.9s remaining: 1.11s
938: learn: 0.9191505 total: 16.9s remaining: 1.1s
939: learn: 0.9191473 total: 16.9s remaining: 1.08s
940: learn: 0.9191472 total: 16.9s remaining: 1.06s
941: learn: 0.9189589 total: 16.9s remaining: 1.04s
942: learn: 0.9189450 total: 16.9s remaining: 1.02s
943: learn: 0.9187612 total: 17s remaining: 1.01s
944: learn: 0.9186901 total: 17s remaining: 988ms
945: learn: 0.9186110 total: 17s remaining: 971ms
946: learn: 0.9186016 total: 17s remaining: 953ms
947: learn: 0.9185463 total: 17.1s remaining: 935ms
948: learn: 0.9185444 total: 17.1s remaining: 917ms
949: learn: 0.9181659 total: 17.1s remaining: 899ms
950: learn: 0.9181390 total: 17.1s remaining: 882ms
951: learn: 0.9175305 total: 17.1s remaining: 864ms
952: learn: 0.9174466 total: 17.2s remaining: 847ms
953: learn: 0.9169795 total: 17.2s remaining: 829ms
954: learn: 0.9169756 total: 17.2s remaining: 810ms
955: learn: 0.9169725 total: 17.2s remaining: 792ms
956: learn: 0.9169492 total: 17.2s remaining: 774ms
957: learn: 0.9168816 total: 17.3s remaining: 757ms
958: learn: 0.9168644 total: 17.3s remaining: 739ms
959: learn: 0.9167979 total: 17.3s remaining: 721ms
960: learn: 0.9166470 total: 17.3s remaining: 703ms
961: learn: 0.9166357 total: 17.4s remaining: 686ms
962: learn: 0.9166277 total: 17.4s remaining: 668ms
963: learn: 0.9166251 total: 17.4s remaining: 650ms
964: learn: 0.9164784 total: 17.4s remaining: 632ms
965: learn: 0.9164753 total: 17.4s remaining: 613ms
966: learn: 0.9164736 total: 17.4s remaining: 595ms
967: learn: 0.9164695 total: 17.5s remaining: 577ms
968: learn: 0.9164682 total: 17.5s remaining: 559ms
969: learn: 0.9150696 total: 17.5s remaining: 541ms
970: learn: 0.9149685 total: 17.5s remaining: 523ms
971: learn: 0.9148729 total: 17.5s remaining: 505ms
972: learn: 0.9147592 total: 17.5s remaining: 487ms
973: learn: 0.9146005 total: 17.6s remaining: 469ms
974: learn: 0.9143617 total: 17.6s remaining: 451ms
975: learn: 0.9143583 total: 17.6s remaining: 433ms
976: learn: 0.9141965 total: 17.6s remaining: 415ms
977: learn: 0.9141110 total: 17.7s remaining: 397ms
978: learn: 0.9140405 total: 17.7s remaining: 379ms
979: learn: 0.9138889 total: 17.7s remaining: 361ms
980: learn: 0.9138113 total: 17.7s remaining: 343ms
981: learn: 0.9134689 total: 17.7s remaining: 325ms
982: learn: 0.9133169 total: 17.8s remaining: 307ms
983: learn: 0.9132972 total: 17.8s remaining: 289ms
984: learn: 0.9132143 total: 17.8s remaining: 271ms
985: learn: 0.9130617 total: 17.8s remaining: 253ms
986: learn: 0.9129397 total: 17.8s remaining: 235ms
987: learn: 0.9129123 total: 17.9s remaining: 217ms
988: learn: 0.9128408 total: 17.9s remaining: 199ms
989: learn: 0.9126947 total: 17.9s remaining: 181ms
990: learn: 0.9126010 total: 17.9s remaining: 163ms
991: learn: 0.9125974 total: 17.9s remaining: 145ms
992: learn: 0.9125176 total: 18s remaining: 127ms
993: learn: 0.9124580 total: 18s remaining: 108ms
994: learn: 0.9124545 total: 18s remaining: 90.3ms
995: learn: 0.9124467 total: 18s remaining: 72.3ms
996: learn: 0.9124419 total: 18s remaining: 54.2ms
997: learn: 0.9122201 total: 18s remaining: 36.2ms
998: learn: 0.9120819 total: 18.1s remaining: 18.1ms
999: learn: 0.9120328 total: 18.1s remaining: 0us
0: learn: 4.0257606 total: 23.4ms remaining: 23.4s
1: learn: 4.0131097 total: 45.8ms remaining: 22.9s
2: learn: 4.0049900 total: 63.9ms remaining: 21.2s
```

```
3: learn: 3.9949163 total: 74.7ms remaining: 18.6s
4: learn: 3.9849819 total: 97.6ms remaining: 19.4s
5: learn: 3.9755296 total: 120ms remaining: 19.9s
6: learn: 3.9675216 total: 130ms remaining: 18.4s
7: learn: 3.9577438 total: 152ms remaining: 18.9s
8: learn: 3.9484410 total: 166ms remaining: 18.3s
9: learn: 3.9408713 total: 184ms remaining: 18.2s
10: learn: 3.9341000 total: 193ms remaining: 17.4s
11: learn: 3.9258506 total: 203ms remaining: 16.7s
12: learn: 3.9196394 total: 211ms remaining: 16s
13: learn: 3.9113202 total: 238ms remaining: 16.8s
14: learn: 3.9025277 total: 261ms remaining: 17.1s
15: learn: 3.8939200 total: 283ms remaining: 17.4s
16: learn: 3.8876570 total: 294ms remaining: 17s
17: learn: 3.8807275 total: 307ms remaining: 16.8s
18: learn: 3.8753437 total: 330ms remaining: 17s
19: learn: 3.8733623 total: 347ms remaining: 17s
20: learn: 3.8655134 total: 370ms remaining: 17.3s
21: learn: 3.8588351 total: 394ms remaining: 17.5s
22: learn: 3.8515833 total: 416ms remaining: 17.7s
23: learn: 3.8462471 total: 443ms remaining: 18s
24: learn: 3.8414197 total: 460ms remaining: 18s
25: learn: 3.8358979 total: 483ms remaining: 18.1s
26: learn: 3.8295852 total: 505ms remaining: 18.2s
27: learn: 3.8233424 total: 528ms remaining: 18.3s
28: learn: 3.8173343 total: 550ms remaining: 18.4s
29: learn: 3.8108979 total: 573ms remaining: 18.5s
30: learn: 3.8092162 total: 592ms remaining: 18.5s
31: learn: 3.8031892 total: 617ms remaining: 18.7s
32: learn: 3.7975663 total: 640ms remaining: 18.7s
33: learn: 3.7917986 total: 667ms remaining: 19s
34: learn: 3.7867360 total: 690ms remaining: 19s
35: learn: 3.7819399 total: 701ms remaining: 18.8s
36: learn: 3.7767426 total: 723ms remaining: 18.8s
37: learn: 3.7730866 total: 745ms remaining: 18.9s
38: learn: 3.7680129 total: 768ms remaining: 18.9s
39: learn: 3.7646649 total: 790ms remaining: 19s
40: learn: 3.7597260 total: 807ms remaining: 18.9s
41: learn: 3.7542084 total: 826ms remaining: 18.8s
42: learn: 3.7495295 total: 851ms remaining: 18.9s
43: learn: 3.7483324 total: 862ms remaining: 18.7s
44: learn: 3.7441001 total: 880ms remaining: 18.7s
45: learn: 3.7392170 total: 902ms remaining: 18.7s
46: learn: 3.7351965 total: 924ms remaining: 18.7s
47: learn: 3.7328095 total: 932ms remaining: 18.5s
48: learn: 3.7289713 total: 954ms remaining: 18.5s
49: learn: 3.7250729 total: 977ms remaining: 18.6s
50: learn: 3.7239465 total: 995ms remaining: 18.5s
51: learn: 3.7203449 total: 1.02s remaining: 18.6s
52: learn: 3.7170443 total: 1.04s remaining: 18.6s
53: learn: 3.7138620 total: 1.06s remaining: 18.6s
54: learn: 3.7110986 total: 1.08s remaining: 18.6s
55: learn: 3.7074880 total: 1.1s remaining: 18.6s
56: learn: 3.7034214 total: 1.13s remaining: 18.6s
57: learn: 3.7003067 total: 1.13s remaining: 18.4s
58: learn: 3.6970205 total: 1.16s remaining: 18.4s
59: learn: 3.6960740 total: 1.16s remaining: 18.2s
60: learn: 3.6922749 total: 1.19s remaining: 18.3s
61: learn: 3.6891518 total: 1.2s remaining: 18.2s
62: learn: 3.6861885 total: 1.21s remaining: 18.1s
63: learn: 3.6853585 total: 1.22s remaining: 17.9s
64: learn: 3.6821043 total: 1.25s remaining: 17.9s
65: learn: 3.6793335 total: 1.27s remaining: 17.9s
66: learn: 3.6771734 total: 1.29s remaining: 18s
67: learn: 3.6763843 total: 1.31s remaining: 18s
68: learn: 3.6744727 total: 1.33s remaining: 18s
69: learn: 3.6713553 total: 1.36s remaining: 18s
70: learn: 3.6592480 total: 1.38s remaining: 18.1s
71: learn: 3.6571507 total: 1.4s remaining: 18.1s
72: learn: 3.6553876 total: 1.42s remaining: 18s
73: learn: 3.6535621 total: 1.43s remaining: 17.9s
74: learn: 3.6505440 total: 1.45s remaining: 17.8s
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75: learn: 3.6484333 total: 1.47s remaining: 17.8s
76: learn: 3.6478019 total: 1.48s remaining: 17.7s
77: learn: 3.6455329 total: 1.49s remaining: 17.6s
78: learn: 3.6429585 total: 1.52s remaining: 17.7s
79: learn: 3.6391622 total: 1.54s remaining: 17.7s
80: learn: 3.6372023 total: 1.56s remaining: 17.7s
81: learn: 3.6361550 total: 1.57s remaining: 17.6s
82: learn: 3.6355720 total: 1.6s remaining: 17.7s
83: learn: 3.6328697 total: 1.63s remaining: 17.7s
84: learn: 3.6319110 total: 1.64s remaining: 17.6s
85: learn: 3.6301346 total: 1.64s remaining: 17.5s
86: learn: 3.6269998 total: 1.67s remaining: 17.5s
87: learn: 3.6247671 total: 1.69s remaining: 17.5s
88: learn: 3.6237222 total: 1.71s remaining: 17.5s
89: learn: 3.6217582 total: 1.74s remaining: 17.5s
90: learn: 3.6198195 total: 1.76s remaining: 17.6s
91: learn: 3.6173839 total: 1.78s remaining: 17.5s
92: learn: 3.6157052 total: 1.79s remaining: 17.5s
93: learn: 3.6116047 total: 1.81s remaining: 17.5s
94: learn: 3.6094063 total: 1.83s remaining: 17.5s
95: learn: 3.6073799 total: 1.86s remaining: 17.5s
96: learn: 3.6069519 total: 1.86s remaining: 17.4s
97: learn: 3.6066014 total: 1.88s remaining: 17.3s
98: learn: 3.6038067 total: 1.9s remaining: 17.3s
99: learn: 3.6023411 total: 1.91s remaining: 17.2s
100: learn: 3.6019614 total: 1.92s remaining: 17.1s
101: learn: 3.6008791 total: 1.93s remaining: 17s
102: learn: 3.6005159 total: 1.94s remaining: 16.9s
103: learn: 3.5999989 total: 1.95s remaining: 16.8s
104: learn: 3.5996375 total: 1.96s remaining: 16.7s
105: learn: 3.5989797 total: 1.97s remaining: 16.6s
106: learn: 3.5979469 total: 1.98s remaining: 16.5s
107: learn: 3.5970090 total: 2s remaining: 16.5s
108: learn: 3.5944210 total: 2.02s remaining: 16.5s
109: learn: 3.5924622 total: 2.04s remaining: 16.5s
110: learn: 3.5908177 total: 2.05s remaining: 16.4s
111: learn: 3.5902739 total: 2.06s remaining: 16.4s
112: learn: 3.5887890 total: 2.07s remaining: 16.3s
113: learn: 3.5878773 total: 2.09s remaining: 16.2s
114: learn: 3.5875817 total: 2.1s remaining: 16.1s
115: learn: 3.5873229 total: 2.11s remaining: 16.1s
116: learn: 3.5859729 total: 2.14s remaining: 16.1s
117: learn: 3.5854169 total: 2.15s remaining: 16s
118: learn: 3.5851643 total: 2.15s remaining: 16s
119: learn: 3.5841109 total: 2.17s remaining: 15.9s
120: learn: 3.5838543 total: 2.18s remaining: 15.8s
121: learn: 3.5821726 total: 2.19s remaining: 15.7s
122: learn: 3.5818391 total: 2.19s remaining: 15.6s
123: learn: 3.5799061 total: 2.21s remaining: 15.6s
124: learn: 3.5784612 total: 2.23s remaining: 15.7s
125: learn: 3.5772835 total: 2.25s remaining: 15.6s
126: learn: 3.5764749 total: 2.28s remaining: 15.6s
127: learn: 3.5762472 total: 2.29s remaining: 15.6s
128: learn: 3.5751314 total: 2.31s remaining: 15.6s
129: learn: 3.5609536 total: 2.33s remaining: 15.6s
130: learn: 3.5607358 total: 2.34s remaining: 15.5s
131: learn: 3.5604165 total: 2.35s remaining: 15.5s
132: learn: 3.5580494 total: 2.37s remaining: 15.5s
133: learn: 3.5578379 total: 2.38s remaining: 15.4s
134: learn: 3.5555189 total: 2.4s remaining: 15.4s
135: learn: 3.5551403 total: 2.42s remaining: 15.4s
136: learn: 3.5536672 total: 2.45s remaining: 15.4s
137: learn: 3.5534752 total: 2.46s remaining: 15.4s
138: learn: 3.5522766 total: 2.48s remaining: 15.3s
139: learn: 3.5510471 total: 2.5s remaining: 15.4s
140: learn: 3.5493613 total: 2.52s remaining: 15.4s
141: learn: 3.5477028 total: 2.53s remaining: 15.3s
142: learn: 3.5463949 total: 2.55s remaining: 15.3s
143: learn: 3.5462323 total: 2.56s remaining: 15.2s
144: learn: 3.5460952 total: 2.57s remaining: 15.2s
145: learn: 3.5459399 total: 2.58s remaining: 15.1s
146: learn: 3.5455663 total: 2.6s remaining: 15.1s
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147: learn: 3.5444936 total: 2.62s remaining: 15.1s
148: learn: 3.5443454 total: 2.63s remaining: 15s
149: learn: 3.5431297 total: 2.65s remaining: 15s
150: learn: 3.5422745 total: 2.67s remaining: 15s
151: learn: 3.5402190 total: 2.69s remaining: 15s
152: learn: 3.5398636 total: 2.71s remaining: 15s
153: learn: 3.5397350 total: 2.72s remaining: 14.9s
154: learn: 3.5396495 total: 2.73s remaining: 14.9s
155: learn: 3.5388165 total: 2.74s remaining: 14.8s
156: learn: 3.5369141 total: 2.77s remaining: 14.9s
157: learn: 3.5361309 total: 2.78s remaining: 14.8s
158: learn: 3.5360142 total: 2.79s remaining: 14.8s
159: learn: 3.5359005 total: 2.8s remaining: 14.7s
160: learn: 3.5345045 total: 2.81s remaining: 14.7s
161: learn: 3.5336763 total: 2.84s remaining: 14.7s
162: learn: 3.5321156 total: 2.86s remaining: 14.7s
163: learn: 3.5316311 total: 2.87s remaining: 14.6s
164: learn: 3.5315284 total: 2.88s remaining: 14.6s
165: learn: 3.5310384 total: 2.89s remaining: 14.5s
166: learn: 3.5306653 total: 2.91s remaining: 14.5s
167: learn: 3.5305662 total: 2.92s remaining: 14.4s
168: learn: 3.5304697 total: 2.93s remaining: 14.4s
169: learn: 3.5303753 total: 2.94s remaining: 14.3s
170: learn: 3.5290409 total: 2.96s remaining: 14.3s
171: learn: 3.5286084 total: 2.97s remaining: 14.3s
172: learn: 3.5285189 total: 2.98s remaining: 14.3s
173: learn: 3.5274105 total: 3s remaining: 14.3s
174: learn: 3.5266887 total: 3.03s remaining: 14.3s
175: learn: 3.5266018 total: 3.04s remaining: 14.2s
176: learn: 3.5260495 total: 3.06s remaining: 14.2s
177: learn: 3.5259665 total: 3.07s remaining: 14.2s
178: learn: 3.5246438 total: 3.09s remaining: 14.2s
179: learn: 3.5240624 total: 3.11s remaining: 14.2s
180: learn: 3.5240174 total: 3.12s remaining: 14.1s
181: learn: 3.5237967 total: 3.13s remaining: 14.1s
182: learn: 3.5230876 total: 3.14s remaining: 14s
183: learn: 3.5230469 total: 3.15s remaining: 14s
184: learn: 3.5229795 total: 3.16s remaining: 13.9s
185: learn: 3.5224780 total: 3.17s remaining: 13.9s
186: learn: 3.5224122 total: 3.18s remaining: 13.8s
187: learn: 3.5219011 total: 3.19s remaining: 13.8s
188: learn: 3.5206620 total: 3.22s remaining: 13.8s
189: learn: 3.5200037 total: 3.24s remaining: 13.8s
190: learn: 3.5197461 total: 3.25s remaining: 13.8s
191: learn: 3.5192532 total: 3.26s remaining: 13.7s
192: learn: 3.5187203 total: 3.27s remaining: 13.7s
193: learn: 3.5184246 total: 3.28s remaining: 13.6s
194: learn: 3.5183692 total: 3.29s remaining: 13.6s
195: learn: 3.5183114 total: 3.31s remaining: 13.6s
196: learn: 3.4968858 total: 3.33s remaining: 13.6s
197: learn: 3.4959804 total: 3.34s remaining: 13.5s
198: learn: 3.4750730 total: 3.36s remaining: 13.5s
199: learn: 3.4741433 total: 3.39s remaining: 13.6s
200: learn: 3.4739701 total: 3.4s remaining: 13.5s
201: learn: 3.4739198 total: 3.4s remaining: 13.5s
202: learn: 3.4738704 total: 3.41s remaining: 13.4s
203: learn: 3.4733887 total: 3.44s remaining: 13.4s
204: learn: 3.4733382 total: 3.44s remaining: 13.4s
205: learn: 3.4732892 total: 3.45s remaining: 13.3s
206: learn: 3.4719481 total: 3.47s remaining: 13.3s
207: learn: 3.4707487 total: 3.49s remaining: 13.3s
208: learn: 3.4700909 total: 3.52s remaining: 13.3s
209: learn: 3.4696719 total: 3.53s remaining: 13.3s
210: learn: 3.4692894 total: 3.55s remaining: 13.3s
211: learn: 3.4671570 total: 3.57s remaining: 13.3s
212: learn: 3.4671332 total: 3.58s remaining: 13.2s
213: learn: 3.4503683 total: 3.61s remaining: 13.3s
214: learn: 3.4384189 total: 3.63s remaining: 13.3s
215: learn: 3.4381015 total: 3.66s remaining: 13.3s
216: learn: 3.4380635 total: 3.66s remaining: 13.2s
217: learn: 3.4370875 total: 3.68s remaining: 13.2s
218: learn: 3.4365922 total: 3.71s remaining: 13.2s
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219: learn: 3.4362678 total: 3.73s remaining: 13.2s
220: learn: 3.4361556 total: 3.74s remaining: 13.2s
221: learn: 3.4185381 total: 3.76s remaining: 13.2s
222: learn: 3.4185019 total: 3.77s remaining: 13.1s
223: learn: 3.4174605 total: 3.79s remaining: 13.1s
224: learn: 3.4172441 total: 3.8s remaining: 13.1s
225: learn: 3.4167216 total: 3.82s remaining: 13.1s
226: learn: 3.4164226 total: 3.84s remaining: 13.1s
227: learn: 3.4155235 total: 3.86s remaining: 13.1s
228: learn: 3.4155094 total: 3.87s remaining: 13s
229: learn: 3.4065647 total: 3.89s remaining: 13s
230: learn: 3.4061682 total: 3.92s remaining: 13s
231: learn: 3.4061103 total: 3.92s remaining: 13s
232: learn: 3.3895337 total: 3.95s remaining: 13s
233: learn: 3.3893924 total: 3.97s remaining: 13s
234: learn: 3.3883925 total: 3.98s remaining: 12.9s
235: learn: 3.3866927 total: 4s remaining: 12.9s
236: learn: 3.3864559 total: 4s remaining: 12.9s
237: learn: 3.3855963 total: 4.03s remaining: 12.9s
238: learn: 3.3850809 total: 4.05s remaining: 12.9s
239: learn: 3.3837378 total: 4.07s remaining: 12.9s
240: learn: 3.3837289 total: 4.08s remaining: 12.8s
241: learn: 3.3830727 total: 4.1s remaining: 12.8s
242: learn: 3.3830497 total: 4.11s remaining: 12.8s
243: learn: 3.3830391 total: 4.11s remaining: 12.7s
244: learn: 3.3823021 total: 4.13s remaining: 12.7s
245: learn: 3.3632140 total: 4.16s remaining: 12.7s
246: learn: 3.3631884 total: 4.17s remaining: 12.7s
247: learn: 3.3631630 total: 4.17s remaining: 12.7s
248: learn: 3.3631378 total: 4.18s remaining: 12.6s
249: learn: 3.3624852 total: 4.2s remaining: 12.6s
250: learn: 3.3611544 total: 4.22s remaining: 12.6s
251: learn: 3.3611330 total: 4.24s remaining: 12.6s
252: learn: 3.3611097 total: 4.25s remaining: 12.5s
253: learn: 3.3610856 total: 4.26s remaining: 12.5s
254: learn: 3.3607986 total: 4.27s remaining: 12.5s
255: learn: 3.3603197 total: 4.29s remaining: 12.5s
256: learn: 3.3596333 total: 4.31s remaining: 12.5s
257: learn: 3.3595723 total: 4.32s remaining: 12.4s
258: learn: 3.3595231 total: 4.33s remaining: 12.4s
259: learn: 3.3435684 total: 4.35s remaining: 12.4s
260: learn: 3.3435520 total: 4.36s remaining: 12.4s
261: learn: 3.3430790 total: 4.38s remaining: 12.3s
262: learn: 3.3430726 total: 4.38s remaining: 12.3s
263: learn: 3.3430532 total: 4.39s remaining: 12.2s
264: learn: 3.3423016 total: 4.42s remaining: 12.2s
265: learn: 3.3412899 total: 4.44s remaining: 12.2s
266: learn: 3.3233254 total: 4.46s remaining: 12.3s
267: learn: 3.3231274 total: 4.47s remaining: 12.2s
268: learn: 3.3231216 total: 4.48s remaining: 12.2s
269: learn: 3.3230670 total: 4.49s remaining: 12.1s
270: learn: 3.3228976 total: 4.5s remaining: 12.1s
271: learn: 3.3228838 total: 4.51s remaining: 12.1s
272: learn: 3.3224865 total: 4.53s remaining: 12.1s
273: learn: 3.3224259 total: 4.55s remaining: 12.1s
274: learn: 3.3224199 total: 4.56s remaining: 12s
275: learn: 3.3217286 total: 4.58s remaining: 12s
276: learn: 3.3216830 total: 4.59s remaining: 12s
277: learn: 3.3215848 total: 4.61s remaining: 12s
278: learn: 3.3215799 total: 4.62s remaining: 11.9s
279: learn: 3.3215669 total: 4.63s remaining: 11.9s
280: learn: 3.3214538 total: 4.64s remaining: 11.9s
281: learn: 3.3214506 total: 4.65s remaining: 11.8s
282: learn: 3.3214380 total: 4.66s remaining: 11.8s
283: learn: 3.3214251 total: 4.67s remaining: 11.8s
284: learn: 3.3214221 total: 4.67s remaining: 11.7s
285: learn: 3.3214189 total: 4.69s remaining: 11.7s
286: learn: 3.3214146 total: 4.69s remaining: 11.7s
287: learn: 3.3214120 total: 4.7s remaining: 11.6s
288: learn: 3.3199177 total: 4.72s remaining: 11.6s
289: learn: 3.3199138 total: 4.73s remaining: 11.6s
290: learn: 3.3192969 total: 4.75s remaining: 11.6s
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291: learn: 3.3191665 total: 4.78s remaining: 11.6s
292: learn: 3.3182588 total: 4.8s remaining: 11.6s
293: learn: 3.3182558 total: 4.8s remaining: 11.5s
294: learn: 3.3179474 total: 4.83s remaining: 11.5s
295: learn: 3.3179434 total: 4.83s remaining: 11.5s
296: learn: 3.3179411 total: 4.84s remaining: 11.5s
297: learn: 3.3172220 total: 4.87s remaining: 11.5s
298: learn: 3.3167658 total: 4.89s remaining: 11.5s
299: learn: 3.3161060 total: 4.91s remaining: 11.5s
300: learn: 3.3161026 total: 4.92s remaining: 11.4s
301: learn: 3.3160653 total: 4.92s remaining: 11.4s
302: learn: 3.3158260 total: 4.94s remaining: 11.4s
303: learn: 3.3158233 total: 4.94s remaining: 11.3s
304: learn: 3.3156043 total: 4.96s remaining: 11.3s
305: learn: 3.3156022 total: 4.97s remaining: 11.3s
306: learn: 3.3142167 total: 4.99s remaining: 11.3s
307: learn: 3.3139958 total: 5.01s remaining: 11.3s
308: learn: 3.3139939 total: 5.02s remaining: 11.2s
309: learn: 3.3139909 total: 5.03s remaining: 11.2s
310: learn: 3.3139879 total: 5.04s remaining: 11.2s
311: learn: 3.3139290 total: 5.05s remaining: 11.1s
312: learn: 3.3136408 total: 5.06s remaining: 11.1s
313: learn: 3.2957518 total: 5.08s remaining: 11.1s
314: learn: 3.2949774 total: 5.1s remaining: 11.1s
315: learn: 3.2949753 total: 5.1s remaining: 11s
316: learn: 3.2949729 total: 5.11s remaining: 11s
317: learn: 3.2949702 total: 5.12s remaining: 11s
318: learn: 3.2947701 total: 5.13s remaining: 10.9s
319: learn: 3.2944650 total: 5.14s remaining: 10.9s
320: learn: 3.2937425 total: 5.16s remaining: 10.9s
321: learn: 3.2937395 total: 5.17s remaining: 10.9s
322: learn: 3.2936236 total: 5.17s remaining: 10.8s
323: learn: 3.2936208 total: 5.18s remaining: 10.8s
324: learn: 3.2929601 total: 5.2s remaining: 10.8s
325: learn: 3.2921237 total: 5.22s remaining: 10.8s
326: learn: 3.2921219 total: 5.23s remaining: 10.8s
327: learn: 3.2917030 total: 5.25s remaining: 10.8s
328: learn: 3.2909089 total: 5.27s remaining: 10.8s
329: learn: 3.2909069 total: 5.28s remaining: 10.7s
330: learn: 3.2907879 total: 5.29s remaining: 10.7s
331: learn: 3.2905642 total: 5.3s remaining: 10.7s
332: learn: 3.2897247 total: 5.32s remaining: 10.7s
333: learn: 3.2896565 total: 5.33s remaining: 10.6s
334: learn: 3.2895400 total: 5.36s remaining: 10.6s
335: learn: 3.2895119 total: 5.36s remaining: 10.6s
336: learn: 3.2885004 total: 5.39s remaining: 10.6s
337: learn: 3.2882545 total: 5.41s remaining: 10.6s
338: learn: 3.2882441 total: 5.42s remaining: 10.6s
339: learn: 3.2878120 total: 5.43s remaining: 10.5s
340: learn: 3.2877830 total: 5.44s remaining: 10.5s
341: learn: 3.2877318 total: 5.45s remaining: 10.5s
342: learn: 3.2872553 total: 5.46s remaining: 10.5s
343: learn: 3.2700237 total: 5.48s remaining: 10.5s
344: learn: 3.2695731 total: 5.5s remaining: 10.4s
345: learn: 3.2688370 total: 5.52s remaining: 10.4s
346: learn: 3.2686043 total: 5.54s remaining: 10.4s
347: learn: 3.2685583 total: 5.56s remaining: 10.4s
348: learn: 3.2567429 total: 5.58s remaining: 10.4s
349: learn: 3.2566483 total: 5.59s remaining: 10.4s
350: learn: 3.2566342 total: 5.6s remaining: 10.3s
351: learn: 3.2565804 total: 5.61s remaining: 10.3s
352: learn: 3.2564185 total: 5.63s remaining: 10.3s
353: learn: 3.2564124 total: 5.64s remaining: 10.3s
354: learn: 3.2557341 total: 5.66s remaining: 10.3s
355: learn: 3.2557002 total: 5.67s remaining: 10.3s
356: learn: 3.2556662 total: 5.68s remaining: 10.2s
357: learn: 3.2384663 total: 5.7s remaining: 10.2s
358: learn: 3.2382921 total: 5.72s remaining: 10.2s
359: learn: 3.2382829 total: 5.73s remaining: 10.2s
360: learn: 3.2380627 total: 5.74s remaining: 10.2s
361: learn: 3.2377522 total: 5.76s remaining: 10.2s
362: learn: 3.2377401 total: 5.78s remaining: 10.1s
```

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363: learn: 3.2377066 total: 5.8s remaining: 10.1s
364: learn: 3.2376589 total: 5.81s remaining: 10.1s
365: learn: 3.2372595 total: 5.83s remaining: 10.1s
366: learn: 3.2371871 total: 5.84s remaining: 10.1s
367: learn: 3.2369700 total: 5.86s remaining: 10.1s
368: learn: 3.2360255 total: 5.88s remaining: 10.1s
369: learn: 3.2359125 total: 5.89s remaining: 10s
370: learn: 3.2358942 total: 5.9s remaining: 10s
371: learn: 3.2358543 total: 5.92s remaining: 9.99s
372: learn: 3.2216418 total: 5.94s remaining: 9.98s
373: learn: 3.2215270 total: 5.96s remaining: 9.97s
374: learn: 3.2213778 total: 5.98s remaining: 9.96s
375: learn: 3.2208267 total: 5.99s remaining: 9.94s
376: learn: 3.2207856 total: 6.01s remaining: 9.93s
377: learn: 3.2205532 total: 6.03s remaining: 9.93s
378: learn: 3.2071257 total: 6.05s remaining: 9.92s
379: learn: 3.2070068 total: 6.07s remaining: 9.91s
380: learn: 3.1906673 total: 6.1s remaining: 9.9s
381: learn: 3.1902749 total: 6.12s remaining: 9.9s
382: learn: 3.1902448 total: 6.13s remaining: 9.88s
383: learn: 3.1897368 total: 6.14s remaining: 9.86s
384: learn: 3.1895999 total: 6.16s remaining: 9.84s
385: learn: 3.1891850 total: 6.18s remaining: 9.83s
386: learn: 3.1891485 total: 6.19s remaining: 9.81s
387: learn: 3.1891143 total: 6.21s remaining: 9.8s
388: learn: 3.1889895 total: 6.24s remaining: 9.8s
389: learn: 3.1889756 total: 6.26s remaining: 9.79s
390: learn: 3.1884242 total: 6.28s remaining: 9.78s
391: learn: 3.1883302 total: 6.29s remaining: 9.75s
392: learn: 3.1877972 total: 6.31s remaining: 9.74s
393: learn: 3.1874980 total: 6.33s remaining: 9.74s
394: learn: 3.1873814 total: 6.36s remaining: 9.74s
395: learn: 3.1872874 total: 6.38s remaining: 9.73s
396: learn: 3.1872377 total: 6.39s remaining: 9.71s
397: learn: 3.1871959 total: 6.42s remaining: 9.71s
398: learn: 3.1871627 total: 6.43s remaining: 9.68s
399: learn: 3.1870779 total: 6.43s remaining: 9.65s
400: learn: 3.1805585 total: 6.46s remaining: 9.64s
401: learn: 3.1803489 total: 6.48s remaining: 9.63s
402: learn: 3.1802761 total: 6.49s remaining: 9.62s
403: learn: 3.1802732 total: 6.5s remaining: 9.59s
404: learn: 3.1801778 total: 6.52s remaining: 9.58s
405: learn: 3.1801752 total: 6.53s remaining: 9.55s
406: learn: 3.1801050 total: 6.54s remaining: 9.54s
407: learn: 3.1769454 total: 6.57s remaining: 9.53s
408: learn: 3.1769210 total: 6.58s remaining: 9.5s
409: learn: 3.1768893 total: 6.6s remaining: 9.49s
410: learn: 3.1767480 total: 6.63s remaining: 9.49s
411: learn: 3.1767030 total: 6.65s remaining: 9.48s
412: learn: 3.1765148 total: 6.65s remaining: 9.46s
413: learn: 3.1764983 total: 6.67s remaining: 9.44s
414: learn: 3.1726147 total: 6.69s remaining: 9.43s
415: learn: 3.1725286 total: 6.7s remaining: 9.4s
416: learn: 3.1598127 total: 6.72s remaining: 9.39s
417: learn: 3.1597698 total: 6.72s remaining: 9.36s
418: learn: 3.1474186 total: 6.75s remaining: 9.36s
419: learn: 3.1473941 total: 6.76s remaining: 9.33s
420: learn: 3.1473923 total: 6.76s remaining: 9.3s
421: learn: 3.1473232 total: 6.79s remaining: 9.29s
422: learn: 3.1473210 total: 6.79s remaining: 9.27s
423: learn: 3.1473189 total: 6.8s remaining: 9.24s
424: learn: 3.1470673 total: 6.82s remaining: 9.23s
425: learn: 3.1315590 total: 6.84s remaining: 9.22s
426: learn: 3.1315411 total: 6.85s remaining: 9.2s
427: learn: 3.1315397 total: 6.86s remaining: 9.17s
428: learn: 3.1314972 total: 6.87s remaining: 9.14s
429: learn: 3.1311493 total: 6.89s remaining: 9.14s
430: learn: 3.1311425 total: 6.91s remaining: 9.12s
431: learn: 3.1308816 total: 6.93s remaining: 9.11s
432: learn: 3.1308493 total: 6.94s remaining: 9.09s
433: learn: 3.1307082 total: 6.96s remaining: 9.08s
434: learn: 3.1307071 total: 6.97s remaining: 9.05s
```

