

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

```
In [2]: import plotly.express as px
```

```
In [3]: df=pd.read_csv("C:/Users/Seth-Ese Joey/Desktop/Python for Datscience/DatasetAfricaMalaria.csv")
pd.set_option('display.max.columns',None)
df.head()
```

Out[3]:

	Country_Name	Year	Country _Code	Incidence_of_malaria_(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimalarial_dr (% of children under age 5 with fe
0	Algeria	2007	DZA	0.01	26.0	NaN	
1	Angola	2007	AGO	286.72	1533485.0	18.0	
2	Benin	2007	BEN	480.24	0.0	NaN	
3	Botswana	2007	BWA	1.03	390.0	NaN	
4	Burkina Faso	2007	BFA	503.80	44246.0	NaN	

```
In [4]: df.columns
```

```
Out[4]: Index(['Country_Name', 'Year', 'Country_Code',
'Incidence_of_malaria_(per 1,000 population at risk)',
'Malaria_cases_reported',
'Use_o_insecticide-treated bed nets (% of under-5 population)',
'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)',
'Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)',
'People using safely managed drinking water services (% of population)',
'People using safely managed drinking water services, rural (% of rural population)',
'People using safely managed drinking water services, urban (% of urban population)',
'People using safely managed sanitation services (% of population)',
'People using safely managed sanitation services, rural (% of rural population)',
'People using safely managed sanitation services, urban (% of urban population)',
'Rural population (% of total population)',
'Rural population growth (annual %)',
'Urban population (% of total population)',
'Urban population growth (annual %)',
'People using at least basic drinking water services (% of population)',
'People using at least basic drinking water services, rural (% of rural population)',
'People using at least basic drinking water services, urban (% of urban population)',
'People using at least basic sanitation services (% of population)',
'People using at least basic sanitation services, rural (% of rural population)',
'People using at least basic sanitation services, urban (% of urban population)',
'latitude', 'longitude', 'geometry'],
dtype='object')
```

```
In [5]: df.rename(columns={'Country_Code':'Country_Code'}, inplace=True)
```

```
In [ ]:
```

```
In [6]: df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 594 entries, 0 to 593
Data columns (total 27 columns):
 #   Column                                                                 Non-Null Count  Dtype
---  -
 0   Country_Name                                                            594 non-null    object
 1   Year                                                                    594 non-null    int64
 2   Country_Code                                                            594 non-null    object
 3   Incidence_of_malaria_(per 1,000 population at risk)                  550 non-null    float64
 4   Malaria_cases_reported                                                 550 non-null    float64
 5   Use_o_insecticide-treated bed nets (% of under-5 population)         132 non-null    float64
 6   Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever) 122 non-null    float64
 7   Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)    106 non-null    float64
 8   People using safely managed drinking water services (% of population) 99 non-null     float64
 9   People using safely managed drinking water services, rural (% of rural population)         88 non-null     float64
10   People using safely managed drinking water services, urban (% of urban population)         176 non-null    float64
11   People using safely managed sanitation services (% of population)      132 non-null    float64
12   People using safely managed sanitation services, rural (% of rural population)            110 non-null    float64
13   People using safely managed sanitation services, urban (% of urban population)            132 non-null    float64
14   Rural population (% of total population)                               588 non-null    float64
15   Rural population growth (annual %)                                     588 non-null    float64
16   Urban population (% of total population)                               588 non-null    float64
17   Urban population growth (annual %)                                     588 non-null    float64
18   People using at least basic drinking water services (% of population) 588 non-null    float64
19   People using at least basic drinking water services, rural (% of rural population)         566 non-null    float64
20   People using at least basic drinking water services, urban (% of urban population)         566 non-null    float64
21   People using at least basic sanitation services (% of population)       588 non-null    float64
22   People using at least basic sanitation services, rural (% of rural population)            566 non-null    float64
23   People using at least basic sanitation services, urban (% of urban population)            566 non-null    float64
24   latitude                                                                594 non-null    float64
25   longitude                                                                594 non-null    float64
26   geometry                                                                594 non-null    object
dtypes: float64(23), int64(1), object(3)
memory usage: 125.4+ KB

```

```
In [7]: df.isnull().sum()
```

```
Out[7]: Country_Name 0
Year 0
Country_Code 0
Incidence_of_malaria_(per 1,000 population at risk) 44
Malaria_cases_reported 44
Use_o_insecticide-treated bed nets (% of under-5 population) 462
Children_with_fever_receiving_antimalarial drugs (% of children under age 5 with fever) 472
Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women) 488
People using safely managed drinking water services (% of population) 495
People using safely managed drinking water services, rural (% of rural population) 506
People using safely managed drinking water services, urban (% of urban population) 418
People using safely managed sanitation services (% of population) 462
People using safely managed sanitation services, rural (% of rural population) 484
People using safely managed sanitation services, urban (% of urban population) 462
Rural population (% of total population) 6
Rural population growth (annual %) 6
Urban population (% of total population) 6
Urban population growth (annual %) 6
People using at least basic drinking water services (% of population) 6
People using at least basic drinking water services, rural (% of rural population) 28
People using at least basic drinking water services, urban (% of urban population) 28
People using at least basic sanitation services (% of population) 6
People using at least basic sanitation services, rural (% of rural population) 28
People using at least basic sanitation services, urban (% of urban population) 28
latitude 0
longitude 0
geometry 0
dtype: int64
```

```
In [8]: df.shape
```

```
Out[8]: (594, 27)
```

DATA CLEANING

```
In [9]: l=df.columns
f=l[3:-3]
f
```

```
Out[9]: Index(['Incidence_of_malaria_(per 1,000 population at risk)',
'Malaria_cases_reported',
'Use_o_insecticide-treated bed nets (% of under-5 population)',
'Children_with_fever_receiving_antimalarial drugs (% of children under age 5 with fever)',
'Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)',
'People using safely managed drinking water services (% of population)',
'People using safely managed drinking water services, rural (% of rural population)',
'People using safely managed drinking water services, urban (% of urban population)',
'People using safely managed sanitation services (% of population)',
'People using safely managed sanitation services, rural (% of rural population)',
'People using safely managed sanitation services, urban (% of urban population)',
'Rural population (% of total population)',
'Rural population growth (annual %)',
'Urban population (% of total population)',
'Urban population growth (annual %)',
'People using at least basic drinking water services (% of population)',
'People using at least basic drinking water services, rural (% of rural population)',
'People using at least basic drinking water services, urban (% of urban population)',
'People using at least basic sanitation services (% of population)',
'People using at least basic sanitation services, rural (% of rural population)',
'People using at least basic sanitation services, urban (% of urban population)'],
dtype='object')
```

```
In [10]: a=df.columns
b=a[3:-1]
c=[]
for i in b:
    mean=df[i].mean()
    c.append(mean)
d=dict(zip(a,c))
for k,v in d.items():
    df[k]=df[k].fillna(v)
df
```

Out[10]:

	Country_Name	Year	Country_Code	Incidence_of_malaria_(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antima (% of children under age
0	Algeria	2007	DZA	0.010000	2.600000e+01	33.47899	
1	Angola	2007	AGO	286.720000	1.533485e+06	18.00000	
2	Benin	2007	BEN	480.240000	0.000000e+00	33.47899	
3	Botswana	2007	BWA	1.030000	3.900000e+02	33.47899	
4	Burkina Faso	2007	BFA	503.800000	4.424600e+04	33.47899	
...	
589	Togo	2017	TGO	278.200000	1.755577e+06	69.70000	
590	Tunisia	2017	TUN	30.201639	1.501396e+01	33.47899	
591	Uganda	2017	UGA	336.760000	1.166783e+07	33.47899	
592	Zambia	2017	ZMB	160.050000	5.505639e+06	33.47899	
593	Zimbabwe	2017	ZWE	108.550000	4.675080e+05	33.47899	

594 rows × 27 columns

In [11]: df.isnull().sum()

Out[11]: Country_Name 0
Year 0
Country_Code 0
Incidence_of_malaria_(per 1,000 population at risk) 0
Malaria_cases_reported 0
Use_o_insecticide-treated bed nets (% of under-5 population) 0
Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever) 0
Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women) 0
People using safely managed drinking water services (% of population) 0
People using safely managed drinking water services, rural (% of rural population) 0
People using safely managed drinking water services, urban (% of urban population) 0
People using safely managed sanitation services (% of population) 0
People using safely managed sanitation services, rural (% of rural population) 0
People using safely managed sanitation services, urban (% of urban population) 0
Rural population (% of total population) 0
Rural population growth (annual %) 0
Urban population (% of total population) 0
Urban population growth (annual %) 0
People using at least basic drinking water services (% of population) 0
People using at least basic drinking water services, rural (% of rural population) 0
People using at least basic drinking water services, urban (% of urban population) 0
People using at least basic sanitation services (% of population) 0
People using at least basic sanitation services, rural (% of rural population) 0
People using at least basic sanitation services, urban (% of urban population) 28
latitude 0
longitude 0
geometry 0
dtype: int64

In [12]: df['People using at least basic sanitation services, urban (% of urban population)']=df['People using at least

In [13]: df.isnull().sum()

```

Out[13]: Country_Name                                0
        Year                                           0
        Country_Code                                  0
        Incidence_of_malaria_(per 1,000 population at risk) 0
        Malaria_cases_reported                       0
        Use_o_insecticide-treated bed nets (% of under-5 population) 0
        Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever) 0
        Intermittent_preventive_treatment (IPT) of malaria in pregnancy (% of pregnant women) 0
        People_using_safely_managed_drinking_water_services (% of population) 0
        People_using_safely_managed_drinking_water_services, rural (% of rural population) 0
        People_using_safely_managed_drinking_water_services, urban (% of urban population) 0
        People_using_safely_managed_sanitation_services (% of population) 0
        People_using_safely_managed_sanitation_services, rural (% of rural population) 0
        People_using_safely_managed_sanitation_services, urban (% of urban population) 0
        Rural_population (% of total population)      0
        Rural_population_growth (annual %)           0
        Urban_population (% of total population)     0
        Urban_population_growth (annual %)           0
        People_using_at_least_basic_drinking_water_services (% of population) 0
        People_using_at_least_basic_drinking_water_services, rural (% of rural population) 0
        People_using_at_least_basic_drinking_water_services, urban (% of urban population) 0
        People_using_at_least_basic_sanitation_services (% of population) 0
        People_using_at_least_basic_sanitation_services, rural (% of rural population) 0
        People_using_at_least_basic_sanitation_services, urban (% of urban population) 0
        latitude                                       0
        longitude                                     0
        geometry                                       0
        dtype: int64

```

```

In [14]: df.columns

```

```

Out[14]: Index(['Country_Name', 'Year', 'Country_Code',
        'Incidence_of_malaria_(per 1,000 population at risk)',
        'Malaria_cases_reported',
        'Use_o_insecticide-treated bed nets (% of under-5 population)',
        'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)',
        'Intermittent_preventive_treatment (IPT) of malaria in pregnancy (% of pregnant women)',
        'People_using_safely_managed_drinking_water_services (% of population)',
        'People_using_safely_managed_drinking_water_services, rural (% of rural population)',
        'People_using_safely_managed_drinking_water_services, urban (% of urban population)',
        'People_using_safely_managed_sanitation_services (% of population)',
        'People_using_safely_managed_sanitation_services, rural (% of rural population)',
        'People_using_safely_managed_sanitation_services, urban (% of urban population)',
        'Rural_population (% of total population)',
        'Rural_population_growth (annual %)',
        'Urban_population (% of total population)',
        'Urban_population_growth (annual %)',
        'People_using_at_least_basic_drinking_water_services (% of population)',
        'People_using_at_least_basic_drinking_water_services, rural (% of rural population)',
        'People_using_at_least_basic_drinking_water_services, urban (% of urban population)',
        'People_using_at_least_basic_sanitation_services (% of population)',
        'People_using_at_least_basic_sanitation_services, rural (% of rural population)',
        'People_using_at_least_basic_sanitation_services, urban (% of urban population)',
        'latitude', 'longitude', 'geometry'],
        dtype='object')

```

```

In [15]: dic = {'Congo, Dem. Rep.': 'Congo Dem.Rep', 'Congo, Rep.': 'Congo Rep', 'Egypt, Arab Rep.': 'Egypt', 'Gambia, The': 'T

```

```

In [16]: df2=df.replace(dic,regex=True)

```

```

In [17]: dff=df2[['Country_Name', 'Year', 'Country_Code',
        'Incidence_of_malaria_(per 1,000 population at risk)',
        'Malaria_cases_reported',
        'Use_o_insecticide-treated bed nets (% of under-5 population)',
        'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)', 'People using
        'People_using_safely_managed_drinking_water_services, urban (% of urban population)',
        'People_using_safely_managed_sanitation_services (% of population)',
        'People_using_safely_managed_sanitation_services, rural (% of rural population)',
        'People_using_safely_managed_sanitation_services, urban (% of urban population)',
        'Rural_population (% of total population)',
        'Rural_population_growth (annual %)',
        'Urban_population (% of total population)', 'People_using_at_least_basic_drinking_water_services (% of po
        'People_using_at_least_basic_drinking_water_services, rural (% of rural population)',
        'People_using_at_least_basic_drinking_water_services, urban (% of urban population)',
        'People_using_at_least_basic_sanitation_services (% of population)',
        'People_using_at_least_basic_sanitation_services, rural (% of rural population)',
        'People_using_at_least_basic_sanitation_services, urban (% of urban population)']]
        dff.head()

```

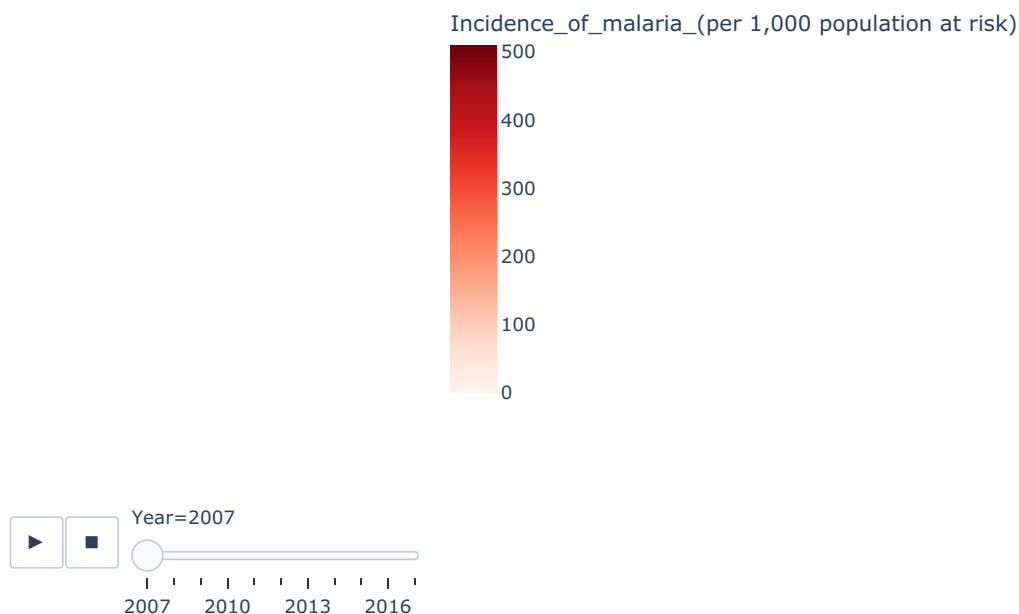
Out[17]:

	Country_Name	Year	Country_Code	Incidence_of_malaria_(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimala (% of children under age 5 \
0	Algeria	2007	DZA	0.01	26.0	33.47899	
1	Angola	2007	AGO	286.72	1533485.0	18.00000	
2	Benin	2007	BEN	480.24	0.0	33.47899	
3	Botswana	2007	BWA	1.03	390.0	33.47899	
4	Burkina Faso	2007	BFA	503.80	44246.0	33.47899	

```
In [18]: fig1 = px.choropleth(dff,locations=dff['Country_Code'],color=dff['Incidence_of_malaria_(per 1,000 population at risk)'],fig1.show()
```



Incidence of Malaria at risk in Africa



QUESTIONS

- 1.Number of malaria cases reported in the west africa(Ghana,Nigeria,Benin,Togo,cameroon) between 2015 to 2017
- 2.Number of malaria cases reported in east africa(Tanzania, Uganda, Zambia) between 2015 to 2017
- 3.Number of malaria cases reported in central africa(Chad, Congo Republic - Brazzaville, Democratic Republic of Congo) 2015 to 2017
- 4.Which country as the highest record of malaria cases in whole africa(from 2007 to 2017)
- 5.compare countries in west africa that uses safely and basic drink water service
- 6.Frequent occurrence of malaria in Nigeria for 2017

```
In [19]: dff.head()
```

Out[19]:

	Country_Name	Year	Country_Code	Incidence_of_malaria(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimala (% of children under age 5)
0	Algeria	2007	DZA	0.01	26.0	33.47899	
1	Angola	2007	AGO	286.72	1533485.0	18.00000	
2	Benin	2007	BEN	480.24	0.0	33.47899	
3	Botswana	2007	BWA	1.03	390.0	33.47899	
4	Burkina Faso	2007	BFA	503.80	44246.0	33.47899	

```
In [20]: dff['Country_Name'].unique()
```

```
Out[20]: array(['Algeria', 'Angola', 'Benin', 'Botswana', 'Burkina Faso',  
      'Burundi', 'Cabo Verde', 'Cameroon', 'Central African Republic',  
      'Chad', 'Comoros', 'Congo Dem.Rep', 'Congo Rep', 'Cote d'Ivoire',  
      'Djibouti', 'Egypt', 'Equatorial Guinea', 'Eritrea', 'Eswatini',  
      'Ethiopia', 'Gabon', 'The Gambia', 'Ghana', 'Guinea',  
      'Guinea-Bissau', 'Kenya', 'Lesotho', 'Liberia', 'Libya',  
      'Madagascar', 'Malawi', 'Mali', 'Mauritania', 'Mauritius',  
      'Morocco', 'Mozambique', 'Namibia', 'Niger', 'Nigeria', 'Rwanda',  
      'Sao Tome and Principe', 'Senegal', 'Seychelles', 'Sierra Leone',  
      'Somalia', 'South Africa', 'South Sudan', 'Sudan', 'Tanzania',  
      'Togo', 'Tunisia', 'Uganda', 'Zambia', 'Zimbabwe'], dtype=object)
```

```
In [21]: # dfc=dfff[(dff.Country_Name=='Ghana')|(dff.Country_Name=='Nigeria')|(dff.Country_Name=='Benin')  
#          |(dff.Country_Name=='Togo')|(dff.Country_Name=='Cameroon')]  
# dfc.head(3)
```

```
In [22]: # df_year=dfc[(dfc.Year>=2015) | (dfc.Year==2017)]  
# df_year
```

```
In [23]: #1.Highest Number of malaria cases reported in the west africa(Ghana,Nigeria,Benin,Togo,cameroon) between 2015  
def W_Afri(dff):  
    dfc=dfff[(dff.Country_Name=='Ghana')|(dff.Country_Name=='Nigeria')|(dff.Country_Name=='Benin')  
             |(dff.Country_Name=='Togo')|(dff.Country_Name=='Cameroon')|(dff.Country_Name=='Burkina Faso')  
             |(dff.Country_Name=='Cape Verde')|(dff.Country_Name=='Côte D'Ivoire')|(dff.Country_Name=='Gambia')  
             |(dff.Country_Name=='Guinea')|(dff.Country_Name=='Guinea-Bissau')|(dff.Country_Name=='Liberia')  
             |(dff.Country_Name=='Mali')|(dff.Country_Name=='Mauritania')|(dff.Country_Name=='Niger')  
             |(dff.Country_Name=='Senegal')|(dff.Country_Name=='Sierra Leone')]  
    df_year=dfc[(dfc.Year>=2015) & (dfc.Year==2017)]  
    mal_WA=df_year.groupby('Country_Name')['Malaria_cases_reported'].sum().sort_values(ascending=False)  
    print(f'The highest number of case in West Africa{mal_WA}')  
    plt.title('Highest countries with Malaria cases in West Africa bewtween 2015 to 2017')  
    mal_WA.plot(x='Country_Name',y='Malaria_cases_reported',kind='bar')  
    plt.show()  
    print('___'*40)  
  
#2.Number of malaria cases reported in east africa(Tanzania, Uganda, Zambia) between 2015 to 2017  
def E_Afri(dff):  
    dfa=dfff[(dff.Country_Name=='Burundi')|(dff.Country_Name=='Comoros')|(dff.Country_Name=='Djibouti')  
             |(dff.Country_Name=='Ethiopia')|(dff.Country_Name=='Eritrea')|(dff.Country_Name=='Kenya')  
             |(dff.Country_Name=='Madagascar')|(dff.Country_Name=='Malawi')|(dff.Country_Name=='Mauritius')  
             |(dff.Country_Name=='Mozambique')|(dff.Country_Name=='Rwanda')|(dff.Country_Name=='Somalia')  
             |(dff.Country_Name=='Somaliland')|(dff.Country_Name=='Tanzania')|(dff.Country_Name=='Zambia')  
             |(dff.Country_Name=='Zimbabwe')]  
    df_yea=dfa[(dfa.Year>=2015)|(dfa.Year==2017)]  
    mal_EA=df_yea.groupby('Country_Name')['Malaria_cases_reported'].sum().sort_values(ascending=False)  
    print(f'The highest number of case in East Africa {mal_EA}')  
    plt.title('Highest countries with Malaria cases in East Africa bewtween 2015 to 2017')  
    mal_EA.plot(x='Country_Name',y='Malaria_cases_reported',kind='barh')  
    plt.show()  
    print('___'*40)  
  
#3.Number of malaria cases reported in central africa(Chad, Congo Republic - Brazzaville,  
#Democratic Republic of Congo) 2015 to 2017  
def C_Afri(dff):  
    dfk= dff[(dff.Country_Name=='Central African Republic')|(dff.Country_Name=='Chad')|(dff.Country_Name=='Congo  
             |(dff.Country_Name=='Congo Rep')|(dff.Country_Name=='Equatorial Guinea')|(dff.Country_Name=='Gabon')  
             |(dff.Country_Name=='Sao Tome and Principe')]  
    dfk_year=dfk[(dfk.Year>=2015)|(dfk.Year==2017)]  
    mal_CA=dfk_year.groupby('Country_Name')['Malaria_cases_reported'].sum().sort_values(ascending=False)  
    tm=mal_CA[mal_CA>400000]  
    tl=mal_CA[mal_CA<400000]  
    t_small=pd.Series(tl.sum(),index=['Others(Congo rep,Eq.Guinea,Gabon & Sao Tome and P)'])  
    t_append=tm.append(t_small)  
    print(f'The number of malaria cases reported in Central africa\n{t_append}')
```

```

plt.title('Malaria cases in Central Africa between 2015 to 2017')
exp=[0,0.6,0.6,0.6]
t.append.plot(kind='pie',autopct='%1.f%%',explode=exp)
plt.show()
print('__'*40)

#4.Which country as the highest record of malaria cases in whole africa(from 2007 to 2017)
def africa(dff):
    df_af=dff.groupby('Country_Name')['Malaria_cases_reported'].sum().sort_values(ascending=False).head(1)
    for k,v in df_af.items():
        print(f'The country with the highest reported case is "{k}" with {v} reported Cases')
    print('__'*40)

#5.compare countries in west africa that uses safely and basic drink water service
def west_Africa(dff):
    dfw=df[(dff.Country_Name=='Ghana')|(dff.Country_Name=='Nigeria')|(dff.Country_Name=='Benin')
            |(dff.Country_Name=='Togo')|(dff.Country_Name=='Cameroon')|(dff.Country_Name=='Burkina Faso')
            |(dff.Country_Name=='Cape Verde')|(dff.Country_Name=='Côte D'Ivoire')|(dff.Country_Name=='Gambia')
            |(dff.Country_Name=='Guinea')|(dff.Country_Name=='Guinea-Bissau')|(dff.Country_Name=='Liberia')
            |(dff.Country_Name=='Mali')|(dff.Country_Name=='Mauritania')|(dff.Country_Name=='Niger')
            |(dff.Country_Name=='Senegal')|(dff.Country_Name=='Sierra Leone')]
    dem= dfw.groupby('Country_Name')['People using safely managed drinking water services (% of population)'].sum()
    print(f'Percentage countries with People using safely drinking water in West Africa {dem}')
    plt.title('countries with People using safely drinking water in West Africa')
    dem.plot(x='Country_Name',y='People using safely managed drinking water services (% of population)',kind='bar')
    plt.show()
    print('__'*40)

#6.children(5yrs and below) with fever receiving anti malaria drugs between 2015 to 2017
def freq_Nig(dff):
    a=dff[(dff.Country_Name=='Nigeria')]
    b=a[(a.Year>=2015) | (a.Year==2017)]
    c=b.groupby('Country_Name')['Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)'].sum()
    for k,v in c.items():
        print(f'Children(5yrs and below) with fever receiving anti malaria drugs between 2015 to 2017: {round(v,2)}')
    print('__'*40)

#Calling my functions
def main():
    m1=W_Afri(dff)
    m2=E_Afri(dff)
    m3=C_Afri(dff)
    m4=africa(dff)
    m5=west_Africa(dff)
    m6=freq_Nig(dff)

if __name__ == "__main__":
    main()

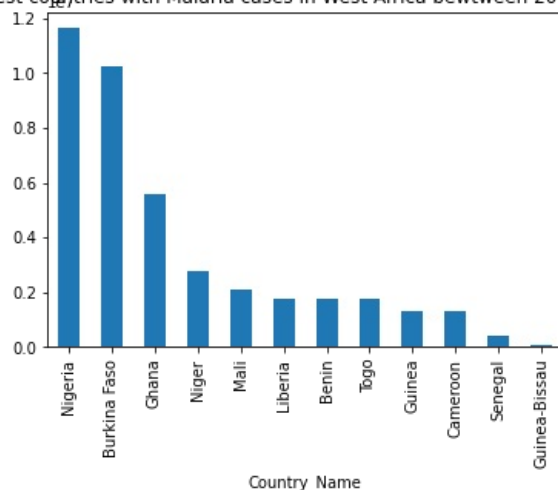
```

The highest number of case iN West AfricaCountry_Name

Nigeria	11639713.0
Burkina Faso	10255415.0
Ghana	5584185.0
Niger	2761268.0
Mali	2097797.0
Liberia	1783968.0
Benin	1774022.0
Togo	1755577.0
Guinea	1335323.0
Cameroon	1317371.0
Senegal	395706.0
Guinea-Bissau	92846.0

Name: Malaria_cases_reported, dtype: float64

Highest countries with Malaria cases in West Africa bewtween 2015 to 2017

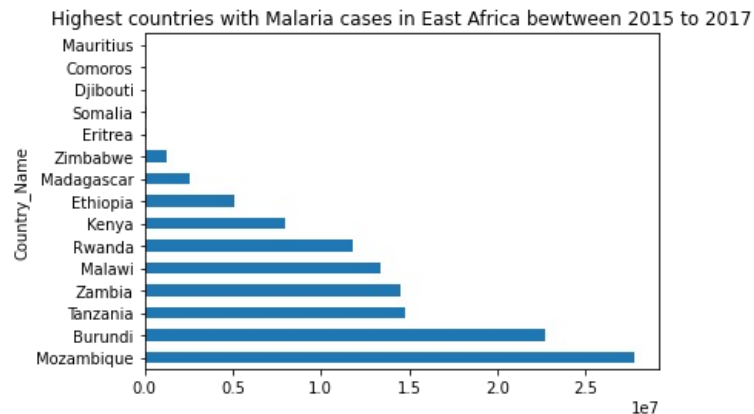


The highest number of case in East Africa Country_Name

Mozambique	2.780629e+07
Burundi	2.267570e+07
Tanzania	1.478505e+07

Zambia	1.454162e+07
Malawi	1.338996e+07
Rwanda	1.183362e+07
Kenya	7.932457e+06
Ethiopia	5.116302e+06
Madagascar	2.527950e+06
Zimbabwe	1.263890e+06
Eritrea	1.062920e+05
Somalia	9.171900e+04
Djibouti	3.794800e+04
Comoros	5.673000e+03
Mauritius	4.504188e+01

Name: Malaria_cases_reported, dtype: float64



C:\Users\Seth-Ese Joey\AppData\Local\Temp\ipykernel_2812\3751504442.py:45: FutureWarning:

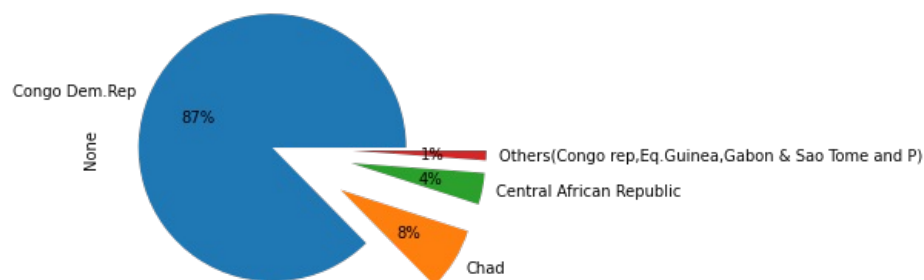
The series.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

The number of malaria cases reported in Central africa

Congo Dem.Rep	46152937.0
Chad	4044186.0
Central African Republic	2014906.0
Others(Congo rep,Eq.Guinea,Gabon & Sao Tome and P)	619457.0

dtype: float64

Malaria cases in Central Africa between 2015 to 2017

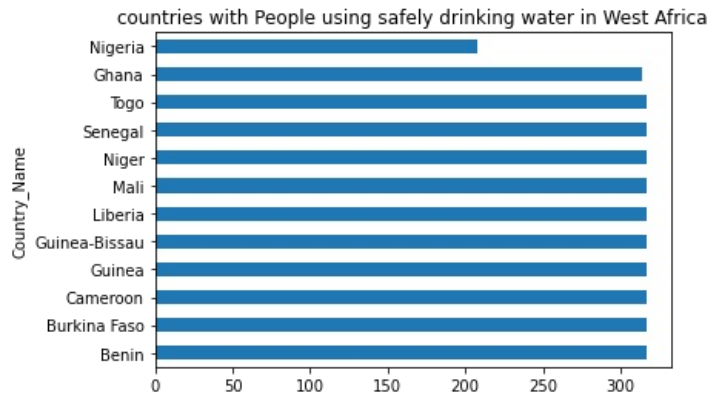


The country with the highest reported case is "Congo Dem.Rep" with 77555524.0 reported Cases

Percentage countries with People using safely drinking water in West Africa Country_Name

Benin	316.458333
Burkina Faso	316.458333
Cameroon	316.458333
Guinea	316.458333
Guinea-Bissau	316.458333
Liberia	316.458333
Mali	316.458333
Niger	316.458333
Senegal	316.458333
Togo	316.458333
Ghana	313.920000
Nigeria	207.860000

Name: People using safely managed drinking water services (% of population), dtype: float64



Children(5yrs and below) with fever receiving anti malaria drugs between 2015 to 2017: 66.14%