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435: learn: 3.1188328 total: 7s remaining: 9.05s
436: learn: 3.1188283 total: 7s remaining: 9.02s
437: learn: 3.1185832 total: 7.03s remaining: 9.02s
438: learn: 3.1184858 total: 7.04s remaining: 8.99s
439: learn: 3.1069506 total: 7.06s remaining: 8.98s
440: learn: 3.1069468 total: 7.07s remaining: 8.96s
441: learn: 3.1069434 total: 7.08s remaining: 8.94s
442: learn: 3.1066000 total: 7.1s remaining: 8.93s
443: learn: 3.1065273 total: 7.12s remaining: 8.92s
444: learn: 3.1064938 total: 7.14s remaining: 8.91s
445: learn: 3.1064925 total: 7.15s remaining: 8.88s
446: learn: 3.1064915 total: 7.16s remaining: 8.86s
447: learn: 3.1060572 total: 7.18s remaining: 8.85s
448: learn: 3.1060553 total: 7.19s remaining: 8.83s
449: learn: 3.1060002 total: 7.21s remaining: 8.82s
450: learn: 3.1059364 total: 7.22s remaining: 8.79s
451: learn: 3.1059362 total: 7.23s remaining: 8.77s
452: learn: 3.1058954 total: 7.24s remaining: 8.74s
453: learn: 3.1058071 total: 7.25s remaining: 8.72s
454: learn: 3.1056842 total: 7.27s remaining: 8.71s
455: learn: 3.1056521 total: 7.29s remaining: 8.69s
456: learn: 3.1056061 total: 7.3s remaining: 8.67s
457: learn: 3.1055677 total: 7.31s remaining: 8.65s
458: learn: 3.1055099 total: 7.32s remaining: 8.63s
459: learn: 3.1053413 total: 7.34s remaining: 8.62s
460: learn: 3.1053403 total: 7.35s remaining: 8.6s
461: learn: 3.1053401 total: 7.36s remaining: 8.57s
462: learn: 3.1053396 total: 7.37s remaining: 8.55s
463: learn: 3.1052959 total: 7.39s remaining: 8.53s
464: learn: 3.1052573 total: 7.41s remaining: 8.52s
465: learn: 3.0904176 total: 7.43s remaining: 8.51s
466: learn: 3.0903407 total: 7.44s remaining: 8.49s
467: learn: 3.0903385 total: 7.45s remaining: 8.47s
468: learn: 3.0903351 total: 7.46s remaining: 8.45s
469: learn: 3.0903133 total: 7.48s remaining: 8.43s
470: learn: 3.0900546 total: 7.5s remaining: 8.42s
471: learn: 3.0900028 total: 7.52s remaining: 8.41s
472: learn: 3.0895391 total: 7.54s remaining: 8.4s
473: learn: 3.0893569 total: 7.55s remaining: 8.38s
474: learn: 3.0888839 total: 7.57s remaining: 8.36s
475: learn: 3.0888782 total: 7.58s remaining: 8.34s
476: learn: 3.0888359 total: 7.59s remaining: 8.32s
477: learn: 3.0887756 total: 7.6s remaining: 8.3s
478: learn: 3.0886255 total: 7.63s remaining: 8.3s
479: learn: 3.0886223 total: 7.64s remaining: 8.28s
480: learn: 3.0883547 total: 7.66s remaining: 8.27s
481: learn: 3.0883287 total: 7.68s remaining: 8.26s
482: learn: 3.0772316 total: 7.71s remaining: 8.25s
483: learn: 3.0771159 total: 7.72s remaining: 8.23s
484: learn: 3.0770351 total: 7.75s remaining: 8.22s
485: learn: 3.0770070 total: 7.77s remaining: 8.21s
486: learn: 3.0765360 total: 7.78s remaining: 8.2s
487: learn: 3.0764802 total: 7.8s remaining: 8.18s
488: learn: 3.0761482 total: 7.82s remaining: 8.17s
489: learn: 3.0760929 total: 7.84s remaining: 8.16s
490: learn: 3.0760907 total: 7.85s remaining: 8.14s
491: learn: 3.0757448 total: 7.86s remaining: 8.12s
492: learn: 3.0756343 total: 7.88s remaining: 8.11s
493: learn: 3.0755983 total: 7.89s remaining: 8.09s
494: learn: 3.0731693 total: 7.92s remaining: 8.07s
495: learn: 3.0729575 total: 7.94s remaining: 8.06s
496: learn: 3.0729558 total: 7.95s remaining: 8.04s
497: learn: 3.0729540 total: 7.96s remaining: 8.02s
498: learn: 3.0729517 total: 7.97s remaining: 8s
499: learn: 3.0724730 total: 7.99s remaining: 7.99s
500: learn: 3.0721844 total: 8.01s remaining: 7.98s
501: learn: 3.0721505 total: 8.03s remaining: 7.97s
502: learn: 3.0721458 total: 8.04s remaining: 7.95s
503: learn: 3.0720465 total: 8.06s remaining: 7.93s
504: learn: 3.0720231 total: 8.08s remaining: 7.92s
505: learn: 3.0718881 total: 8.1s remaining: 7.91s
506: learn: 3.0718879 total: 8.11s remaining: 7.89s
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507: learn: 3.0718878 total: 8.12s remaining: 7.87s
508: learn: 3.0718410 total: 8.14s remaining: 7.86s
509: learn: 3.0717862 total: 8.16s remaining: 7.84s
510: learn: 3.0717228 total: 8.18s remaining: 7.83s
511: learn: 3.0716788 total: 8.19s remaining: 7.81s
512: learn: 3.0716787 total: 8.2s remaining: 7.79s
513: learn: 3.0716159 total: 8.23s remaining: 7.78s
514: learn: 3.0715990 total: 8.24s remaining: 7.76s
515: learn: 3.0715090 total: 8.26s remaining: 7.75s
516: learn: 3.0714850 total: 8.28s remaining: 7.74s
517: learn: 3.0710234 total: 8.3s remaining: 7.73s
518: learn: 3.0710209 total: 8.32s remaining: 7.72s
519: learn: 3.0708744 total: 8.35s remaining: 7.7s
520: learn: 3.0708743 total: 8.37s remaining: 7.69s
521: learn: 3.0707890 total: 8.38s remaining: 7.67s
522: learn: 3.0707871 total: 8.39s remaining: 7.65s
523: learn: 3.0605909 total: 8.41s remaining: 7.64s
524: learn: 3.0605466 total: 8.42s remaining: 7.62s
525: learn: 3.0604907 total: 8.44s remaining: 7.6s
526: learn: 3.0581917 total: 8.46s remaining: 7.59s
527: learn: 3.0581913 total: 8.46s remaining: 7.57s
528: learn: 3.0581792 total: 8.49s remaining: 7.55s
529: learn: 3.0580510 total: 8.5s remaining: 7.54s
530: learn: 3.0580510 total: 8.51s remaining: 7.51s
531: learn: 3.0580507 total: 8.52s remaining: 7.49s
532: learn: 3.0580422 total: 8.53s remaining: 7.47s
533: learn: 3.0579149 total: 8.55s remaining: 7.46s
534: learn: 3.0578927 total: 8.57s remaining: 7.45s
535: learn: 3.0578922 total: 8.58s remaining: 7.43s
536: learn: 3.0578904 total: 8.59s remaining: 7.4s
537: learn: 3.0578857 total: 8.61s remaining: 7.39s
538: learn: 3.0463139 total: 8.63s remaining: 7.38s
539: learn: 3.0462831 total: 8.64s remaining: 7.36s
540: learn: 3.0462747 total: 8.66s remaining: 7.34s
541: learn: 3.0462734 total: 8.67s remaining: 7.32s
542: learn: 3.0462621 total: 8.68s remaining: 7.31s
543: learn: 3.0458418 total: 8.7s remaining: 7.3s
544: learn: 3.0458402 total: 8.71s remaining: 7.28s
545: learn: 3.0457828 total: 8.73s remaining: 7.26s
546: learn: 3.0457813 total: 8.75s remaining: 7.24s
547: learn: 3.0457800 total: 8.76s remaining: 7.22s
548: learn: 3.0457711 total: 8.77s remaining: 7.2s
549: learn: 3.0456564 total: 8.79s remaining: 7.19s
550: learn: 3.0456532 total: 8.79s remaining: 7.17s
551: learn: 3.0456505 total: 8.8s remaining: 7.14s
552: learn: 3.0456297 total: 8.82s remaining: 7.13s
553: learn: 3.0456195 total: 8.84s remaining: 7.12s
554: learn: 3.0456178 total: 8.85s remaining: 7.09s
555: learn: 3.0455402 total: 8.86s remaining: 7.08s
556: learn: 3.0455329 total: 8.88s remaining: 7.06s
557: learn: 3.0431469 total: 8.9s remaining: 7.05s
558: learn: 3.0431455 total: 8.91s remaining: 7.03s
559: learn: 3.0427225 total: 8.93s remaining: 7.02s
560: learn: 3.0427024 total: 8.95s remaining: 7.01s
561: learn: 3.0422890 total: 8.97s remaining: 7s
562: learn: 3.0422196 total: 9s remaining: 6.98s
563: learn: 3.0422183 total: 9.01s remaining: 6.96s
564: learn: 3.0421479 total: 9.02s remaining: 6.95s
565: learn: 3.0421468 total: 9.03s remaining: 6.92s
566: learn: 3.0421278 total: 9.06s remaining: 6.92s
567: learn: 3.0421094 total: 9.08s remaining: 6.91s
568: learn: 3.0420977 total: 9.09s remaining: 6.88s
569: learn: 3.0419264 total: 9.11s remaining: 6.87s
570: learn: 3.0417031 total: 9.12s remaining: 6.85s
571: learn: 3.0416029 total: 9.14s remaining: 6.84s
572: learn: 3.0415598 total: 9.16s remaining: 6.82s
573: learn: 3.0415595 total: 9.18s remaining: 6.81s
574: learn: 3.0303078 total: 9.2s remaining: 6.8s
575: learn: 3.0303073 total: 9.21s remaining: 6.78s
576: learn: 3.0301457 total: 9.23s remaining: 6.77s
577: learn: 3.0301431 total: 9.25s remaining: 6.75s
578: learn: 3.0301416 total: 9.27s remaining: 6.74s
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579: learn: 3.0301410 total: 9.29s remaining: 6.72s
580: learn: 3.0299820 total: 9.31s remaining: 6.71s
581: learn: 3.0299813 total: 9.33s remaining: 6.7s
582: learn: 3.0191507 total: 9.35s remaining: 6.69s
583: learn: 3.0190460 total: 9.37s remaining: 6.68s
584: learn: 3.0189713 total: 9.39s remaining: 6.66s
585: learn: 3.0189631 total: 9.41s remaining: 6.65s
586: learn: 3.0189616 total: 9.42s remaining: 6.63s
587: learn: 3.0189433 total: 9.43s remaining: 6.61s
588: learn: 3.0189162 total: 9.45s remaining: 6.6s
589: learn: 3.0189150 total: 9.47s remaining: 6.58s
590: learn: 3.0187909 total: 9.49s remaining: 6.57s
591: learn: 3.0125763 total: 9.51s remaining: 6.56s
592: learn: 3.0125600 total: 9.53s remaining: 6.54s
593: learn: 3.0104368 total: 9.55s remaining: 6.53s
594: learn: 3.0104326 total: 9.57s remaining: 6.52s
595: learn: 3.0104247 total: 9.6s remaining: 6.5s
596: learn: 3.0100816 total: 9.62s remaining: 6.5s
597: learn: 3.0100806 total: 9.64s remaining: 6.48s
598: learn: 2.9977996 total: 9.66s remaining: 6.47s
599: learn: 2.9963812 total: 9.69s remaining: 6.46s
600: learn: 2.9963658 total: 9.71s remaining: 6.45s
601: learn: 2.9963525 total: 9.73s remaining: 6.43s
602: learn: 2.9963493 total: 9.75s remaining: 6.42s
603: learn: 2.9963346 total: 9.77s remaining: 6.41s
604: learn: 2.9962964 total: 9.79s remaining: 6.39s
605: learn: 2.9887196 total: 9.81s remaining: 6.38s
606: learn: 2.9884541 total: 9.84s remaining: 6.37s
607: learn: 2.9884503 total: 9.84s remaining: 6.35s
608: learn: 2.9883703 total: 9.86s remaining: 6.33s
609: learn: 2.9883387 total: 9.87s remaining: 6.31s
610: learn: 2.9879686 total: 9.89s remaining: 6.3s
611: learn: 2.9876157 total: 9.91s remaining: 6.29s
612: learn: 2.9876011 total: 9.94s remaining: 6.27s
613: learn: 2.9875999 total: 9.94s remaining: 6.25s
614: learn: 2.9875904 total: 9.97s remaining: 6.24s
615: learn: 2.9855873 total: 9.99s remaining: 6.23s
616: learn: 2.9855858 total: 10s remaining: 6.21s
617: learn: 2.9850776 total: 10s remaining: 6.19s
618: learn: 2.9850771 total: 10s remaining: 6.17s
619: learn: 2.9850468 total: 10s remaining: 6.16s
620: learn: 2.9842594 total: 10.1s remaining: 6.15s
621: learn: 2.9842455 total: 10.1s remaining: 6.14s
622: learn: 2.9842429 total: 10.1s remaining: 6.12s
623: learn: 2.9841826 total: 10.1s remaining: 6.1s
624: learn: 2.9840987 total: 10.2s remaining: 6.09s
625: learn: 2.9840024 total: 10.2s remaining: 6.08s
626: learn: 2.9839735 total: 10.2s remaining: 6.06s
627: learn: 2.9839304 total: 10.2s remaining: 6.04s
628: learn: 2.9839277 total: 10.2s remaining: 6.03s
629: learn: 2.9769021 total: 10.2s remaining: 6.02s
630: learn: 2.9768775 total: 10.3s remaining: 6s
631: learn: 2.9768761 total: 10.3s remaining: 5.99s
632: learn: 2.9768213 total: 10.3s remaining: 5.98s
633: learn: 2.9767362 total: 10.3s remaining: 5.96s
634: learn: 2.9767037 total: 10.3s remaining: 5.95s
635: learn: 2.9766776 total: 10.4s remaining: 5.93s
636: learn: 2.9766751 total: 10.4s remaining: 5.92s
637: learn: 2.9765809 total: 10.4s remaining: 5.91s
638: learn: 2.9763648 total: 10.4s remaining: 5.89s
639: learn: 2.9762783 total: 10.5s remaining: 5.88s
640: learn: 2.9762309 total: 10.5s remaining: 5.87s
641: learn: 2.9762119 total: 10.5s remaining: 5.85s
642: learn: 2.9762104 total: 10.5s remaining: 5.83s
643: learn: 2.9761401 total: 10.5s remaining: 5.82s
644: learn: 2.9761393 total: 10.5s remaining: 5.81s
645: learn: 2.9761260 total: 10.6s remaining: 5.79s
646: learn: 2.9760360 total: 10.6s remaining: 5.78s
647: learn: 2.9760341 total: 10.6s remaining: 5.76s
648: learn: 2.9759579 total: 10.6s remaining: 5.75s
649: learn: 2.9759349 total: 10.7s remaining: 5.74s
650: learn: 2.9758393 total: 10.7s remaining: 5.72s
```

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651: learn: 2.9758299 total: 10.7s remaining: 5.71s
652: learn: 2.9757063 total: 10.7s remaining: 5.7s
653: learn: 2.9757039 total: 10.7s remaining: 5.67s
654: learn: 2.9757020 total: 10.7s remaining: 5.66s
655: learn: 2.9755848 total: 10.7s remaining: 5.64s
656: learn: 2.9755670 total: 10.8s remaining: 5.62s
657: learn: 2.9753240 total: 10.8s remaining: 5.61s
658: learn: 2.9753148 total: 10.8s remaining: 5.59s
659: learn: 2.9752704 total: 10.8s remaining: 5.58s
660: learn: 2.9648468 total: 10.8s remaining: 5.56s
661: learn: 2.9646381 total: 10.9s remaining: 5.54s
662: learn: 2.9645665 total: 10.9s remaining: 5.53s
663: learn: 2.9544112 total: 10.9s remaining: 5.51s
664: learn: 2.9543604 total: 10.9s remaining: 5.5s
665: learn: 2.9532824 total: 10.9s remaining: 5.49s
666: learn: 2.9532713 total: 11s remaining: 5.47s
667: learn: 2.9530109 total: 11s remaining: 5.46s
668: learn: 2.9529596 total: 11s remaining: 5.45s
669: learn: 2.9529588 total: 11s remaining: 5.43s
670: learn: 2.9529576 total: 11s remaining: 5.41s
671: learn: 2.9529273 total: 11.1s remaining: 5.39s
672: learn: 2.9529269 total: 11.1s remaining: 5.38s
673: learn: 2.9529140 total: 11.1s remaining: 5.37s
674: learn: 2.9528936 total: 11.1s remaining: 5.35s
675: learn: 2.9528921 total: 11.1s remaining: 5.33s
676: learn: 2.9528915 total: 11.1s remaining: 5.31s
677: learn: 2.9528900 total: 11.2s remaining: 5.29s
678: learn: 2.9528888 total: 11.2s remaining: 5.28s
679: learn: 2.9526618 total: 11.2s remaining: 5.26s
680: learn: 2.9526603 total: 11.2s remaining: 5.25s
681: learn: 2.9526594 total: 11.2s remaining: 5.23s
682: learn: 2.9526588 total: 11.2s remaining: 5.21s
683: learn: 2.9526578 total: 11.2s remaining: 5.19s
684: learn: 2.9526569 total: 11.3s remaining: 5.18s
685: learn: 2.9525497 total: 11.3s remaining: 5.17s
686: learn: 2.9525492 total: 11.3s remaining: 5.15s
687: learn: 2.9524989 total: 11.3s remaining: 5.13s
688: learn: 2.9524224 total: 11.3s remaining: 5.12s
689: learn: 2.9524220 total: 11.4s remaining: 5.1s
690: learn: 2.9522274 total: 11.4s remaining: 5.09s
691: learn: 2.9522255 total: 11.4s remaining: 5.07s
692: learn: 2.9522250 total: 11.4s remaining: 5.06s
693: learn: 2.9522245 total: 11.4s remaining: 5.04s
694: learn: 2.9467003 total: 11.4s remaining: 5.02s
695: learn: 2.9467000 total: 11.5s remaining: 5s
696: learn: 2.9451083 total: 11.5s remaining: 4.99s
697: learn: 2.9448763 total: 11.5s remaining: 4.97s
698: learn: 2.9448754 total: 11.5s remaining: 4.96s
699: learn: 2.9431541 total: 11.5s remaining: 4.95s
700: learn: 2.9431503 total: 11.6s remaining: 4.93s
701: learn: 2.9431494 total: 11.6s remaining: 4.91s
702: learn: 2.9431482 total: 11.6s remaining: 4.9s
703: learn: 2.9431478 total: 11.6s remaining: 4.88s
704: learn: 2.9431323 total: 11.6s remaining: 4.86s
705: learn: 2.9431320 total: 11.6s remaining: 4.85s
706: learn: 2.9430742 total: 11.7s remaining: 4.83s
707: learn: 2.9430270 total: 11.7s remaining: 4.82s
708: learn: 2.9430255 total: 11.7s remaining: 4.8s
709: learn: 2.9430250 total: 11.7s remaining: 4.78s
710: learn: 2.9430245 total: 11.7s remaining: 4.76s
711: learn: 2.9430240 total: 11.7s remaining: 4.75s
712: learn: 2.9430142 total: 11.8s remaining: 4.73s
713: learn: 2.9430051 total: 11.8s remaining: 4.72s
714: learn: 2.9430047 total: 11.8s remaining: 4.7s
715: learn: 2.9429942 total: 11.8s remaining: 4.68s
716: learn: 2.9429940 total: 11.8s remaining: 4.67s
717: learn: 2.9429908 total: 11.8s remaining: 4.65s
718: learn: 2.9429897 total: 11.8s remaining: 4.63s
719: learn: 2.9429894 total: 11.9s remaining: 4.61s
720: learn: 2.9429890 total: 11.9s remaining: 4.59s
721: learn: 2.9429802 total: 11.9s remaining: 4.58s
722: learn: 2.9429785 total: 11.9s remaining: 4.56s
```

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723: learn: 2.9429780 total: 11.9s remaining: 4.54s
724: learn: 2.9429517 total: 11.9s remaining: 4.52s
725: learn: 2.9429483 total: 11.9s remaining: 4.5s
726: learn: 2.9429474 total: 11.9s remaining: 4.49s
727: learn: 2.9346977 total: 12s remaining: 4.47s
728: learn: 2.9346972 total: 12s remaining: 4.45s
729: learn: 2.9346971 total: 12s remaining: 4.43s
730: learn: 2.9346829 total: 12s remaining: 4.41s
731: learn: 2.9346817 total: 12s remaining: 4.39s
732: learn: 2.9220715 total: 12s remaining: 4.38s
733: learn: 2.9220553 total: 12s remaining: 4.37s
734: learn: 2.9220247 total: 12.1s remaining: 4.35s
735: learn: 2.9220240 total: 12.1s remaining: 4.33s
736: learn: 2.9220103 total: 12.1s remaining: 4.32s
737: learn: 2.9220088 total: 12.1s remaining: 4.3s
738: learn: 2.9220076 total: 12.1s remaining: 4.28s
739: learn: 2.9220056 total: 12.1s remaining: 4.26s
740: learn: 2.9220044 total: 12.1s remaining: 4.25s
741: learn: 2.9220036 total: 12.2s remaining: 4.23s
742: learn: 2.9220024 total: 12.2s remaining: 4.21s
743: learn: 2.9220012 total: 12.2s remaining: 4.19s
744: learn: 2.9219511 total: 12.2s remaining: 4.18s
745: learn: 2.9219503 total: 12.2s remaining: 4.16s
746: learn: 2.9218811 total: 12.2s remaining: 4.14s
747: learn: 2.9218804 total: 12.2s remaining: 4.12s
748: learn: 2.9218792 total: 12.3s remaining: 4.11s
749: learn: 2.9218782 total: 12.3s remaining: 4.09s
750: learn: 2.9218776 total: 12.3s remaining: 4.07s
751: learn: 2.9218769 total: 12.3s remaining: 4.05s
752: learn: 2.9218759 total: 12.3s remaining: 4.03s
753: learn: 2.9216274 total: 12.3s remaining: 4.02s
754: learn: 2.9216262 total: 12.3s remaining: 4s
755: learn: 2.9216255 total: 12.3s remaining: 3.98s
756: learn: 2.9215936 total: 12.4s remaining: 3.96s
757: learn: 2.9215929 total: 12.4s remaining: 3.95s
758: learn: 2.9215922 total: 12.4s remaining: 3.93s
759: learn: 2.9215649 total: 12.4s remaining: 3.92s
760: learn: 2.9214725 total: 12.4s remaining: 3.9s
761: learn: 2.9214720 total: 12.4s remaining: 3.88s
762: learn: 2.9214713 total: 12.4s remaining: 3.86s
763: learn: 2.9214397 total: 12.5s remaining: 3.85s
764: learn: 2.9214368 total: 12.5s remaining: 3.83s
765: learn: 2.9089088 total: 12.5s remaining: 3.82s
766: learn: 2.9089082 total: 12.5s remaining: 3.8s
767: learn: 2.9089080 total: 12.5s remaining: 3.78s
768: learn: 2.9089074 total: 12.5s remaining: 3.76s
769: learn: 2.9088531 total: 12.5s remaining: 3.75s
770: learn: 2.9085287 total: 12.6s remaining: 3.73s
771: learn: 2.9083053 total: 12.6s remaining: 3.72s
772: learn: 2.9083049 total: 12.6s remaining: 3.7s
773: learn: 2.9079500 total: 12.6s remaining: 3.68s
774: learn: 2.9079494 total: 12.6s remaining: 3.67s
775: learn: 2.9079486 total: 12.6s remaining: 3.65s
776: learn: 2.9079480 total: 12.7s remaining: 3.63s
777: learn: 2.9079468 total: 12.7s remaining: 3.62s
778: learn: 2.9079342 total: 12.7s remaining: 3.6s
779: learn: 2.9076415 total: 12.7s remaining: 3.59s
780: learn: 2.9073984 total: 12.7s remaining: 3.57s
781: learn: 2.9073980 total: 12.7s remaining: 3.55s
782: learn: 2.9073965 total: 12.8s remaining: 3.54s
783: learn: 2.9072234 total: 12.8s remaining: 3.52s
784: learn: 2.9071631 total: 12.8s remaining: 3.5s
785: learn: 2.9037539 total: 12.8s remaining: 3.49s
786: learn: 2.9037526 total: 12.8s remaining: 3.47s
787: learn: 2.9037316 total: 12.9s remaining: 3.46s
788: learn: 2.9037116 total: 12.9s remaining: 3.44s
789: learn: 2.9037106 total: 12.9s remaining: 3.43s
790: learn: 2.9037099 total: 12.9s remaining: 3.41s
791: learn: 2.9036968 total: 12.9s remaining: 3.39s
792: learn: 2.9034706 total: 12.9s remaining: 3.38s
793: learn: 2.9032349 total: 13s remaining: 3.36s
794: learn: 2.9032342 total: 13s remaining: 3.35s
```

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795: learn: 2.9032328 total: 13s remaining: 3.33s
796: learn: 2.9032322 total: 13s remaining: 3.31s
797: learn: 2.9032313 total: 13s remaining: 3.29s
798: learn: 2.8938503 total: 13s remaining: 3.28s
799: learn: 2.8938152 total: 13.1s remaining: 3.27s
800: learn: 2.8938143 total: 13.1s remaining: 3.25s
801: learn: 2.8938137 total: 13.1s remaining: 3.24s
802: learn: 2.8938080 total: 13.1s remaining: 3.22s
803: learn: 2.8936112 total: 13.1s remaining: 3.2s
804: learn: 2.8935994 total: 13.2s remaining: 3.19s
805: learn: 2.8816445 total: 13.2s remaining: 3.17s
806: learn: 2.8816441 total: 13.2s remaining: 3.16s
807: learn: 2.8816435 total: 13.2s remaining: 3.14s
808: learn: 2.8816360 total: 13.2s remaining: 3.13s
809: learn: 2.8816356 total: 13.3s remaining: 3.11s
810: learn: 2.8816262 total: 13.3s remaining: 3.09s
811: learn: 2.8816257 total: 13.3s remaining: 3.08s
812: learn: 2.8718033 total: 13.3s remaining: 3.06s
813: learn: 2.8713705 total: 13.3s remaining: 3.04s
814: learn: 2.8713699 total: 13.3s remaining: 3.03s
815: learn: 2.8713694 total: 13.4s remaining: 3.01s
816: learn: 2.8713691 total: 13.4s remaining: 3s
817: learn: 2.8683239 total: 13.4s remaining: 2.98s
818: learn: 2.8682377 total: 13.4s remaining: 2.97s
819: learn: 2.8681923 total: 13.4s remaining: 2.95s
820: learn: 2.8681817 total: 13.5s remaining: 2.94s
821: learn: 2.8681811 total: 13.5s remaining: 2.92s
822: learn: 2.8681799 total: 13.5s remaining: 2.9s
823: learn: 2.8681789 total: 13.5s remaining: 2.89s
824: learn: 2.8668622 total: 13.5s remaining: 2.87s
825: learn: 2.8668620 total: 13.5s remaining: 2.85s
826: learn: 2.8668573 total: 13.6s remaining: 2.84s
827: learn: 2.8668566 total: 13.6s remaining: 2.82s
828: learn: 2.8668553 total: 13.6s remaining: 2.81s
829: learn: 2.8668416 total: 13.6s remaining: 2.79s
830: learn: 2.8668237 total: 13.6s remaining: 2.77s
831: learn: 2.8667390 total: 13.7s remaining: 2.76s
832: learn: 2.8667388 total: 13.7s remaining: 2.74s
833: learn: 2.8667385 total: 13.7s remaining: 2.72s
834: learn: 2.8667321 total: 13.7s remaining: 2.71s
835: learn: 2.8667310 total: 13.7s remaining: 2.69s
836: learn: 2.8667249 total: 13.7s remaining: 2.68s
837: learn: 2.8667059 total: 13.8s remaining: 2.66s
838: learn: 2.8667053 total: 13.8s remaining: 2.64s
839: learn: 2.8664284 total: 13.8s remaining: 2.63s
840: learn: 2.8663610 total: 13.8s remaining: 2.61s
841: learn: 2.8662081 total: 13.8s remaining: 2.59s
842: learn: 2.8662056 total: 13.8s remaining: 2.58s
843: learn: 2.8662055 total: 13.8s remaining: 2.56s
844: learn: 2.8661996 total: 13.9s remaining: 2.54s
845: learn: 2.8661914 total: 13.9s remaining: 2.53s
846: learn: 2.8661911 total: 13.9s remaining: 2.51s
847: learn: 2.8661185 total: 13.9s remaining: 2.5s
848: learn: 2.8661174 total: 13.9s remaining: 2.48s
849: learn: 2.8661164 total: 14s remaining: 2.46s
850: learn: 2.8661124 total: 14s remaining: 2.45s
851: learn: 2.8661123 total: 14s remaining: 2.43s
852: learn: 2.8661035 total: 14s remaining: 2.41s
853: learn: 2.8661031 total: 14s remaining: 2.4s
854: learn: 2.8661026 total: 14s remaining: 2.38s
855: learn: 2.8661023 total: 14s remaining: 2.36s
856: learn: 2.8661019 total: 14.1s remaining: 2.34s
857: learn: 2.8660678 total: 14.1s remaining: 2.33s
858: learn: 2.8658113 total: 14.1s remaining: 2.31s
859: learn: 2.8631086 total: 14.1s remaining: 2.3s
860: learn: 2.8629774 total: 14.1s remaining: 2.28s
861: learn: 2.8629772 total: 14.1s remaining: 2.26s
862: learn: 2.8629770 total: 14.1s remaining: 2.25s
863: learn: 2.8627278 total: 14.2s remaining: 2.23s
864: learn: 2.8627278 total: 14.2s remaining: 2.21s
865: learn: 2.8627243 total: 14.2s remaining: 2.2s
866: learn: 2.8626392 total: 14.2s remaining: 2.18s
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867: learn: 2.8626390 total: 14.2s remaining: 2.17s
868: learn: 2.8626389 total: 14.3s remaining: 2.15s
869: learn: 2.8626299 total: 14.3s remaining: 2.13s
870: learn: 2.8625995 total: 14.3s remaining: 2.12s
871: learn: 2.8625977 total: 14.3s remaining: 2.1s
872: learn: 2.8625976 total: 14.3s remaining: 2.08s
873: learn: 2.8625888 total: 14.4s remaining: 2.07s
874: learn: 2.8625885 total: 14.4s remaining: 2.05s
875: learn: 2.8625880 total: 14.4s remaining: 2.04s
876: learn: 2.8625879 total: 14.4s remaining: 2.02s
877: learn: 2.8625860 total: 14.4s remaining: 2s
878: learn: 2.8625854 total: 14.4s remaining: 1.98s
879: learn: 2.8625851 total: 14.4s remaining: 1.97s
880: learn: 2.8625304 total: 14.4s remaining: 1.95s
881: learn: 2.8625299 total: 14.5s remaining: 1.93s
882: learn: 2.8625296 total: 14.5s remaining: 1.92s
883: learn: 2.8625292 total: 14.5s remaining: 1.9s
884: learn: 2.8625286 total: 14.5s remaining: 1.88s
885: learn: 2.8625249 total: 14.5s remaining: 1.86s
886: learn: 2.8625246 total: 14.5s remaining: 1.85s
887: learn: 2.8625243 total: 14.5s remaining: 1.83s
888: learn: 2.8625239 total: 14.5s remaining: 1.81s
889: learn: 2.8624866 total: 14.5s remaining: 1.8s
890: learn: 2.8624376 total: 14.6s remaining: 1.78s
891: learn: 2.8624323 total: 14.6s remaining: 1.77s
892: learn: 2.8624319 total: 14.6s remaining: 1.75s
893: learn: 2.8624209 total: 14.6s remaining: 1.73s
894: learn: 2.8621431 total: 14.6s remaining: 1.72s
895: learn: 2.8621396 total: 14.7s remaining: 1.7s
896: learn: 2.8621382 total: 14.7s remaining: 1.69s
897: learn: 2.8621291 total: 14.7s remaining: 1.67s
898: learn: 2.8595637 total: 14.7s remaining: 1.65s
899: learn: 2.8595630 total: 14.7s remaining: 1.64s
900: learn: 2.8595625 total: 14.7s remaining: 1.62s
901: learn: 2.8595622 total: 14.7s remaining: 1.6s
902: learn: 2.8595612 total: 14.8s remaining: 1.58s
903: learn: 2.8565287 total: 14.8s remaining: 1.57s
904: learn: 2.8565283 total: 14.8s remaining: 1.55s
905: learn: 2.8565274 total: 14.8s remaining: 1.53s
906: learn: 2.8478567 total: 14.8s remaining: 1.52s
907: learn: 2.8478564 total: 14.8s remaining: 1.5s
908: learn: 2.8475657 total: 14.9s remaining: 1.49s
909: learn: 2.8475649 total: 14.9s remaining: 1.47s
910: learn: 2.8475641 total: 14.9s remaining: 1.45s
911: learn: 2.8475638 total: 14.9s remaining: 1.44s
912: learn: 2.8475633 total: 14.9s remaining: 1.42s
913: learn: 2.8474566 total: 14.9s remaining: 1.4s
914: learn: 2.8472304 total: 14.9s remaining: 1.39s
915: learn: 2.8472298 total: 15s remaining: 1.37s
916: learn: 2.8459572 total: 15s remaining: 1.36s
917: learn: 2.8459568 total: 15s remaining: 1.34s
918: learn: 2.8459536 total: 15s remaining: 1.32s
919: learn: 2.8459506 total: 15s remaining: 1.31s
920: learn: 2.8459475 total: 15.1s remaining: 1.29s
921: learn: 2.8459053 total: 15.1s remaining: 1.27s
922: learn: 2.8459049 total: 15.1s remaining: 1.26s
923: learn: 2.8458267 total: 15.1s remaining: 1.24s
924: learn: 2.8458259 total: 15.1s remaining: 1.23s
925: learn: 2.8458256 total: 15.1s remaining: 1.21s
926: learn: 2.8458229 total: 15.2s remaining: 1.19s
927: learn: 2.8457981 total: 15.2s remaining: 1.18s
928: learn: 2.8457957 total: 15.2s remaining: 1.16s
929: learn: 2.8457958 total: 15.2s remaining: 1.14s
930: learn: 2.8456421 total: 15.2s remaining: 1.13s
931: learn: 2.8456004 total: 15.2s remaining: 1.11s
932: learn: 2.8340939 total: 15.3s remaining: 1.1s
933: learn: 2.8340890 total: 15.3s remaining: 1.08s
934: learn: 2.8340878 total: 15.3s remaining: 1.06s
935: learn: 2.8340871 total: 15.3s remaining: 1.05s
936: learn: 2.8340718 total: 15.3s remaining: 1.03s
937: learn: 2.8340714 total: 15.4s remaining: 1.01s
938: learn: 2.8340693 total: 15.4s remaining: 999ms
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939: learn: 2.8247717 total: 15.4s remaining: 983ms
940: learn: 2.8247707 total: 15.4s remaining: 966ms
941: learn: 2.8245316 total: 15.4s remaining: 950ms
942: learn: 2.8244898 total: 15.4s remaining: 933ms
943: learn: 2.8244892 total: 15.4s remaining: 916ms
944: learn: 2.8244885 total: 15.5s remaining: 900ms
945: learn: 2.8244882 total: 15.5s remaining: 884ms
946: learn: 2.8244857 total: 15.5s remaining: 869ms
947: learn: 2.8239275 total: 15.5s remaining: 852ms
948: learn: 2.8239249 total: 15.6s remaining: 836ms
949: learn: 2.8238567 total: 15.6s remaining: 820ms
950: learn: 2.8238168 total: 15.6s remaining: 804ms
951: learn: 2.8176984 total: 15.6s remaining: 788ms
952: learn: 2.8176980 total: 15.6s remaining: 771ms
953: learn: 2.8094635 total: 15.7s remaining: 755ms
954: learn: 2.8094531 total: 15.7s remaining: 739ms
955: learn: 2.8051768 total: 15.7s remaining: 723ms
956: learn: 2.8051764 total: 15.7s remaining: 706ms
957: learn: 2.8051685 total: 15.7s remaining: 690ms
958: learn: 2.8051578 total: 15.8s remaining: 674ms
959: learn: 2.8051572 total: 15.8s remaining: 657ms
960: learn: 2.8051392 total: 15.8s remaining: 641ms
961: learn: 2.8051370 total: 15.8s remaining: 625ms
962: learn: 2.8051339 total: 15.8s remaining: 608ms
963: learn: 2.8051179 total: 15.8s remaining: 592ms
964: learn: 2.8051171 total: 15.9s remaining: 575ms
965: learn: 2.8043041 total: 15.9s remaining: 559ms
966: learn: 2.8043031 total: 15.9s remaining: 543ms
967: learn: 2.8043026 total: 15.9s remaining: 526ms
968: learn: 2.8041864 total: 15.9s remaining: 510ms
969: learn: 2.8017115 total: 16s remaining: 493ms
970: learn: 2.8017113 total: 16s remaining: 477ms
971: learn: 2.8017106 total: 16s remaining: 460ms
972: learn: 2.8014003 total: 16s remaining: 444ms
973: learn: 2.8013997 total: 16s remaining: 427ms
974: learn: 2.8013976 total: 16s remaining: 411ms
975: learn: 2.8013968 total: 16s remaining: 394ms
976: learn: 2.8013955 total: 16s remaining: 377ms
977: learn: 2.8013355 total: 16.1s remaining: 361ms
978: learn: 2.8013349 total: 16.1s remaining: 345ms
979: learn: 2.8013109 total: 16.1s remaining: 328ms
980: learn: 2.8012202 total: 16.1s remaining: 312ms
981: learn: 2.8011868 total: 16.1s remaining: 296ms
982: learn: 2.8011839 total: 16.1s remaining: 279ms
983: learn: 2.8009852 total: 16.2s remaining: 263ms
984: learn: 2.8009851 total: 16.2s remaining: 246ms
985: learn: 2.8009831 total: 16.2s remaining: 230ms
986: learn: 2.8009479 total: 16.2s remaining: 213ms
987: learn: 2.8009476 total: 16.2s remaining: 197ms
988: learn: 2.8009472 total: 16.2s remaining: 181ms
989: learn: 2.8009080 total: 16.3s remaining: 164ms
990: learn: 2.8009069 total: 16.3s remaining: 148ms
991: learn: 2.8009066 total: 16.3s remaining: 131ms
992: learn: 2.7929441 total: 16.3s remaining: 115ms
993: learn: 2.7928042 total: 16.3s remaining: 98.5ms
994: learn: 2.7928031 total: 16.3s remaining: 82.1ms
995: learn: 2.7927837 total: 16.3s remaining: 65.6ms
996: learn: 2.7927835 total: 16.4s remaining: 49.2ms
997: learn: 2.7925429 total: 16.4s remaining: 32.8ms
998: learn: 2.7925248 total: 16.4s remaining: 16.4ms
999: learn: 2.7925246 total: 16.4s remaining: 0us
0: learn: 3.8157431 total: 22.4ms remaining: 22.3s
1: learn: 3.8092716 total: 43.9ms remaining: 21.9s
2: learn: 3.8006678 total: 64.7ms remaining: 21.5s
3: learn: 3.7732038 total: 85.7ms remaining: 21.3s
4: learn: 3.7685323 total: 107ms remaining: 21.2s
5: learn: 3.7631711 total: 124ms remaining: 20.5s
6: learn: 3.7579016 total: 137ms remaining: 19.4s
7: learn: 3.7313350 total: 149ms remaining: 18.5s
8: learn: 3.7276720 total: 156ms remaining: 17.2s
9: learn: 3.7013532 total: 178ms remaining: 17.6s
10: learn: 3.6975379 total: 186ms remaining: 16.7s
```

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11: learn: 3.6949793 total: 193ms remaining: 15.9s
12: learn: 3.6907735 total: 200ms remaining: 15.2s
13: learn: 3.6847148 total: 217ms remaining: 15.3s
14: learn: 3.6779114 total: 243ms remaining: 15.9s
15: learn: 3.6717235 total: 264ms remaining: 16.2s
16: learn: 3.6658845 total: 273ms remaining: 15.8s
17: learn: 3.6605943 total: 286ms remaining: 15.6s
18: learn: 3.6352772 total: 303ms remaining: 15.6s
19: learn: 3.6330108 total: 314ms remaining: 15.4s
20: learn: 3.6081185 total: 327ms remaining: 15.2s
21: learn: 3.5836497 total: 339ms remaining: 15.1s
22: learn: 3.5778216 total: 361ms remaining: 15.3s
23: learn: 3.5732089 total: 382ms remaining: 15.5s
24: learn: 3.5678600 total: 402ms remaining: 15.7s
25: learn: 3.5440130 total: 412ms remaining: 15.4s
26: learn: 3.5396504 total: 433ms remaining: 15.6s
27: learn: 3.5348668 total: 447ms remaining: 15.5s
28: learn: 3.5314438 total: 456ms remaining: 15.3s
29: learn: 3.5057778 total: 477ms remaining: 15.4s
30: learn: 3.5037234 total: 485ms remaining: 15.2s
31: learn: 3.4991858 total: 495ms remaining: 15s
32: learn: 3.4944922 total: 512ms remaining: 15s
33: learn: 3.4902956 total: 522ms remaining: 14.8s
34: learn: 3.4883818 total: 538ms remaining: 14.8s
35: learn: 3.4843354 total: 547ms remaining: 14.6s
36: learn: 3.4802041 total: 557ms remaining: 14.5s
37: learn: 3.4760303 total: 578ms remaining: 14.6s
38: learn: 3.4730929 total: 599ms remaining: 14.8s
39: learn: 3.4704164 total: 619ms remaining: 14.9s
40: learn: 3.4687005 total: 629ms remaining: 14.7s
41: learn: 3.4657280 total: 651ms remaining: 14.9s
42: learn: 3.4617662 total: 673ms remaining: 15s
43: learn: 3.4601536 total: 685ms remaining: 14.9s
44: learn: 3.4565415 total: 706ms remaining: 15s
45: learn: 3.4549929 total: 722ms remaining: 15s
46: learn: 3.4513988 total: 735ms remaining: 14.9s
47: learn: 3.4499216 total: 747ms remaining: 14.8s
48: learn: 3.4485224 total: 763ms remaining: 14.8s
49: learn: 3.4473985 total: 770ms remaining: 14.6s
50: learn: 3.4442088 total: 781ms remaining: 14.5s
51: learn: 3.4414432 total: 802ms remaining: 14.6s
52: learn: 3.4390456 total: 811ms remaining: 14.5s
53: learn: 3.4377184 total: 823ms remaining: 14.4s
54: learn: 3.4155212 total: 835ms remaining: 14.4s
55: learn: 3.3937086 total: 860ms remaining: 14.5s
56: learn: 3.3909792 total: 881ms remaining: 14.6s
57: learn: 3.3694250 total: 898ms remaining: 14.6s
58: learn: 3.3668886 total: 919ms remaining: 14.7s
59: learn: 3.3641107 total: 940ms remaining: 14.7s
60: learn: 3.3615103 total: 955ms remaining: 14.7s
61: learn: 3.3595806 total: 969ms remaining: 14.7s
62: learn: 3.3570830 total: 977ms remaining: 14.5s
63: learn: 3.3558296 total: 985ms remaining: 14.4s
64: learn: 3.3546568 total: 993ms remaining: 14.3s
65: learn: 3.3521228 total: 1s remaining: 14.2s
66: learn: 3.3512964 total: 1.01s remaining: 14.1s
67: learn: 3.3499354 total: 1.02s remaining: 14s
68: learn: 3.3475674 total: 1.03s remaining: 13.9s
69: learn: 3.3456309 total: 1.05s remaining: 14s
70: learn: 3.3431504 total: 1.07s remaining: 14s
71: learn: 3.3213327 total: 1.09s remaining: 14.1s
72: learn: 3.3196950 total: 1.1s remaining: 14s
73: learn: 3.2993560 total: 1.11s remaining: 13.9s
74: learn: 3.2978104 total: 1.13s remaining: 14s
75: learn: 3.2968044 total: 1.14s remaining: 13.9s
76: learn: 3.2958218 total: 1.15s remaining: 13.8s
77: learn: 3.2942366 total: 1.16s remaining: 13.7s
78: learn: 3.2919552 total: 1.17s remaining: 13.7s
79: learn: 3.2895969 total: 1.19s remaining: 13.7s
80: learn: 3.2886792 total: 1.2s remaining: 13.6s
81: learn: 3.2874786 total: 1.22s remaining: 13.6s
82: learn: 3.2865018 total: 1.24s remaining: 13.7s
```

```
83: learn: 3.2654016 total: 1.26s remaining: 13.7s
84: learn: 3.2633477 total: 1.28s remaining: 13.8s
85: learn: 3.2627229 total: 1.31s remaining: 13.9s
86: learn: 3.2419980 total: 1.33s remaining: 13.9s
87: learn: 3.2414585 total: 1.34s remaining: 13.8s
88: learn: 3.2406263 total: 1.35s remaining: 13.8s
89: learn: 3.2214026 total: 1.36s remaining: 13.8s
90: learn: 3.2198115 total: 1.37s remaining: 13.7s
91: learn: 3.2190106 total: 1.38s remaining: 13.6s
92: learn: 3.2182173 total: 1.39s remaining: 13.5s
93: learn: 3.2174523 total: 1.39s remaining: 13.4s
94: learn: 3.2160981 total: 1.41s remaining: 13.5s
95: learn: 3.1971945 total: 1.43s remaining: 13.5s
96: learn: 3.1962799 total: 1.45s remaining: 13.5s
97: learn: 3.1955541 total: 1.46s remaining: 13.4s
98: learn: 3.1940410 total: 1.48s remaining: 13.5s
99: learn: 3.1933374 total: 1.49s remaining: 13.4s
100: learn: 3.1926500 total: 1.5s remaining: 13.3s
101: learn: 3.1736804 total: 1.52s remaining: 13.4s
102: learn: 3.1721641 total: 1.54s remaining: 13.4s
103: learn: 3.1707954 total: 1.56s remaining: 13.5s
104: learn: 3.1694939 total: 1.58s remaining: 13.5s
105: learn: 3.1534787 total: 1.6s remaining: 13.5s
106: learn: 3.1528506 total: 1.61s remaining: 13.4s
107: learn: 3.1522329 total: 1.62s remaining: 13.4s
108: learn: 3.1508195 total: 1.63s remaining: 13.4s
109: learn: 3.1502236 total: 1.64s remaining: 13.3s
110: learn: 3.1487614 total: 1.67s remaining: 13.3s
111: learn: 3.1472355 total: 1.69s remaining: 13.4s
112: learn: 3.1467779 total: 1.7s remaining: 13.3s
113: learn: 3.1290954 total: 1.71s remaining: 13.3s
114: learn: 3.1286924 total: 1.72s remaining: 13.2s
115: learn: 3.1276024 total: 1.73s remaining: 13.2s
116: learn: 3.1265414 total: 1.74s remaining: 13.1s
117: learn: 3.1092682 total: 1.75s remaining: 13.1s
118: learn: 3.1083419 total: 1.76s remaining: 13s
119: learn: 3.1079437 total: 1.77s remaining: 13s
120: learn: 3.1074176 total: 1.78s remaining: 12.9s
121: learn: 3.0945349 total: 1.79s remaining: 12.9s
122: learn: 3.0931281 total: 1.81s remaining: 12.9s
123: learn: 3.0926298 total: 1.82s remaining: 12.9s
124: learn: 3.0758181 total: 1.84s remaining: 12.9s
125: learn: 3.0753267 total: 1.85s remaining: 12.9s
126: learn: 3.0748479 total: 1.86s remaining: 12.8s
127: learn: 3.0743808 total: 1.87s remaining: 12.7s
128: learn: 3.0578741 total: 1.88s remaining: 12.7s
129: learn: 3.0472656 total: 1.91s remaining: 12.8s
130: learn: 3.0468657 total: 1.93s remaining: 12.8s
131: learn: 3.0458426 total: 1.94s remaining: 12.8s
132: learn: 3.0446879 total: 1.96s remaining: 12.8s
133: learn: 3.0442457 total: 1.98s remaining: 12.8s
134: learn: 3.0434556 total: 1.99s remaining: 12.8s
135: learn: 3.0421426 total: 2s remaining: 12.7s
136: learn: 3.0417011 total: 2.02s remaining: 12.7s
137: learn: 3.0410251 total: 2.02s remaining: 12.6s
138: learn: 3.0308445 total: 2.04s remaining: 12.6s
139: learn: 3.0302135 total: 2.05s remaining: 12.6s
140: learn: 3.0300356 total: 2.06s remaining: 12.5s
141: learn: 3.0297468 total: 2.07s remaining: 12.5s
142: learn: 3.0199063 total: 2.09s remaining: 12.5s
143: learn: 3.0186401 total: 2.12s remaining: 12.6s
144: learn: 3.0182584 total: 2.13s remaining: 12.6s
145: learn: 3.0175350 total: 2.13s remaining: 12.5s
146: learn: 3.0171677 total: 2.14s remaining: 12.4s
147: learn: 3.0165274 total: 2.15s remaining: 12.4s
148: learn: 3.0161714 total: 2.16s remaining: 12.3s
149: learn: 3.0156286 total: 2.17s remaining: 12.3s
150: learn: 3.0149078 total: 2.19s remaining: 12.3s
151: learn: 3.0144536 total: 2.2s remaining: 12.3s
152: learn: 3.0140608 total: 2.21s remaining: 12.2s
153: learn: 3.0137310 total: 2.22s remaining: 12.2s
154: learn: 3.0130922 total: 2.23s remaining: 12.2s
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155: learn: 2.9968619 total: 2.25s remaining: 12.2s
156: learn: 2.9815412 total: 2.27s remaining: 12.2s
157: learn: 2.9808570 total: 2.29s remaining: 12.2s
158: learn: 2.9805408 total: 2.3s remaining: 12.2s
159: learn: 2.9793818 total: 2.31s remaining: 12.1s
160: learn: 2.9675553 total: 2.33s remaining: 12.2s
161: learn: 2.9519862 total: 2.35s remaining: 12.2s
162: learn: 2.9431285 total: 2.37s remaining: 12.2s
163: learn: 2.9286097 total: 2.38s remaining: 12.1s
164: learn: 2.9283154 total: 2.39s remaining: 12.1s
165: learn: 2.9182308 total: 2.41s remaining: 12.1s
166: learn: 2.9059366 total: 2.43s remaining: 12.1s
167: learn: 2.8979084 total: 2.44s remaining: 12.1s
168: learn: 2.8975948 total: 2.46s remaining: 12.1s
169: learn: 2.8973183 total: 2.47s remaining: 12.1s
170: learn: 2.8971998 total: 2.48s remaining: 12s
171: learn: 2.8969357 total: 2.49s remaining: 12s
172: learn: 2.8966748 total: 2.5s remaining: 12s
173: learn: 2.8958398 total: 2.51s remaining: 11.9s
174: learn: 2.8880098 total: 2.54s remaining: 12s
175: learn: 2.8877611 total: 2.54s remaining: 11.9s
176: learn: 2.8874782 total: 2.56s remaining: 11.9s
177: learn: 2.8738113 total: 2.58s remaining: 11.9s
178: learn: 2.8734436 total: 2.6s remaining: 11.9s
179: learn: 2.8731532 total: 2.62s remaining: 11.9s
180: learn: 2.8725807 total: 2.64s remaining: 11.9s
181: learn: 2.8587763 total: 2.66s remaining: 11.9s
182: learn: 2.8457755 total: 2.68s remaining: 12s
183: learn: 2.8453712 total: 2.7s remaining: 12s
184: learn: 2.8451064 total: 2.72s remaining: 12s
185: learn: 2.8318730 total: 2.75s remaining: 12s
186: learn: 2.8312717 total: 2.76s remaining: 12s
187: learn: 2.8311053 total: 2.77s remaining: 12s
188: learn: 2.8308901 total: 2.79s remaining: 12s
189: learn: 2.8240549 total: 2.8s remaining: 12s
190: learn: 2.8239179 total: 2.83s remaining: 12s
191: learn: 2.8235135 total: 2.85s remaining: 12s
192: learn: 2.8228311 total: 2.87s remaining: 12s
193: learn: 2.8162402 total: 2.88s remaining: 12s
194: learn: 2.8160003 total: 2.88s remaining: 11.9s
195: learn: 2.8157931 total: 2.89s remaining: 11.9s
196: learn: 2.8150426 total: 2.9s remaining: 11.8s
197: learn: 2.8149256 total: 2.92s remaining: 11.8s
198: learn: 2.8146834 total: 2.93s remaining: 11.8s
199: learn: 2.8141783 total: 2.95s remaining: 11.8s
200: learn: 2.8131231 total: 2.98s remaining: 11.8s
201: learn: 2.8130852 total: 2.99s remaining: 11.8s
202: learn: 2.8128664 total: 2.99s remaining: 11.8s
203: learn: 2.8126858 total: 3s remaining: 11.7s
204: learn: 2.8004980 total: 3.02s remaining: 11.7s
205: learn: 2.8003510 total: 3.03s remaining: 11.7s
206: learn: 2.8001434 total: 3.04s remaining: 11.7s
207: learn: 2.7999646 total: 3.05s remaining: 11.6s
208: learn: 2.7998620 total: 3.06s remaining: 11.6s
209: learn: 2.7996937 total: 3.07s remaining: 11.6s
210: learn: 2.7995226 total: 3.1s remaining: 11.6s
211: learn: 2.7991784 total: 3.11s remaining: 11.6s
212: learn: 2.7982196 total: 3.13s remaining: 11.6s
213: learn: 2.7976060 total: 3.14s remaining: 11.5s
214: learn: 2.7971988 total: 3.15s remaining: 11.5s
215: learn: 2.7848696 total: 3.18s remaining: 11.5s
216: learn: 2.7847203 total: 3.18s remaining: 11.5s
217: learn: 2.7785690 total: 3.2s remaining: 11.5s
218: learn: 2.7784241 total: 3.21s remaining: 11.4s
219: learn: 2.7776385 total: 3.23s remaining: 11.5s
220: learn: 2.7772906 total: 3.24s remaining: 11.4s
221: learn: 2.7767726 total: 3.26s remaining: 11.4s
222: learn: 2.7764730 total: 3.27s remaining: 11.4s
223: learn: 2.7763322 total: 3.28s remaining: 11.4s
224: learn: 2.7760698 total: 3.29s remaining: 11.3s
225: learn: 2.7756243 total: 3.31s remaining: 11.3s
226: learn: 2.7636333 total: 3.33s remaining: 11.4s
```

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227: learn: 2.7631889 total: 3.35s remaining: 11.3s
228: learn: 2.7517767 total: 3.36s remaining: 11.3s
229: learn: 2.7514807 total: 3.38s remaining: 11.3s
230: learn: 2.7511295 total: 3.39s remaining: 11.3s
231: learn: 2.7507319 total: 3.4s remaining: 11.3s
232: learn: 2.7505915 total: 3.42s remaining: 11.3s
233: learn: 2.7502345 total: 3.44s remaining: 11.3s
234: learn: 2.7501417 total: 3.45s remaining: 11.2s
235: learn: 2.7487555 total: 3.47s remaining: 11.2s
236: learn: 2.7486597 total: 3.48s remaining: 11.2s
237: learn: 2.7395914 total: 3.5s remaining: 11.2s
238: learn: 2.7284399 total: 3.51s remaining: 11.2s
239: learn: 2.7171724 total: 3.53s remaining: 11.2s
240: learn: 2.7170705 total: 3.54s remaining: 11.2s
241: learn: 2.7169481 total: 3.57s remaining: 11.2s
242: learn: 2.7165038 total: 3.58s remaining: 11.1s
243: learn: 2.7044181 total: 3.6s remaining: 11.1s
244: learn: 2.7043075 total: 3.6s remaining: 11.1s
245: learn: 2.7040888 total: 3.61s remaining: 11.1s
246: learn: 2.7039584 total: 3.62s remaining: 11s
247: learn: 2.7038730 total: 3.64s remaining: 11s
248: learn: 2.7037660 total: 3.65s remaining: 11s
249: learn: 2.7033783 total: 3.66s remaining: 11s
250: learn: 2.7032709 total: 3.67s remaining: 11s
251: learn: 2.7031693 total: 3.68s remaining: 10.9s
252: learn: 2.6900664 total: 3.7s remaining: 10.9s
253: learn: 2.6794376 total: 3.72s remaining: 10.9s
254: learn: 2.6793384 total: 3.73s remaining: 10.9s
255: learn: 2.6689241 total: 3.75s remaining: 10.9s
256: learn: 2.6614745 total: 3.77s remaining: 10.9s
257: learn: 2.6610605 total: 3.79s remaining: 10.9s
258: learn: 2.6598321 total: 3.81s remaining: 10.9s
259: learn: 2.6594508 total: 3.83s remaining: 10.9s
260: learn: 2.6593591 total: 3.84s remaining: 10.9s
261: learn: 2.6592686 total: 3.85s remaining: 10.8s
262: learn: 2.6586257 total: 3.87s remaining: 10.8s
263: learn: 2.6581167 total: 3.88s remaining: 10.8s
264: learn: 2.6580310 total: 3.89s remaining: 10.8s
265: learn: 2.6578784 total: 3.9s remaining: 10.8s
266: learn: 2.6548081 total: 3.92s remaining: 10.8s
267: learn: 2.6543918 total: 3.93s remaining: 10.7s
268: learn: 2.6427829 total: 3.96s remaining: 10.8s
269: learn: 2.6427006 total: 3.98s remaining: 10.8s
270: learn: 2.6320530 total: 4s remaining: 10.8s
271: learn: 2.6319742 total: 4.02s remaining: 10.8s
272: learn: 2.6224625 total: 4.04s remaining: 10.8s
273: learn: 2.6222053 total: 4.05s remaining: 10.7s
274: learn: 2.6221305 total: 4.06s remaining: 10.7s
275: learn: 2.6220584 total: 4.07s remaining: 10.7s
276: learn: 2.6212831 total: 4.09s remaining: 10.7s
277: learn: 2.6111882 total: 4.1s remaining: 10.7s
278: learn: 2.6111258 total: 4.12s remaining: 10.6s
279: learn: 2.6106734 total: 4.14s remaining: 10.6s
280: learn: 2.6005332 total: 4.16s remaining: 10.6s
281: learn: 2.6004675 total: 4.17s remaining: 10.6s
282: learn: 2.6003881 total: 4.19s remaining: 10.6s
283: learn: 2.6000465 total: 4.2s remaining: 10.6s
284: learn: 2.5999842 total: 4.21s remaining: 10.6s
285: learn: 2.5999098 total: 4.22s remaining: 10.5s
286: learn: 2.5998496 total: 4.23s remaining: 10.5s
287: learn: 2.5997906 total: 4.24s remaining: 10.5s
288: learn: 2.5898054 total: 4.26s remaining: 10.5s
289: learn: 2.5893756 total: 4.29s remaining: 10.5s
290: learn: 2.5892497 total: 4.29s remaining: 10.5s
291: learn: 2.5891995 total: 4.3s remaining: 10.4s
292: learn: 2.5794311 total: 4.33s remaining: 10.4s
293: learn: 2.5699730 total: 4.35s remaining: 10.4s
294: learn: 2.5699187 total: 4.36s remaining: 10.4s
295: learn: 2.5660336 total: 4.38s remaining: 10.4s
296: learn: 2.5553440 total: 4.41s remaining: 10.4s
297: learn: 2.5548731 total: 4.43s remaining: 10.4s
298: learn: 2.5544428 total: 4.45s remaining: 10.4s
```