MODELLING AND PREDICTION

```
In [24]: from sklearn.ensemble import GradientBoostingRegressor
from catboost import CatBoostRegressor
from sklearn.linear_model import LinearRegression, Lasso, Ridge, BayesianRidge, SGDRegressor, ElasticNet
from sklearn.tree import DecisionTreeRegressor
from sklearn.svm import LinearSVR
from sklearn.neighbors import KNeighborsRegressor
from sklearn.ensemble import RandomForestRegressor

import seaborn as sns
from sklearn import preprocessing
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score
```

In []:

```
In [25]: dff.columns
```

```
Out[25]: Index(['Country_Name', 'Year', 'Country_Code',
      'Incidence_of_malaria_(per 1,000 population at risk)',
      'Malaria_cases_reported',
      'Use_o_insecticide-treated bed nets (% of under-5 population)',
      'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)',
      'People using safely managed drinking water services (% of population)',
      'People using safely managed drinking water services, rural (% of rural population)',
      'People using safely managed drinking water services, urban (% of urban population)',
      'People using safely managed sanitation services (% of population)',
      'People using safely managed sanitation services, rural (% of rural population)',
      'People using safely managed sanitation services, urban (% of urban population)',
      'Rural population (% of total population)',
      'Rural population growth (annual %)',
      'Urban population (% of total population)',
      'People using at least basic drinking water services (% of population)',
      'People using at least basic drinking water services, rural (% of rural population)',
      'People using at least basic drinking water services, urban (% of urban population)',
      'People using at least basic sanitation services (% of population)',
      'People using at least basic sanitation services, rural (% of rural population)',
      'People using at least basic sanitation services, urban (% of urban population)'],
      dtype='object')
```

```
In [26]: dfm= dff[['Country_Name', 'Year', 'Country_Code',
      'Incidence_of_malaria_(per 1,000 population at risk)',
      'Malaria_cases_reported',
      'Use_o_insecticide-treated bed nets (% of under-5 population)',
      'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)',
      'Rural population (% of total population)',
      'Rural population growth (annual %)',
      'Urban population (% of total population)',
      'People using at least basic drinking water services (% of population)',
      'People using at least basic drinking water services, rural (% of rural population)',
      'People using at least basic drinking water services, urban (% of urban population)',
      'People using at least basic sanitation services (% of population)',
      'People using at least basic sanitation services, rural (% of rural population)',
```

```
'People using at least basic sanitation services, urban (% of urban population)']]]
dfm.head()
```

Out[26]:

	Country_Name	Year	Country_Code	Incidence_of_malaria_(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimala (% of children under age 5 w
0	Algeria	2007	DZA	0.01	26.0	33.47899	
1	Angola	2007	AGO	286.72	1533485.0	18.00000	
2	Benin	2007	BEN	480.24	0.0	33.47899	
3	Botswana	2007	BWA	1.03	390.0	33.47899	
4	Burkina Faso	2007	BFA	503.80	44246.0	33.47899	

```
In [27]: cor=dfm.corr()
# sns.heatmap(cor,annot=True,cmap='Reds')
# plt.show()
cor
```

Out[27]:

	Year	Incidence_of_malaria_(per 1,000 population at risk)	Malaria_cases_reported	Use_o_ insecticide- treated bed nets (% of under-5 population)	Children_with_fever (% of c
Year	1.000000	-0.065638	0.354238	0.215416	
Incidence_of_malaria_(per 1,000 population at risk)	-0.065638	1.000000	0.310266	0.066227	
Malaria_cases_reported	0.354238	0.310266	1.000000	0.174221	
Use_o_ insecticide-treated bed nets (% of under-5 population)	0.215416	0.066227	0.174221	1.000000	
Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)	-0.036874	0.265305	0.176511	0.216277	
Rural population (% of total population)	-0.103137	0.269575	0.223116	0.116701	
Rural population growth (annual %)	0.069519	-0.013296	0.005363	0.005322	
Urban population (% of total population)	0.087486	-0.256835	-0.221120	-0.116606	
People using at least basic drinking water services (% of population)	0.120229	-0.455586	-0.271980	-0.051654	
People using at least basic drinking water services, rural (% of rural population)	0.109514	-0.335402	-0.190198	0.011498	
People using at least basic drinking water services, urban (% of urban population)	0.083341	-0.247330	-0.091589	0.009061	
People using at least basic sanitation services (% of population)	0.070560	-0.534841	-0.221945	-0.086651	
People using at least basic sanitation services, rural (% of rural population)	0.068939	-0.434878	-0.148719	-0.038481	
People using at least basic sanitation services, urban (% of urban population)	0.058602	-0.482007	-0.242715	-0.120721	

```
In [28]: df2['Country_Code'].unique()
```

```
Out[28]: array(['DZA', 'AGO', 'BEN', 'BWA', 'BFA', 'BDI', 'CPV', 'CMR', 'CAF',
        'TCD', 'COM', 'COD', 'COG', 'CIV', 'DJI', 'EGY', 'GNQ', 'ERI',
        'SWZ', 'ETH', 'GAB', 'GMB', 'GHA', 'GIN', 'GNB', 'KEN', 'LSO',
        'LBR', 'LBY', 'MDG', 'MWI', 'MLI', 'MRT', 'MUS', 'MAR', 'MOZ',
        'NAM', 'NER', 'NGA', 'RWA', 'STP', 'SEN', 'SYC', 'SLE', 'SOM',
        'ZAF', 'SSD', 'SDN', 'TZA', 'TGO', 'TUN', 'UGA', 'ZMB', 'ZWE'],
        dtype=object)
```

```
In [29]: #Dropping column that will be predicted
# ddm=dfm.drop('Incidence_of_malaria_(per 1,000 population at risk)',axis=1)
# ddm.head()
```

```
In [30]: # df2.drop('geometry',axis=1,inplace=True)
```

```
In [31]: abs(cor['Incidence_of_malaria_(per 1,000 population at risk)'])
```

```
Out[31]: Year 0.065638
Incidence_of_malaria_(per 1,000 population at risk) 1.000000
Malaria_cases_reported 0.310266
Use_o_insecticide-treated bed nets (% of under-5 population) 0.066227
Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever) 0.265305
Rural population (% of total population) 0.269575
Rural population growth (annual %) 0.013296
Urban population (% of total population) 0.256835
People using at least basic drinking water services (% of population) 0.455586
People using at least basic drinking water services, rural (% of rural population) 0.335402
People using at least basic drinking water services, urban (% of urban population) 0.247330
People using at least basic sanitation services (% of population) 0.534841
People using at least basic sanitation services, rural (% of rural population) 0.434878
People using at least basic sanitation services, urban (% of urban population) 0.482007
Name: Incidence_of_malaria_(per 1,000 population at risk), dtype: float64
```

```
In [ ]:
```

```
In [32]: ddm=df2.drop('Incidence_of_malaria_(per 1,000 population at risk)',axis=1)
ddm.head()
```

Out[32]:

	Country_Name	Year	Country_Code	Malaria_cases_reported	Use_o_insecticide-treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)	Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)	pop
0	Algeria	2007	DZA	26.0	33.47899	12.470568	51.549545	21
1	Angola	2007	AGO	1533485.0	18.00000	29.800000	1.500000	21
2	Benin	2007	BEN	0.0	33.47899	12.470568	51.549545	21
3	Botswana	2007	BWA	390.0	33.47899	12.470568	51.549545	21
4	Burkina Faso	2007	BFA	44246.0	33.47899	12.470568	51.549545	21

```
In [33]: df_inci=df2['Incidence_of_malaria_(per 1,000 population at risk)']
df_inci
```

```
Out[33]: 0    0.010000
1    286.720000
2    480.240000
3     1.030000
4    503.800000
...
589  278.200000
590   30.201639
591  336.760000
592  160.050000
593  108.550000
Name: Incidence_of_malaria_(per 1,000 population at risk), Length: 594, dtype: float64
```

```
In [34]: num= ddm.select_dtypes(np.number)
num_col=num.columns.to_list()
num_col
```

```
Out[34]: ['Year',
'Malaria_cases_reported',
'Use_o_insecticide-treated bed nets (% of under-5 population)',
'Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)',
'Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)',
'People using safely managed drinking water services (% of population)',
'People using safely managed drinking water services, rural (% of rural population)',
'People using safely managed drinking water services, urban (% of urban population)',
'People using safely managed sanitation services (% of population)',
'People using safely managed sanitation services, rural (% of rural population)',
'People using safely managed sanitation services, urban (% of urban population)',
'Rural population (% of total population)',
'Rural population growth (annual %)',
'Urban population (% of total population)',
'Urban population growth (annual %)',
'People using at least basic drinking water services (% of population)',
'People using at least basic drinking water services, rural (% of rural population)',
'People using at least basic drinking water services, urban (% of urban population)',
'People using at least basic sanitation services (% of population)',
'People using at least basic sanitation services, rural (% of rural population)',
'People using at least basic sanitation services, urban (% of urban population)',
'latitude',
'longitude']
```

```
In [35]: obj=ddm.select_dtypes(np.object)
non_num=obj.columns.to_list()
non_num
```

C:\Users\Seth-Ese Joey\AppData\Local\Temp\ipykernel_2812\1411064344.py:1: DeprecationWarning:

`np.object` is a deprecated alias for the builtin `object`. To silence this warning, use `object` by itself. Doing this will not modify any behavior and is safe.
 Deprecated in NumPy 1.20; for more details and guidance: <https://numpy.org/devdocs/release/1.20.0-notes.html#deprecations>

```
Out[35]: ['Country_Name', 'Country_Code', 'geometry']
```

```
In [36]: #Converting non numeric columns to numeric columns
from sklearn import preprocessing
label_Encoder = preprocessing.LabelEncoder()
```

```
In [37]: obj
```

```
Out[37]:
```

	Country_Name	Country_Code	geometry
0	Algeria	DZA	POINT (28.033886 1.659626)
1	Angola	AGO	POINT (-11.202692 17.873887)
2	Benin	BEN	POINT (9.307689999999999 2.315834)
3	Botswana	BWA	POINT (-22.328474 24.684866)
4	Burkina Faso	BFA	POINT (12.238333 -1.561593)
...
589	Togo	TGO	POINT (8.619543 0.824782)
590	Tunisia	TUN	POINT (33.886917 9.537499)
591	Uganda	UGA	POINT (1.373333 32.290275)
592	Zambia	ZMB	POINT (-13.133897 27.849332)
593	Zimbabwe	ZWE	POINT (-19.015438 29.154857)

594 rows × 3 columns

```
In [38]: for i in non_num:
obj[i]=label_Encoder.fit_transform(obj[i])
```

```
In [39]: df2['Country_Name'].unique()
```

```
Out[39]: array(['Algeria', 'Angola', 'Benin', 'Botswana', 'Burkina Faso',
'Burundi', 'Cabo Verde', 'Cameroon', 'Central African Republic',
'Chad', 'Comoros', 'Congo Dem.Rep', 'Congo Rep', 'Cote d'Ivoire',
'Djibouti', 'Egypt', 'Equatorial Guinea', 'Eritrea', 'Eswatini',
'Ethiopia', 'Gabon', 'The Gambia', 'Ghana', 'Guinea',
'Guinea-Bissau', 'Kenya', 'Lesotho', 'Liberia', 'Libya',
'Madagascar', 'Malawi', 'Mali', 'Mauritania', 'Mauritius',
'Morocco', 'Mozambique', 'Namibia', 'Niger', 'Nigeria', 'Rwanda',
'Sao Tome and Principe', 'Senegal', 'Seychelles', 'Sierra Leone',
'Somalia', 'South Africa', 'South Sudan', 'Sudan', 'Tanzania',
'Togo', 'Tunisia', 'Uganda', 'Zambia', 'Zimbabwe'], dtype=object)
```

```
In [40]: obj['Country_Name'].unique()
#Nig 38
```

```
Out[40]: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
        17, 18, 19, 20, 48, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32,
        33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 50,
        51, 52, 53])
```

```
In [41]: df2['Country_Code'].unique()
#Nig39,Gha 23
```

```
Out[41]: array(['DZA', 'AGO', 'BEN', 'BWA', 'BFA', 'BDI', 'CPV', 'CMR', 'CAF',
        'TCD', 'COM', 'COD', 'COG', 'CIV', 'DJI', 'EGY', 'GNQ', 'ERI',
        'SWZ', 'ETH', 'GAB', 'GMB', 'GHA', 'GIN', 'GNB', 'KEN', 'LSO',
        'LBR', 'LBY', 'MDG', 'MWI', 'MLI', 'MRT', 'MUS', 'MAR', 'MOZ',
        'NAM', 'NER', 'NGA', 'RWA', 'STP', 'SEN', 'SYC', 'SLE', 'SOM',
        'ZAF', 'SSD', 'SDN', 'TZA', 'TGO', 'TUN', 'UGA', 'ZMB', 'ZWE'],
        dtype=object)
```

```
In [42]: obj['Country_Code'].unique()
#ghana 18,Nig 36
```

```
Out[42]: array([13,  0,  2,  4,  3,  1, 11,  7,  5, 46, 10,  8,  9,  6, 12, 14, 22,
        15, 44, 16, 17, 20, 18, 19, 21, 23, 26, 24, 25, 28, 33, 29, 31, 32,
        27, 30, 34, 35, 36, 37, 43, 39, 45, 40, 41, 51, 42, 38, 49, 47, 48,
        50, 52, 53])
```

```
In [43]: obj
```

Out[43]:

	Country_Name	Country_Code	geometry
0		0	13
1		1	0
2		2	2
3		3	4
4		4	3
...
589		49	47
590		50	48
591		51	50
592		52	52
593		53	53

594 rows × 3 columns

```
In [44]: #Concatinating the two dataframe
concat_data=pd.concat([num,obj],axis=1)
concat_data.head()
```

Out[44]:

	Year	Malaria_cases_reported	Use_o_ insecticide-treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)	Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)	People using safely managed drinking water services (% of population)	People using safely managed drinking water services, rural (% of rural population)	Peop usir safe manage drinkir wat service urban (of urb: populatio
0	2007	26.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.1746:
1	2007	1533485.0	18.00000	29.800000	1.500000	28.768939	14.361727	32.1746:
2	2007	0.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.1746:
3	2007	390.0	33.47899	12.470568	51.549545	28.768939	14.361727	83.96000
4	2007	44246.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.1746:

```
In [45]: #Modeling my data using linear regresion
from sklearn.model_selection import train_test_split
```

```
In [46]: X_train,X_test,y_train,y_test=train_test_split(concat_data,df_inci,test_size=0.29,random_state=4)
X_train.head()
```

Out[46]:

	Year	Malaria_cases_reported	Use_o insecticide- treated bed nets (% of under-5 population)	Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever)	Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)	People using safely managed drinking water services (% of population)	People using safely managed drinking water services, rural (% of rural population)	Pe u s: man: drin w servi urba of u
413	2014	7407175.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.17
123	2009	0.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.17
237	2011	268020.0	33.47899	12.470568	51.549545	28.768939	14.361727	60.99
168	2010	47.0	33.47899	12.470568	51.549545	28.768939	14.361727	32.17
429	2014	3631939.0	33.47899	12.470568	51.549545	6.710000	3.750000	17.51

In [47]: X_train.shape

Out[47]: (421, 26)

```
In [48]: models = {}  
def train_validate_predict(regressor, x_train, y_train, x_test, y_test, index):  
    model = regressor  
    model.fit(x_train, y_train)  
  
    y_pred = model.predict(x_test)  
  
    r2 = r2_score(y_test, y_pred)  
    models[index] = r2
```

```
In [49]: model_list = [LinearRegression, Lasso, Ridge, BayesianRidge, DecisionTreeRegressor, LinearSVR, KNeighborsRegres  
    RandomForestRegressor, GradientBoostingRegressor, ElasticNet, SGDRegressor, CatBoostRegressor]  
model_names = ['Linear Regression', 'Lasso', 'Ridge', 'Bayesian Ridge', 'Decision Tree Regressor', 'Linear SVR',  
    'KNeighbors Regressor', 'Random Forest Regressor', 'Gradient Boosting Regressor', 'Elastic Net',  
    'Cat Boost Regressor']  
  
index = 0  
for regressor in model_list:  
    train_validate_predict(regressor(), X_train, y_train, X_test, y_test, model_names[index])  
    index+=1
```

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model_coordinate_descent.py:647: ConvergenceWarning:

Objective did not converge. You might want to increase the number of iterations, check the scale of the feature
s or consider increasing regularisation. Duality gap: 2.156e+06, tolerance: 1.091e+03

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\svm_base.py:1206: ConvergenceWarning:

Liblinear failed to converge, increase the number of iterations.