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299: learn: 2.5544002 total: 4.46s remaining: 10.4s
300: learn: 2.5458885 total: 4.49s remaining: 10.4s
301: learn: 2.5331336 total: 4.51s remaining: 10.4s
302: learn: 2.5238955 total: 4.54s remaining: 10.4s
303: learn: 2.5115655 total: 4.56s remaining: 10.4s
304: learn: 2.4993449 total: 4.58s remaining: 10.4s
305: learn: 2.4992978 total: 4.59s remaining: 10.4s
306: learn: 2.4918095 total: 4.62s remaining: 10.4s
307: learn: 2.4915941 total: 4.64s remaining: 10.4s
308: learn: 2.4915486 total: 4.65s remaining: 10.4s
309: learn: 2.4827643 total: 4.67s remaining: 10.4s
310: learn: 2.4823672 total: 4.68s remaining: 10.4s
311: learn: 2.4822583 total: 4.7s remaining: 10.4s
312: learn: 2.4736356 total: 4.72s remaining: 10.4s
313: learn: 2.4656330 total: 4.74s remaining: 10.4s
314: learn: 2.4571332 total: 4.77s remaining: 10.4s
315: learn: 2.4570904 total: 4.77s remaining: 10.3s
316: learn: 2.4488324 total: 4.8s remaining: 10.3s
317: learn: 2.4485887 total: 4.81s remaining: 10.3s
318: learn: 2.4456985 total: 4.84s remaining: 10.3s
319: learn: 2.4456577 total: 4.85s remaining: 10.3s
320: learn: 2.4456161 total: 4.86s remaining: 10.3s
321: learn: 2.4455329 total: 4.87s remaining: 10.2s
322: learn: 2.4454934 total: 4.88s remaining: 10.2s
323: learn: 2.4373935 total: 4.9s remaining: 10.2s
324: learn: 2.4256952 total: 4.92s remaining: 10.2s
325: learn: 2.4253768 total: 4.95s remaining: 10.2s
326: learn: 2.4253397 total: 4.96s remaining: 10.2s
327: learn: 2.4246077 total: 4.98s remaining: 10.2s
328: learn: 2.4175123 total: 5.01s remaining: 10.2s
329: learn: 2.4174771 total: 5.01s remaining: 10.2s
330: learn: 2.4169506 total: 5.02s remaining: 10.2s
331: learn: 2.4169165 total: 5.03s remaining: 10.1s
332: learn: 2.4090243 total: 5.06s remaining: 10.1s
333: learn: 2.3987986 total: 5.08s remaining: 10.1s
334: learn: 2.3906210 total: 5.1s remaining: 10.1s
335: learn: 2.3829655 total: 5.12s remaining: 10.1s
336: learn: 2.3719856 total: 5.15s remaining: 10.1s
337: learn: 2.3710506 total: 5.16s remaining: 10.1s
338: learn: 2.3707715 total: 5.18s remaining: 10.1s
339: learn: 2.3601240 total: 5.21s remaining: 10.1s
340: learn: 2.3593019 total: 5.23s remaining: 10.1s
341: learn: 2.3520800 total: 5.25s remaining: 10.1s
342: learn: 2.3519651 total: 5.27s remaining: 10.1s
343: learn: 2.3446470 total: 5.29s remaining: 10.1s
344: learn: 2.3439696 total: 5.3s remaining: 10.1s
345: learn: 2.3438734 total: 5.31s remaining: 10s
346: learn: 2.3435305 total: 5.32s remaining: 10s
347: learn: 2.3424217 total: 5.34s remaining: 10s
348: learn: 2.3324794 total: 5.37s remaining: 10s
349: learn: 2.3322908 total: 5.39s remaining: 10s
350: learn: 2.3251324 total: 5.41s remaining: 10s
351: learn: 2.3152814 total: 5.43s remaining: 10s
352: learn: 2.3152511 total: 5.45s remaining: 9.98s
353: learn: 2.3051418 total: 5.47s remaining: 9.98s
354: learn: 2.3047533 total: 5.48s remaining: 9.96s
355: learn: 2.2957180 total: 5.5s remaining: 9.96s
356: learn: 2.2956888 total: 5.52s remaining: 9.95s
357: learn: 2.2880780 total: 5.54s remaining: 9.94s
358: learn: 2.2871841 total: 5.56s remaining: 9.92s
359: learn: 2.2796200 total: 5.58s remaining: 9.92s
360: learn: 2.2795926 total: 5.59s remaining: 9.89s
361: learn: 2.2747702 total: 5.61s remaining: 9.89s
362: learn: 2.2745418 total: 5.62s remaining: 9.87s
363: learn: 2.2676030 total: 5.64s remaining: 9.86s
364: learn: 2.2598830 total: 5.67s remaining: 9.86s
365: learn: 2.2598570 total: 5.68s remaining: 9.85s
366: learn: 2.2531652 total: 5.71s remaining: 9.84s
367: learn: 2.2447622 total: 5.73s remaining: 9.84s
368: learn: 2.2381859 total: 5.75s remaining: 9.84s
369: learn: 2.2381611 total: 5.76s remaining: 9.82s
370: learn: 2.2381378 total: 5.77s remaining: 9.79s
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371: learn: 2.2311231 total: 5.8s remaining: 9.79s
372: learn: 2.2311006 total: 5.8s remaining: 9.76s
373: learn: 2.2309116 total: 5.82s remaining: 9.73s
374: learn: 2.2224390 total: 5.84s remaining: 9.73s
375: learn: 2.2214401 total: 5.86s remaining: 9.73s
376: learn: 2.2214170 total: 5.89s remaining: 9.73s
377: learn: 2.2213917 total: 5.89s remaining: 9.7s
378: learn: 2.2145946 total: 5.92s remaining: 9.7s
379: learn: 2.2145699 total: 5.92s remaining: 9.67s
380: learn: 2.2145436 total: 5.94s remaining: 9.66s
381: learn: 2.2137715 total: 5.96s remaining: 9.65s
382: learn: 2.2137507 total: 5.98s remaining: 9.63s
383: learn: 2.2059133 total: 6.01s remaining: 9.64s
384: learn: 2.2058934 total: 6.02s remaining: 9.61s
385: learn: 2.2056841 total: 6.03s remaining: 9.59s
386: learn: 2.2056601 total: 6.04s remaining: 9.56s
387: learn: 2.1970094 total: 6.06s remaining: 9.56s
388: learn: 2.1967975 total: 6.08s remaining: 9.55s
389: learn: 2.1883091 total: 6.11s remaining: 9.56s
390: learn: 2.1879598 total: 6.13s remaining: 9.55s
391: learn: 2.1879391 total: 6.14s remaining: 9.53s
392: learn: 2.1818614 total: 6.17s remaining: 9.53s
393: learn: 2.1817031 total: 6.19s remaining: 9.52s
394: learn: 2.1812790 total: 6.21s remaining: 9.52s
395: learn: 2.1812581 total: 6.22s remaining: 9.49s
396: learn: 2.1812369 total: 6.24s remaining: 9.47s
397: learn: 2.1754496 total: 6.26s remaining: 9.47s
398: learn: 2.1749817 total: 6.28s remaining: 9.46s
399: learn: 2.1749248 total: 6.3s remaining: 9.45s
400: learn: 2.1688280 total: 6.33s remaining: 9.45s
401: learn: 2.1687033 total: 6.35s remaining: 9.44s
402: learn: 2.1686849 total: 6.36s remaining: 9.41s
403: learn: 2.1678001 total: 6.38s remaining: 9.41s
404: learn: 2.1677825 total: 6.39s remaining: 9.38s
405: learn: 2.1677653 total: 6.39s remaining: 9.36s
406: learn: 2.1617797 total: 6.41s remaining: 9.34s
407: learn: 2.1615300 total: 6.43s remaining: 9.33s
408: learn: 2.1580156 total: 6.46s remaining: 9.33s
409: learn: 2.1579986 total: 6.47s remaining: 9.32s
410: learn: 2.1579830 total: 6.48s remaining: 9.29s
411: learn: 2.1579668 total: 6.5s remaining: 9.27s
412: learn: 2.1579517 total: 6.5s remaining: 9.25s
413: learn: 2.1579370 total: 6.51s remaining: 9.22s
414: learn: 2.1520844 total: 6.54s remaining: 9.22s
415: learn: 2.1453503 total: 6.56s remaining: 9.21s
416: learn: 2.1453367 total: 6.57s remaining: 9.19s
417: learn: 2.1450408 total: 6.59s remaining: 9.18s
418: learn: 2.1450265 total: 6.61s remaining: 9.16s
419: learn: 2.1450136 total: 6.62s remaining: 9.14s
420: learn: 2.1393860 total: 6.64s remaining: 9.13s
421: learn: 2.1329245 total: 6.66s remaining: 9.13s
422: learn: 2.1328383 total: 6.67s remaining: 9.1s
423: learn: 2.1328246 total: 6.69s remaining: 9.08s
424: learn: 2.1271773 total: 6.71s remaining: 9.08s
425: learn: 2.1209414 total: 6.73s remaining: 9.07s
426: learn: 2.1209299 total: 6.74s remaining: 9.05s
427: learn: 2.1201086 total: 6.77s remaining: 9.04s
428: learn: 2.1200968 total: 6.78s remaining: 9.02s
429: learn: 2.1200857 total: 6.79s remaining: 9s
430: learn: 2.1196935 total: 6.81s remaining: 8.99s
431: learn: 2.1196828 total: 6.82s remaining: 8.97s
432: learn: 2.1141164 total: 6.84s remaining: 8.96s
433: learn: 2.1086121 total: 6.87s remaining: 8.96s
434: learn: 2.1027790 total: 6.89s remaining: 8.95s
435: learn: 2.0971155 total: 6.92s remaining: 8.95s
436: learn: 2.0971046 total: 6.93s remaining: 8.94s
437: learn: 2.0970951 total: 6.95s remaining: 8.91s
438: learn: 2.0958641 total: 6.97s remaining: 8.91s
439: learn: 2.0903958 total: 7s remaining: 8.91s
440: learn: 2.0903867 total: 7.01s remaining: 8.88s
441: learn: 2.0903781 total: 7.02s remaining: 8.86s
442: learn: 2.0901223 total: 7.04s remaining: 8.85s
```

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443: learn: 2.0898744 total: 7.06s remaining: 8.84s
444: learn: 2.0898660 total: 7.07s remaining: 8.82s
445: learn: 2.0897931 total: 7.08s remaining: 8.8s
446: learn: 2.0885439 total: 7.1s remaining: 8.78s
447: learn: 2.0882277 total: 7.12s remaining: 8.78s
448: learn: 2.0874239 total: 7.14s remaining: 8.76s
449: learn: 2.0819500 total: 7.17s remaining: 8.76s
450: learn: 2.0765396 total: 7.19s remaining: 8.75s
451: learn: 2.0713011 total: 7.21s remaining: 8.74s
452: learn: 2.0680384 total: 7.24s remaining: 8.74s
453: learn: 2.0668461 total: 7.25s remaining: 8.72s
454: learn: 2.0667978 total: 7.27s remaining: 8.71s
455: learn: 2.0617186 total: 7.29s remaining: 8.7s
456: learn: 2.0616705 total: 7.3s remaining: 8.68s
457: learn: 2.0616236 total: 7.32s remaining: 8.66s
458: learn: 2.0615778 total: 7.33s remaining: 8.63s
459: learn: 2.0614938 total: 7.34s remaining: 8.62s
460: learn: 2.0614485 total: 7.37s remaining: 8.62s
461: learn: 2.0614042 total: 7.38s remaining: 8.6s
462: learn: 2.0611410 total: 7.41s remaining: 8.59s
463: learn: 2.0610495 total: 7.42s remaining: 8.57s
464: learn: 2.0608754 total: 7.43s remaining: 8.55s
465: learn: 2.0559766 total: 7.45s remaining: 8.54s
466: learn: 2.0507433 total: 7.48s remaining: 8.53s
467: learn: 2.0495703 total: 7.5s remaining: 8.52s
468: learn: 2.0445633 total: 7.52s remaining: 8.51s
469: learn: 2.0440900 total: 7.53s remaining: 8.49s
470: learn: 2.0429174 total: 7.54s remaining: 8.47s
471: learn: 2.0420822 total: 7.55s remaining: 8.45s
472: learn: 2.0414855 total: 7.58s remaining: 8.45s
473: learn: 2.0368157 total: 7.6s remaining: 8.44s
474: learn: 2.0367459 total: 7.62s remaining: 8.42s
475: learn: 2.0356452 total: 7.63s remaining: 8.4s
476: learn: 2.0355776 total: 7.65s remaining: 8.39s
477: learn: 2.0345028 total: 7.66s remaining: 8.36s
478: learn: 2.0341419 total: 7.68s remaining: 8.36s
479: learn: 2.0339299 total: 7.7s remaining: 8.35s
480: learn: 2.0328771 total: 7.71s remaining: 8.32s
481: learn: 2.0324577 total: 7.72s remaining: 8.3s
482: learn: 2.0297103 total: 7.75s remaining: 8.29s
483: learn: 2.0252509 total: 7.77s remaining: 8.28s
484: learn: 2.0241609 total: 7.79s remaining: 8.27s
485: learn: 2.0198784 total: 7.81s remaining: 8.26s
486: learn: 2.0195999 total: 7.83s remaining: 8.25s
487: learn: 2.0195103 total: 7.84s remaining: 8.23s
488: learn: 2.0185378 total: 7.85s remaining: 8.2s
489: learn: 2.0140174 total: 7.87s remaining: 8.19s
490: learn: 2.0139431 total: 7.88s remaining: 8.17s
491: learn: 2.0089672 total: 7.91s remaining: 8.16s
492: learn: 2.0079932 total: 7.93s remaining: 8.16s
493: learn: 2.0030661 total: 7.96s remaining: 8.15s
494: learn: 1.9982998 total: 7.98s remaining: 8.14s
495: learn: 1.9936460 total: 8.01s remaining: 8.14s
496: learn: 1.9900641 total: 8.04s remaining: 8.13s
497: learn: 1.9860350 total: 8.06s remaining: 8.13s
498: learn: 1.9821265 total: 8.08s remaining: 8.12s
499: learn: 1.9810413 total: 8.09s remaining: 8.09s
500: learn: 1.9771484 total: 8.11s remaining: 8.08s
501: learn: 1.9770278 total: 8.13s remaining: 8.07s
502: learn: 1.9769810 total: 8.15s remaining: 8.05s
503: learn: 1.9732320 total: 8.17s remaining: 8.04s
504: learn: 1.9699684 total: 8.2s remaining: 8.03s
505: learn: 1.9677195 total: 8.22s remaining: 8.02s
506: learn: 1.9633919 total: 8.24s remaining: 8.01s
507: learn: 1.9633036 total: 8.26s remaining: 8s
508: learn: 1.9617221 total: 8.28s remaining: 7.99s
509: learn: 1.9617035 total: 8.29s remaining: 7.96s
510: learn: 1.9581305 total: 8.31s remaining: 7.95s
511: learn: 1.9579447 total: 8.33s remaining: 7.94s
512: learn: 1.9572258 total: 8.35s remaining: 7.92s
513: learn: 1.9568580 total: 8.37s remaining: 7.92s
514: learn: 1.9567854 total: 8.38s remaining: 7.89s
```

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515: learn: 1.9556962 total: 8.39s remaining: 7.87s
516: learn: 1.9546319 total: 8.41s remaining: 7.85s
517: learn: 1.9545519 total: 8.42s remaining: 7.84s
518: learn: 1.9535097 total: 8.43s remaining: 7.82s
519: learn: 1.9527718 total: 8.46s remaining: 7.81s
520: learn: 1.9524146 total: 8.47s remaining: 7.79s
521: learn: 1.9514141 total: 8.48s remaining: 7.76s
522: learn: 1.9469732 total: 8.5s remaining: 7.75s
523: learn: 1.9467591 total: 8.52s remaining: 7.74s
524: learn: 1.9457552 total: 8.53s remaining: 7.72s
525: learn: 1.9421282 total: 8.55s remaining: 7.71s
526: learn: 1.9377378 total: 8.58s remaining: 7.7s
527: learn: 1.9343361 total: 8.6s remaining: 7.69s
528: learn: 1.9300964 total: 8.63s remaining: 7.68s
529: learn: 1.9290498 total: 8.64s remaining: 7.66s
530: learn: 1.9289625 total: 8.65s remaining: 7.64s
531: learn: 1.9286092 total: 8.67s remaining: 7.63s
532: learn: 1.9282681 total: 8.69s remaining: 7.62s
533: learn: 1.9279663 total: 8.72s remaining: 7.61s
534: learn: 1.9275395 total: 8.74s remaining: 7.59s
535: learn: 1.9267054 total: 8.76s remaining: 7.58s
536: learn: 1.9266441 total: 8.78s remaining: 7.57s
537: learn: 1.9256488 total: 8.79s remaining: 7.55s
538: learn: 1.9224299 total: 8.81s remaining: 7.54s
539: learn: 1.9220119 total: 8.84s remaining: 7.53s
540: learn: 1.9217108 total: 8.86s remaining: 7.52s
541: learn: 1.9185935 total: 8.89s remaining: 7.51s
542: learn: 1.9185212 total: 8.91s remaining: 7.5s
543: learn: 1.9175442 total: 8.93s remaining: 7.49s
544: learn: 1.9144975 total: 8.96s remaining: 7.48s
545: learn: 1.9115505 total: 8.98s remaining: 7.47s
546: learn: 1.9106062 total: 8.99s remaining: 7.44s
547: learn: 1.9102464 total: 9.02s remaining: 7.44s
548: learn: 1.9093310 total: 9.03s remaining: 7.42s
549: learn: 1.9090805 total: 9.06s remaining: 7.41s
550: learn: 1.9090650 total: 9.07s remaining: 7.39s
551: learn: 1.9081748 total: 9.08s remaining: 7.37s
552: learn: 1.9081229 total: 9.1s remaining: 7.36s
553: learn: 1.9077620 total: 9.13s remaining: 7.35s
554: learn: 1.9068963 total: 9.14s remaining: 7.33s
555: learn: 1.9068358 total: 9.15s remaining: 7.3s
556: learn: 1.9059725 total: 9.17s remaining: 7.29s
557: learn: 1.9051352 total: 9.18s remaining: 7.27s
558: learn: 1.9049661 total: 9.2s remaining: 7.26s
559: learn: 1.9043805 total: 9.22s remaining: 7.25s
560: learn: 1.9043162 total: 9.25s remaining: 7.24s
561: learn: 1.9041028 total: 9.27s remaining: 7.22s
562: learn: 1.9012488 total: 9.29s remaining: 7.21s
563: learn: 1.9009729 total: 9.32s remaining: 7.2s
564: learn: 1.9008704 total: 9.33s remaining: 7.18s
565: learn: 1.8965646 total: 9.35s remaining: 7.17s
566: learn: 1.8957514 total: 9.36s remaining: 7.15s
567: learn: 1.8949574 total: 9.37s remaining: 7.13s
568: learn: 1.8942593 total: 9.4s remaining: 7.12s
569: learn: 1.8941309 total: 9.42s remaining: 7.11s
570: learn: 1.8925751 total: 9.44s remaining: 7.1s
571: learn: 1.8898547 total: 9.47s remaining: 7.08s
572: learn: 1.8897508 total: 9.49s remaining: 7.08s
573: learn: 1.8896256 total: 9.52s remaining: 7.06s
574: learn: 1.8894753 total: 9.54s remaining: 7.05s
575: learn: 1.8868453 total: 9.56s remaining: 7.04s
576: learn: 1.8860781 total: 9.58s remaining: 7.03s
577: learn: 1.8860352 total: 9.61s remaining: 7.01s
578: learn: 1.8859555 total: 9.63s remaining: 7s
579: learn: 1.8816966 total: 9.65s remaining: 6.99s
580: learn: 1.8816398 total: 9.67s remaining: 6.97s
581: learn: 1.8810560 total: 9.7s remaining: 6.96s
582: learn: 1.8809989 total: 9.72s remaining: 6.95s
583: learn: 1.8805574 total: 9.74s remaining: 6.94s
584: learn: 1.8804352 total: 9.76s remaining: 6.93s
585: learn: 1.8803913 total: 9.79s remaining: 6.92s
586: learn: 1.8803462 total: 9.81s remaining: 6.9s
```

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587: learn: 1.8798559 total: 9.82s remaining: 6.88s
588: learn: 1.8790705 total: 9.83s remaining: 6.86s
589: learn: 1.8788192 total: 9.86s remaining: 6.85s
590: learn: 1.8783019 total: 9.88s remaining: 6.83s
591: learn: 1.8781354 total: 9.9s remaining: 6.82s
592: learn: 1.8773991 total: 9.92s remaining: 6.81s
593: learn: 1.8770558 total: 9.94s remaining: 6.79s
594: learn: 1.8763432 total: 9.95s remaining: 6.77s
595: learn: 1.8762254 total: 9.97s remaining: 6.76s
596: learn: 1.8761812 total: 9.99s remaining: 6.74s
597: learn: 1.8754945 total: 10s remaining: 6.73s
598: learn: 1.8754533 total: 10s remaining: 6.72s
599: learn: 1.8732286 total: 10.1s remaining: 6.7s
600: learn: 1.8731946 total: 10.1s remaining: 6.69s
601: learn: 1.8730699 total: 10.1s remaining: 6.68s
602: learn: 1.8723873 total: 10.1s remaining: 6.67s
603: learn: 1.8720565 total: 10.1s remaining: 6.65s
604: learn: 1.8717614 total: 10.2s remaining: 6.64s
605: learn: 1.8693311 total: 10.2s remaining: 6.63s
606: learn: 1.8686810 total: 10.2s remaining: 6.61s
607: learn: 1.8663319 total: 10.2s remaining: 6.6s
608: learn: 1.8659502 total: 10.3s remaining: 6.58s
609: learn: 1.8659133 total: 10.3s remaining: 6.57s
610: learn: 1.8657092 total: 10.3s remaining: 6.55s
611: learn: 1.8650497 total: 10.3s remaining: 6.53s
612: learn: 1.8644144 total: 10.3s remaining: 6.51s
613: learn: 1.8641596 total: 10.3s remaining: 6.5s
614: learn: 1.8639399 total: 10.4s remaining: 6.49s
615: learn: 1.8616641 total: 10.4s remaining: 6.47s
616: learn: 1.8594782 total: 10.4s remaining: 6.46s
617: learn: 1.8592457 total: 10.4s remaining: 6.45s
618: learn: 1.8586573 total: 10.4s remaining: 6.42s
619: learn: 1.8571426 total: 10.5s remaining: 6.41s
620: learn: 1.8565972 total: 10.5s remaining: 6.39s
621: learn: 1.8560408 total: 10.5s remaining: 6.38s
622: learn: 1.8560092 total: 10.5s remaining: 6.36s
623: learn: 1.8538693 total: 10.5s remaining: 6.35s
624: learn: 1.8535805 total: 10.6s remaining: 6.34s
625: learn: 1.8533876 total: 10.6s remaining: 6.32s
626: learn: 1.8532814 total: 10.6s remaining: 6.3s
627: learn: 1.8532478 total: 10.6s remaining: 6.29s
628: learn: 1.8529823 total: 10.6s remaining: 6.28s
629: learn: 1.8523403 total: 10.7s remaining: 6.26s
630: learn: 1.8520161 total: 10.7s remaining: 6.24s
631: learn: 1.8499330 total: 10.7s remaining: 6.23s
632: learn: 1.8493907 total: 10.7s remaining: 6.21s
633: learn: 1.8493662 total: 10.7s remaining: 6.19s
634: learn: 1.8473962 total: 10.8s remaining: 6.18s
635: learn: 1.8454918 total: 10.8s remaining: 6.17s
636: learn: 1.8436364 total: 10.8s remaining: 6.15s
637: learn: 1.8434954 total: 10.8s remaining: 6.14s
638: learn: 1.8417152 total: 10.8s remaining: 6.13s
639: learn: 1.8399639 total: 10.9s remaining: 6.11s
640: learn: 1.8394189 total: 10.9s remaining: 6.09s
641: learn: 1.8393855 total: 10.9s remaining: 6.07s
642: learn: 1.8393538 total: 10.9s remaining: 6.05s
643: learn: 1.8393139 total: 10.9s remaining: 6.04s
644: learn: 1.8392845 total: 10.9s remaining: 6.02s
645: learn: 1.8392521 total: 10.9s remaining: 6s
646: learn: 1.8387438 total: 11s remaining: 5.98s
647: learn: 1.8370518 total: 11s remaining: 5.96s
648: learn: 1.8367628 total: 11s remaining: 5.95s
649: learn: 1.8363895 total: 11s remaining: 5.93s
650: learn: 1.8358851 total: 11s remaining: 5.92s
651: learn: 1.8353935 total: 11.1s remaining: 5.9s
652: learn: 1.8352364 total: 11.1s remaining: 5.89s
653: learn: 1.8351626 total: 11.1s remaining: 5.88s
654: learn: 1.8351358 total: 11.1s remaining: 5.86s
655: learn: 1.8350090 total: 11.2s remaining: 5.85s
656: learn: 1.8333769 total: 11.2s remaining: 5.83s
657: learn: 1.8271150 total: 11.2s remaining: 5.82s
658: learn: 1.8270879 total: 11.2s remaining: 5.8s
```

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659: learn: 1.8266227 total: 11.2s remaining: 5.79s
660: learn: 1.8250890 total: 11.3s remaining: 5.78s
661: learn: 1.8247928 total: 11.3s remaining: 5.76s
662: learn: 1.8247680 total: 11.3s remaining: 5.74s
663: learn: 1.8232859 total: 11.3s remaining: 5.73s
664: learn: 1.8230123 total: 11.3s remaining: 5.71s
665: learn: 1.8225404 total: 11.4s remaining: 5.69s
666: learn: 1.8211081 total: 11.4s remaining: 5.68s
667: learn: 1.8210620 total: 11.4s remaining: 5.66s
668: learn: 1.8209991 total: 11.4s remaining: 5.64s
669: learn: 1.8205712 total: 11.4s remaining: 5.62s
670: learn: 1.8191680 total: 11.4s remaining: 5.61s
671: learn: 1.8187506 total: 11.4s remaining: 5.59s
672: learn: 1.8186761 total: 11.5s remaining: 5.57s
673: learn: 1.8186528 total: 11.5s remaining: 5.55s
674: learn: 1.8184715 total: 11.5s remaining: 5.53s
675: learn: 1.8184362 total: 11.5s remaining: 5.52s
676: learn: 1.8180171 total: 11.5s remaining: 5.5s
677: learn: 1.8166814 total: 11.6s remaining: 5.49s
678: learn: 1.8162903 total: 11.6s remaining: 5.47s
679: learn: 1.8162077 total: 11.6s remaining: 5.46s
680: learn: 1.8161833 total: 11.6s remaining: 5.44s
681: learn: 1.8161599 total: 11.6s remaining: 5.42s
682: learn: 1.8161390 total: 11.6s remaining: 5.4s
683: learn: 1.8157456 total: 11.7s remaining: 5.38s
684: learn: 1.8156209 total: 11.7s remaining: 5.36s
685: learn: 1.8154808 total: 11.7s remaining: 5.35s
686: learn: 1.8153449 total: 11.7s remaining: 5.33s
687: learn: 1.8140579 total: 11.7s remaining: 5.32s
688: learn: 1.8136654 total: 11.7s remaining: 5.3s
689: learn: 1.8090898 total: 11.8s remaining: 5.29s
690: learn: 1.8090028 total: 11.8s remaining: 5.27s
691: learn: 1.8089800 total: 11.8s remaining: 5.26s
692: learn: 1.8077335 total: 11.8s remaining: 5.25s
693: learn: 1.8075731 total: 11.9s remaining: 5.23s
694: learn: 1.8075146 total: 11.9s remaining: 5.22s
695: learn: 1.8074863 total: 11.9s remaining: 5.2s
696: learn: 1.8032092 total: 11.9s remaining: 5.18s
697: learn: 1.8020249 total: 11.9s remaining: 5.17s
698: learn: 1.8019591 total: 12s remaining: 5.15s
699: learn: 1.8018060 total: 12s remaining: 5.14s
700: learn: 1.8017745 total: 12s remaining: 5.13s
701: learn: 1.8011230 total: 12s remaining: 5.11s
702: learn: 1.8009089 total: 12.1s remaining: 5.1s
703: learn: 1.8008921 total: 12.1s remaining: 5.08s
704: learn: 1.8003952 total: 12.1s remaining: 5.06s
705: learn: 1.7992571 total: 12.1s remaining: 5.05s
706: learn: 1.7990860 total: 12.1s remaining: 5.03s
707: learn: 1.7957568 total: 12.2s remaining: 5.02s
708: learn: 1.7957282 total: 12.2s remaining: 5s
709: learn: 1.7956419 total: 12.2s remaining: 4.99s
710: learn: 1.7945488 total: 12.2s remaining: 4.97s
711: learn: 1.7945220 total: 12.3s remaining: 4.96s
712: learn: 1.7934656 total: 12.3s remaining: 4.95s
713: learn: 1.7934452 total: 12.3s remaining: 4.93s
714: learn: 1.7934278 total: 12.3s remaining: 4.92s
715: learn: 1.7934027 total: 12.4s remaining: 4.9s
716: learn: 1.7933785 total: 12.4s remaining: 4.88s
717: learn: 1.7892606 total: 12.4s remaining: 4.87s
718: learn: 1.7892378 total: 12.4s remaining: 4.85s
719: learn: 1.7885019 total: 12.4s remaining: 4.84s
720: learn: 1.7883441 total: 12.5s remaining: 4.83s
721: learn: 1.7879325 total: 12.5s remaining: 4.8s
722: learn: 1.7879119 total: 12.5s remaining: 4.79s
723: learn: 1.7875104 total: 12.5s remaining: 4.77s
724: learn: 1.7874395 total: 12.5s remaining: 4.75s
725: learn: 1.7870475 total: 12.5s remaining: 4.73s
726: learn: 1.7870280 total: 12.6s remaining: 4.71s
727: learn: 1.7870089 total: 12.6s remaining: 4.7s
728: learn: 1.7866101 total: 12.6s remaining: 4.68s
729: learn: 1.7856296 total: 12.6s remaining: 4.66s
730: learn: 1.7855413 total: 12.6s remaining: 4.65s
```

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731: learn: 1.7855250 total: 12.7s remaining: 4.63s
732: learn: 1.7845776 total: 12.7s remaining: 4.62s
733: learn: 1.7845258 total: 12.7s remaining: 4.6s
734: learn: 1.7844061 total: 12.7s remaining: 4.58s
735: learn: 1.7843874 total: 12.7s remaining: 4.56s
736: learn: 1.7839953 total: 12.7s remaining: 4.54s
737: learn: 1.7836277 total: 12.7s remaining: 4.52s
738: learn: 1.7836094 total: 12.8s remaining: 4.5s
739: learn: 1.7826944 total: 12.8s remaining: 4.49s
740: learn: 1.7826475 total: 12.8s remaining: 4.47s
741: learn: 1.7785612 total: 12.8s remaining: 4.46s
742: learn: 1.7785449 total: 12.8s remaining: 4.44s
743: learn: 1.7785285 total: 12.9s remaining: 4.42s
744: learn: 1.7781552 total: 12.9s remaining: 4.4s
745: learn: 1.7777972 total: 12.9s remaining: 4.38s
746: learn: 1.7760540 total: 12.9s remaining: 4.37s
747: learn: 1.7751695 total: 12.9s remaining: 4.35s
748: learn: 1.7748144 total: 12.9s remaining: 4.33s
749: learn: 1.7746789 total: 13s remaining: 4.32s
750: learn: 1.7738239 total: 13s remaining: 4.3s
751: learn: 1.7729977 total: 13s remaining: 4.29s
752: learn: 1.7729830 total: 13s remaining: 4.27s
753: learn: 1.7709907 total: 13.1s remaining: 4.26s
754: learn: 1.7708512 total: 13.1s remaining: 4.24s
755: learn: 1.7708333 total: 13.1s remaining: 4.23s
756: learn: 1.7700199 total: 13.1s remaining: 4.21s
757: learn: 1.7698336 total: 13.1s remaining: 4.2s
758: learn: 1.7654563 total: 13.2s remaining: 4.18s
759: learn: 1.7654394 total: 13.2s remaining: 4.16s
760: learn: 1.7650860 total: 13.2s remaining: 4.14s
761: learn: 1.7650702 total: 13.2s remaining: 4.13s
762: learn: 1.7649594 total: 13.2s remaining: 4.11s
763: learn: 1.7649468 total: 13.2s remaining: 4.09s
764: learn: 1.7646094 total: 13.3s remaining: 4.07s
765: learn: 1.7638190 total: 13.3s remaining: 4.06s
766: learn: 1.7638047 total: 13.3s remaining: 4.04s
767: learn: 1.7637872 total: 13.3s remaining: 4.03s
768: learn: 1.7637716 total: 13.3s remaining: 4.01s
769: learn: 1.7637155 total: 13.4s remaining: 3.99s
770: learn: 1.7629516 total: 13.4s remaining: 3.98s
771: learn: 1.7626229 total: 13.4s remaining: 3.96s
772: learn: 1.7626019 total: 13.4s remaining: 3.94s
773: learn: 1.7624249 total: 13.4s remaining: 3.92s
774: learn: 1.7621060 total: 13.4s remaining: 3.9s
775: learn: 1.7620932 total: 13.5s remaining: 3.88s
776: learn: 1.7618580 total: 13.5s remaining: 3.87s
777: learn: 1.7617851 total: 13.5s remaining: 3.85s
778: learn: 1.7617728 total: 13.5s remaining: 3.83s
779: learn: 1.7614628 total: 13.5s remaining: 3.81s
780: learn: 1.7613496 total: 13.5s remaining: 3.8s
781: learn: 1.7613378 total: 13.6s remaining: 3.78s
782: learn: 1.7612724 total: 13.6s remaining: 3.76s
783: learn: 1.7612612 total: 13.6s remaining: 3.75s
784: learn: 1.7611790 total: 13.6s remaining: 3.73s
785: learn: 1.7611629 total: 13.6s remaining: 3.71s
786: learn: 1.7568103 total: 13.7s remaining: 3.7s
787: learn: 1.7567575 total: 13.7s remaining: 3.68s
788: learn: 1.7566669 total: 13.7s remaining: 3.66s
789: learn: 1.7566166 total: 13.7s remaining: 3.65s
790: learn: 1.7566052 total: 13.7s remaining: 3.63s
791: learn: 1.7565567 total: 13.7s remaining: 3.61s
792: learn: 1.7561421 total: 13.8s remaining: 3.59s
793: learn: 1.7559148 total: 13.8s remaining: 3.58s
794: learn: 1.7558739 total: 13.8s remaining: 3.56s
795: learn: 1.7558645 total: 13.8s remaining: 3.54s
796: learn: 1.7558497 total: 13.9s remaining: 3.53s
797: learn: 1.7555430 total: 13.9s remaining: 3.51s
798: learn: 1.7547993 total: 13.9s remaining: 3.49s
799: learn: 1.7547787 total: 13.9s remaining: 3.48s
800: learn: 1.7547475 total: 13.9s remaining: 3.46s
801: learn: 1.7547015 total: 13.9s remaining: 3.44s
802: learn: 1.7539828 total: 14s remaining: 3.42s
```

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803: learn: 1.7539024 total: 14s remaining: 3.41s
804: learn: 1.7538862 total: 14s remaining: 3.39s
805: learn: 1.7531914 total: 14s remaining: 3.38s
806: learn: 1.7508561 total: 14.1s remaining: 3.36s
807: learn: 1.7508468 total: 14.1s remaining: 3.35s
808: learn: 1.7505379 total: 14.1s remaining: 3.33s
809: learn: 1.7502251 total: 14.1s remaining: 3.31s
810: learn: 1.7501893 total: 14.2s remaining: 3.3s
811: learn: 1.7489331 total: 14.2s remaining: 3.28s
812: learn: 1.7488066 total: 14.2s remaining: 3.27s
813: learn: 1.7482939 total: 14.2s remaining: 3.25s
814: learn: 1.7480197 total: 14.2s remaining: 3.23s
815: learn: 1.7477931 total: 14.3s remaining: 3.21s
816: learn: 1.7475977 total: 14.3s remaining: 3.2s
817: learn: 1.7475251 total: 14.3s remaining: 3.18s
818: learn: 1.7473802 total: 14.3s remaining: 3.16s
819: learn: 1.7473701 total: 14.3s remaining: 3.15s
820: learn: 1.7466785 total: 14.4s remaining: 3.13s
821: learn: 1.7460331 total: 14.4s remaining: 3.12s
822: learn: 1.7460247 total: 14.4s remaining: 3.1s
823: learn: 1.7454017 total: 14.4s remaining: 3.08s
824: learn: 1.7453936 total: 14.5s remaining: 3.07s
825: learn: 1.7453305 total: 14.5s remaining: 3.05s
826: learn: 1.7453227 total: 14.5s remaining: 3.03s
827: learn: 1.7452998 total: 14.5s remaining: 3.01s
828: learn: 1.7446976 total: 14.5s remaining: 3s
829: learn: 1.7444260 total: 14.5s remaining: 2.98s
830: learn: 1.7394907 total: 14.6s remaining: 2.96s
831: learn: 1.7394305 total: 14.6s remaining: 2.94s
832: learn: 1.7393688 total: 14.6s remaining: 2.93s
833: learn: 1.7393020 total: 14.6s remaining: 2.91s
834: learn: 1.7392950 total: 14.6s remaining: 2.89s
835: learn: 1.7386945 total: 14.7s remaining: 2.87s
836: learn: 1.7381221 total: 14.7s remaining: 2.86s
837: learn: 1.7356411 total: 14.7s remaining: 2.84s
838: learn: 1.7356040 total: 14.7s remaining: 2.82s
839: learn: 1.7355172 total: 14.7s remaining: 2.81s
840: learn: 1.7319800 total: 14.8s remaining: 2.79s
841: learn: 1.7291239 total: 14.8s remaining: 2.77s
842: learn: 1.7290680 total: 14.8s remaining: 2.76s
843: learn: 1.7290010 total: 14.8s remaining: 2.74s
844: learn: 1.7284567 total: 14.9s remaining: 2.72s
845: learn: 1.7281973 total: 14.9s remaining: 2.71s
846: learn: 1.7281921 total: 14.9s remaining: 2.69s
847: learn: 1.7279574 total: 14.9s remaining: 2.67s
848: learn: 1.7277069 total: 14.9s remaining: 2.65s
849: learn: 1.7272342 total: 14.9s remaining: 2.64s
850: learn: 1.7271913 total: 15s remaining: 2.62s
851: learn: 1.7269553 total: 15s remaining: 2.6s
852: learn: 1.7269518 total: 15s remaining: 2.58s
853: learn: 1.7266534 total: 15s remaining: 2.56s
854: learn: 1.7225023 total: 15s remaining: 2.55s
855: learn: 1.7224463 total: 15.1s remaining: 2.53s
856: learn: 1.7224108 total: 15.1s remaining: 2.52s
857: learn: 1.7224050 total: 15.1s remaining: 2.5s
858: learn: 1.7223609 total: 15.1s remaining: 2.48s
859: learn: 1.7221493 total: 15.2s remaining: 2.47s
860: learn: 1.7182321 total: 15.2s remaining: 2.45s
861: learn: 1.7182129 total: 15.2s remaining: 2.43s
862: learn: 1.7179824 total: 15.2s remaining: 2.41s
863: learn: 1.7152972 total: 15.2s remaining: 2.4s
864: learn: 1.7152704 total: 15.3s remaining: 2.38s
865: learn: 1.7150388 total: 15.3s remaining: 2.36s
866: learn: 1.7148194 total: 15.3s remaining: 2.35s
867: learn: 1.7147207 total: 15.3s remaining: 2.33s
868: learn: 1.7145963 total: 15.3s remaining: 2.31s
869: learn: 1.7145904 total: 15.3s remaining: 2.29s
870: learn: 1.7139941 total: 15.4s remaining: 2.27s
871: learn: 1.7138408 total: 15.4s remaining: 2.26s
872: learn: 1.7137563 total: 15.4s remaining: 2.24s
873: learn: 1.7137156 total: 15.4s remaining: 2.22s
874: learn: 1.7134377 total: 15.5s remaining: 2.21s
```

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875: learn: 1.7134174 total: 15.5s remaining: 2.19s
876: learn: 1.7134121 total: 15.5s remaining: 2.17s
877: learn: 1.7133919 total: 15.5s remaining: 2.16s
878: learn: 1.7131728 total: 15.5s remaining: 2.14s
879: learn: 1.7107550 total: 15.6s remaining: 2.12s
880: learn: 1.7106826 total: 15.6s remaining: 2.1s
881: learn: 1.7106609 total: 15.6s remaining: 2.08s
882: learn: 1.7104725 total: 15.6s remaining: 2.07s
883: learn: 1.7099016 total: 15.6s remaining: 2.05s
884: learn: 1.7074149 total: 15.7s remaining: 2.04s
885: learn: 1.7074076 total: 15.7s remaining: 2.02s
886: learn: 1.7072026 total: 15.7s remaining: 2s
887: learn: 1.7071977 total: 15.7s remaining: 1.98s
888: learn: 1.7071922 total: 15.7s remaining: 1.96s
889: learn: 1.7071872 total: 15.7s remaining: 1.94s
890: learn: 1.7071227 total: 15.8s remaining: 1.93s
891: learn: 1.7069314 total: 15.8s remaining: 1.91s
892: learn: 1.7063656 total: 15.8s remaining: 1.89s
893: learn: 1.7063456 total: 15.8s remaining: 1.87s
894: learn: 1.7062072 total: 15.8s remaining: 1.86s
895: learn: 1.7062026 total: 15.8s remaining: 1.84s
896: learn: 1.7060166 total: 15.9s remaining: 1.82s
897: learn: 1.7059823 total: 15.9s remaining: 1.8s
898: learn: 1.7054391 total: 15.9s remaining: 1.79s
899: learn: 1.7041787 total: 15.9s remaining: 1.77s
900: learn: 1.7039235 total: 16s remaining: 1.75s
901: learn: 1.7039191 total: 16s remaining: 1.74s
902: learn: 1.7037305 total: 16s remaining: 1.72s
903: learn: 1.7032005 total: 16s remaining: 1.7s
904: learn: 1.7031915 total: 16s remaining: 1.68s
905: learn: 1.7031839 total: 16s remaining: 1.66s
906: learn: 1.7031792 total: 16.1s remaining: 1.65s
907: learn: 1.7026667 total: 16.1s remaining: 1.63s
908: learn: 1.7026373 total: 16.1s remaining: 1.61s
909: learn: 1.7024618 total: 16.1s remaining: 1.59s
910: learn: 1.7022824 total: 16.1s remaining: 1.57s
911: learn: 1.7021149 total: 16.1s remaining: 1.56s
912: learn: 1.7021046 total: 16.2s remaining: 1.54s
913: learn: 1.7021022 total: 16.2s remaining: 1.52s
914: learn: 1.7010752 total: 16.2s remaining: 1.5s
915: learn: 1.7005795 total: 16.2s remaining: 1.49s
916: learn: 1.7001006 total: 16.2s remaining: 1.47s
917: learn: 1.6996377 total: 16.3s remaining: 1.45s
918: learn: 1.6996309 total: 16.3s remaining: 1.43s
919: learn: 1.6995734 total: 16.3s remaining: 1.42s
920: learn: 1.6991259 total: 16.3s remaining: 1.4s
921: learn: 1.6991107 total: 16.3s remaining: 1.38s
922: learn: 1.6990852 total: 16.4s remaining: 1.36s
923: learn: 1.6990816 total: 16.4s remaining: 1.35s
924: learn: 1.6986494 total: 16.4s remaining: 1.33s
925: learn: 1.6982312 total: 16.4s remaining: 1.31s
926: learn: 1.6980659 total: 16.4s remaining: 1.29s
927: learn: 1.6980505 total: 16.4s remaining: 1.28s
928: learn: 1.6980460 total: 16.5s remaining: 1.26s
929: learn: 1.6978794 total: 16.5s remaining: 1.24s
930: learn: 1.6978774 total: 16.5s remaining: 1.22s
931: learn: 1.6978445 total: 16.5s remaining: 1.21s
932: learn: 1.6978282 total: 16.5s remaining: 1.19s
933: learn: 1.6972209 total: 16.6s remaining: 1.17s
934: learn: 1.6972029 total: 16.6s remaining: 1.15s
935: learn: 1.6967995 total: 16.6s remaining: 1.14s
936: learn: 1.6967914 total: 16.6s remaining: 1.12s
937: learn: 1.6967873 total: 16.6s remaining: 1.1s
938: learn: 1.6967840 total: 16.7s remaining: 1.08s
939: learn: 1.6965815 total: 16.7s remaining: 1.06s
940: learn: 1.6965770 total: 16.7s remaining: 1.05s
941: learn: 1.6965347 total: 16.7s remaining: 1.03s
942: learn: 1.6964809 total: 16.7s remaining: 1.01s
943: learn: 1.6962547 total: 16.7s remaining: 994ms
944: learn: 1.6962510 total: 16.8s remaining: 976ms
945: learn: 1.6960931 total: 16.8s remaining: 958ms
946: learn: 1.6960554 total: 16.8s remaining: 940ms
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947: learn: 1.6960474 total: 16.8s remaining: 923ms
948: learn: 1.6960444 total: 16.8s remaining: 905ms
949: learn: 1.6959454 total: 16.9s remaining: 887ms
950: learn: 1.6959339 total: 16.9s remaining: 869ms
951: learn: 1.6958813 total: 16.9s remaining: 852ms
952: learn: 1.6957288 total: 16.9s remaining: 834ms
953: learn: 1.6957251 total: 16.9s remaining: 816ms
954: learn: 1.6956765 total: 17s remaining: 799ms
955: learn: 1.6952877 total: 17s remaining: 781ms
956: learn: 1.6952702 total: 17s remaining: 764ms
957: learn: 1.6952667 total: 17s remaining: 746ms
958: learn: 1.6952528 total: 17s remaining: 728ms
959: learn: 1.6948768 total: 17.1s remaining: 711ms
960: learn: 1.6945134 total: 17.1s remaining: 693ms
961: learn: 1.6944093 total: 17.1s remaining: 676ms
962: learn: 1.6943109 total: 17.1s remaining: 658ms
963: learn: 1.6902967 total: 17.2s remaining: 641ms
964: learn: 1.6901603 total: 17.2s remaining: 623ms
965: learn: 1.6901164 total: 17.2s remaining: 605ms
966: learn: 1.6899102 total: 17.2s remaining: 588ms
967: learn: 1.6899076 total: 17.2s remaining: 570ms
968: learn: 1.6895739 total: 17.3s remaining: 552ms
969: learn: 1.6894186 total: 17.3s remaining: 534ms
970: learn: 1.6894171 total: 17.3s remaining: 516ms
971: learn: 1.6892730 total: 17.3s remaining: 498ms
972: learn: 1.6892625 total: 17.3s remaining: 480ms
973: learn: 1.6889397 total: 17.3s remaining: 463ms
974: learn: 1.6889376 total: 17.3s remaining: 445ms
975: learn: 1.6886258 total: 17.4s remaining: 427ms
976: learn: 1.6886221 total: 17.4s remaining: 409ms
977: learn: 1.6885259 total: 17.4s remaining: 392ms
978: learn: 1.6882246 total: 17.4s remaining: 374ms
979: learn: 1.6879333 total: 17.5s remaining: 356ms
980: learn: 1.6877710 total: 17.5s remaining: 338ms
981: learn: 1.6874892 total: 17.5s remaining: 321ms
982: learn: 1.6874878 total: 17.5s remaining: 303ms
983: learn: 1.6874781 total: 17.5s remaining: 285ms
984: learn: 1.6873334 total: 17.6s remaining: 267ms
985: learn: 1.6872679 total: 17.6s remaining: 250ms
986: learn: 1.6872654 total: 17.6s remaining: 232ms
987: learn: 1.6871255 total: 17.6s remaining: 214ms
988: learn: 1.6870892 total: 17.6s remaining: 196ms
989: learn: 1.6868176 total: 17.6s remaining: 178ms
990: learn: 1.6866876 total: 17.7s remaining: 160ms
991: learn: 1.6865606 total: 17.7s remaining: 143ms
992: learn: 1.6865592 total: 17.7s remaining: 125ms
993: learn: 1.6828671 total: 17.7s remaining: 107ms
994: learn: 1.6825940 total: 17.7s remaining: 89.2ms
995: learn: 1.6825756 total: 17.8s remaining: 71.3ms
996: learn: 1.6825405 total: 17.8s remaining: 53.5ms
997: learn: 1.6825056 total: 17.8s remaining: 35.7ms
998: learn: 1.6825035 total: 17.8s remaining: 17.8ms
999: learn: 1.6825015 total: 17.8s remaining: 0us
0: learn: 3.9101991 total: 24.1ms remaining: 24.1s
1: learn: 3.9017559 total: 47.2ms remaining: 23.6s
2: learn: 3.8919995 total: 65.4ms remaining: 21.7s
3: learn: 3.8838467 total: 87.8ms remaining: 21.9s
4: learn: 3.8752651 total: 110ms remaining: 22s
5: learn: 3.8677628 total: 128ms remaining: 21.2s
6: learn: 3.8600596 total: 142ms remaining: 20.1s
7: learn: 3.8506121 total: 164ms remaining: 20.4s
8: learn: 3.8437334 total: 187ms remaining: 20.6s
9: learn: 3.8352410 total: 205ms remaining: 20.3s
10: learn: 3.8282956 total: 215ms remaining: 19.3s
11: learn: 3.8233348 total: 229ms remaining: 18.9s
12: learn: 3.8119759 total: 251ms remaining: 19.1s
13: learn: 3.8051592 total: 261ms remaining: 18.4s
14: learn: 3.7971184 total: 283ms remaining: 18.6s
15: learn: 3.7935899 total: 292ms remaining: 17.9s
16: learn: 3.7866920 total: 314ms remaining: 18.2s
17: learn: 3.7814081 total: 336ms remaining: 18.3s
18: learn: 3.7751901 total: 358ms remaining: 18.5s
```