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model_coordinate_descent.py:647: ConvergenceWarning:

Objective did not converge. You might want to increase the number of iterations, check the scale of the feature
s or consider increasing regularisation. Duality gap: 2.155e+06, tolerance: 1.091e+03

Learning rate set to 0.035712

0:	learn: 157.9632502	total: 209ms	remaining: 3m 28s
1:	learn: 154.6314890	total: 212ms	remaining: 1m 45s
2:	learn: 151.2803966	total: 215ms	remaining: 1m 11s
3:	learn: 148.0735742	total: 217ms	remaining: 53.9s
4:	learn: 145.4433111	total: 219ms	remaining: 43.6s
5:	learn: 142.9062126	total: 221ms	remaining: 36.6s
6:	learn: 140.1356792	total: 223ms	remaining: 31.7s
7:	learn: 137.5669876	total: 225ms	remaining: 27.9s
8:	learn: 135.2407449	total: 227ms	remaining: 25s
9:	learn: 132.6970028	total: 229ms	remaining: 22.7s
10:	learn: 130.1723118	total: 231ms	remaining: 20.8s
11:	learn: 127.6799348	total: 233ms	remaining: 19.2s
12:	learn: 125.6465552	total: 235ms	remaining: 17.9s
13:	learn: 123.2384277	total: 237ms	remaining: 16.7s
14:	learn: 120.7546365	total: 239ms	remaining: 15.7s
15:	learn: 118.8787722	total: 242ms	remaining: 14.9s
16:	learn: 116.9315941	total: 244ms	remaining: 14.1s
17:	learn: 114.8081579	total: 246ms	remaining: 13.4s
18:	learn: 113.1034046	total: 248ms	remaining: 12.8s
19:	learn: 111.2613629	total: 250ms	remaining: 12.2s
20:	learn: 109.4929589	total: 252ms	remaining: 11.8s
21:	learn: 107.2733196	total: 254ms	remaining: 11.3s
22:	learn: 105.6607188	total: 256ms	remaining: 10.9s
23:	learn: 103.8646179	total: 258ms	remaining: 10.5s
24:	learn: 102.5788577	total: 261ms	remaining: 10.2s
25:	learn: 100.9482894	total: 263ms	remaining: 9.84s
26:	learn: 99.2787387	total: 265ms	remaining: 9.54s

27:	learn: 98.1586486	total: 267ms	remaining: 9.26s
28:	learn: 96.2717877	total: 269ms	remaining: 9s
29:	learn: 94.6622190	total: 271ms	remaining: 8.75s
30:	learn: 93.2757426	total: 273ms	remaining: 8.52s
31:	learn: 91.9739067	total: 275ms	remaining: 8.31s
32:	learn: 90.6291749	total: 277ms	remaining: 8.11s
33:	learn: 89.2371496	total: 279ms	remaining: 7.94s
34:	learn: 87.6371851	total: 283ms	remaining: 7.79s
35:	learn: 86.2355443	total: 285ms	remaining: 7.63s
36:	learn: 85.0375673	total: 287ms	remaining: 7.47s
37:	learn: 83.9203439	total: 290ms	remaining: 7.33s
38:	learn: 82.9042824	total: 292ms	remaining: 7.19s
39:	learn: 81.6405024	total: 294ms	remaining: 7.06s
40:	learn: 80.4938968	total: 297ms	remaining: 6.94s
41:	learn: 79.6075154	total: 299ms	remaining: 6.82s
42:	learn: 78.5930131	total: 301ms	remaining: 6.7s
43:	learn: 77.4327065	total: 303ms	remaining: 6.59s
44:	learn: 76.3169341	total: 305ms	remaining: 6.48s
45:	learn: 75.0897076	total: 307ms	remaining: 6.38s
46:	learn: 74.0544879	total: 309ms	remaining: 6.27s
47:	learn: 73.2400823	total: 311ms	remaining: 6.17s
48:	learn: 72.3384012	total: 313ms	remaining: 6.08s
49:	learn: 71.6344082	total: 315ms	remaining: 5.99s
50:	learn: 70.7788526	total: 317ms	remaining: 5.9s
51:	learn: 70.0682551	total: 319ms	remaining: 5.82s
52:	learn: 69.1677731	total: 321ms	remaining: 5.74s
53:	learn: 68.5672320	total: 323ms	remaining: 5.66s
54:	learn: 67.9169748	total: 325ms	remaining: 5.58s
55:	learn: 66.9260415	total: 327ms	remaining: 5.51s
56:	learn: 66.0513741	total: 329ms	remaining: 5.44s
57:	learn: 65.4782499	total: 331ms	remaining: 5.38s
58:	learn: 64.9270208	total: 333ms	remaining: 5.31s
59:	learn: 64.1588681	total: 335ms	remaining: 5.25s
60:	learn: 63.5099226	total: 337ms	remaining: 5.18s
61:	learn: 62.8112865	total: 339ms	remaining: 5.12s
62:	learn: 62.1678745	total: 341ms	remaining: 5.07s
63:	learn: 61.5269143	total: 343ms	remaining: 5.01s
64:	learn: 60.8011269	total: 345ms	remaining: 4.96s
65:	learn: 60.2113804	total: 362ms	remaining: 5.12s
66:	learn: 59.6992955	total: 364ms	remaining: 5.07s
67:	learn: 59.0007880	total: 367ms	remaining: 5.03s
68:	learn: 58.4795250	total: 369ms	remaining: 4.98s
69:	learn: 57.7180137	total: 371ms	remaining: 4.93s
70:	learn: 57.0804373	total: 374ms	remaining: 4.89s
71:	learn: 56.5086332	total: 376ms	remaining: 4.84s
72:	learn: 55.9861950	total: 379ms	remaining: 4.81s
73:	learn: 55.4724912	total: 382ms	remaining: 4.78s
74:	learn: 54.9933892	total: 385ms	remaining: 4.75s
75:	learn: 54.5791438	total: 388ms	remaining: 4.72s
76:	learn: 54.1342255	total: 392ms	remaining: 4.7s
77:	learn: 53.5310910	total: 395ms	remaining: 4.67s
78:	learn: 52.9750501	total: 398ms	remaining: 4.64s
79:	learn: 52.4194663	total: 401ms	remaining: 4.61s
80:	learn: 51.9162582	total: 404ms	remaining: 4.58s
81:	learn: 51.6704066	total: 407ms	remaining: 4.55s
82:	learn: 51.0709090	total: 409ms	remaining: 4.52s
83:	learn: 50.5731895	total: 412ms	remaining: 4.49s
84:	learn: 50.1020437	total: 414ms	remaining: 4.46s
85:	learn: 49.6849600	total: 417ms	remaining: 4.43s
86:	learn: 49.3830361	total: 420ms	remaining: 4.4s
87:	learn: 49.0369385	total: 422ms	remaining: 4.38s
88:	learn: 48.8538364	total: 425ms	remaining: 4.34s
89:	learn: 48.5350687	total: 427ms	remaining: 4.32s
90:	learn: 48.2558969	total: 429ms	remaining: 4.29s
91:	learn: 47.9346070	total: 431ms	remaining: 4.26s
92:	learn: 47.5631325	total: 434ms	remaining: 4.23s
93:	learn: 47.2254702	total: 436ms	remaining: 4.2s
94:	learn: 46.7731070	total: 438ms	remaining: 4.17s
95:	learn: 46.3460508	total: 440ms	remaining: 4.15s
96:	learn: 46.1944071	total: 443ms	remaining: 4.12s
97:	learn: 45.8302399	total: 445ms	remaining: 4.1s
98:	learn: 45.4802524	total: 448ms	remaining: 4.07s
99:	learn: 45.2085587	total: 450ms	remaining: 4.05s
100:	learn: 44.9003801	total: 453ms	remaining: 4.03s
101:	learn: 44.5482387	total: 456ms	remaining: 4.01s
102:	learn: 44.0529924	total: 458ms	remaining: 3.99s
103:	learn: 43.7667685	total: 461ms	remaining: 3.97s
104:	learn: 43.4905877	total: 463ms	remaining: 3.95s
105:	learn: 43.2623136	total: 466ms	remaining: 3.93s
106:	learn: 42.9234561	total: 468ms	remaining: 3.91s
107:	learn: 42.4150069	total: 470ms	remaining: 3.88s
108:	learn: 42.1900618	total: 473ms	remaining: 3.86s
109:	learn: 41.8804566	total: 475ms	remaining: 3.84s
110:	learn: 41.5210346	total: 477ms	remaining: 3.82s
111:	learn: 41.3126197	total: 480ms	remaining: 3.8s
112:	learn: 41.0408374	total: 482ms	remaining: 3.78s
113:	learn: 40.9309219	total: 484ms	remaining: 3.76s
114:	learn: 40.7970071	total: 486ms	remaining: 3.74s
115:	learn: 40.4624778	total: 489ms	remaining: 3.73s

116:	learn:	40.2580206	total:	491ms	remaining:	3.71s
117:	learn:	40.0059598	total:	494ms	remaining:	3.69s
118:	learn:	39.8538651	total:	496ms	remaining:	3.67s
119:	learn:	39.4946759	total:	499ms	remaining:	3.66s
120:	learn:	39.3039351	total:	501ms	remaining:	3.64s
121:	learn:	39.0750984	total:	504ms	remaining:	3.62s
122:	learn:	38.7762250	total:	506ms	remaining:	3.61s
123:	learn:	38.6029670	total:	509ms	remaining:	3.59s
124:	learn:	38.3675759	total:	511ms	remaining:	3.58s
125:	learn:	38.1352360	total:	513ms	remaining:	3.56s
126:	learn:	37.9189190	total:	516ms	remaining:	3.54s
127:	learn:	37.7663381	total:	518ms	remaining:	3.53s
128:	learn:	37.5016525	total:	520ms	remaining:	3.51s
129:	learn:	37.3662633	total:	522ms	remaining:	3.5s
130:	learn:	37.1227026	total:	525ms	remaining:	3.48s
131:	learn:	36.9868518	total:	527ms	remaining:	3.46s
132:	learn:	36.7638906	total:	529ms	remaining:	3.45s
133:	learn:	36.5882345	total:	531ms	remaining:	3.43s
134:	learn:	36.3593926	total:	533ms	remaining:	3.42s
135:	learn:	36.0019787	total:	536ms	remaining:	3.4s
136:	learn:	35.7779144	total:	538ms	remaining:	3.39s
137:	learn:	35.6249734	total:	540ms	remaining:	3.37s
138:	learn:	35.4086083	total:	542ms	remaining:	3.36s
139:	learn:	35.1433981	total:	545ms	remaining:	3.34s
140:	learn:	34.9118771	total:	547ms	remaining:	3.33s
141:	learn:	34.6445410	total:	549ms	remaining:	3.32s
142:	learn:	34.4073283	total:	553ms	remaining:	3.31s
143:	learn:	34.1768546	total:	556ms	remaining:	3.3s
144:	learn:	33.9792883	total:	559ms	remaining:	3.29s
145:	learn:	33.8318372	total:	561ms	remaining:	3.28s
146:	learn:	33.5691534	total:	565ms	remaining:	3.28s
147:	learn:	33.3549957	total:	569ms	remaining:	3.27s
148:	learn:	33.1705202	total:	573ms	remaining:	3.27s
149:	learn:	32.9469501	total:	577ms	remaining:	3.27s
150:	learn:	32.7842686	total:	580ms	remaining:	3.26s
151:	learn:	32.5508934	total:	583ms	remaining:	3.25s
152:	learn:	32.3941858	total:	587ms	remaining:	3.25s
153:	learn:	32.2480464	total:	590ms	remaining:	3.24s
154:	learn:	32.0850392	total:	593ms	remaining:	3.23s
155:	learn:	31.9069084	total:	596ms	remaining:	3.22s
156:	learn:	31.8233217	total:	599ms	remaining:	3.21s
157:	learn:	31.7048366	total:	601ms	remaining:	3.2s
158:	learn:	31.5596756	total:	604ms	remaining:	3.19s
159:	learn:	31.3860011	total:	606ms	remaining:	3.18s
160:	learn:	31.2092610	total:	608ms	remaining:	3.17s
161:	learn:	30.9634016	total:	611ms	remaining:	3.16s
162:	learn:	30.7692757	total:	613ms	remaining:	3.15s
163:	learn:	30.5907506	total:	615ms	remaining:	3.13s
164:	learn:	30.3999005	total:	618ms	remaining:	3.13s
165:	learn:	30.1817350	total:	620ms	remaining:	3.12s
166:	learn:	30.0801927	total:	623ms	remaining:	3.11s
167:	learn:	29.9323991	total:	625ms	remaining:	3.1s
168:	learn:	29.7812267	total:	628ms	remaining:	3.08s
169:	learn:	29.6804558	total:	630ms	remaining:	3.08s
170:	learn:	29.4668588	total:	633ms	remaining:	3.07s
171:	learn:	29.2718243	total:	636ms	remaining:	3.06s
172:	learn:	29.1584533	total:	639ms	remaining:	3.05s
173:	learn:	28.9855512	total:	641ms	remaining:	3.04s
174:	learn:	28.7825441	total:	643ms	remaining:	3.03s
175:	learn:	28.5546687	total:	646ms	remaining:	3.02s
176:	learn:	28.3718987	total:	648ms	remaining:	3.01s
177:	learn:	28.2288826	total:	650ms	remaining:	3s
178:	learn:	28.0702823	total:	653ms	remaining:	2.99s
179:	learn:	27.9148238	total:	655ms	remaining:	2.98s
180:	learn:	27.7436086	total:	657ms	remaining:	2.97s
181:	learn:	27.6332654	total:	660ms	remaining:	2.96s
182:	learn:	27.4990035	total:	662ms	remaining:	2.96s
183:	learn:	27.4011389	total:	665ms	remaining:	2.95s
184:	learn:	27.2693913	total:	668ms	remaining:	2.94s
185:	learn:	27.1418778	total:	670ms	remaining:	2.93s
186:	learn:	27.0960346	total:	673ms	remaining:	2.92s
187:	learn:	26.9881984	total:	675ms	remaining:	2.92s
188:	learn:	26.8372308	total:	678ms	remaining:	2.91s
189:	learn:	26.8035266	total:	681ms	remaining:	2.9s
190:	learn:	26.7487573	total:	683ms	remaining:	2.89s
191:	learn:	26.6385763	total:	686ms	remaining:	2.89s
192:	learn:	26.4822932	total:	689ms	remaining:	2.88s
193:	learn:	26.3568198	total:	692ms	remaining:	2.87s
194:	learn:	26.2369917	total:	695ms	remaining:	2.87s
195:	learn:	26.1516999	total:	698ms	remaining:	2.86s
196:	learn:	26.0731878	total:	700ms	remaining:	2.85s
197:	learn:	26.0442224	total:	703ms	remaining:	2.85s
198:	learn:	25.9804361	total:	706ms	remaining:	2.84s
199:	learn:	25.8350500	total:	709ms	remaining:	2.83s
200:	learn:	25.6853602	total:	712ms	remaining:	2.83s
201:	learn:	25.5180039	total:	714ms	remaining:	2.82s
202:	learn:	25.3673046	total:	718ms	remaining:	2.82s
203:	learn:	25.2922305	total:	722ms	remaining:	2.81s
204:	learn:	25.1284566	total:	725ms	remaining:	2.81s