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19: learn: 3.7712193 total: 376ms remaining: 18.4s
20: learn: 3.7656847 total: 394ms remaining: 18.4s
21: learn: 3.7601722 total: 404ms remaining: 17.9s
22: learn: 3.7550216 total: 426ms remaining: 18.1s
23: learn: 3.7482521 total: 453ms remaining: 18.4s
24: learn: 3.7434019 total: 475ms remaining: 18.5s
25: learn: 3.7388647 total: 498ms remaining: 18.6s
26: learn: 3.7346842 total: 514ms remaining: 18.5s
27: learn: 3.7306948 total: 523ms remaining: 18.2s
28: learn: 3.7188109 total: 546ms remaining: 18.3s
29: learn: 3.7134169 total: 568ms remaining: 18.4s
30: learn: 3.7098770 total: 577ms remaining: 18s
31: learn: 3.7038446 total: 599ms remaining: 18.1s
32: learn: 3.7006421 total: 608ms remaining: 17.8s
33: learn: 3.6953806 total: 631ms remaining: 17.9s
34: learn: 3.6921856 total: 658ms remaining: 18.1s
35: learn: 3.6815724 total: 680ms remaining: 18.2s
36: learn: 3.6777677 total: 691ms remaining: 18s
37: learn: 3.6700707 total: 713ms remaining: 18.1s
38: learn: 3.6655346 total: 736ms remaining: 18.1s
39: learn: 3.6621802 total: 746ms remaining: 17.9s
40: learn: 3.6594751 total: 758ms remaining: 17.7s
41: learn: 3.6558728 total: 781ms remaining: 17.8s
42: learn: 3.6526927 total: 794ms remaining: 17.7s
43: learn: 3.6481472 total: 817ms remaining: 17.7s
44: learn: 3.6457764 total: 839ms remaining: 17.8s
45: learn: 3.6427939 total: 861ms remaining: 17.9s
46: learn: 3.6403575 total: 874ms remaining: 17.7s
47: learn: 3.6381155 total: 883ms remaining: 17.5s
48: learn: 3.6354592 total: 905ms remaining: 17.6s
49: learn: 3.6327252 total: 915ms remaining: 17.4s
50: learn: 3.6301003 total: 925ms remaining: 17.2s
51: learn: 3.6277800 total: 948ms remaining: 17.3s
52: learn: 3.6235166 total: 977ms remaining: 17.5s
53: learn: 3.6214761 total: 988ms remaining: 17.3s
54: learn: 3.6181882 total: 1.01s remaining: 17.4s
55: learn: 3.6138541 total: 1.04s remaining: 17.5s
56: learn: 3.6101306 total: 1.06s remaining: 17.5s
57: learn: 3.6075495 total: 1.08s remaining: 17.6s
58: learn: 3.6043290 total: 1.09s remaining: 17.4s
59: learn: 3.6026899 total: 1.11s remaining: 17.4s
60: learn: 3.6010164 total: 1.12s remaining: 17.3s
61: learn: 3.5928026 total: 1.14s remaining: 17.3s
62: learn: 3.5910164 total: 1.17s remaining: 17.3s
63: learn: 3.5890521 total: 1.18s remaining: 17.2s
64: learn: 3.5875019 total: 1.19s remaining: 17.1s
65: learn: 3.5855482 total: 1.2s remaining: 17s
66: learn: 3.5845568 total: 1.21s remaining: 16.8s
67: learn: 3.5784252 total: 1.23s remaining: 16.9s
68: learn: 3.5768651 total: 1.25s remaining: 16.8s
69: learn: 3.5749894 total: 1.26s remaining: 16.8s
70: learn: 3.5736408 total: 1.27s remaining: 16.6s
71: learn: 3.5723166 total: 1.28s remaining: 16.6s
72: learn: 3.5712504 total: 1.29s remaining: 16.4s
73: learn: 3.5696910 total: 1.31s remaining: 16.3s
74: learn: 3.5686540 total: 1.32s remaining: 16.2s
75: learn: 3.5659678 total: 1.33s remaining: 16.2s
76: learn: 3.5638984 total: 1.35s remaining: 16.2s
77: learn: 3.5612899 total: 1.36s remaining: 16.1s
78: learn: 3.5585411 total: 1.38s remaining: 16.1s
79: learn: 3.5536050 total: 1.41s remaining: 16.2s
80: learn: 3.5512092 total: 1.42s remaining: 16.2s
81: learn: 3.5505840 total: 1.43s remaining: 16s
82: learn: 3.5491892 total: 1.45s remaining: 16.1s
83: learn: 3.5474197 total: 1.48s remaining: 16.2s
84: learn: 3.5464202 total: 1.49s remaining: 16.1s
85: learn: 3.5448082 total: 1.51s remaining: 16.1s
86: learn: 3.5419285 total: 1.54s remaining: 16.1s
87: learn: 3.5395868 total: 1.56s remaining: 16.2s
88: learn: 3.5389233 total: 1.57s remaining: 16.1s
89: learn: 3.5365777 total: 1.58s remaining: 16s
90: learn: 3.5355384 total: 1.59s remaining: 15.9s
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91: learn: 3.5347290 total: 1.6s remaining: 15.8s
92: learn: 3.5328371 total: 1.61s remaining: 15.7s
93: learn: 3.5317846 total: 1.63s remaining: 15.7s
94: learn: 3.5295458 total: 1.65s remaining: 15.7s
95: learn: 3.5287382 total: 1.66s remaining: 15.6s
96: learn: 3.5279648 total: 1.67s remaining: 15.6s
97: learn: 3.5265291 total: 1.7s remaining: 15.6s
98: learn: 3.5246067 total: 1.71s remaining: 15.6s
99: learn: 3.5240309 total: 1.72s remaining: 15.5s
100: learn: 3.5226893 total: 1.74s remaining: 15.5s
101: learn: 3.5134521 total: 1.76s remaining: 15.5s
102: learn: 3.5127265 total: 1.79s remaining: 15.6s
103: learn: 3.5119717 total: 1.79s remaining: 15.5s
104: learn: 3.5113009 total: 1.81s remaining: 15.4s
105: learn: 3.5107788 total: 1.82s remaining: 15.3s
106: learn: 3.5099949 total: 1.83s remaining: 15.3s
107: learn: 3.5093348 total: 1.84s remaining: 15.2s
108: learn: 3.5075932 total: 1.85s remaining: 15.1s
109: learn: 3.5004336 total: 1.88s remaining: 15.2s
110: learn: 3.4998084 total: 1.89s remaining: 15.1s
111: learn: 3.4927519 total: 1.91s remaining: 15.2s
112: learn: 3.4911113 total: 1.92s remaining: 15.1s
113: learn: 3.4900554 total: 1.95s remaining: 15.1s
114: learn: 3.4895132 total: 1.96s remaining: 15.1s
115: learn: 3.4880289 total: 1.98s remaining: 15.1s
116: learn: 3.4875519 total: 2s remaining: 15.1s
117: learn: 3.4857306 total: 2.02s remaining: 15.1s
118: learn: 3.4847823 total: 2.03s remaining: 15s
119: learn: 3.4833429 total: 2.05s remaining: 15.1s
120: learn: 3.4826440 total: 2.06s remaining: 15s
121: learn: 3.4717982 total: 2.09s remaining: 15s
122: learn: 3.4714438 total: 2.11s remaining: 15s
123: learn: 3.4698755 total: 2.13s remaining: 15s
124: learn: 3.4693283 total: 2.14s remaining: 15s
125: learn: 3.4679980 total: 2.15s remaining: 14.9s
126: learn: 3.4676082 total: 2.17s remaining: 14.9s
127: learn: 3.4660919 total: 2.19s remaining: 14.9s
128: learn: 3.4494904 total: 2.21s remaining: 14.9s
129: learn: 3.4492634 total: 2.22s remaining: 14.8s
130: learn: 3.4489145 total: 2.23s remaining: 14.8s
131: learn: 3.4482669 total: 2.24s remaining: 14.7s
132: learn: 3.4479133 total: 2.26s remaining: 14.7s
133: learn: 3.4474647 total: 2.28s remaining: 14.7s
134: learn: 3.4312911 total: 2.3s remaining: 14.7s
135: learn: 3.4304235 total: 2.32s remaining: 14.7s
136: learn: 3.4298079 total: 2.33s remaining: 14.7s
137: learn: 3.4281679 total: 2.35s remaining: 14.7s
138: learn: 3.4277088 total: 2.38s remaining: 14.7s
139: learn: 3.4275386 total: 2.39s remaining: 14.7s
140: learn: 3.4265767 total: 2.41s remaining: 14.7s
141: learn: 3.4260295 total: 2.42s remaining: 14.7s
142: learn: 3.4245343 total: 2.45s remaining: 14.7s
143: learn: 3.4243257 total: 2.46s remaining: 14.6s
144: learn: 3.4230197 total: 2.47s remaining: 14.6s
145: learn: 3.4227507 total: 2.49s remaining: 14.5s
146: learn: 3.4213276 total: 2.51s remaining: 14.6s
147: learn: 3.4209863 total: 2.54s remaining: 14.6s
148: learn: 3.4196096 total: 2.56s remaining: 14.6s
149: learn: 3.4192823 total: 2.57s remaining: 14.6s
150: learn: 3.4190418 total: 2.58s remaining: 14.5s
151: learn: 3.4187788 total: 2.6s remaining: 14.5s
152: learn: 3.4181215 total: 2.63s remaining: 14.5s
153: learn: 3.4068120 total: 2.65s remaining: 14.6s
154: learn: 3.4066139 total: 2.66s remaining: 14.5s
155: learn: 3.4060256 total: 2.67s remaining: 14.5s
156: learn: 3.4057338 total: 2.69s remaining: 14.4s
157: learn: 3.4051745 total: 2.71s remaining: 14.5s
158: learn: 3.4040561 total: 2.74s remaining: 14.5s
159: learn: 3.4038867 total: 2.75s remaining: 14.4s
160: learn: 3.3959721 total: 2.77s remaining: 14.4s
161: learn: 3.3890612 total: 2.79s remaining: 14.5s
162: learn: 3.3878994 total: 2.82s remaining: 14.5s
```

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163: learn: 3.3874403 total: 2.83s remaining: 14.4s
164: learn: 3.3866694 total: 2.85s remaining: 14.4s
165: learn: 3.3860331 total: 2.86s remaining: 14.4s
166: learn: 3.3850728 total: 2.88s remaining: 14.4s
167: learn: 3.3845644 total: 2.91s remaining: 14.4s
168: learn: 3.3843677 total: 2.93s remaining: 14.4s
169: learn: 3.3842288 total: 2.94s remaining: 14.4s
170: learn: 3.3819728 total: 2.98s remaining: 14.4s
171: learn: 3.3818336 total: 2.99s remaining: 14.4s
172: learn: 3.3813919 total: 3s remaining: 14.3s
173: learn: 3.3810111 total: 3.02s remaining: 14.3s
174: learn: 3.3722377 total: 3.04s remaining: 14.3s
175: learn: 3.3721149 total: 3.06s remaining: 14.3s
176: learn: 3.3719920 total: 3.07s remaining: 14.3s
177: learn: 3.3718358 total: 3.09s remaining: 14.3s
178: learn: 3.3716872 total: 3.1s remaining: 14.2s
179: learn: 3.3707006 total: 3.12s remaining: 14.2s
180: learn: 3.3706088 total: 3.13s remaining: 14.2s
181: learn: 3.3691844 total: 3.16s remaining: 14.2s
182: learn: 3.3677909 total: 3.18s remaining: 14.2s
183: learn: 3.3524479 total: 3.2s remaining: 14.2s
184: learn: 3.3446113 total: 3.23s remaining: 14.2s
185: learn: 3.3439385 total: 3.24s remaining: 14.2s
186: learn: 3.3430602 total: 3.26s remaining: 14.2s
187: learn: 3.3423254 total: 3.28s remaining: 14.2s
188: learn: 3.3314340 total: 3.3s remaining: 14.2s
189: learn: 3.3226368 total: 3.33s remaining: 14.2s
190: learn: 3.3225469 total: 3.34s remaining: 14.1s
191: learn: 3.3224796 total: 3.35s remaining: 14.1s
192: learn: 3.3223867 total: 3.36s remaining: 14.1s
193: learn: 3.3220112 total: 3.37s remaining: 14s
194: learn: 3.3159154 total: 3.39s remaining: 14s
195: learn: 3.2973930 total: 3.42s remaining: 14s
196: learn: 3.2899832 total: 3.44s remaining: 14s
197: learn: 3.2881748 total: 3.46s remaining: 14s
198: learn: 3.2769575 total: 3.48s remaining: 14s
199: learn: 3.2764659 total: 3.49s remaining: 14s
200: learn: 3.2763870 total: 3.5s remaining: 13.9s
201: learn: 3.2760217 total: 3.51s remaining: 13.9s
202: learn: 3.2755830 total: 3.53s remaining: 13.9s
203: learn: 3.2751564 total: 3.54s remaining: 13.8s
204: learn: 3.2745704 total: 3.57s remaining: 13.8s
205: learn: 3.2744988 total: 3.59s remaining: 13.8s
206: learn: 3.2741027 total: 3.6s remaining: 13.8s
207: learn: 3.2674620 total: 3.62s remaining: 13.8s
208: learn: 3.2671818 total: 3.65s remaining: 13.8s
209: learn: 3.2669896 total: 3.66s remaining: 13.8s
210: learn: 3.2666792 total: 3.67s remaining: 13.7s
211: learn: 3.2517706 total: 3.7s remaining: 13.7s
212: learn: 3.2507749 total: 3.72s remaining: 13.7s
213: learn: 3.2367793 total: 3.74s remaining: 13.8s
214: learn: 3.2249778 total: 3.77s remaining: 13.8s
215: learn: 3.2249124 total: 3.78s remaining: 13.7s
216: learn: 3.2076427 total: 3.81s remaining: 13.7s
217: learn: 3.2075179 total: 3.81s remaining: 13.7s
218: learn: 3.2070285 total: 3.83s remaining: 13.6s
219: learn: 3.2068040 total: 3.84s remaining: 13.6s
220: learn: 3.2065729 total: 3.86s remaining: 13.6s
221: learn: 3.2062007 total: 3.87s remaining: 13.6s
222: learn: 3.2058024 total: 3.88s remaining: 13.5s
223: learn: 3.2057219 total: 3.9s remaining: 13.5s
224: learn: 3.2054488 total: 3.92s remaining: 13.5s
225: learn: 3.2048379 total: 3.94s remaining: 13.5s
226: learn: 3.2045157 total: 3.95s remaining: 13.5s
227: learn: 3.1913669 total: 3.98s remaining: 13.5s
228: learn: 3.1910885 total: 4.01s remaining: 13.5s
229: learn: 3.1908505 total: 4.02s remaining: 13.5s
230: learn: 3.1852482 total: 4.04s remaining: 13.5s
231: learn: 3.1849269 total: 4.07s remaining: 13.5s
232: learn: 3.1847783 total: 4.08s remaining: 13.4s
233: learn: 3.1845725 total: 4.09s remaining: 13.4s
234: learn: 3.1843614 total: 4.1s remaining: 13.3s
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235: learn: 3.1828021 total: 4.12s remaining: 13.3s
236: learn: 3.1822368 total: 4.14s remaining: 13.3s
237: learn: 3.1821949 total: 4.15s remaining: 13.3s
238: learn: 3.1790932 total: 4.17s remaining: 13.3s
239: learn: 3.1783530 total: 4.2s remaining: 13.3s
240: learn: 3.1780803 total: 4.22s remaining: 13.3s
241: learn: 3.1780421 total: 4.24s remaining: 13.3s
242: learn: 3.1693869 total: 4.26s remaining: 13.3s
243: learn: 3.1692480 total: 4.27s remaining: 13.2s
244: learn: 3.1690605 total: 4.29s remaining: 13.2s
245: learn: 3.1526114 total: 4.32s remaining: 13.2s
246: learn: 3.1522191 total: 4.33s remaining: 13.2s
247: learn: 3.1495017 total: 4.36s remaining: 13.2s
248: learn: 3.1493460 total: 4.36s remaining: 13.2s
249: learn: 3.1493094 total: 4.37s remaining: 13.1s
250: learn: 3.1492002 total: 4.39s remaining: 13.1s
251: learn: 3.1490762 total: 4.4s remaining: 13.1s
252: learn: 3.1391606 total: 4.42s remaining: 13.1s
253: learn: 3.1391289 total: 4.44s remaining: 13s
254: learn: 3.1348475 total: 4.46s remaining: 13s
255: learn: 3.1346091 total: 4.49s remaining: 13s
256: learn: 3.1345818 total: 4.5s remaining: 13s
257: learn: 3.1343492 total: 4.51s remaining: 13s
258: learn: 3.1339848 total: 4.53s remaining: 12.9s
259: learn: 3.1339426 total: 4.55s remaining: 12.9s
260: learn: 3.1338501 total: 4.56s remaining: 12.9s
261: learn: 3.1337508 total: 4.57s remaining: 12.9s
262: learn: 3.1332009 total: 4.59s remaining: 12.9s
263: learn: 3.1329941 total: 4.6s remaining: 12.8s
264: learn: 3.1327911 total: 4.61s remaining: 12.8s
265: learn: 3.1324923 total: 4.63s remaining: 12.8s
266: learn: 3.1321707 total: 4.65s remaining: 12.8s
267: learn: 3.1318084 total: 4.67s remaining: 12.8s
268: learn: 3.1316565 total: 4.68s remaining: 12.7s
269: learn: 3.1314893 total: 4.71s remaining: 12.7s
270: learn: 3.1312393 total: 4.71s remaining: 12.7s
271: learn: 3.1311801 total: 4.72s remaining: 12.6s
272: learn: 3.1311603 total: 4.74s remaining: 12.6s
273: learn: 3.1308476 total: 4.76s remaining: 12.6s
274: learn: 3.1308276 total: 4.77s remaining: 12.6s
275: learn: 3.1308056 total: 4.79s remaining: 12.6s
276: learn: 3.1306328 total: 4.81s remaining: 12.6s
277: learn: 3.1146875 total: 4.82s remaining: 12.5s
278: learn: 3.1144829 total: 4.84s remaining: 12.5s
279: learn: 3.1130002 total: 4.86s remaining: 12.5s
280: learn: 3.1063671 total: 4.88s remaining: 12.5s
281: learn: 3.1060992 total: 4.9s remaining: 12.5s
282: learn: 3.0889707 total: 4.92s remaining: 12.5s
283: learn: 3.0815554 total: 4.95s remaining: 12.5s
284: learn: 3.0662244 total: 4.97s remaining: 12.5s
285: learn: 3.0662072 total: 4.99s remaining: 12.5s
286: learn: 3.0660264 total: 5.01s remaining: 12.5s
287: learn: 3.0659067 total: 5.03s remaining: 12.4s
288: learn: 3.0654842 total: 5.04s remaining: 12.4s
289: learn: 3.0652729 total: 5.07s remaining: 12.4s
290: learn: 3.0647511 total: 5.08s remaining: 12.4s
291: learn: 3.0546726 total: 5.11s remaining: 12.4s
292: learn: 3.0539120 total: 5.13s remaining: 12.4s
293: learn: 3.0536092 total: 5.15s remaining: 12.4s
294: learn: 3.0535951 total: 5.16s remaining: 12.3s
295: learn: 3.0535912 total: 5.17s remaining: 12.3s
296: learn: 3.0438579 total: 5.19s remaining: 12.3s
297: learn: 3.0436658 total: 5.2s remaining: 12.3s
298: learn: 3.0435159 total: 5.23s remaining: 12.3s
299: learn: 3.0340709 total: 5.25s remaining: 12.3s
300: learn: 3.0302479 total: 5.28s remaining: 12.3s
301: learn: 3.0159730 total: 5.3s remaining: 12.2s
302: learn: 3.0158880 total: 5.31s remaining: 12.2s
303: learn: 3.0043334 total: 5.33s remaining: 12.2s
304: learn: 3.0043186 total: 5.34s remaining: 12.2s
305: learn: 3.0042950 total: 5.37s remaining: 12.2s
306: learn: 3.0040769 total: 5.39s remaining: 12.2s
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307: learn: 2.9952009 total: 5.41s remaining: 12.2s
308: learn: 2.9948100 total: 5.43s remaining: 12.2s
309: learn: 2.9845061 total: 5.46s remaining: 12.1s
310: learn: 2.9843147 total: 5.48s remaining: 12.1s
311: learn: 2.9839645 total: 5.49s remaining: 12.1s
312: learn: 2.9835998 total: 5.51s remaining: 12.1s
313: learn: 2.9734618 total: 5.53s remaining: 12.1s
314: learn: 2.9701824 total: 5.56s remaining: 12.1s
315: learn: 2.9646581 total: 5.58s remaining: 12.1s
316: learn: 2.9643994 total: 5.59s remaining: 12s
317: learn: 2.9640111 total: 5.61s remaining: 12s
318: learn: 2.9639204 total: 5.63s remaining: 12s
319: learn: 2.9623083 total: 5.66s remaining: 12s
320: learn: 2.9623050 total: 5.67s remaining: 12s
321: learn: 2.9618514 total: 5.69s remaining: 12s
322: learn: 2.9618223 total: 5.7s remaining: 11.9s
323: learn: 2.9617843 total: 5.71s remaining: 11.9s
324: learn: 2.9481712 total: 5.73s remaining: 11.9s
325: learn: 2.9480331 total: 5.74s remaining: 11.9s
326: learn: 2.9361764 total: 5.77s remaining: 11.9s
327: learn: 2.9319568 total: 5.79s remaining: 11.9s
328: learn: 2.9292279 total: 5.81s remaining: 11.9s
329: learn: 2.9197605 total: 5.84s remaining: 11.8s
330: learn: 2.9195580 total: 5.85s remaining: 11.8s
331: learn: 2.9190262 total: 5.88s remaining: 11.8s
332: learn: 2.9189032 total: 5.88s remaining: 11.8s
333: learn: 2.9097662 total: 5.91s remaining: 11.8s
334: learn: 2.9095773 total: 5.92s remaining: 11.7s
335: learn: 2.9095512 total: 5.93s remaining: 11.7s
336: learn: 2.9095229 total: 5.94s remaining: 11.7s
337: learn: 2.9093330 total: 5.96s remaining: 11.7s
338: learn: 2.9093321 total: 5.97s remaining: 11.6s
339: learn: 2.9092040 total: 6s remaining: 11.7s
340: learn: 2.9089903 total: 6.02s remaining: 11.6s
341: learn: 2.9086600 total: 6.05s remaining: 11.6s
342: learn: 2.9083297 total: 6.06s remaining: 11.6s
343: learn: 2.9052827 total: 6.08s remaining: 11.6s
344: learn: 2.9051667 total: 6.09s remaining: 11.6s
345: learn: 2.9050464 total: 6.11s remaining: 11.5s
346: learn: 2.9046206 total: 6.13s remaining: 11.5s
347: learn: 2.9045034 total: 6.14s remaining: 11.5s
348: learn: 2.9008161 total: 6.16s remaining: 11.5s
349: learn: 2.9007057 total: 6.18s remaining: 11.5s
350: learn: 2.8967060 total: 6.2s remaining: 11.5s
351: learn: 2.8928720 total: 6.22s remaining: 11.5s
352: learn: 2.8926645 total: 6.24s remaining: 11.4s
353: learn: 2.8925642 total: 6.27s remaining: 11.4s
354: learn: 2.8922113 total: 6.29s remaining: 11.4s
355: learn: 2.8845727 total: 6.31s remaining: 11.4s
356: learn: 2.8845170 total: 6.34s remaining: 11.4s
357: learn: 2.8836698 total: 6.37s remaining: 11.4s
358: learn: 2.8834511 total: 6.39s remaining: 11.4s
359: learn: 2.8816059 total: 6.41s remaining: 11.4s
360: learn: 2.8815204 total: 6.42s remaining: 11.4s
361: learn: 2.8734125 total: 6.45s remaining: 11.4s
362: learn: 2.8732472 total: 6.47s remaining: 11.4s
363: learn: 2.8727654 total: 6.5s remaining: 11.4s
364: learn: 2.8727341 total: 6.51s remaining: 11.3s
365: learn: 2.8727047 total: 6.53s remaining: 11.3s
366: learn: 2.8726092 total: 6.54s remaining: 11.3s
367: learn: 2.8725935 total: 6.55s remaining: 11.3s
368: learn: 2.8723972 total: 6.58s remaining: 11.2s
369: learn: 2.8723049 total: 6.59s remaining: 11.2s
370: learn: 2.8720799 total: 6.6s remaining: 11.2s
371: learn: 2.8718782 total: 6.62s remaining: 11.2s
372: learn: 2.8718634 total: 6.64s remaining: 11.2s
373: learn: 2.8700575 total: 6.66s remaining: 11.1s
374: learn: 2.8698098 total: 6.68s remaining: 11.1s
375: learn: 2.8601663 total: 6.71s remaining: 11.1s
376: learn: 2.8601385 total: 6.73s remaining: 11.1s
377: learn: 2.8598655 total: 6.75s remaining: 11.1s
378: learn: 2.8570348 total: 6.77s remaining: 11.1s
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379: learn: 2.8570209 total: 6.78s remaining: 11.1s
380: learn: 2.8570080 total: 6.8s remaining: 11s
381: learn: 2.8555917 total: 6.81s remaining: 11s
382: learn: 2.8483596 total: 6.84s remaining: 11s
383: learn: 2.8483474 total: 6.85s remaining: 11s
384: learn: 2.8479865 total: 6.87s remaining: 11s
385: learn: 2.8479773 total: 6.88s remaining: 10.9s
386: learn: 2.8479363 total: 6.9s remaining: 10.9s
387: learn: 2.8433321 total: 6.92s remaining: 10.9s
388: learn: 2.8335014 total: 6.94s remaining: 10.9s
389: learn: 2.8213220 total: 6.96s remaining: 10.9s
390: learn: 2.8127713 total: 6.99s remaining: 10.9s
391: learn: 2.8126199 total: 7.01s remaining: 10.9s
392: learn: 2.8077958 total: 7.03s remaining: 10.9s
393: learn: 2.8074368 total: 7.05s remaining: 10.8s
394: learn: 2.8072997 total: 7.07s remaining: 10.8s
395: learn: 2.8071801 total: 7.09s remaining: 10.8s
396: learn: 2.8060965 total: 7.12s remaining: 10.8s
397: learn: 2.8058468 total: 7.14s remaining: 10.8s
398: learn: 2.7994539 total: 7.16s remaining: 10.8s
399: learn: 2.7993830 total: 7.17s remaining: 10.8s
400: learn: 2.7966094 total: 7.19s remaining: 10.7s
401: learn: 2.7965523 total: 7.21s remaining: 10.7s
402: learn: 2.7963097 total: 7.23s remaining: 10.7s
403: learn: 2.7962382 total: 7.25s remaining: 10.7s
404: learn: 2.7961616 total: 7.27s remaining: 10.7s
405: learn: 2.7952885 total: 7.29s remaining: 10.7s
406: learn: 2.7951325 total: 7.31s remaining: 10.7s
407: learn: 2.7887515 total: 7.34s remaining: 10.6s
408: learn: 2.7885656 total: 7.36s remaining: 10.6s
409: learn: 2.7884374 total: 7.38s remaining: 10.6s
410: learn: 2.7882482 total: 7.4s remaining: 10.6s
411: learn: 2.7882311 total: 7.41s remaining: 10.6s
412: learn: 2.7881158 total: 7.43s remaining: 10.6s
413: learn: 2.7878752 total: 7.45s remaining: 10.5s
414: learn: 2.7820024 total: 7.47s remaining: 10.5s
415: learn: 2.7801547 total: 7.5s remaining: 10.5s
416: learn: 2.7799246 total: 7.52s remaining: 10.5s
417: learn: 2.7794724 total: 7.54s remaining: 10.5s
418: learn: 2.7794557 total: 7.55s remaining: 10.5s
419: learn: 2.7793183 total: 7.57s remaining: 10.4s
420: learn: 2.7793092 total: 7.58s remaining: 10.4s
421: learn: 2.7787566 total: 7.6s remaining: 10.4s
422: learn: 2.7780440 total: 7.62s remaining: 10.4s
423: learn: 2.7780379 total: 7.64s remaining: 10.4s
424: learn: 2.7777968 total: 7.66s remaining: 10.4s
425: learn: 2.7663749 total: 7.68s remaining: 10.4s
426: learn: 2.7636137 total: 7.71s remaining: 10.3s
427: learn: 2.7598723 total: 7.73s remaining: 10.3s
428: learn: 2.7595490 total: 7.75s remaining: 10.3s
429: learn: 2.7590408 total: 7.77s remaining: 10.3s
430: learn: 2.7589299 total: 7.79s remaining: 10.3s
431: learn: 2.7586100 total: 7.81s remaining: 10.3s
432: learn: 2.7586015 total: 7.82s remaining: 10.2s
433: learn: 2.7500957 total: 7.84s remaining: 10.2s
434: learn: 2.7420853 total: 7.87s remaining: 10.2s
435: learn: 2.7310915 total: 7.89s remaining: 10.2s
436: learn: 2.7310403 total: 7.9s remaining: 10.2s
437: learn: 2.7310368 total: 7.92s remaining: 10.2s
438: learn: 2.7309423 total: 7.94s remaining: 10.1s
439: learn: 2.7283308 total: 7.96s remaining: 10.1s
440: learn: 2.7282302 total: 7.98s remaining: 10.1s
441: learn: 2.7281940 total: 8.01s remaining: 10.1s
442: learn: 2.7280438 total: 8.02s remaining: 10.1s
443: learn: 2.7279929 total: 8.03s remaining: 10.1s
444: learn: 2.7255484 total: 8.05s remaining: 10s
445: learn: 2.7184498 total: 8.08s remaining: 10s
446: learn: 2.7184106 total: 8.09s remaining: 10s
447: learn: 2.7151630 total: 8.12s remaining: 10s
448: learn: 2.7150195 total: 8.14s remaining: 9.99s
449: learn: 2.7149739 total: 8.15s remaining: 9.96s
450: learn: 2.7149184 total: 8.16s remaining: 9.93s
```

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451: learn: 2.7109133 total: 8.19s remaining: 9.93s
452: learn: 2.7108885 total: 8.2s remaining: 9.9s
453: learn: 2.7108453 total: 8.21s remaining: 9.87s
454: learn: 2.7108322 total: 8.22s remaining: 9.85s
455: learn: 2.7108124 total: 8.24s remaining: 9.83s
456: learn: 2.7107784 total: 8.26s remaining: 9.81s
457: learn: 2.7107549 total: 8.28s remaining: 9.8s
458: learn: 2.7106858 total: 8.3s remaining: 9.79s
459: learn: 2.7105022 total: 8.33s remaining: 9.78s
460: learn: 2.6998519 total: 8.35s remaining: 9.76s
461: learn: 2.6909277 total: 8.37s remaining: 9.75s
462: learn: 2.6835676 total: 8.4s remaining: 9.74s
463: learn: 2.6835650 total: 8.41s remaining: 9.71s
464: learn: 2.6833898 total: 8.43s remaining: 9.7s
465: learn: 2.6833758 total: 8.45s remaining: 9.69s
466: learn: 2.6833197 total: 8.46s remaining: 9.66s
467: learn: 2.6826247 total: 8.48s remaining: 9.64s
468: learn: 2.6825636 total: 8.5s remaining: 9.63s
469: learn: 2.6825524 total: 8.52s remaining: 9.61s
470: learn: 2.6825460 total: 8.53s remaining: 9.58s
471: learn: 2.6824187 total: 8.54s remaining: 9.55s
472: learn: 2.6806701 total: 8.56s remaining: 9.54s
473: learn: 2.6801614 total: 8.59s remaining: 9.53s
474: learn: 2.6801583 total: 8.61s remaining: 9.51s
475: learn: 2.6800066 total: 8.63s remaining: 9.5s
476: learn: 2.6799834 total: 8.65s remaining: 9.48s
477: learn: 2.6799486 total: 8.65s remaining: 9.45s
478: learn: 2.6799333 total: 8.68s remaining: 9.44s
479: learn: 2.6727035 total: 8.7s remaining: 9.42s
480: learn: 2.6726959 total: 8.71s remaining: 9.4s
481: learn: 2.6726650 total: 8.72s remaining: 9.37s
482: learn: 2.6726309 total: 8.74s remaining: 9.35s
483: learn: 2.6726083 total: 8.75s remaining: 9.33s
484: learn: 2.6724794 total: 8.77s remaining: 9.31s
485: learn: 2.6724604 total: 8.78s remaining: 9.29s
486: learn: 2.6724270 total: 8.79s remaining: 9.27s
487: learn: 2.6723685 total: 8.81s remaining: 9.25s
488: learn: 2.6723627 total: 8.82s remaining: 9.22s
489: learn: 2.6708624 total: 8.84s remaining: 9.2s
490: learn: 2.6702113 total: 8.87s remaining: 9.19s
491: learn: 2.6666735 total: 8.89s remaining: 9.18s
492: learn: 2.6619427 total: 8.91s remaining: 9.16s
493: learn: 2.6618308 total: 8.93s remaining: 9.15s
494: learn: 2.6577079 total: 8.95s remaining: 9.13s
495: learn: 2.6512107 total: 8.97s remaining: 9.12s
496: learn: 2.6490440 total: 9s remaining: 9.11s
497: learn: 2.6490371 total: 9.02s remaining: 9.09s
498: learn: 2.6490248 total: 9.04s remaining: 9.07s
499: learn: 2.6489440 total: 9.05s remaining: 9.05s
500: learn: 2.6489237 total: 9.06s remaining: 9.03s
501: learn: 2.6489076 total: 9.08s remaining: 9.01s
502: learn: 2.6488628 total: 9.1s remaining: 8.99s
503: learn: 2.6470622 total: 9.13s remaining: 8.98s
504: learn: 2.6470078 total: 9.15s remaining: 8.97s
505: learn: 2.6469023 total: 9.16s remaining: 8.94s
506: learn: 2.6430091 total: 9.18s remaining: 8.93s
507: learn: 2.6429992 total: 9.21s remaining: 8.92s
508: learn: 2.6429874 total: 9.23s remaining: 8.9s
509: learn: 2.6429722 total: 9.24s remaining: 8.88s
510: learn: 2.6389176 total: 9.26s remaining: 8.86s
511: learn: 2.6389101 total: 9.29s remaining: 8.85s
512: learn: 2.6387791 total: 9.31s remaining: 8.84s
513: learn: 2.6387650 total: 9.33s remaining: 8.82s
514: learn: 2.6386854 total: 9.34s remaining: 8.8s
515: learn: 2.6386723 total: 9.36s remaining: 8.78s
516: learn: 2.6386460 total: 9.37s remaining: 8.75s
517: learn: 2.6377323 total: 9.39s remaining: 8.74s
518: learn: 2.6318989 total: 9.41s remaining: 8.72s
519: learn: 2.6317652 total: 9.44s remaining: 8.71s
520: learn: 2.6317484 total: 9.46s remaining: 8.7s
521: learn: 2.6269636 total: 9.48s remaining: 8.68s
522: learn: 2.6210014 total: 9.5s remaining: 8.67s
```

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523: learn: 2.6209766 total: 9.52s remaining: 8.65s
524: learn: 2.6209097 total: 9.54s remaining: 8.63s
525: learn: 2.6149762 total: 9.56s remaining: 8.62s
526: learn: 2.6095854 total: 9.59s remaining: 8.6s
527: learn: 2.6062566 total: 9.61s remaining: 8.59s
528: learn: 2.6051556 total: 9.63s remaining: 8.57s
529: learn: 2.5996786 total: 9.66s remaining: 8.56s
530: learn: 2.5995867 total: 9.67s remaining: 8.54s
531: learn: 2.5994370 total: 9.69s remaining: 8.53s
532: learn: 2.5994137 total: 9.7s remaining: 8.5s
533: learn: 2.5994085 total: 9.71s remaining: 8.48s
534: learn: 2.5994031 total: 9.74s remaining: 8.46s
535: learn: 2.5992840 total: 9.76s remaining: 8.45s
536: learn: 2.5924399 total: 9.78s remaining: 8.43s
537: learn: 2.5924279 total: 9.79s remaining: 8.41s
538: learn: 2.5871149 total: 9.82s remaining: 8.4s
539: learn: 2.5871027 total: 9.83s remaining: 8.37s
540: learn: 2.5870842 total: 9.84s remaining: 8.35s
541: learn: 2.5846110 total: 9.86s remaining: 8.34s
542: learn: 2.5846050 total: 9.89s remaining: 8.32s
543: learn: 2.5845339 total: 9.91s remaining: 8.31s
544: learn: 2.5844901 total: 9.93s remaining: 8.29s
545: learn: 2.5795874 total: 9.96s remaining: 8.28s
546: learn: 2.5794726 total: 9.98s remaining: 8.26s
547: learn: 2.5793810 total: 9.99s remaining: 8.24s
548: learn: 2.5793632 total: 10s remaining: 8.22s
549: learn: 2.5793542 total: 10s remaining: 8.19s
550: learn: 2.5699717 total: 10s remaining: 8.19s
551: learn: 2.5649317 total: 10.1s remaining: 8.17s
552: learn: 2.5649208 total: 10.1s remaining: 8.15s
553: learn: 2.5649118 total: 10.1s remaining: 8.13s
554: learn: 2.5648954 total: 10.1s remaining: 8.11s
555: learn: 2.5648847 total: 10.1s remaining: 8.09s
556: learn: 2.5648835 total: 10.1s remaining: 8.06s
557: learn: 2.5648400 total: 10.2s remaining: 8.04s
558: learn: 2.5648320 total: 10.2s remaining: 8.03s
559: learn: 2.5601718 total: 10.2s remaining: 8.01s
560: learn: 2.5601052 total: 10.2s remaining: 8.01s
561: learn: 2.5600277 total: 10.3s remaining: 7.99s
562: learn: 2.5600237 total: 10.3s remaining: 7.98s
563: learn: 2.5599139 total: 10.3s remaining: 7.96s
564: learn: 2.5599053 total: 10.3s remaining: 7.95s
565: learn: 2.5598958 total: 10.3s remaining: 7.93s
566: learn: 2.5598807 total: 10.3s remaining: 7.9s
567: learn: 2.5592370 total: 10.4s remaining: 7.89s
568: learn: 2.5592286 total: 10.4s remaining: 7.87s
569: learn: 2.5592142 total: 10.4s remaining: 7.84s
570: learn: 2.5583722 total: 10.4s remaining: 7.83s
571: learn: 2.5569355 total: 10.4s remaining: 7.81s
572: learn: 2.5569018 total: 10.5s remaining: 7.79s
573: learn: 2.5568921 total: 10.5s remaining: 7.77s
574: learn: 2.5525003 total: 10.5s remaining: 7.76s
575: learn: 2.5431041 total: 10.5s remaining: 7.75s
576: learn: 2.5429936 total: 10.5s remaining: 7.73s
577: learn: 2.5412538 total: 10.6s remaining: 7.72s
578: learn: 2.5412208 total: 10.6s remaining: 7.7s
579: learn: 2.5382925 total: 10.6s remaining: 7.68s
580: learn: 2.5382887 total: 10.6s remaining: 7.67s
581: learn: 2.5382871 total: 10.6s remaining: 7.64s
582: learn: 2.5382840 total: 10.7s remaining: 7.63s
583: learn: 2.5382486 total: 10.7s remaining: 7.61s
584: learn: 2.5382286 total: 10.7s remaining: 7.59s
585: learn: 2.5325017 total: 10.7s remaining: 7.58s
586: learn: 2.5279092 total: 10.7s remaining: 7.56s
587: learn: 2.5279058 total: 10.8s remaining: 7.55s
588: learn: 2.5240954 total: 10.8s remaining: 7.53s
589: learn: 2.5240665 total: 10.8s remaining: 7.52s
590: learn: 2.5230687 total: 10.8s remaining: 7.5s
591: learn: 2.5200636 total: 10.9s remaining: 7.49s
592: learn: 2.5200561 total: 10.9s remaining: 7.46s
593: learn: 2.5159964 total: 10.9s remaining: 7.45s
594: learn: 2.5159926 total: 10.9s remaining: 7.43s
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595: learn: 2.5076771 total: 10.9s remaining: 7.42s
596: learn: 2.5072283 total: 11s remaining: 7.4s
597: learn: 2.5035886 total: 11s remaining: 7.39s
598: learn: 2.5035780 total: 11s remaining: 7.37s
599: learn: 2.5035692 total: 11s remaining: 7.35s
600: learn: 2.5035582 total: 11.1s remaining: 7.34s
601: learn: 2.5034290 total: 11.1s remaining: 7.32s
602: learn: 2.5034209 total: 11.1s remaining: 7.3s
603: learn: 2.5034142 total: 11.1s remaining: 7.29s
604: learn: 2.5034076 total: 11.1s remaining: 7.27s
605: learn: 2.4998768 total: 11.2s remaining: 7.25s
606: learn: 2.4998480 total: 11.2s remaining: 7.24s
607: learn: 2.4997679 total: 11.2s remaining: 7.22s
608: learn: 2.4997002 total: 11.2s remaining: 7.2s
609: learn: 2.4996941 total: 11.2s remaining: 7.17s
610: learn: 2.4996770 total: 11.2s remaining: 7.15s
611: learn: 2.4996702 total: 11.2s remaining: 7.13s
612: learn: 2.4957856 total: 11.3s remaining: 7.11s
613: learn: 2.4957741 total: 11.3s remaining: 7.09s
614: learn: 2.4957042 total: 11.3s remaining: 7.07s
615: learn: 2.4941467 total: 11.3s remaining: 7.06s
616: learn: 2.4941305 total: 11.3s remaining: 7.04s
617: learn: 2.4941231 total: 11.4s remaining: 7.02s
618: learn: 2.4935437 total: 11.4s remaining: 7s
619: learn: 2.4935369 total: 11.4s remaining: 6.99s
620: learn: 2.4934322 total: 11.4s remaining: 6.97s
621: learn: 2.4934259 total: 11.4s remaining: 6.95s
622: learn: 2.4934002 total: 11.5s remaining: 6.93s
623: learn: 2.4933973 total: 11.5s remaining: 6.92s
624: learn: 2.4933919 total: 11.5s remaining: 6.89s
625: learn: 2.4933234 total: 11.5s remaining: 6.88s
626: learn: 2.4933087 total: 11.5s remaining: 6.85s
627: learn: 2.4933041 total: 11.5s remaining: 6.83s
628: learn: 2.4932624 total: 11.6s remaining: 6.82s
629: learn: 2.4932485 total: 11.6s remaining: 6.79s
630: learn: 2.4926355 total: 11.6s remaining: 6.78s
631: learn: 2.4914952 total: 11.6s remaining: 6.76s
632: learn: 2.4914945 total: 11.6s remaining: 6.74s
633: learn: 2.4914877 total: 11.6s remaining: 6.72s
634: learn: 2.4914823 total: 11.7s remaining: 6.7s
635: learn: 2.4862462 total: 11.7s remaining: 6.68s
636: learn: 2.4862411 total: 11.7s remaining: 6.66s
637: learn: 2.4861605 total: 11.7s remaining: 6.64s
638: learn: 2.4829948 total: 11.7s remaining: 6.63s
639: learn: 2.4829904 total: 11.7s remaining: 6.61s
640: learn: 2.4829311 total: 11.8s remaining: 6.6s
641: learn: 2.4829268 total: 11.8s remaining: 6.58s
642: learn: 2.4829227 total: 11.8s remaining: 6.56s
643: learn: 2.4829176 total: 11.8s remaining: 6.54s
644: learn: 2.4829159 total: 11.8s remaining: 6.52s
645: learn: 2.4798443 total: 11.9s remaining: 6.5s
646: learn: 2.4771597 total: 11.9s remaining: 6.49s
647: learn: 2.4771521 total: 11.9s remaining: 6.47s
648: learn: 2.4770975 total: 11.9s remaining: 6.45s
649: learn: 2.4770315 total: 12s remaining: 6.44s
650: learn: 2.4769817 total: 12s remaining: 6.42s
651: learn: 2.4769240 total: 12s remaining: 6.41s
652: learn: 2.4769123 total: 12s remaining: 6.39s
653: learn: 2.4768525 total: 12.1s remaining: 6.38s
654: learn: 2.4767978 total: 12.1s remaining: 6.36s
655: learn: 2.4767939 total: 12.1s remaining: 6.34s
656: learn: 2.4734023 total: 12.1s remaining: 6.32s
657: learn: 2.4734000 total: 12.1s remaining: 6.3s
658: learn: 2.4733970 total: 12.1s remaining: 6.28s
659: learn: 2.4733931 total: 12.2s remaining: 6.26s
660: learn: 2.4733875 total: 12.2s remaining: 6.24s
661: learn: 2.4733750 total: 12.2s remaining: 6.22s
662: learn: 2.4733687 total: 12.2s remaining: 6.2s
663: learn: 2.4733654 total: 12.2s remaining: 6.18s
664: learn: 2.4706471 total: 12.2s remaining: 6.16s
665: learn: 2.4706452 total: 12.2s remaining: 6.14s
666: learn: 2.4677458 total: 12.3s remaining: 6.12s
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667: learn: 2.4676242 total: 12.3s remaining: 6.11s
668: learn: 2.4676125 total: 12.3s remaining: 6.08s
669: learn: 2.4674519 total: 12.3s remaining: 6.07s
670: learn: 2.4670360 total: 12.3s remaining: 6.05s
671: learn: 2.4670325 total: 12.4s remaining: 6.04s
672: learn: 2.4655520 total: 12.4s remaining: 6.02s
673: learn: 2.4655421 total: 12.4s remaining: 6s
674: learn: 2.4655027 total: 12.4s remaining: 5.99s
675: learn: 2.4654810 total: 12.5s remaining: 5.97s
676: learn: 2.4654750 total: 12.5s remaining: 5.95s
677: learn: 2.4654722 total: 12.5s remaining: 5.93s
678: learn: 2.4653328 total: 12.5s remaining: 5.91s
679: learn: 2.4653303 total: 12.5s remaining: 5.89s
680: learn: 2.4653284 total: 12.5s remaining: 5.87s
681: learn: 2.4653259 total: 12.5s remaining: 5.85s
682: learn: 2.4653217 total: 12.6s remaining: 5.83s
683: learn: 2.4653190 total: 12.6s remaining: 5.81s
684: learn: 2.4627455 total: 12.6s remaining: 5.8s
685: learn: 2.4627378 total: 12.6s remaining: 5.78s
686: learn: 2.4625693 total: 12.6s remaining: 5.76s
687: learn: 2.4621316 total: 12.7s remaining: 5.75s
688: learn: 2.4621198 total: 12.7s remaining: 5.73s
689: learn: 2.4621015 total: 12.7s remaining: 5.71s
690: learn: 2.4621015 total: 12.7s remaining: 5.69s
691: learn: 2.4589187 total: 12.7s remaining: 5.67s
692: learn: 2.4589157 total: 12.8s remaining: 5.65s
693: learn: 2.4559782 total: 12.8s remaining: 5.63s
694: learn: 2.4543309 total: 12.8s remaining: 5.62s
695: learn: 2.4539357 total: 12.8s remaining: 5.6s
696: learn: 2.4539252 total: 12.8s remaining: 5.58s
697: learn: 2.4539229 total: 12.9s remaining: 5.56s
698: learn: 2.4539207 total: 12.9s remaining: 5.54s
699: learn: 2.4463103 total: 12.9s remaining: 5.53s
700: learn: 2.4461834 total: 12.9s remaining: 5.51s
701: learn: 2.4457627 total: 12.9s remaining: 5.49s
702: learn: 2.4457606 total: 13s remaining: 5.47s
703: learn: 2.4457602 total: 13s remaining: 5.45s
704: learn: 2.4457180 total: 13s remaining: 5.43s
705: learn: 2.4441962 total: 13s remaining: 5.42s
706: learn: 2.4441843 total: 13s remaining: 5.4s
707: learn: 2.4441815 total: 13.1s remaining: 5.38s
708: learn: 2.4441800 total: 13.1s remaining: 5.36s
709: learn: 2.4441781 total: 13.1s remaining: 5.34s
710: learn: 2.4430058 total: 13.1s remaining: 5.32s
711: learn: 2.4430048 total: 13.1s remaining: 5.3s
712: learn: 2.4425075 total: 13.1s remaining: 5.29s
713: learn: 2.4425075 total: 13.1s remaining: 5.26s
714: learn: 2.4424759 total: 13.2s remaining: 5.24s
715: learn: 2.4424592 total: 13.2s remaining: 5.22s
716: learn: 2.4424575 total: 13.2s remaining: 5.2s
717: learn: 2.4424520 total: 13.2s remaining: 5.18s
718: learn: 2.4424487 total: 13.2s remaining: 5.16s
719: learn: 2.4424477 total: 13.2s remaining: 5.14s
720: learn: 2.4382018 total: 13.2s remaining: 5.13s
721: learn: 2.4382003 total: 13.3s remaining: 5.1s
722: learn: 2.4381909 total: 13.3s remaining: 5.08s
723: learn: 2.4381897 total: 13.3s remaining: 5.06s
724: learn: 2.4381808 total: 13.3s remaining: 5.04s
725: learn: 2.4381100 total: 13.3s remaining: 5.02s
726: learn: 2.4381054 total: 13.3s remaining: 5s
727: learn: 2.4381044 total: 13.3s remaining: 4.98s
728: learn: 2.4381035 total: 13.3s remaining: 4.96s
729: learn: 2.4381023 total: 13.4s remaining: 4.94s
730: learn: 2.4381010 total: 13.4s remaining: 4.92s
731: learn: 2.4380995 total: 13.4s remaining: 4.9s
732: learn: 2.4351821 total: 13.4s remaining: 4.88s
733: learn: 2.4335516 total: 13.4s remaining: 4.86s
734: learn: 2.4335308 total: 13.5s remaining: 4.85s
735: learn: 2.4335254 total: 13.5s remaining: 4.83s
736: learn: 2.4333969 total: 13.5s remaining: 4.82s
737: learn: 2.4333970 total: 13.5s remaining: 4.79s
738: learn: 2.4250203 total: 13.5s remaining: 4.78s
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739: learn: 2.4235163 total: 13.5s remaining: 4.76s
740: learn: 2.4234700 total: 13.6s remaining: 4.74s
741: learn: 2.4221298 total: 13.6s remaining: 4.73s
742: learn: 2.4211686 total: 13.6s remaining: 4.71s
743: learn: 2.4211411 total: 13.6s remaining: 4.69s
744: learn: 2.4211043 total: 13.7s remaining: 4.67s
745: learn: 2.4211004 total: 13.7s remaining: 4.65s
746: learn: 2.4210619 total: 13.7s remaining: 4.64s
747: learn: 2.4210458 total: 13.7s remaining: 4.62s
748: learn: 2.4210454 total: 13.7s remaining: 4.59s
749: learn: 2.4209235 total: 13.7s remaining: 4.58s
750: learn: 2.4185876 total: 13.8s remaining: 4.56s
751: learn: 2.4183607 total: 13.8s remaining: 4.54s
752: learn: 2.4183584 total: 13.8s remaining: 4.52s
753: learn: 2.4183578 total: 13.8s remaining: 4.5s
754: learn: 2.4182792 total: 13.8s remaining: 4.49s
755: learn: 2.4108355 total: 13.8s remaining: 4.47s
756: learn: 2.4108345 total: 13.9s remaining: 4.45s
757: learn: 2.4108343 total: 13.9s remaining: 4.43s
758: learn: 2.4096025 total: 13.9s remaining: 4.42s
759: learn: 2.4095945 total: 13.9s remaining: 4.39s
760: learn: 2.4095268 total: 13.9s remaining: 4.38s
761: learn: 2.4094956 total: 14s remaining: 4.36s
762: learn: 2.4094614 total: 14s remaining: 4.34s
763: learn: 2.4094604 total: 14s remaining: 4.33s
764: learn: 2.4094368 total: 14s remaining: 4.3s
765: learn: 2.4055330 total: 14s remaining: 4.29s
766: learn: 2.4055039 total: 14.1s remaining: 4.27s
767: learn: 2.4055029 total: 14.1s remaining: 4.25s
768: learn: 2.4054731 total: 14.1s remaining: 4.24s
769: learn: 2.4053960 total: 14.1s remaining: 4.22s
770: learn: 2.4053501 total: 14.1s remaining: 4.2s
771: learn: 2.4053494 total: 14.2s remaining: 4.18s
772: learn: 2.4053490 total: 14.2s remaining: 4.16s
773: learn: 2.4052519 total: 14.2s remaining: 4.14s
774: learn: 2.4052269 total: 14.2s remaining: 4.12s
775: learn: 2.4052195 total: 14.2s remaining: 4.1s
776: learn: 2.4051950 total: 14.2s remaining: 4.08s
777: learn: 2.4030054 total: 14.2s remaining: 4.07s
778: learn: 2.4029886 total: 14.3s remaining: 4.05s
779: learn: 2.4004950 total: 14.3s remaining: 4.03s
780: learn: 2.3993454 total: 14.3s remaining: 4.01s
781: learn: 2.3993179 total: 14.3s remaining: 4s
782: learn: 2.3991940 total: 14.4s remaining: 3.98s
783: learn: 2.3991921 total: 14.4s remaining: 3.96s
784: learn: 2.3991601 total: 14.4s remaining: 3.94s
785: learn: 2.3970767 total: 14.4s remaining: 3.92s
786: learn: 2.3970735 total: 14.4s remaining: 3.9s
787: learn: 2.3970508 total: 14.4s remaining: 3.88s
788: learn: 2.3970505 total: 14.4s remaining: 3.86s
789: learn: 2.3958826 total: 14.5s remaining: 3.85s
790: learn: 2.3958821 total: 14.5s remaining: 3.83s
791: learn: 2.3958820 total: 14.5s remaining: 3.81s
792: learn: 2.3957466 total: 14.5s remaining: 3.79s
793: learn: 2.3956983 total: 14.6s remaining: 3.78s
794: learn: 2.3956916 total: 14.6s remaining: 3.76s
795: learn: 2.3921432 total: 14.6s remaining: 3.74s
796: learn: 2.3921427 total: 14.6s remaining: 3.72s
797: learn: 2.3921398 total: 14.6s remaining: 3.7s
798: learn: 2.3913851 total: 14.6s remaining: 3.68s
799: learn: 2.3913849 total: 14.6s remaining: 3.66s
800: learn: 2.3913847 total: 14.7s remaining: 3.64s
801: learn: 2.3879481 total: 14.7s remaining: 3.62s
802: learn: 2.3845592 total: 14.7s remaining: 3.61s
803: learn: 2.3845585 total: 14.7s remaining: 3.59s
804: learn: 2.3845113 total: 14.7s remaining: 3.57s
805: learn: 2.3845110 total: 14.8s remaining: 3.55s
806: learn: 2.3845105 total: 14.8s remaining: 3.53s
807: learn: 2.3845088 total: 14.8s remaining: 3.51s
808: learn: 2.3845085 total: 14.8s remaining: 3.49s
809: learn: 2.3843352 total: 14.8s remaining: 3.47s
810: learn: 2.3843350 total: 14.8s remaining: 3.45s
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811: learn: 2.3843027 total: 14.8s remaining: 3.44s
812: learn: 2.3776281 total: 14.9s remaining: 3.42s
813: learn: 2.3776280 total: 14.9s remaining: 3.4s
814: learn: 2.3776274 total: 14.9s remaining: 3.38s
815: learn: 2.3776273 total: 14.9s remaining: 3.36s
816: learn: 2.3776242 total: 14.9s remaining: 3.34s
817: learn: 2.3774448 total: 14.9s remaining: 3.32s
818: learn: 2.3773955 total: 15s remaining: 3.31s
819: learn: 2.3755996 total: 15s remaining: 3.29s
820: learn: 2.3755972 total: 15s remaining: 3.27s
821: learn: 2.3746621 total: 15s remaining: 3.25s
822: learn: 2.3714421 total: 15s remaining: 3.23s
823: learn: 2.3694305 total: 15.1s remaining: 3.22s
824: learn: 2.3694283 total: 15.1s remaining: 3.2s
825: learn: 2.3689598 total: 15.1s remaining: 3.18s
826: learn: 2.3689596 total: 15.1s remaining: 3.16s
827: learn: 2.3689593 total: 15.1s remaining: 3.14s
828: learn: 2.3689591 total: 15.1s remaining: 3.12s
829: learn: 2.3689557 total: 15.2s remaining: 3.1s
830: learn: 2.3689335 total: 15.2s remaining: 3.09s
831: learn: 2.3686555 total: 15.2s remaining: 3.07s
832: learn: 2.3686529 total: 15.2s remaining: 3.05s
833: learn: 2.3686517 total: 15.2s remaining: 3.03s
834: learn: 2.3686514 total: 15.3s remaining: 3.01s
835: learn: 2.3686329 total: 15.3s remaining: 2.99s
836: learn: 2.3686029 total: 15.3s remaining: 2.98s
837: learn: 2.3669812 total: 15.3s remaining: 2.96s
838: learn: 2.3669810 total: 15.3s remaining: 2.94s
839: learn: 2.3669805 total: 15.3s remaining: 2.92s
840: learn: 2.3669746 total: 15.3s remaining: 2.9s
841: learn: 2.3669251 total: 15.4s remaining: 2.88s
842: learn: 2.3669248 total: 15.4s remaining: 2.86s
843: learn: 2.3659261 total: 15.4s remaining: 2.85s
844: learn: 2.3658863 total: 15.4s remaining: 2.83s
845: learn: 2.3658637 total: 15.4s remaining: 2.81s
846: learn: 2.3658422 total: 15.4s remaining: 2.79s
847: learn: 2.3658401 total: 15.5s remaining: 2.77s
848: learn: 2.3658399 total: 15.5s remaining: 2.75s
849: learn: 2.3623079 total: 15.5s remaining: 2.73s
850: learn: 2.3622677 total: 15.5s remaining: 2.72s
851: learn: 2.3604675 total: 15.5s remaining: 2.7s
852: learn: 2.3604640 total: 15.6s remaining: 2.68s
853: learn: 2.3604639 total: 15.6s remaining: 2.66s
854: learn: 2.3595233 total: 15.6s remaining: 2.64s
855: learn: 2.3594978 total: 15.6s remaining: 2.63s
856: learn: 2.3594087 total: 15.6s remaining: 2.61s
857: learn: 2.3593269 total: 15.7s remaining: 2.59s
858: learn: 2.3592994 total: 15.7s remaining: 2.57s
859: learn: 2.3592982 total: 15.7s remaining: 2.55s
860: learn: 2.3592963 total: 15.7s remaining: 2.54s
861: learn: 2.3578494 total: 15.7s remaining: 2.52s
862: learn: 2.3578494 total: 15.7s remaining: 2.5s
863: learn: 2.3578276 total: 15.8s remaining: 2.48s
864: learn: 2.3536404 total: 15.8s remaining: 2.46s
865: learn: 2.3536399 total: 15.8s remaining: 2.44s
866: learn: 2.3536387 total: 15.8s remaining: 2.42s
867: learn: 2.3536195 total: 15.8s remaining: 2.41s
868: learn: 2.3536184 total: 15.8s remaining: 2.39s
869: learn: 2.3536166 total: 15.8s remaining: 2.37s
870: learn: 2.3535817 total: 15.9s remaining: 2.35s
871: learn: 2.3535806 total: 15.9s remaining: 2.33s
872: learn: 2.3532227 total: 15.9s remaining: 2.31s
873: learn: 2.3524303 total: 15.9s remaining: 2.29s
874: learn: 2.3472193 total: 15.9s remaining: 2.28s
875: learn: 2.3472172 total: 16s remaining: 2.26s
876: learn: 2.3472167 total: 16s remaining: 2.24s
877: learn: 2.3441918 total: 16s remaining: 2.22s
878: learn: 2.3441916 total: 16s remaining: 2.2s
879: learn: 2.3441916 total: 16s remaining: 2.18s
880: learn: 2.3432899 total: 16s remaining: 2.17s
881: learn: 2.3432901 total: 16s remaining: 2.15s
882: learn: 2.3432877 total: 16.1s remaining: 2.13s
```

```
883: learn: 2.3423980 total: 16.1s remaining: 2.11s
884: learn: 2.3408820 total: 16.1s remaining: 2.09s
885: learn: 2.3408807 total: 16.1s remaining: 2.08s
886: learn: 2.3408788 total: 16.1s remaining: 2.06s
887: learn: 2.3403560 total: 16.2s remaining: 2.04s
888: learn: 2.3403551 total: 16.2s remaining: 2.02s
889: learn: 2.3402707 total: 16.2s remaining: 2s
890: learn: 2.3402708 total: 16.2s remaining: 1.98s
891: learn: 2.3402706 total: 16.2s remaining: 1.97s
892: learn: 2.3402690 total: 16.2s remaining: 1.95s
893: learn: 2.3402677 total: 16.2s remaining: 1.93s
894: learn: 2.3402628 total: 16.3s remaining: 1.91s
895: learn: 2.3402457 total: 16.3s remaining: 1.89s
896: learn: 2.3402455 total: 16.3s remaining: 1.87s
897: learn: 2.3402407 total: 16.3s remaining: 1.85s
898: learn: 2.3394912 total: 16.3s remaining: 1.83s
899: learn: 2.3394911 total: 16.3s remaining: 1.81s
900: learn: 2.3393971 total: 16.4s remaining: 1.8s
901: learn: 2.3393971 total: 16.4s remaining: 1.78s
902: learn: 2.3393957 total: 16.4s remaining: 1.76s
903: learn: 2.3365076 total: 16.4s remaining: 1.74s
904: learn: 2.3357991 total: 16.4s remaining: 1.72s
905: learn: 2.3357975 total: 16.4s remaining: 1.71s
906: learn: 2.3357975 total: 16.5s remaining: 1.69s
907: learn: 2.3357972 total: 16.5s remaining: 1.67s
908: learn: 2.3357806 total: 16.5s remaining: 1.65s
909: learn: 2.3357671 total: 16.5s remaining: 1.63s
910: learn: 2.3344328 total: 16.5s remaining: 1.61s
911: learn: 2.3344330 total: 16.5s remaining: 1.59s
912: learn: 2.3344320 total: 16.5s remaining: 1.57s
913: learn: 2.3344320 total: 16.5s remaining: 1.56s
914: learn: 2.3344304 total: 16.6s remaining: 1.54s
915: learn: 2.3328259 total: 16.6s remaining: 1.52s
916: learn: 2.3328213 total: 16.6s remaining: 1.5s
917: learn: 2.3316723 total: 16.6s remaining: 1.48s
918: learn: 2.3316613 total: 16.6s remaining: 1.47s
919: learn: 2.3316450 total: 16.7s remaining: 1.45s
920: learn: 2.3316449 total: 16.7s remaining: 1.43s
921: learn: 2.3316437 total: 16.7s remaining: 1.41s
922: learn: 2.3280112 total: 16.7s remaining: 1.39s
923: learn: 2.3280109 total: 16.7s remaining: 1.37s
924: learn: 2.3278481 total: 16.7s remaining: 1.36s
925: learn: 2.3251310 total: 16.8s remaining: 1.34s
926: learn: 2.3250679 total: 16.8s remaining: 1.32s
927: learn: 2.3250655 total: 16.8s remaining: 1.3s
928: learn: 2.3250498 total: 16.8s remaining: 1.28s
929: learn: 2.3250349 total: 16.8s remaining: 1.27s
930: learn: 2.3250348 total: 16.8s remaining: 1.25s
931: learn: 2.3250198 total: 16.9s remaining: 1.23s
932: learn: 2.3244971 total: 16.9s remaining: 1.21s
933: learn: 2.3244970 total: 16.9s remaining: 1.19s
934: learn: 2.3244951 total: 16.9s remaining: 1.18s
935: learn: 2.3244954 total: 16.9s remaining: 1.16s
936: learn: 2.3244952 total: 16.9s remaining: 1.14s
937: learn: 2.3244091 total: 16.9s remaining: 1.12s
938: learn: 2.3244090 total: 17s remaining: 1.1s
939: learn: 2.3237507 total: 17s remaining: 1.08s
940: learn: 2.3237505 total: 17s remaining: 1.06s
941: learn: 2.3237357 total: 17s remaining: 1.05s
942: learn: 2.3237260 total: 17s remaining: 1.03s
943: learn: 2.3237098 total: 17.1s remaining: 1.01s
944: learn: 2.3237096 total: 17.1s remaining: 993ms
945: learn: 2.3237096 total: 17.1s remaining: 975ms
946: learn: 2.3237054 total: 17.1s remaining: 957ms
947: learn: 2.3236290 total: 17.1s remaining: 939ms
948: learn: 2.3236260 total: 17.1s remaining: 921ms
949: learn: 2.3236260 total: 17.1s remaining: 903ms
950: learn: 2.3236249 total: 17.2s remaining: 884ms
951: learn: 2.3236196 total: 17.2s remaining: 866ms
952: learn: 2.3236197 total: 17.2s remaining: 848ms
953: learn: 2.3232156 total: 17.2s remaining: 830ms
954: learn: 2.3232153 total: 17.2s remaining: 812ms
```

```
955: learn: 2.3232145 total: 17.2s remaining: 794ms
956: learn: 2.3229192 total: 17.3s remaining: 776ms
957: learn: 2.3229177 total: 17.3s remaining: 758ms
958: learn: 2.3228775 total: 17.3s remaining: 740ms
959: learn: 2.3228776 total: 17.3s remaining: 721ms
960: learn: 2.3217321 total: 17.3s remaining: 703ms
961: learn: 2.3217188 total: 17.3s remaining: 685ms
962: learn: 2.3178326 total: 17.4s remaining: 667ms
963: learn: 2.3172506 total: 17.4s remaining: 650ms
964: learn: 2.3171991 total: 17.4s remaining: 632ms
965: learn: 2.3112265 total: 17.4s remaining: 614ms
966: learn: 2.3112262 total: 17.4s remaining: 596ms
967: learn: 2.3112258 total: 17.5s remaining: 577ms
968: learn: 2.3089199 total: 17.5s remaining: 559ms
969: learn: 2.3087924 total: 17.5s remaining: 542ms
970: learn: 2.3087921 total: 17.5s remaining: 523ms
971: learn: 2.3087911 total: 17.5s remaining: 505ms
972: learn: 2.3067878 total: 17.6s remaining: 487ms
973: learn: 2.3067876 total: 17.6s remaining: 469ms
974: learn: 2.3067867 total: 17.6s remaining: 451ms
975: learn: 2.3051924 total: 17.6s remaining: 433ms
976: learn: 2.3051881 total: 17.6s remaining: 415ms
977: learn: 2.3051749 total: 17.6s remaining: 397ms
978: learn: 2.3040034 total: 17.6s remaining: 379ms
979: learn: 2.3040025 total: 17.7s remaining: 360ms
980: learn: 2.3040014 total: 17.7s remaining: 342ms
981: learn: 2.3039825 total: 17.7s remaining: 324ms
982: learn: 2.3039793 total: 17.7s remaining: 306ms
983: learn: 2.3039758 total: 17.7s remaining: 288ms
984: learn: 2.3000427 total: 17.7s remaining: 270ms
985: learn: 2.2999815 total: 17.8s remaining: 252ms
986: learn: 2.2974767 total: 17.8s remaining: 234ms
987: learn: 2.2960741 total: 17.8s remaining: 216ms
988: learn: 2.2939008 total: 17.8s remaining: 198ms
989: learn: 2.2935376 total: 17.9s remaining: 180ms
990: learn: 2.2935377 total: 17.9s remaining: 162ms
991: learn: 2.2934758 total: 17.9s remaining: 144ms
992: learn: 2.2929452 total: 17.9s remaining: 126ms
993: learn: 2.2904555 total: 17.9s remaining: 108ms
994: learn: 2.2904553 total: 17.9s remaining: 90.2ms
995: learn: 2.2904425 total: 18s remaining: 72.1ms
996: learn: 2.2904426 total: 18s remaining: 54ms
997: learn: 2.2871829 total: 18s remaining: 36ms
998: learn: 2.2871813 total: 18s remaining: 18ms
999: learn: 2.2871788 total: 18s remaining: 0us
    fit_time  score_time   test_r2  test_neg_mean_squared_error
0  16.587509    0.011394 -1.503384                    -8.861710
1  18.823941    0.011539 -0.012015                   -50.752490
2  17.092326    0.011530 -0.778435                    -0.902815
3  18.501569    0.011281 -0.037804                    -7.539530
4  18.695392    0.014979 -0.098061                    -4.601747
```

In [0]:

```
r2_CB=model_CB.score(X_test, y_test)
mse_CB=mean_squared_error(y_test,model_CB.predict(X_test))

print('\n',"R2 for the Catboost Regressor: ",r2_CB)
print("Mean squared error for the test sample is: ",mse_CB)
```

```
 R2 for the Catboost Regressor:  -0.043331967559998574
Mean squared error for the test sample is:  5.748928396244525
```

Reduced data: a negative r2 bad, so is a mse at 5.75.

Non-reduced data: r2 at 0.32 is not too great, a mse at 2.70e^-5 is in it self great but together with the low r2 it suggest there is a problem.