205:	learn: 25.0441871	total: 728ms	remaining: 2.81s
206:	learn: 24.9047403	total: 733ms	remaining: 2.81s
207:	learn: 24.8287976	total: 737ms	remaining: 2.8s
208:	learn: 24.7698408	total: 740ms	remaining: 2.8s
209:	learn: 24.7173460	total: 743ms	remaining: 2.79s
210:	learn: 24.6276768	total: 746ms	remaining: 2.79s
211:	learn: 24.5617675	total: 748ms	remaining: 2.78s
212:	learn: 24.4972738	total: 751ms	remaining: 2.77s
213:	learn: 24.3922695	total: 754ms	remaining: 2.77s
214:	learn: 24.3030303	total: 757ms	remaining: 2.76s
215:	learn: 24.2412405	total: 760ms	remaining: 2.76s
216:	learn: 24.1996618	total: 763ms	remaining: 2.75s
217:	learn: 24.0429777	total: 766ms	remaining: 2.75s
218:	learn: 24.0116883	total: 768ms	remaining: 2.74s
219:	learn: 23.8954084	total: 771ms	remaining: 2.73s
220:	learn: 23.7781937	total: 774ms	remaining: 2.73s
221:	learn: 23.7339876	total: 777ms	remaining: 2.72s
222:	learn: 23.7016977	total: 780ms	remaining: 2.72s
223:	learn: 23.5862213	total: 783ms	remaining: 2.71s
224:	learn: 23.4301876	total: 786ms	remaining: 2.71s
225:	learn: 23.2824279	total: 789ms	remaining: 2.7s
226:	learn: 23.2023362	total: 791ms	remaining: 2.69s
227:	learn: 23.1042647	total: 794ms	remaining: 2.69s
228:	learn: 22.9845774	total: 797ms	remaining: 2.68s
229:	learn: 22.9552458	total: 799ms	remaining: 2.67s
230:	learn: 22.8594285	total: 802ms	remaining: 2.67s
231:	learn: 22.8104841	total: 805ms	remaining: 2.66s
232:	learn: 22.6712070	total: 807ms	remaining: 2.66s
233:	learn: 22.5392625	total: 810ms	remaining: 2.65s
234:	learn: 22.4508492	total: 813ms	remaining: 2.65s
235:	learn: 22.4206628	total: 816ms	remaining: 2.64s
236:	learn: 22.2964855	total: 819ms	remaining: 2.64s
237:	learn: 22.2148002	total: 822ms	remaining: 2.63s
238:	learn: 22.1074206	total: 825ms	remaining: 2.63s
239:	learn: 22.0673287	total: 828ms	remaining: 2.62s
240:	learn: 22.0159384	total: 831ms	remaining: 2.62s
241:	learn: 21.9089285	total: 834ms	remaining: 2.61s
242:	learn: 21.8300328	total: 837ms	remaining: 2.61s
243:	learn: 21.7981993	total: 839ms	remaining: 2.6s
244:	learn: 21.6368216	total: 841ms	remaining: 2.59s
245:	learn: 21.5707454	total: 844ms	remaining: 2.59s
246:	learn: 21.5296975	total: 847ms	remaining: 2.58s
247:	learn: 21.4849623	total: 850ms	remaining: 2.58s
248:	learn: 21.4432367	total: 853ms	remaining: 2.57s
249:	learn: 21.4236202	total: 856ms	remaining: 2.57s
250:	learn: 21.3906065	total: 860ms	remaining: 2.56s
251:	learn: 21.2693139	total: 862ms	remaining: 2.56s
252:	learn: 21.2503570	total: 865ms	remaining: 2.55s
253:	learn: 21.2317409	total: 868ms	remaining: 2.55s
254:	learn: 21.2004612	total: 870ms	remaining: 2.54s
255:	learn: 21.0890983	total: 873ms	remaining: 2.54s
256:	learn: 21.0682866	total: 875ms	remaining: 2.53s
257:	learn: 21.0000861	total: 878ms	remaining: 2.52s
258:	learn: 20.8914779	total: 881ms	remaining: 2.52s
259:	learn: 20.7839701	total: 884ms	remaining: 2.51s
260:	learn: 20.7672518	total: 886ms	remaining: 2.51s
261:	learn: 20.6672710	total: 888ms	remaining: 2.5s
262:	learn: 20.6475415	total: 891ms	remaining: 2.5s
263:	learn: 20.5419692	total: 893ms	remaining: 2.49s
264:	learn: 20.5249056	total: 895ms	remaining: 2.48s
265:	learn: 20.4828871	total: 898ms	remaining: 2.48s
266:	learn: 20.4541745	total: 901ms	remaining: 2.47s
267:	learn: 20.3536158	total: 903ms	remaining: 2.47s
268:	learn: 20.3390041	total: 906ms	remaining: 2.46s
269:	learn: 20.2690453	total: 910ms	remaining: 2.46s
270:	learn: 20.1644287	total: 912ms	remaining: 2.45s
271:	learn: 20.0757010	total: 915ms	remaining: 2.45s
272:	learn: 19.9591798	total: 918ms	remaining: 2.44s
273:	learn: 19.9358330	total: 920ms	remaining: 2.44s
274:	learn: 19.8617522	total: 923ms	remaining: 2.43s
275:	learn: 19.7584979	total: 926ms	remaining: 2.43s
276:	learn: 19.6930147	total: 929ms	remaining: 2.42s
277:	learn: 19.6200627	total: 931ms	remaining: 2.42s
278:	learn: 19.5475098	total: 934ms	remaining: 2.41s
279:	learn: 19.4661671	total: 936ms	remaining: 2.41s
280:	learn: 19.4202876	total: 938ms	remaining: 2.4s
281:	learn: 19.3179582	total: 941ms	remaining: 2.39s
282:	learn: 19.2394367	total: 943ms	remaining: 2.39s
283:	learn: 19.1436925	total: 945ms	remaining: 2.38s
284:	learn: 19.0997811	total: 948ms	remaining: 2.38s
285:	learn: 19.0045916	total: 950ms	remaining: 2.37s
286:	learn: 18.9445960	total: 953ms	remaining: 2.37s
287:	learn: 18.8372168	total: 956ms	remaining: 2.36s
288:	learn: 18.7549485	total: 958ms	remaining: 2.36s
289:	learn: 18.6782802	total: 961ms	remaining: 2.35s
290:	learn: 18.5980809	total: 964ms	remaining: 2.35s
291:	learn: 18.5220805	total: 966ms	remaining: 2.34s
292:	learn: 18.4504190	total: 969ms	remaining: 2.34s
293:	learn: 18.4043606	total: 972ms	remaining: 2.33s

294:	learn:	18.3333668	total:	975ms	remaining:	2.33s
295:	learn:	18.2621833	total:	977ms	remaining:	2.32s
296:	learn:	18.2209285	total:	980ms	remaining:	2.32s
297:	learn:	18.1299840	total:	982ms	remaining:	2.31s
298:	learn:	18.0642296	total:	984ms	remaining:	2.31s
299:	learn:	18.0095207	total:	987ms	remaining:	2.3s
300:	learn:	17.9326490	total:	989ms	remaining:	2.3s
301:	learn:	17.9057726	total:	991ms	remaining:	2.29s
302:	learn:	17.8372136	total:	994ms	remaining:	2.29s
303:	learn:	17.8038442	total:	996ms	remaining:	2.28s
304:	learn:	17.7279532	total:	998ms	remaining:	2.27s
305:	learn:	17.6580971	total:	1s	remaining:	2.27s
306:	learn:	17.5842838	total:	1s	remaining:	2.26s
307:	learn:	17.5056312	total:	1.01s	remaining:	2.26s
308:	learn:	17.4584683	total:	1.01s	remaining:	2.25s
309:	learn:	17.4430994	total:	1.01s	remaining:	2.25s
310:	learn:	17.4133300	total:	1.01s	remaining:	2.24s
311:	learn:	17.3763853	total:	1.01s	remaining:	2.24s
312:	learn:	17.3502230	total:	1.02s	remaining:	2.23s
313:	learn:	17.2863472	total:	1.02s	remaining:	2.23s
314:	learn:	17.2223447	total:	1.02s	remaining:	2.23s
315:	learn:	17.1916778	total:	1.02s	remaining:	2.22s
316:	learn:	17.0981797	total:	1.03s	remaining:	2.21s
317:	learn:	17.0370549	total:	1.03s	remaining:	2.21s
318:	learn:	16.9519267	total:	1.03s	remaining:	2.2s
319:	learn:	16.9058083	total:	1.03s	remaining:	2.2s
320:	learn:	16.8741514	total:	1.04s	remaining:	2.19s
321:	learn:	16.7935486	total:	1.04s	remaining:	2.19s
322:	learn:	16.7335292	total:	1.04s	remaining:	2.18s
323:	learn:	16.7018224	total:	1.04s	remaining:	2.18s
324:	learn:	16.6770753	total:	1.05s	remaining:	2.17s
325:	learn:	16.6099385	total:	1.05s	remaining:	2.17s
326:	learn:	16.5890695	total:	1.05s	remaining:	2.16s
327:	learn:	16.5598430	total:	1.05s	remaining:	2.16s
328:	learn:	16.5319626	total:	1.06s	remaining:	2.15s
329:	learn:	16.5027340	total:	1.06s	remaining:	2.15s
330:	learn:	16.4179158	total:	1.06s	remaining:	2.15s
331:	learn:	16.3341425	total:	1.06s	remaining:	2.14s
332:	learn:	16.2869278	total:	1.07s	remaining:	2.15s
333:	learn:	16.2563301	total:	1.08s	remaining:	2.15s
334:	learn:	16.2139027	total:	1.08s	remaining:	2.15s
335:	learn:	16.1667367	total:	1.08s	remaining:	2.14s
336:	learn:	16.1373983	total:	1.09s	remaining:	2.14s
337:	learn:	16.1188388	total:	1.09s	remaining:	2.13s
338:	learn:	16.0523508	total:	1.09s	remaining:	2.13s
339:	learn:	16.0281875	total:	1.09s	remaining:	2.13s
340:	learn:	15.9729637	total:	1.1s	remaining:	2.12s
341:	learn:	15.9229970	total:	1.1s	remaining:	2.12s
342:	learn:	15.8746551	total:	1.1s	remaining:	2.11s
343:	learn:	15.8221266	total:	1.1s	remaining:	2.11s
344:	learn:	15.8118220	total:	1.11s	remaining:	2.1s
345:	learn:	15.7615882	total:	1.11s	remaining:	2.1s
346:	learn:	15.7487471	total:	1.11s	remaining:	2.09s
347:	learn:	15.7378720	total:	1.11s	remaining:	2.09s
348:	learn:	15.7292143	total:	1.12s	remaining:	2.08s
349:	learn:	15.7190052	total:	1.12s	remaining:	2.08s
350:	learn:	15.7093778	total:	1.12s	remaining:	2.08s
351:	learn:	15.6728397	total:	1.12s	remaining:	2.07s
352:	learn:	15.6628790	total:	1.13s	remaining:	2.06s
353:	learn:	15.6447510	total:	1.13s	remaining:	2.06s
354:	learn:	15.6176744	total:	1.13s	remaining:	2.05s
355:	learn:	15.5430945	total:	1.13s	remaining:	2.05s
356:	learn:	15.5261454	total:	1.14s	remaining:	2.04s
357:	learn:	15.4805451	total:	1.14s	remaining:	2.04s
358:	learn:	15.4707085	total:	1.14s	remaining:	2.04s
359:	learn:	15.4014274	total:	1.14s	remaining:	2.03s
360:	learn:	15.3920873	total:	1.14s	remaining:	2.03s
361:	learn:	15.3284965	total:	1.15s	remaining:	2.02s
362:	learn:	15.3193460	total:	1.15s	remaining:	2.02s
363:	learn:	15.2720973	total:	1.15s	remaining:	2.01s
364:	learn:	15.2303998	total:	1.15s	remaining:	2.01s
365:	learn:	15.2215149	total:	1.16s	remaining:	2s
366:	learn:	15.2057007	total:	1.16s	remaining:	2s
367:	learn:	15.1970404	total:	1.16s	remaining:	2s
368:	learn:	15.1586887	total:	1.16s	remaining:	1.99s
369:	learn:	15.1502875	total:	1.17s	remaining:	1.99s
370:	learn:	15.1044194	total:	1.17s	remaining:	1.98s
371:	learn:	15.0631014	total:	1.17s	remaining:	1.98s
372:	learn:	15.0239219	total:	1.17s	remaining:	1.97s
373:	learn:	14.9480154	total:	1.18s	remaining:	1.97s
374:	learn:	14.9043544	total:	1.18s	remaining:	1.96s
375:	learn:	14.8447400	total:	1.18s	remaining:	1.96s
376:	learn:	14.8117703	total:	1.18s	remaining:	1.95s
377:	learn:	14.7640331	total:	1.18s	remaining:	1.95s
378:	learn:	14.7459850	total:	1.19s	remaining:	1.94s
379:	learn:	14.7377960	total:	1.19s	remaining:	1.94s
380:	learn:	14.6939865	total:	1.19s	remaining:	1.94s
381:	learn:	14.6378967	total:	1.19s	remaining:	1.93s
382:	learn:	14.6296045	total:	1.2s	remaining:	1.93s

383:	learn:	14.5829751	total:	1.2s	remaining:	1.93s
384:	learn:	14.5666959	total:	1.2s	remaining:	1.92s
385:	learn:	14.5178318	total:	1.21s	remaining:	1.92s
386:	learn:	14.5019949	total:	1.21s	remaining:	1.91s
387:	learn:	14.4923028	total:	1.21s	remaining:	1.91s
388:	learn:	14.4417841	total:	1.21s	remaining:	1.91s
389:	learn:	14.4241070	total:	1.22s	remaining:	1.9s
390:	learn:	14.3891012	total:	1.22s	remaining:	1.9s
391:	learn:	14.3563411	total:	1.22s	remaining:	1.89s
392:	learn:	14.3181864	total:	1.22s	remaining:	1.89s
393:	learn:	14.2830901	total:	1.22s	remaining:	1.88s
394:	learn:	14.2694006	total:	1.23s	remaining:	1.88s
395:	learn:	14.2518913	total:	1.23s	remaining:	1.88s
396:	learn:	14.2341754	total:	1.23s	remaining:	1.87s
397:	learn:	14.1771068	total:	1.24s	remaining:	1.87s
398:	learn:	14.1590606	total:	1.24s	remaining:	1.86s
399:	learn:	14.1115813	total:	1.24s	remaining:	1.86s
400:	learn:	14.1029563	total:	1.24s	remaining:	1.85s
401:	learn:	14.0719123	total:	1.24s	remaining:	1.85s
402:	learn:	14.0562129	total:	1.25s	remaining:	1.85s
403:	learn:	14.0402435	total:	1.25s	remaining:	1.84s
404:	learn:	14.0228738	total:	1.25s	remaining:	1.84s
405:	learn:	13.9621638	total:	1.25s	remaining:	1.84s
406:	learn:	13.9169963	total:	1.26s	remaining:	1.83s
407:	learn:	13.8922679	total:	1.26s	remaining:	1.83s
408:	learn:	13.8727456	total:	1.26s	remaining:	1.83s
409:	learn:	13.8532482	total:	1.27s	remaining:	1.82s
410:	learn:	13.8465155	total:	1.27s	remaining:	1.82s
411:	learn:	13.8273897	total:	1.27s	remaining:	1.82s
412:	learn:	13.7743607	total:	1.27s	remaining:	1.81s
413:	learn:	13.7563850	total:	1.28s	remaining:	1.81s
414:	learn:	13.7477834	total:	1.28s	remaining:	1.8s
415:	learn:	13.7233511	total:	1.28s	remaining:	1.8s
416:	learn:	13.7161600	total:	1.28s	remaining:	1.8s
417:	learn:	13.6838348	total:	1.29s	remaining:	1.79s
418:	learn:	13.6097844	total:	1.29s	remaining:	1.79s
419:	learn:	13.6039550	total:	1.29s	remaining:	1.78s
420:	learn:	13.5618102	total:	1.29s	remaining:	1.78s
421:	learn:	13.5449678	total:	1.3s	remaining:	1.78s
422:	learn:	13.5069760	total:	1.3s	remaining:	1.77s
423:	learn:	13.5006988	total:	1.3s	remaining:	1.77s
424:	learn:	13.4837921	total:	1.3s	remaining:	1.77s
425:	learn:	13.4661137	total:	1.31s	remaining:	1.76s
426:	learn:	13.4135035	total:	1.31s	remaining:	1.76s
427:	learn:	13.3771826	total:	1.31s	remaining:	1.75s
428:	learn:	13.3525311	total:	1.31s	remaining:	1.75s
429:	learn:	13.3335446	total:	1.32s	remaining:	1.74s
430:	learn:	13.3275503	total:	1.32s	remaining:	1.74s
431:	learn:	13.2863628	total:	1.32s	remaining:	1.74s
432:	learn:	13.2427687	total:	1.32s	remaining:	1.73s
433:	learn:	13.2336132	total:	1.33s	remaining:	1.73s
434:	learn:	13.2041656	total:	1.33s	remaining:	1.73s
435:	learn:	13.1674570	total:	1.33s	remaining:	1.72s
436:	learn:	13.1085466	total:	1.33s	remaining:	1.72s
437:	learn:	13.0630883	total:	1.34s	remaining:	1.72s
438:	learn:	13.0517885	total:	1.34s	remaining:	1.71s
439:	learn:	13.0298766	total:	1.34s	remaining:	1.71s
440:	learn:	13.0165373	total:	1.35s	remaining:	1.71s
441:	learn:	13.0066963	total:	1.35s	remaining:	1.7s
442:	learn:	12.9803143	total:	1.35s	remaining:	1.7s
443:	learn:	12.9362646	total:	1.35s	remaining:	1.7s
444:	learn:	12.8967235	total:	1.36s	remaining:	1.69s
445:	learn:	12.8842110	total:	1.36s	remaining:	1.69s
446:	learn:	12.8237881	total:	1.36s	remaining:	1.68s
447:	learn:	12.7685880	total:	1.36s	remaining:	1.68s
448:	learn:	12.7537359	total:	1.37s	remaining:	1.68s
449:	learn:	12.7404445	total:	1.37s	remaining:	1.67s
450:	learn:	12.6840562	total:	1.37s	remaining:	1.67s
451:	learn:	12.6715142	total:	1.37s	remaining:	1.66s
452:	learn:	12.6562277	total:	1.38s	remaining:	1.66s
453:	learn:	12.6384330	total:	1.38s	remaining:	1.66s
454:	learn:	12.6220841	total:	1.38s	remaining:	1.65s
455:	learn:	12.5967495	total:	1.38s	remaining:	1.65s
456:	learn:	12.5881226	total:	1.39s	remaining:	1.65s
457:	learn:	12.5824934	total:	1.39s	remaining:	1.64s
458:	learn:	12.5763301	total:	1.39s	remaining:	1.64s
459:	learn:	12.5486335	total:	1.39s	remaining:	1.64s
460:	learn:	12.5216657	total:	1.4s	remaining:	1.63s
461:	learn:	12.4583403	total:	1.4s	remaining:	1.63s
462:	learn:	12.4481543	total:	1.4s	remaining:	1.63s
463:	learn:	12.4315262	total:	1.41s	remaining:	1.63s
464:	learn:	12.4105386	total:	1.41s	remaining:	1.62s
465:	learn:	12.4052481	total:	1.41s	remaining:	1.62s
466:	learn:	12.3814553	total:	1.41s	remaining:	1.61s
467:	learn:	12.3510622	total:	1.42s	remaining:	1.61s
468:	learn:	12.3462953	total:	1.42s	remaining:	1.61s
469:	learn:	12.3321110	total:	1.42s	remaining:	1.6s
470:	learn:	12.3195173	total:	1.43s	remaining:	1.6s
471:	learn:	12.3031750	total:	1.43s	remaining:	1.6s

472:	learn:	12.2621436	total:	1.43s	remaining:	1.59s
473:	learn:	12.2382740	total:	1.44s	remaining:	1.59s
474:	learn:	12.2140112	total:	1.44s	remaining:	1.59s
475:	learn:	12.2054259	total:	1.44s	remaining:	1.59s
476:	learn:	12.1956670	total:	1.44s	remaining:	1.58s
477:	learn:	12.1856765	total:	1.45s	remaining:	1.58s
478:	learn:	12.1734145	total:	1.45s	remaining:	1.58s
479:	learn:	12.1380998	total:	1.45s	remaining:	1.57s
480:	learn:	12.0911416	total:	1.45s	remaining:	1.57s
481:	learn:	12.0728607	total:	1.46s	remaining:	1.56s
482:	learn:	12.0415441	total:	1.46s	remaining:	1.56s
483:	learn:	12.0208694	total:	1.46s	remaining:	1.56s
484:	learn:	12.0103676	total:	1.46s	remaining:	1.55s
485:	learn:	12.0005053	total:	1.47s	remaining:	1.55s
486:	learn:	11.9899539	total:	1.47s	remaining:	1.55s
487:	learn:	11.9774141	total:	1.47s	remaining:	1.54s
488:	learn:	11.9672376	total:	1.47s	remaining:	1.54s
489:	learn:	11.9502595	total:	1.48s	remaining:	1.54s
490:	learn:	11.9015207	total:	1.48s	remaining:	1.53s
491:	learn:	11.8964109	total:	1.48s	remaining:	1.53s
492:	learn:	11.8590848	total:	1.49s	remaining:	1.53s
493:	learn:	11.8209384	total:	1.49s	remaining:	1.52s
494:	learn:	11.7939055	total:	1.49s	remaining:	1.52s
495:	learn:	11.7711474	total:	1.49s	remaining:	1.52s
496:	learn:	11.7328376	total:	1.5s	remaining:	1.51s
497:	learn:	11.7160465	total:	1.5s	remaining:	1.51s
498:	learn:	11.6733890	total:	1.5s	remaining:	1.51s
499:	learn:	11.6484715	total:	1.5s	remaining:	1.5s
500:	learn:	11.5866887	total:	1.5s	remaining:	1.5s
501:	learn:	11.5562538	total:	1.51s	remaining:	1.5s
502:	learn:	11.5151757	total:	1.51s	remaining:	1.49s
503:	learn:	11.5064247	total:	1.51s	remaining:	1.49s
504:	learn:	11.4957453	total:	1.51s	remaining:	1.48s
505:	learn:	11.4880706	total:	1.52s	remaining:	1.48s
506:	learn:	11.4699762	total:	1.52s	remaining:	1.48s
507:	learn:	11.4425812	total:	1.52s	remaining:	1.47s
508:	learn:	11.4334734	total:	1.52s	remaining:	1.47s
509:	learn:	11.4219150	total:	1.53s	remaining:	1.47s
510:	learn:	11.3900472	total:	1.53s	remaining:	1.46s
511:	learn:	11.3649372	total:	1.53s	remaining:	1.46s
512:	learn:	11.3480012	total:	1.53s	remaining:	1.46s
513:	learn:	11.3066372	total:	1.54s	remaining:	1.45s
514:	learn:	11.3017903	total:	1.54s	remaining:	1.45s
515:	learn:	11.2671742	total:	1.54s	remaining:	1.45s
516:	learn:	11.2592539	total:	1.54s	remaining:	1.44s
517:	learn:	11.2496036	total:	1.55s	remaining:	1.44s
518:	learn:	11.2342606	total:	1.55s	remaining:	1.44s
519:	learn:	11.1956334	total:	1.55s	remaining:	1.43s
520:	learn:	11.1785964	total:	1.56s	remaining:	1.43s
521:	learn:	11.1307233	total:	1.56s	remaining:	1.43s
522:	learn:	11.1036891	total:	1.56s	remaining:	1.42s
523:	learn:	11.0986655	total:	1.56s	remaining:	1.42s
524:	learn:	11.0629387	total:	1.57s	remaining:	1.42s
525:	learn:	11.0192746	total:	1.57s	remaining:	1.42s
526:	learn:	10.9723695	total:	1.57s	remaining:	1.41s
527:	learn:	10.9647237	total:	1.58s	remaining:	1.41s
528:	learn:	10.9338716	total:	1.58s	remaining:	1.41s
529:	learn:	10.9097323	total:	1.58s	remaining:	1.4s
530:	learn:	10.8958628	total:	1.58s	remaining:	1.4s
531:	learn:	10.8820810	total:	1.59s	remaining:	1.4s
532:	learn:	10.8682949	total:	1.59s	remaining:	1.39s
533:	learn:	10.8565489	total:	1.59s	remaining:	1.39s
534:	learn:	10.8270150	total:	1.59s	remaining:	1.39s
535:	learn:	10.8039470	total:	1.6s	remaining:	1.38s
536:	learn:	10.7998974	total:	1.6s	remaining:	1.38s
537:	learn:	10.7912017	total:	1.6s	remaining:	1.38s
538:	learn:	10.7668632	total:	1.61s	remaining:	1.37s
539:	learn:	10.7516469	total:	1.61s	remaining:	1.37s
540:	learn:	10.7236650	total:	1.61s	remaining:	1.37s
541:	learn:	10.7170608	total:	1.62s	remaining:	1.37s
542:	learn:	10.6822791	total:	1.62s	remaining:	1.36s
543:	learn:	10.6667071	total:	1.62s	remaining:	1.36s
544:	learn:	10.6552044	total:	1.63s	remaining:	1.36s
545:	learn:	10.6397434	total:	1.63s	remaining:	1.35s
546:	learn:	10.6340860	total:	1.63s	remaining:	1.35s
547:	learn:	10.6116600	total:	1.63s	remaining:	1.35s
548:	learn:	10.5801224	total:	1.64s	remaining:	1.34s
549:	learn:	10.5658777	total:	1.64s	remaining:	1.34s
550:	learn:	10.5605838	total:	1.64s	remaining:	1.34s
551:	learn:	10.5236302	total:	1.65s	remaining:	1.33s
552:	learn:	10.5204710	total:	1.65s	remaining:	1.33s
553:	learn:	10.4974812	total:	1.65s	remaining:	1.33s
554:	learn:	10.4647086	total:	1.65s	remaining:	1.33s
555:	learn:	10.4501420	total:	1.66s	remaining:	1.32s
556:	learn:	10.4367166	total:	1.66s	remaining:	1.32s
557:	learn:	10.4103321	total:	1.66s	remaining:	1.32s
558:	learn:	10.3731374	total:	1.66s	remaining:	1.31s
559:	learn:	10.3516882	total:	1.67s	remaining:	1.31s
560:	learn:	10.3385449	total:	1.67s	remaining:	1.31s

561:	learn:	10.3353522	total:	1.67s	remaining:	1.3s
562:	learn:	10.3321879	total:	1.67s	remaining:	1.3s
563:	learn:	10.3202564	total:	1.68s	remaining:	1.3s
564:	learn:	10.3160483	total:	1.68s	remaining:	1.29s
565:	learn:	10.2834481	total:	1.68s	remaining:	1.29s
566:	learn:	10.2599203	total:	1.69s	remaining:	1.29s
567:	learn:	10.2352283	total:	1.69s	remaining:	1.28s
568:	learn:	10.2223189	total:	1.69s	remaining:	1.28s
569:	learn:	10.1846808	total:	1.69s	remaining:	1.28s
570:	learn:	10.1798961	total:	1.7s	remaining:	1.27s
571:	learn:	10.1600535	total:	1.7s	remaining:	1.27s
572:	learn:	10.1420313	total:	1.7s	remaining:	1.27s
573:	learn:	10.1003639	total:	1.7s	remaining:	1.26s
574:	learn:	10.0957399	total:	1.71s	remaining:	1.26s
575:	learn:	10.0835943	total:	1.71s	remaining:	1.26s
576:	learn:	10.0499560	total:	1.71s	remaining:	1.25s
577:	learn:	10.0129085	total:	1.71s	remaining:	1.25s
578:	learn:	10.0038641	total:	1.72s	remaining:	1.25s
579:	learn:	9.9969468	total:	1.72s	remaining:	1.25s
580:	learn:	9.9881342	total:	1.72s	remaining:	1.24s
581:	learn:	9.9762774	total:	1.72s	remaining:	1.24s
582:	learn:	9.9387540	total:	1.73s	remaining:	1.24s
583:	learn:	9.9057174	total:	1.73s	remaining:	1.23s
584:	learn:	9.8657139	total:	1.73s	remaining:	1.23s
585:	learn:	9.8548394	total:	1.73s	remaining:	1.23s
586:	learn:	9.8429102	total:	1.74s	remaining:	1.22s
587:	learn:	9.8104509	total:	1.74s	remaining:	1.22s
588:	learn:	9.7825809	total:	1.74s	remaining:	1.21s
589:	learn:	9.7567681	total:	1.74s	remaining:	1.21s
590:	learn:	9.7532279	total:	1.74s	remaining:	1.21s
591:	learn:	9.7402666	total:	1.75s	remaining:	1.2s
592:	learn:	9.7300814	total:	1.75s	remaining:	1.2s
593:	learn:	9.7193912	total:	1.75s	remaining:	1.2s
594:	learn:	9.7128309	total:	1.75s	remaining:	1.19s
595:	learn:	9.7017776	total:	1.75s	remaining:	1.19s
596:	learn:	9.6968316	total:	1.76s	remaining:	1.19s
597:	learn:	9.6687949	total:	1.76s	remaining:	1.18s
598:	learn:	9.6650669	total:	1.76s	remaining:	1.18s
599:	learn:	9.6385319	total:	1.76s	remaining:	1.18s
600:	learn:	9.6299241	total:	1.77s	remaining:	1.17s
601:	learn:	9.6137466	total:	1.77s	remaining:	1.17s
602:	learn:	9.5897126	total:	1.77s	remaining:	1.17s
603:	learn:	9.5677396	total:	1.78s	remaining:	1.16s
604:	learn:	9.5332435	total:	1.78s	remaining:	1.16s
605:	learn:	9.5275410	total:	1.78s	remaining:	1.16s
606:	learn:	9.5079423	total:	1.79s	remaining:	1.16s
607:	learn:	9.4818367	total:	1.79s	remaining:	1.15s
608:	learn:	9.4511022	total:	1.79s	remaining:	1.15s
609:	learn:	9.4422025	total:	1.79s	remaining:	1.15s
610:	learn:	9.4127871	total:	1.8s	remaining:	1.14s
611:	learn:	9.4018539	total:	1.8s	remaining:	1.14s
612:	learn:	9.3913573	total:	1.8s	remaining:	1.14s
613:	learn:	9.3845530	total:	1.8s	remaining:	1.14s
614:	learn:	9.3549912	total:	1.81s	remaining:	1.13s
615:	learn:	9.3429093	total:	1.81s	remaining:	1.13s
616:	learn:	9.3380271	total:	1.81s	remaining:	1.13s
617:	learn:	9.3322898	total:	1.82s	remaining:	1.12s
618:	learn:	9.2989255	total:	1.82s	remaining:	1.12s
619:	learn:	9.2945668	total:	1.82s	remaining:	1.12s
620:	learn:	9.2823956	total:	1.82s	remaining:	1.11s
621:	learn:	9.2503693	total:	1.83s	remaining:	1.11s
622:	learn:	9.2177988	total:	1.83s	remaining:	1.11s
623:	learn:	9.2100367	total:	1.83s	remaining:	1.1s
624:	learn:	9.2045651	total:	1.83s	remaining:	1.1s
625:	learn:	9.1845652	total:	1.83s	remaining:	1.1s
626:	learn:	9.1579437	total:	1.84s	remaining:	1.09s
627:	learn:	9.1488814	total:	1.84s	remaining:	1.09s
628:	learn:	9.1241190	total:	1.84s	remaining:	1.09s
629:	learn:	9.1206147	total:	1.84s	remaining:	1.08s
630:	learn:	9.0913621	total:	1.85s	remaining:	1.08s
631:	learn:	9.0830965	total:	1.85s	remaining:	1.08s
632:	learn:	9.0461117	total:	1.85s	remaining:	1.07s
633:	learn:	9.0062987	total:	1.85s	remaining:	1.07s
634:	learn:	8.9991364	total:	1.86s	remaining:	1.07s
635:	learn:	8.9911451	total:	1.86s	remaining:	1.06s
636:	learn:	8.9625240	total:	1.86s	remaining:	1.06s
637:	learn:	8.9571425	total:	1.86s	remaining:	1.06s
638:	learn:	8.9467651	total:	1.86s	remaining:	1.05s
639:	learn:	8.9279017	total:	1.87s	remaining:	1.05s
640:	learn:	8.9131832	total:	1.87s	remaining:	1.05s
641:	learn:	8.9088874	total:	1.87s	remaining:	1.04s
642:	learn:	8.9040727	total:	1.87s	remaining:	1.04s
643:	learn:	8.8946796	total:	1.88s	remaining:	1.04s
644:	learn:	8.8731213	total:	1.88s	remaining:	1.03s
645:	learn:	8.8679420	total:	1.88s	remaining:	1.03s
646:	learn:	8.8643182	total:	1.88s	remaining:	1.03s
647:	learn:	8.8560668	total:	1.89s	remaining:	1.02s
648:	learn:	8.8446127	total:	1.89s	remaining:	1.02s
649:	learn:	8.8285130	total:	1.89s	remaining:	1.02s