Elastic Net

In [0]:

```
from sklearn.linear_model import ElasticNet
model_EN=ElasticNet()

model_EN.fit(X_train, y_train)

scores = cross_validate(model_EN, X_train, y_train, cv = 5, scoring=['r2','neg_mean_squared_error'])
print(pd.DataFrame(scores))
```

```
   fit_time  score_time   test_r2  test_neg_mean_squared_error
0  0.004413    0.003000 -0.014027                    -3.589546
1  0.003879    0.002966  0.045284                   -47.878905
2  0.004101    0.003165 -0.300338                    -0.660111
3  0.003833    0.003069  0.427370                    -4.160094
4  0.004019    0.002412  0.257661                    -3.110988
```

In [0]:

```
r2_EN=model_EN.score(X_test, y_test)
mse_EN=mean_squared_error(y_test,model_EN.predict(X_test))

print('\n',"R2 for the Elastic Net Model: ",r2_EN)
print("Mean squared error for the test sample is: ",mse_EN)
```

```
 R2 for the Elastic Net Model:  -0.023728235743015972
Mean squared error for the test sample is:  5.640908653708904
```

Reduced data: r2 at -0.02 indicates something is wrong, this model is NOT sutid for this data. A mse at 5.64 is bad.

Non-reduced data: r2 at -1.6e^-5 indicates something is wrong, this model is NOT sutid for this data. Again a mse at 4.02e^-5 is in it self great but together with the negative r2 it suggest there is a problem.

Visualization of regression statistics

First we save the scores from the three models in a nice dataframe, and then we also plot the data using barplots.

In [0]:

```
r2_list=[r2_LR,r2_CB,r2_EN]
mse_list=[mse_LR,mse_CB,mse_EN]

#Change chose here before you run the rest:
#results_NONreduced=pd.DataFrame(list(zip(r2_list, mse_list)),columns=('R2','MSE'),index=['Lin Reg','CB Reg','Elastic Net'])
results_reduced=pd.DataFrame(list(zip(r2_list, mse_list)),columns=('R2','MSE'),index=['Lin Reg','CB Reg','Elastic Net'])
```

In [0]:

```
results=results_reduced  #chose if you want the results for the reduced or nonreduced data

results
```

Out[0]:

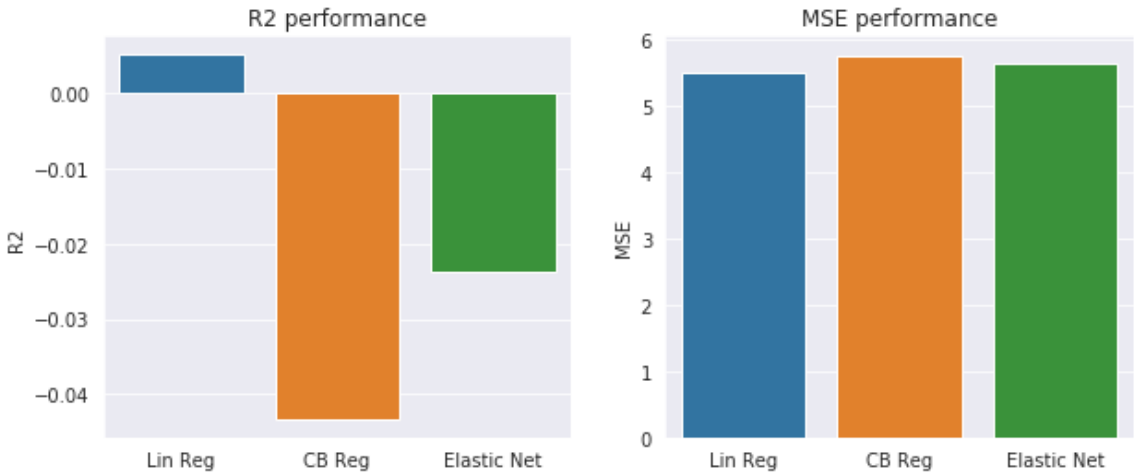
	R2	MSE
Lin Reg	0.005157	5.481746
CB Reg	-0.043332	5.748928
Elastic Net	-0.023728	5.640909

Reduced data: So as mentioned above, non of the models seem to be good at predicting the data, but Lin Reg is the better option.

Non-reduced data: So as mentioned above, non of the models seem to be good at predicting the data.

In [0]:

```
sns.set_style("darkgrid")
fig, ax=plt.subplots(1,2,figsize=(10,4))
sns.barplot(x=results.index.values ,y='R2',data=results,ax=ax[0]).set_title('R2 performa
nce')
sns.barplot(x=results.index.values ,y='MSE',data=results,ax=ax[1]).set_title('MSE perfor
mance')
print(' ')# To stop it from printing random stuff
```



Our conclusion is that the data is not sutied to be used to predict the number of people killed by terror attacks. See more in the stakeholdder report.

Stakeholder Report

Problem statement:

We want to use the ‘Global Terrorism Database’ dataset to gain insights into terrorism attacks. Using unsupervised learning we hope to find that some features says more about attacks, and are more defining when it comes to predicting certain features in the acts, f.ex. The number of casualties or how bad/successful its probable to be. Using supervised learning we wish to predict the number of casualties given the features we have selected.

Description of data acquisition:

The data we used is aquired trough Kaggle, and is called, “Global Terrorism Database. The data was collected through news articles by the publisher, and the author of the data has the following to say about it.

The following text is taken from “https://www.kaggle.com/START-UMD/gtd”

“Context

Information on more than 180,000 Terrorist Attacks

The Global Terrorism Database (GTD) is an open-source database including information on terrorist attacks around the world from 1970 through 2017. The GTD includes systematic data on domestic as well as international terrorist incidents that have occurred during this time period and now includes more than 180,000 attacks. The database is maintained by researchers at the National Consortium for the Study of Terrorism and Responses to Terrorism (START), headquartered at the University of Maryland. More Information

Content

Geography: Worldwide

Time period: 1970-2017, except 1993

Unit of analysis: Attack

Variables: >100 variables on location, tactics, perpetrators, targets, and outcomes

Sources: Unclassified media articles (Note: Please interpret changes over time with caution. Global patterns are driven by diverse trends in particular regions, and data collection is influenced by fluctuations in access to media coverage over both time and place.)

Definition of terrorism:

"The threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation."

See the GTD Codebook for important details on data collection methodology, definitions, and coding schema."

Data cleaning:

Chosen features:

Timestamp	Year-Month-Day
Duration	For those that lasted more than a day, how long? Calculated from resolution and extended.
Longitude	
Latitude	
Success	Was it successful y/n
Nkill	Number of killed victims and attackers
Nkillter	Number of killed attackers
Nwound	Number of wounded
Property	Was there property damage y/n
Vicinity	Was it within or near a city y/n (n= inside a city)
Suicide	Was it a suicide attack y/n
Claimed	Was it claimed by a known group y/n
Gname	Group name if any
Individual	Was it a lone wolf attack y/n
Crit1	Was the act aimed at obtaining a political, economic, religious, or social goal
Crit2	Was the act aimed at, intention to coerce, intimidate or publicize to larger audience(s)
Crit3	Was the act aimed, outside international humanitarian law
Region	World region
Attack type	How was the attack carried out
Weapon type	What was used
Target type	What was attacked

The four last variables have been turned in to dummy variables in our dataset.
The above features, have been chosen by us, because they appear to be, the ones most likely to say something interesting about the attacks, and therefore, be useful in modeling of the data.

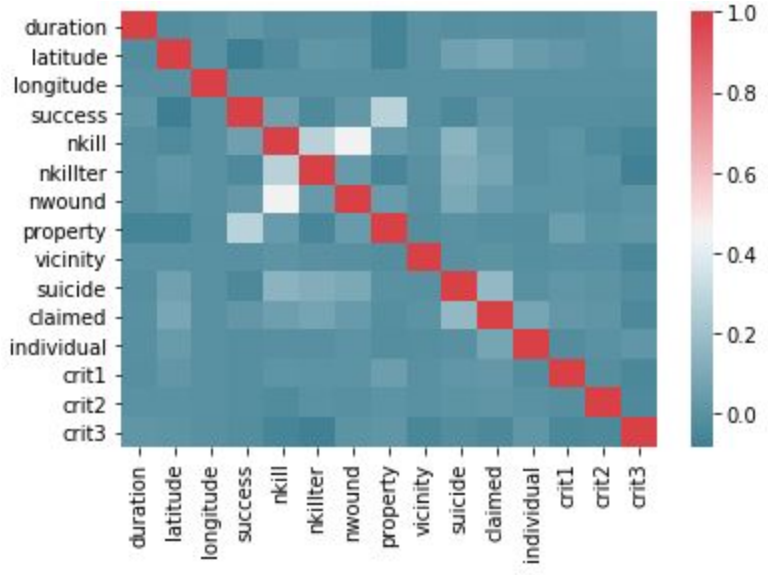
Through the analysis, its hoped, that something in the attacks, are so defining of the act, that it becomes possible to predict or determine, certain features of the attacks, that they might be, better responded to. Gaining more insight into the terrorist attacks, and the style and targets they chose, may give states, and private citizens the insights to better guard themselves.
The aim is to do so through visualizations and prediction models. One last thing to note, on this part, is that the definition of a successful terrorist attack, is not that, there were casualties, but merely, that they succeeded in carrying out their intention. As such, a terrorist wanting to sow

fear, by attacking the police, will be counted as successful, as long as he fires at them or their buildings.

Data exploration

By manipulating and sorting the data we ended up discarding a lot of it since it didn't match the criteria. We then did some exploration and analysis on the remaining data.
In this we found a few interesting points, and some points, that might not come as a surprise to most people.

The first thing we wanted to do with this, was to see if there were any correlations in the data that had been collected.



By looking at this heat map that has been generated over the entire data, we can see that the data doesn't really have any strong correlations through out. There are a few very light correlations around between some of it, but mostly it doesn't correlate significantly. The ones that are interesting are worth mentioning are, the correlation between

1. The killed and the wound.
2. Killed terrorist and killed victims
3. Suicide attacks and killed,wound,killedterrorist
4. If its was claimed and number of killed, wounded
5. Claimed and suicide
6. Individual and claimed.

Now the first 2 correlations seems pretty logical given that there are probably going to be more people dying, the more that people are wounded or vice versa. Also the number of killed

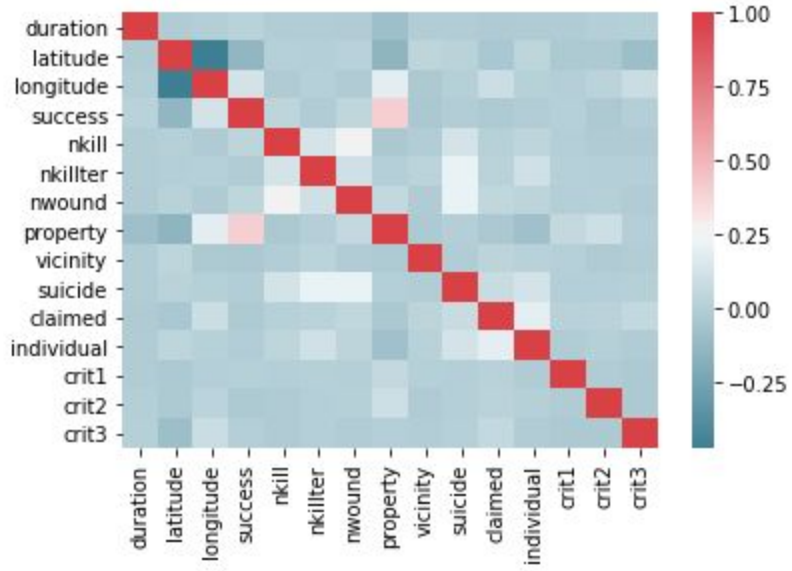
terrorists in the attacks correlation with the number of killed people could be explained by the fact that if terrorist die in the attack, it is more likely to have been a bigger event.

The third correlation with the suicide attacks and killed,wounded and killed terrorists is intresting, due the fact, that it seems to be, that when the attacker doesn't intend to get out alive of the attack, it becomes more dangerous.

The fourth one appears, to indicate,that when the attacks are claimed by a group, they have a tendency to have been more deadly than if they are not.

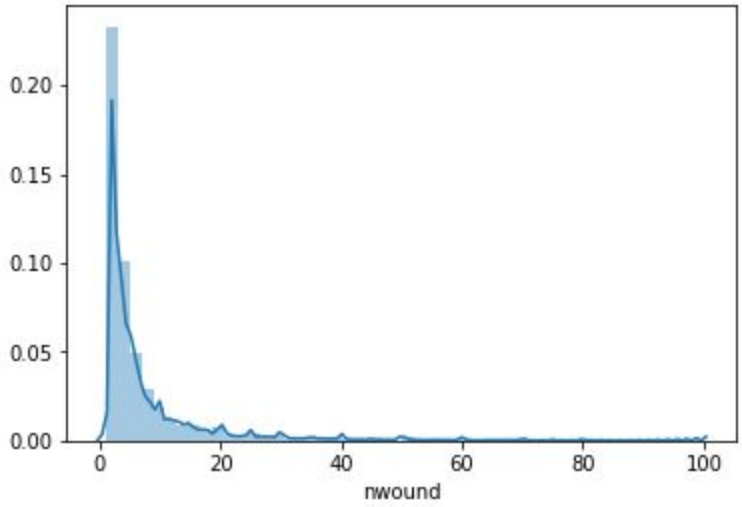
This also ties into the next one, that looks at claimed and suicide attacks.

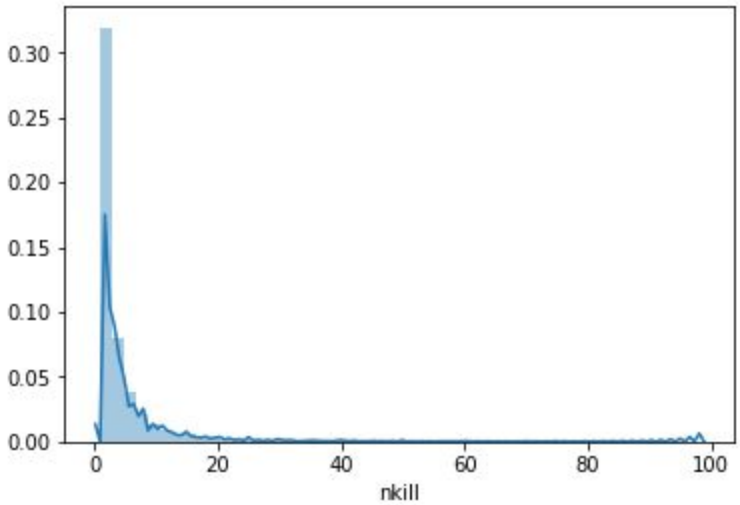
The last one is whether or not it is and individual or a lone wolf attack. Wich of course correlates.



When looking at the same data, for Western Europe only, it can be seen, that it's almost the same, but that some of the correlations become a little less clear as to what is going on.

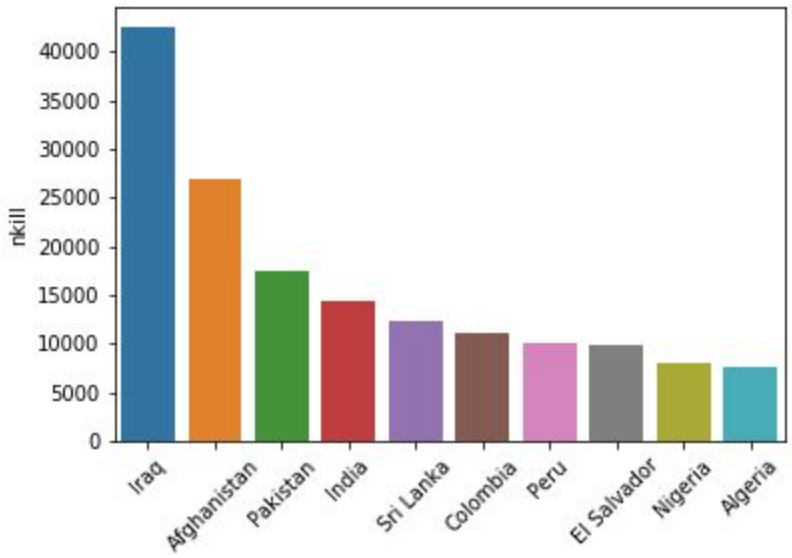
The next thing that becomes interesting to look at, is the distribution of the number of wounded and number of killed.



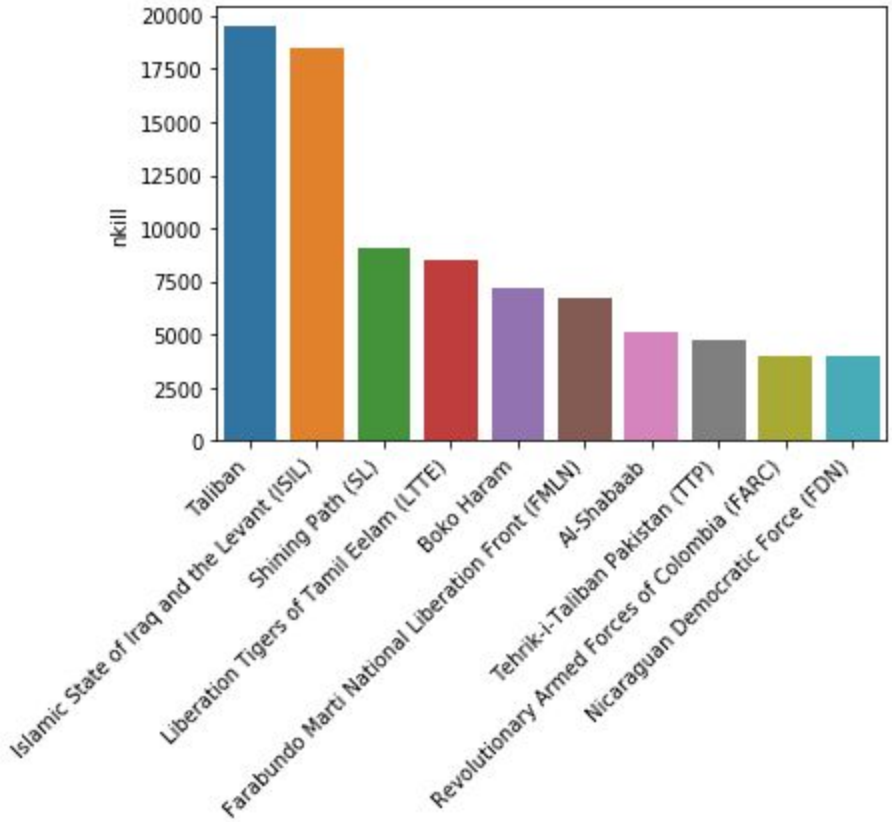


By looking at the two graphs it can be seen, that there neither are normally distributed, and that, most of the attacks, have very few wounded or killed. As mentioned in the colab files, this graph only include attacks with between 0 and 100 killed/wounded to get the most easily interpretable images of most of the attacks that cause casualties. A lot of the attacks in the full data have 0 wounded or killed. Meaning that most terrorist attacks don't cause a lot of damage.

When looking at the top 10 countries for people killed in attacks, it becomes clear that these countries are placed in regions of great geopolitical interest or unrest. It is therefore not a surprise that these countries have the most people killed in attacks.



The image remains the same, when we go further and look at, what groups have killed the most people. The groups with most people killed mainly operate in one or more of the top ten countries. With the exception of some of the last ranks in the deadliest terror organisations.



What we can tell from this quick look at the data, is that not a lot of people are necessarily killed in a single attack, and that groups operating in unstable regions seem to be deadlier.

This points to the fact, that deadly attacks on the western world are rare (outliers), but also that some of the attacks such as 9/11 are among the deadliest. Here we see that the deadliest terror attack in the data was in fact 9/11.

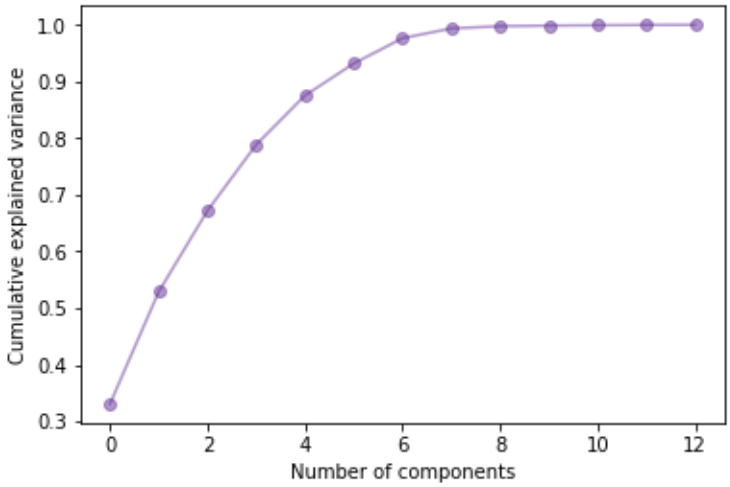
	timestamp	duration	country_txt	latitude	longitude	success	nkill	nkillter	nwound
73126	2001-09-11	0	United States	40.697132	-73.931351	1	1384.0	5.0	8190.0
55934	1994-04-13	0	Rwanda	-1.932787	30.332456	1	1180.0	0.0	0.0
133225	2014-06-10	0	Iraq	36.407394	42.964626	1	670.0	0.0	0.0
179671	2017-10-14	0	Somalia	2.059819	45.326115	1	588.0	1.0	316.0
76347	2004-03-21	0	Nepal	27.959441	84.895897	1	518.0	500.0	216.0

Unsupervised Machine Learning (Dimension Reduction and Clustering)

In order to make sense of the data, we use unsupervised machine learning to reduce the amount of features we need to describe the data. In order to preserve the information in the data while reducing features, we need to create new features which contain all the variation. To do this we use two different dimension reduction methods: Non-negative Matrix Factorization (NMF) and Principal Component Analysis (PCA).

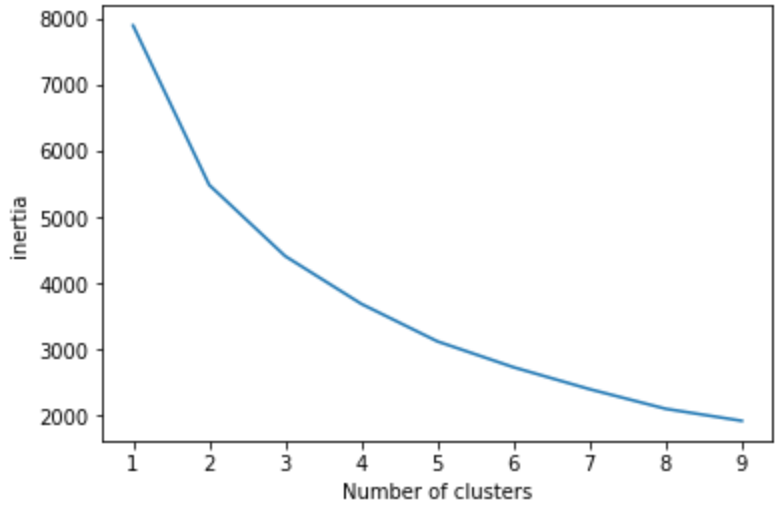
NMF is recommended to use on Categorical variables i.e Gender, Country or in our case AttackType. NMF creates new features which are characterized by patterns in the old features. Since the NMF variables explain patterns in the old categorical variables, the old variables become redundant and can be removed. We then run all the variables through a PCA to find, the most important components and rank them.

The PCA shows that 87% of the variance can be explained by just five principal components.

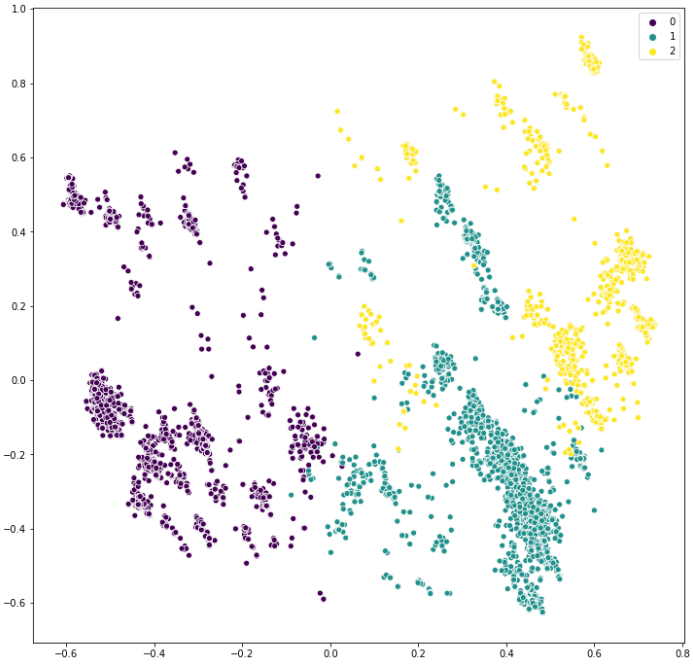


PCA unfortunately loses some interpretability, and these features don't directly translate into our original features, but by clustering how different data points fall within our two most important features, it becomes possible to give all our observations a cluster and thus describe how important they are to our most important features.

We do this with the K-means clustering. By testing the inertia of the model we can find the best number of clusters using the elbow test. The elbow test looks at when the inertia of the model starts to flatten after adding more clusters.



Looking at the graph the is a visible elbow at 2, meaning 3 clusters should separate the data somewhat nicely. Plotting the data with the two first principal components at the x and y axis, and coloring the data points according to their cluster, we get this plot:



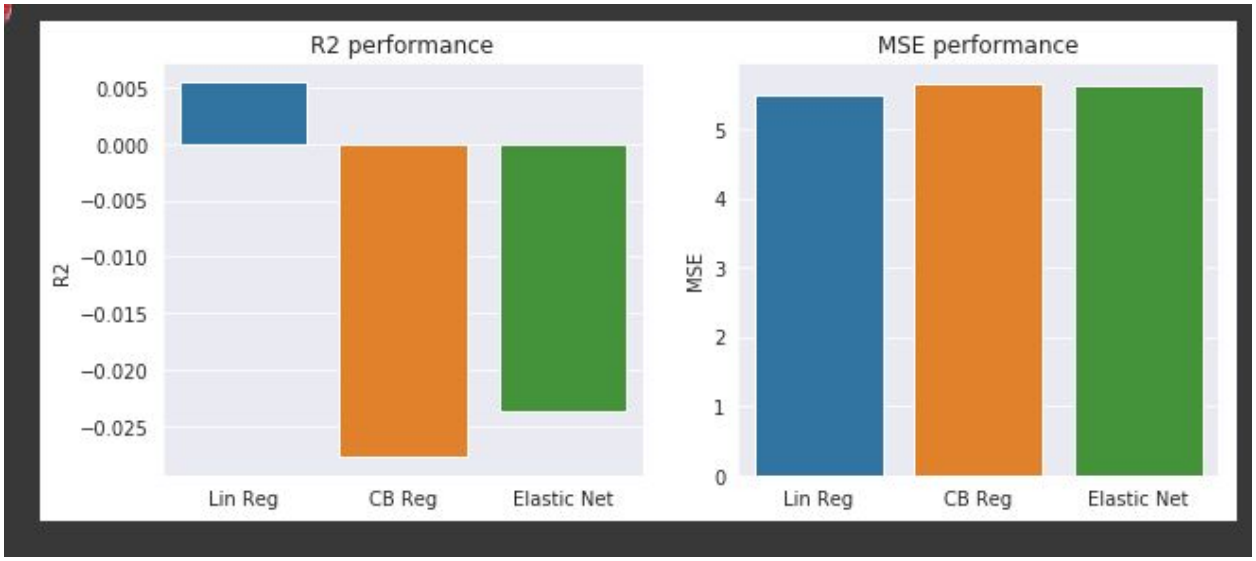
The clustering reveals that one cluster is characterized by having the largest amount of wounded with some people killed. This cluster is also characterized by bombings and property damage.

The second cluster is characterized by having the largest amount of killed, with some wounded. Its is also characterized by Successful Assassinations and firearm attacks. This cluster also has the longest durations of the patterns seen in the data.The final cluster is characterized by low killed and wounded. It is also characterized by successful incendiary attacks where facilities were hit.

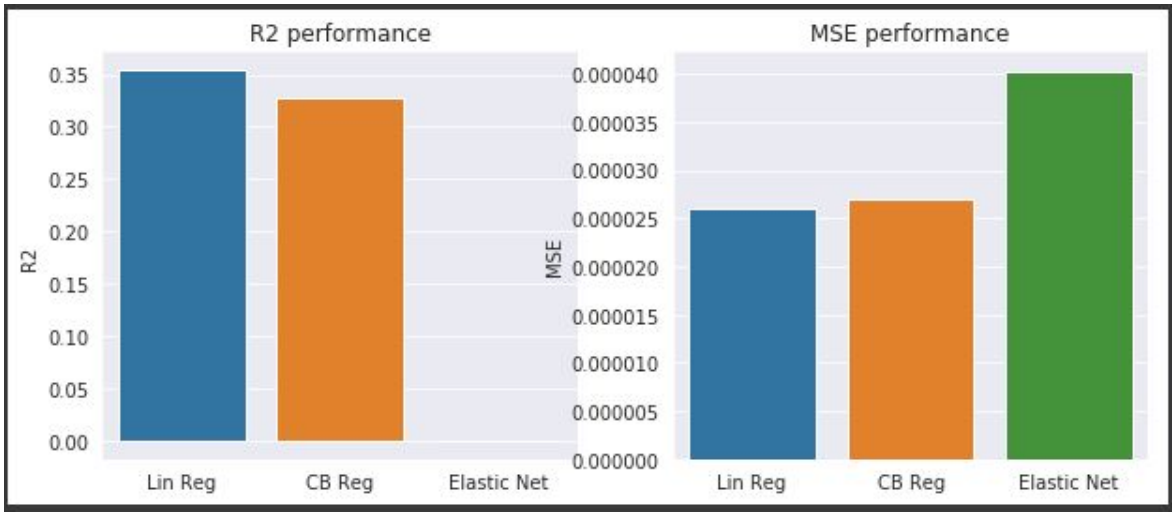
Supervised learning

During the supervised learning, we learned that the data, we were using, did not perform well when used as input in any of the three supervised learning models we tried. The different models all showed poor performance, when it comes to predicting the number of killed people.

The image below shows the r2 and mse of the three different models when fittet on data that has been reduced using NMF. It can be seen that the different models all performed poorly. Negative R2 values are generally an indicator that the model is not appropriate to use on the data, so the Liniar regresson seems to be the best model here.



When we look at the data without that has not been reduced, we see a drop in the MSE indicating the models work better, and now the r2 are positive (or approximately 0).
But the r2 are still a long way from 1, so the models still aren't great, and elastic net should still be disregarded.



Conclusion

From a combination of our dimension reduction and clustering we were able to find that our data could be characterized by three main types of attacks, which resulted in either many wounded(1), many killed(2) or few casualties(3).

In the supervised learning part we were not as successful, we did not succeed in fitting any model great predictive qualities. We suspect that this is in part due to the fact that terrorist attacks are a very complex and chaotic events, that have many more features or parts than we have looked at here.