650:	learn: 8.8083187	total: 1.89s	remaining: 1.01s
651:	learn: 8.7996059	total: 1.89s	remaining: 1.01s
652:	learn: 8.7823211	total: 1.9s	remaining: 1.01s
653:	learn: 8.7621217	total: 1.9s	remaining: 1s
654:	learn: 8.7383698	total: 1.9s	remaining: 1s
655:	learn: 8.7242911	total: 1.9s	remaining: 999ms
656:	learn: 8.7079417	total: 1.91s	remaining: 995ms
657:	learn: 8.6801181	total: 1.91s	remaining: 992ms
658:	learn: 8.6753854	total: 1.91s	remaining: 989ms
659:	learn: 8.6616677	total: 1.91s	remaining: 985ms
660:	learn: 8.6536614	total: 1.92s	remaining: 982ms
661:	learn: 8.6319071	total: 1.92s	remaining: 979ms
662:	learn: 8.6245569	total: 1.92s	remaining: 976ms
663:	learn: 8.6065200	total: 1.92s	remaining: 972ms
664:	learn: 8.5845101	total: 1.92s	remaining: 969ms
665:	learn: 8.5759687	total: 1.93s	remaining: 966ms
666:	learn: 8.5711205	total: 1.93s	remaining: 962ms
667:	learn: 8.5660881	total: 1.93s	remaining: 959ms
668:	learn: 8.5513237	total: 1.93s	remaining: 956ms
669:	learn: 8.5438376	total: 1.93s	remaining: 953ms
670:	learn: 8.5370285	total: 1.94s	remaining: 949ms
671:	learn: 8.5321112	total: 1.94s	remaining: 946ms
672:	learn: 8.5240578	total: 1.94s	remaining: 943ms
673:	learn: 8.5195284	total: 1.94s	remaining: 940ms
674:	learn: 8.5155236	total: 1.95s	remaining: 937ms
675:	learn: 8.5051426	total: 1.95s	remaining: 935ms
676:	learn: 8.4977697	total: 1.95s	remaining: 932ms
677:	learn: 8.4908668	total: 1.95s	remaining: 928ms
678:	learn: 8.4863751	total: 1.96s	remaining: 925ms
679:	learn: 8.4763667	total: 1.96s	remaining: 922ms
680:	learn: 8.4727973	total: 1.96s	remaining: 919ms
681:	learn: 8.4639011	total: 1.96s	remaining: 916ms
682:	learn: 8.4583430	total: 1.97s	remaining: 913ms
683:	learn: 8.4480283	total: 1.97s	remaining: 910ms
684:	learn: 8.4434482	total: 1.97s	remaining: 907ms
685:	learn: 8.4345459	total: 1.97s	remaining: 903ms
686:	learn: 8.4249341	total: 1.98s	remaining: 900ms
687:	learn: 8.4002435	total: 1.98s	remaining: 897ms
688:	learn: 8.3912201	total: 1.98s	remaining: 894ms
689:	learn: 8.3825619	total: 1.98s	remaining: 892ms
690:	learn: 8.3783921	total: 1.99s	remaining: 889ms
691:	learn: 8.3656888	total: 1.99s	remaining: 886ms
692:	learn: 8.3624805	total: 1.99s	remaining: 882ms
693:	learn: 8.3593775	total: 1.99s	remaining: 879ms
694:	learn: 8.3429842	total: 2s	remaining: 876ms
695:	learn: 8.3398095	total: 2s	remaining: 873ms
696:	learn: 8.3305986	total: 2s	remaining: 870ms
697:	learn: 8.3176370	total: 2s	remaining: 867ms
698:	learn: 8.3020973	total: 2s	remaining: 863ms
699:	learn: 8.2840858	total: 2.01s	remaining: 861ms
700:	learn: 8.2579906	total: 2.01s	remaining: 857ms
701:	learn: 8.2450670	total: 2.01s	remaining: 855ms
702:	learn: 8.2244085	total: 2.02s	remaining: 851ms
703:	learn: 8.2121038	total: 2.02s	remaining: 848ms
704:	learn: 8.1955921	total: 2.02s	remaining: 845ms
705:	learn: 8.1925478	total: 2.02s	remaining: 842ms
706:	learn: 8.1859630	total: 2.02s	remaining: 839ms
707:	learn: 8.1712931	total: 2.03s	remaining: 836ms
708:	learn: 8.1674591	total: 2.03s	remaining: 833ms
709:	learn: 8.1637280	total: 2.03s	remaining: 830ms
710:	learn: 8.1541857	total: 2.03s	remaining: 826ms
711:	learn: 8.1483511	total: 2.04s	remaining: 823ms
712:	learn: 8.1366541	total: 2.04s	remaining: 820ms
713:	learn: 8.1154482	total: 2.04s	remaining: 817ms
714:	learn: 8.0982227	total: 2.04s	remaining: 814ms
715:	learn: 8.0916886	total: 2.04s	remaining: 811ms
716:	learn: 8.0881439	total: 2.05s	remaining: 808ms
717:	learn: 8.0677599	total: 2.05s	remaining: 805ms
718:	learn: 8.0642869	total: 2.05s	remaining: 802ms
719:	learn: 8.0609662	total: 2.05s	remaining: 799ms
720:	learn: 8.0414050	total: 2.06s	remaining: 796ms
721:	learn: 8.0223258	total: 2.06s	remaining: 793ms
722:	learn: 8.0195169	total: 2.06s	remaining: 790ms
723:	learn: 8.0170509	total: 2.06s	remaining: 787ms
724:	learn: 8.0061238	total: 2.07s	remaining: 784ms
725:	learn: 7.9763610	total: 2.07s	remaining: 781ms
726:	learn: 7.9704995	total: 2.07s	remaining: 778ms
727:	learn: 7.9679343	total: 2.07s	remaining: 775ms
728:	learn: 7.9652646	total: 2.08s	remaining: 772ms
729:	learn: 7.9376764	total: 2.08s	remaining: 769ms
730:	learn: 7.9301559	total: 2.08s	remaining: 766ms
731:	learn: 7.8985843	total: 2.08s	remaining: 763ms
732:	learn: 7.8917322	total: 2.09s	remaining: 760ms
733:	learn: 7.8816936	total: 2.09s	remaining: 757ms
734:	learn: 7.8782847	total: 2.09s	remaining: 754ms
735:	learn: 7.8754009	total: 2.09s	remaining: 751ms
736:	learn: 7.8693539	total: 2.1s	remaining: 748ms
737:	learn: 7.8534687	total: 2.1s	remaining: 745ms
738:	learn: 7.8258473	total: 2.1s	remaining: 742ms

739:	learn: 7.8119776	total: 2.1s	remaining: 739ms
740:	learn: 7.7962885	total: 2.11s	remaining: 736ms
741:	learn: 7.7854761	total: 2.11s	remaining: 734ms
742:	learn: 7.7657551	total: 2.11s	remaining: 731ms
743:	learn: 7.7621226	total: 2.12s	remaining: 728ms
744:	learn: 7.7408797	total: 2.12s	remaining: 725ms
745:	learn: 7.7076213	total: 2.12s	remaining: 723ms
746:	learn: 7.6774058	total: 2.12s	remaining: 720ms
747:	learn: 7.6560491	total: 2.13s	remaining: 717ms
748:	learn: 7.6302995	total: 2.13s	remaining: 714ms
749:	learn: 7.6188008	total: 2.13s	remaining: 711ms
750:	learn: 7.6150268	total: 2.13s	remaining: 708ms
751:	learn: 7.6055555	total: 2.14s	remaining: 705ms
752:	learn: 7.5879418	total: 2.14s	remaining: 702ms
753:	learn: 7.5860297	total: 2.14s	remaining: 699ms
754:	learn: 7.5669500	total: 2.15s	remaining: 697ms
755:	learn: 7.5630836	total: 2.15s	remaining: 694ms
756:	learn: 7.5535598	total: 2.15s	remaining: 691ms
757:	learn: 7.5343513	total: 2.15s	remaining: 688ms
758:	learn: 7.5162298	total: 2.16s	remaining: 685ms
759:	learn: 7.5005624	total: 2.16s	remaining: 682ms
760:	learn: 7.4909392	total: 2.16s	remaining: 679ms
761:	learn: 7.4679911	total: 2.16s	remaining: 676ms
762:	learn: 7.4664171	total: 2.17s	remaining: 673ms
763:	learn: 7.4450568	total: 2.17s	remaining: 670ms
764:	learn: 7.4392530	total: 2.17s	remaining: 667ms
765:	learn: 7.4376507	total: 2.17s	remaining: 664ms
766:	learn: 7.4263759	total: 2.18s	remaining: 661ms
767:	learn: 7.4230900	total: 2.18s	remaining: 658ms
768:	learn: 7.4217997	total: 2.18s	remaining: 655ms
769:	learn: 7.4141625	total: 2.18s	remaining: 652ms
770:	learn: 7.4084271	total: 2.19s	remaining: 649ms
771:	learn: 7.3913066	total: 2.19s	remaining: 646ms
772:	learn: 7.3897381	total: 2.19s	remaining: 644ms
773:	learn: 7.3729485	total: 2.19s	remaining: 641ms
774:	learn: 7.3594942	total: 2.2s	remaining: 638ms
775:	learn: 7.3557770	total: 2.2s	remaining: 635ms
776:	learn: 7.3481016	total: 2.2s	remaining: 632ms
777:	learn: 7.3360575	total: 2.2s	remaining: 629ms
778:	learn: 7.3327867	total: 2.2s	remaining: 625ms
779:	learn: 7.3299657	total: 2.21s	remaining: 622ms
780:	learn: 7.3045337	total: 2.21s	remaining: 620ms
781:	learn: 7.3010843	total: 2.21s	remaining: 617ms
782:	learn: 7.2902445	total: 2.21s	remaining: 614ms
783:	learn: 7.2853380	total: 2.22s	remaining: 611ms
784:	learn: 7.2586993	total: 2.22s	remaining: 608ms
785:	learn: 7.2569916	total: 2.22s	remaining: 605ms
786:	learn: 7.2368009	total: 2.22s	remaining: 601ms
787:	learn: 7.2254676	total: 2.22s	remaining: 598ms
788:	learn: 7.2129466	total: 2.23s	remaining: 595ms
789:	learn: 7.2076142	total: 2.23s	remaining: 592ms
790:	learn: 7.2060833	total: 2.23s	remaining: 589ms
791:	learn: 7.1969690	total: 2.23s	remaining: 586ms
792:	learn: 7.1817085	total: 2.23s	remaining: 584ms
793:	learn: 7.1722485	total: 2.24s	remaining: 581ms
794:	learn: 7.1505678	total: 2.24s	remaining: 578ms
795:	learn: 7.1441995	total: 2.24s	remaining: 575ms
796:	learn: 7.1387929	total: 2.25s	remaining: 572ms
797:	learn: 7.1374804	total: 2.25s	remaining: 569ms
798:	learn: 7.1327384	total: 2.25s	remaining: 566ms
799:	learn: 7.1211547	total: 2.25s	remaining: 563ms
800:	learn: 7.1116756	total: 2.25s	remaining: 560ms
801:	learn: 7.1076052	total: 2.26s	remaining: 557ms
802:	learn: 7.0917415	total: 2.26s	remaining: 555ms
803:	learn: 7.0831005	total: 2.26s	remaining: 552ms
804:	learn: 7.0811264	total: 2.27s	remaining: 549ms
805:	learn: 7.0755663	total: 2.27s	remaining: 546ms
806:	learn: 7.0654320	total: 2.27s	remaining: 543ms
807:	learn: 7.0476369	total: 2.27s	remaining: 540ms
808:	learn: 7.0458906	total: 2.28s	remaining: 538ms
809:	learn: 7.0381730	total: 2.28s	remaining: 535ms
810:	learn: 7.0297951	total: 2.28s	remaining: 532ms
811:	learn: 7.0249866	total: 2.29s	remaining: 529ms
812:	learn: 7.0166860	total: 2.29s	remaining: 526ms
813:	learn: 7.0085347	total: 2.29s	remaining: 524ms
814:	learn: 7.0072029	total: 2.29s	remaining: 521ms
815:	learn: 7.0057702	total: 2.3s	remaining: 518ms
816:	learn: 7.0003784	total: 2.3s	remaining: 516ms
817:	learn: 6.9829018	total: 2.31s	remaining: 513ms
818:	learn: 6.9589385	total: 2.31s	remaining: 511ms
819:	learn: 6.9554592	total: 2.31s	remaining: 508ms
820:	learn: 6.9393097	total: 2.32s	remaining: 505ms
821:	learn: 6.9349333	total: 2.32s	remaining: 502ms
822:	learn: 6.9333002	total: 2.32s	remaining: 500ms
823:	learn: 6.9296061	total: 2.33s	remaining: 497ms
824:	learn: 6.9054023	total: 2.33s	remaining: 494ms
825:	learn: 6.9027671	total: 2.33s	remaining: 491ms
826:	learn: 6.8859980	total: 2.33s	remaining: 488ms
827:	learn: 6.8797723	total: 2.34s	remaining: 486ms

828:	learn: 6.8568615	total: 2.34s	remaining: 483ms
829:	learn: 6.8517488	total: 2.34s	remaining: 480ms
830:	learn: 6.8494085	total: 2.35s	remaining: 477ms
831:	learn: 6.8473721	total: 2.35s	remaining: 474ms
832:	learn: 6.8332440	total: 2.35s	remaining: 471ms
833:	learn: 6.8262587	total: 2.35s	remaining: 468ms
834:	learn: 6.8225576	total: 2.36s	remaining: 466ms
835:	learn: 6.8061416	total: 2.36s	remaining: 463ms
836:	learn: 6.7942431	total: 2.36s	remaining: 460ms
837:	learn: 6.7922632	total: 2.36s	remaining: 457ms
838:	learn: 6.7840825	total: 2.37s	remaining: 454ms
839:	learn: 6.7764897	total: 2.37s	remaining: 451ms
840:	learn: 6.7584823	total: 2.37s	remaining: 449ms
841:	learn: 6.7571855	total: 2.38s	remaining: 446ms
842:	learn: 6.7537366	total: 2.38s	remaining: 443ms
843:	learn: 6.7395650	total: 2.38s	remaining: 440ms
844:	learn: 6.7234270	total: 2.38s	remaining: 437ms
845:	learn: 6.7158786	total: 2.39s	remaining: 434ms
846:	learn: 6.7037853	total: 2.39s	remaining: 432ms
847:	learn: 6.6896742	total: 2.39s	remaining: 429ms
848:	learn: 6.6885256	total: 2.39s	remaining: 426ms
849:	learn: 6.6811476	total: 2.4s	remaining: 423ms
850:	learn: 6.6623418	total: 2.4s	remaining: 420ms
851:	learn: 6.6579455	total: 2.4s	remaining: 417ms
852:	learn: 6.6500746	total: 2.4s	remaining: 414ms
853:	learn: 6.6323479	total: 2.41s	remaining: 412ms
854:	learn: 6.6310366	total: 2.41s	remaining: 409ms
855:	learn: 6.6299605	total: 2.41s	remaining: 406ms
856:	learn: 6.6265720	total: 2.42s	remaining: 403ms
857:	learn: 6.6204539	total: 2.42s	remaining: 400ms
858:	learn: 6.6171362	total: 2.42s	remaining: 398ms
859:	learn: 6.6143090	total: 2.42s	remaining: 395ms
860:	learn: 6.6112468	total: 2.43s	remaining: 392ms
861:	learn: 6.5970195	total: 2.43s	remaining: 389ms
862:	learn: 6.5852775	total: 2.43s	remaining: 386ms
863:	learn: 6.5810157	total: 2.43s	remaining: 383ms
864:	learn: 6.5785732	total: 2.44s	remaining: 380ms
865:	learn: 6.5719912	total: 2.44s	remaining: 378ms
866:	learn: 6.5704815	total: 2.44s	remaining: 375ms
867:	learn: 6.5695613	total: 2.44s	remaining: 372ms
868:	learn: 6.5686422	total: 2.45s	remaining: 369ms
869:	learn: 6.5675031	total: 2.45s	remaining: 366ms
870:	learn: 6.5549914	total: 2.45s	remaining: 363ms
871:	learn: 6.5345645	total: 2.45s	remaining: 360ms
872:	learn: 6.5203266	total: 2.46s	remaining: 357ms
873:	learn: 6.5166164	total: 2.46s	remaining: 354ms
874:	learn: 6.4970232	total: 2.46s	remaining: 352ms
875:	learn: 6.4839126	total: 2.46s	remaining: 349ms
876:	learn: 6.4799369	total: 2.46s	remaining: 346ms
877:	learn: 6.4763532	total: 2.47s	remaining: 343ms
878:	learn: 6.4624066	total: 2.47s	remaining: 340ms
879:	learn: 6.4559885	total: 2.47s	remaining: 337ms
880:	learn: 6.4499976	total: 2.48s	remaining: 334ms
881:	learn: 6.4316628	total: 2.48s	remaining: 332ms
882:	learn: 6.4146669	total: 2.48s	remaining: 329ms
883:	learn: 6.4137265	total: 2.48s	remaining: 326ms
884:	learn: 6.3913308	total: 2.49s	remaining: 323ms
885:	learn: 6.3873365	total: 2.49s	remaining: 320ms
886:	learn: 6.3813734	total: 2.49s	remaining: 318ms
887:	learn: 6.3784502	total: 2.5s	remaining: 315ms
888:	learn: 6.3653022	total: 2.5s	remaining: 312ms
889:	learn: 6.3575746	total: 2.5s	remaining: 309ms
890:	learn: 6.3386584	total: 2.5s	remaining: 306ms
891:	learn: 6.3200099	total: 2.5s	remaining: 303ms
892:	learn: 6.3096410	total: 2.51s	remaining: 300ms
893:	learn: 6.3016415	total: 2.51s	remaining: 298ms
894:	learn: 6.2863738	total: 2.51s	remaining: 295ms
895:	learn: 6.2809093	total: 2.51s	remaining: 292ms
896:	learn: 6.2729163	total: 2.52s	remaining: 289ms
897:	learn: 6.2706097	total: 2.52s	remaining: 286ms
898:	learn: 6.2651416	total: 2.52s	remaining: 283ms
899:	learn: 6.2593152	total: 2.52s	remaining: 280ms
900:	learn: 6.2568695	total: 2.53s	remaining: 278ms
901:	learn: 6.2446617	total: 2.53s	remaining: 275ms
902:	learn: 6.2267563	total: 2.53s	remaining: 272ms
903:	learn: 6.2231765	total: 2.53s	remaining: 269ms
904:	learn: 6.2142745	total: 2.54s	remaining: 266ms
905:	learn: 6.2132585	total: 2.54s	remaining: 263ms
906:	learn: 6.2119403	total: 2.54s	remaining: 261ms
907:	learn: 6.1951540	total: 2.54s	remaining: 258ms
908:	learn: 6.1864144	total: 2.55s	remaining: 255ms
909:	learn: 6.1677927	total: 2.55s	remaining: 252ms
910:	learn: 6.1613157	total: 2.55s	remaining: 249ms
911:	learn: 6.1551130	total: 2.55s	remaining: 246ms
912:	learn: 6.1490669	total: 2.56s	remaining: 244ms
913:	learn: 6.1402776	total: 2.56s	remaining: 241ms
914:	learn: 6.1271366	total: 2.56s	remaining: 238ms
915:	learn: 6.1247260	total: 2.56s	remaining: 235ms
916:	learn: 6.1119904	total: 2.56s	remaining: 232ms

917:	learn: 6.1067104	total: 2.57s	remaining: 229ms
918:	learn: 6.1005895	total: 2.57s	remaining: 227ms
919:	learn: 6.0995636	total: 2.57s	remaining: 224ms
920:	learn: 6.0928463	total: 2.57s	remaining: 221ms
921:	learn: 6.0882730	total: 2.58s	remaining: 218ms
922:	learn: 6.0850848	total: 2.58s	remaining: 215ms
923:	learn: 6.0670880	total: 2.58s	remaining: 212ms
924:	learn: 6.0530842	total: 2.58s	remaining: 210ms
925:	learn: 6.0439657	total: 2.59s	remaining: 207ms
926:	learn: 6.0429485	total: 2.59s	remaining: 204ms
927:	learn: 6.0377123	total: 2.59s	remaining: 201ms
928:	learn: 6.0257382	total: 2.6s	remaining: 198ms
929:	learn: 6.0185189	total: 2.6s	remaining: 196ms
930:	learn: 6.0169520	total: 2.6s	remaining: 193ms
931:	learn: 6.0037228	total: 2.6s	remaining: 190ms
932:	learn: 5.9985771	total: 2.6s	remaining: 187ms
933:	learn: 5.9845821	total: 2.61s	remaining: 184ms
934:	learn: 5.9801610	total: 2.61s	remaining: 182ms
935:	learn: 5.9673358	total: 2.61s	remaining: 179ms
936:	learn: 5.9587798	total: 2.62s	remaining: 176ms
937:	learn: 5.9492453	total: 2.62s	remaining: 173ms
938:	learn: 5.9439301	total: 2.62s	remaining: 170ms
939:	learn: 5.9338963	total: 2.62s	remaining: 167ms
940:	learn: 5.9311676	total: 2.63s	remaining: 165ms
941:	learn: 5.9287865	total: 2.63s	remaining: 162ms
942:	learn: 5.9268032	total: 2.63s	remaining: 159ms
943:	learn: 5.9174714	total: 2.63s	remaining: 156ms
944:	learn: 5.9118526	total: 2.64s	remaining: 153ms
945:	learn: 5.9053561	total: 2.64s	remaining: 151ms
946:	learn: 5.8898230	total: 2.64s	remaining: 148ms
947:	learn: 5.8856644	total: 2.64s	remaining: 145ms
948:	learn: 5.8803306	total: 2.65s	remaining: 142ms
949:	learn: 5.8737350	total: 2.65s	remaining: 139ms
950:	learn: 5.8706281	total: 2.65s	remaining: 137ms
951:	learn: 5.8544766	total: 2.65s	remaining: 134ms
952:	learn: 5.8389862	total: 2.66s	remaining: 131ms
953:	learn: 5.8267130	total: 2.66s	remaining: 128ms
954:	learn: 5.8217580	total: 2.66s	remaining: 126ms
955:	learn: 5.8077134	total: 2.67s	remaining: 123ms
956:	learn: 5.8019392	total: 2.67s	remaining: 120ms
957:	learn: 5.7897451	total: 2.67s	remaining: 117ms
958:	learn: 5.7728414	total: 2.67s	remaining: 114ms
959:	learn: 5.7691254	total: 2.67s	remaining: 111ms
960:	learn: 5.7625293	total: 2.68s	remaining: 109ms
961:	learn: 5.7608597	total: 2.68s	remaining: 106ms
962:	learn: 5.7531612	total: 2.68s	remaining: 103ms
963:	learn: 5.7478464	total: 2.69s	remaining: 100ms
964:	learn: 5.7407112	total: 2.69s	remaining: 97.5ms
965:	learn: 5.7358469	total: 2.69s	remaining: 94.7ms
966:	learn: 5.7223195	total: 2.69s	remaining: 91.9ms
967:	learn: 5.7188396	total: 2.69s	remaining: 89.1ms
968:	learn: 5.7123524	total: 2.7s	remaining: 86.3ms
969:	learn: 5.7061282	total: 2.7s	remaining: 83.5ms
970:	learn: 5.6954583	total: 2.7s	remaining: 80.7ms
971:	learn: 5.6925507	total: 2.7s	remaining: 77.9ms
972:	learn: 5.6848697	total: 2.71s	remaining: 75.1ms
973:	learn: 5.6735097	total: 2.71s	remaining: 72.3ms
974:	learn: 5.6691825	total: 2.71s	remaining: 69.5ms
975:	learn: 5.6604410	total: 2.71s	remaining: 66.7ms
976:	learn: 5.6546128	total: 2.71s	remaining: 63.9ms
977:	learn: 5.6505795	total: 2.72s	remaining: 61.1ms
978:	learn: 5.6454318	total: 2.72s	remaining: 58.4ms
979:	learn: 5.6380357	total: 2.72s	remaining: 55.6ms
980:	learn: 5.6271931	total: 2.73s	remaining: 52.8ms
981:	learn: 5.6193838	total: 2.73s	remaining: 50ms
982:	learn: 5.6183518	total: 2.73s	remaining: 47.2ms
983:	learn: 5.6096067	total: 2.73s	remaining: 44.4ms
984:	learn: 5.6054620	total: 2.73s	remaining: 41.7ms
985:	learn: 5.6030270	total: 2.74s	remaining: 38.9ms
986:	learn: 5.5964393	total: 2.74s	remaining: 36.1ms
987:	learn: 5.5893599	total: 2.74s	remaining: 33.3ms
988:	learn: 5.5787165	total: 2.74s	remaining: 30.5ms
989:	learn: 5.5756448	total: 2.75s	remaining: 27.7ms
990:	learn: 5.5709130	total: 2.75s	remaining: 25ms
991:	learn: 5.5668314	total: 2.75s	remaining: 22.2ms
992:	learn: 5.5595141	total: 2.75s	remaining: 19.4ms
993:	learn: 5.5417124	total: 2.76s	remaining: 16.6ms
994:	learn: 5.5337983	total: 2.76s	remaining: 13.9ms
995:	learn: 5.5247630	total: 2.76s	remaining: 11.1ms
996:	learn: 5.5201147	total: 2.76s	remaining: 8.32ms
997:	learn: 5.5137698	total: 2.77s	remaining: 5.54ms
998:	learn: 5.5106445	total: 2.77s	remaining: 2.77ms
999:	learn: 5.5073092	total: 2.77s	remaining: 0us

```
Out[50]: {'Linear Regression': 0.5213327698192156,
'Lasso': 0.49918307022686714,
'Ridge': 0.520660013985339,
'Bayesian Ridge': 0.4779043849952116,
'Decision Tree Regressor': 0.9486580186872675,
'Linear SVR': -109993.86614514828,
'KNeighbors Regressor': 0.26670051664338756,
'Random Forest Regressor': 0.9463852321124017,
'Gradient Boosting Regressor': 0.9347408073837639,
'Elastic Net': 0.4880742796913011,
'SGD Regressor': -2.7240709770686826e+39,
'Cat Boost Regressor': 0.9612466289331771}
```

```
In [51]: lin_reg=LinearRegression()
```

```
In [52]: catB= CatBoostRegressor()
catB
```

```
Out[52]: <catboost.core.CatBoostRegressor at 0x22aaa7d2940>
```

```
In [53]: cb= catB.fit(X_train,y_train)
cb
```

Learning rate set to 0.035712

0:	learn: 157.9632502	total: 2.45ms	remaining: 2.44s
1:	learn: 154.6314890	total: 4.72ms	remaining: 2.35s
2:	learn: 151.2803966	total: 6.94ms	remaining: 2.31s
3:	learn: 148.0735742	total: 9.25ms	remaining: 2.3s
4:	learn: 145.4433111	total: 11.5ms	remaining: 2.28s
5:	learn: 142.9062126	total: 13.8ms	remaining: 2.29s
6:	learn: 140.1356792	total: 15.9ms	remaining: 2.25s
7:	learn: 137.5669876	total: 18.1ms	remaining: 2.24s
8:	learn: 135.2407449	total: 20.1ms	remaining: 2.22s
9:	learn: 132.6970028	total: 22.4ms	remaining: 2.22s
10:	learn: 130.1723118	total: 24.7ms	remaining: 2.22s
11:	learn: 127.6799348	total: 26.9ms	remaining: 2.21s
12:	learn: 125.6465552	total: 29ms	remaining: 2.2s
13:	learn: 123.2384277	total: 30.9ms	remaining: 2.17s
14:	learn: 120.7546365	total: 33.2ms	remaining: 2.18s
15:	learn: 118.8787722	total: 35.3ms	remaining: 2.17s
16:	learn: 116.9315941	total: 37.4ms	remaining: 2.16s
17:	learn: 114.8081579	total: 39.5ms	remaining: 2.15s
18:	learn: 113.1034046	total: 41.6ms	remaining: 2.15s
19:	learn: 111.2613629	total: 43.7ms	remaining: 2.14s
20:	learn: 109.4929589	total: 45.9ms	remaining: 2.14s
21:	learn: 107.2733196	total: 48.1ms	remaining: 2.14s
22:	learn: 105.6607188	total: 50.4ms	remaining: 2.14s
23:	learn: 103.8646179	total: 52.5ms	remaining: 2.13s
24:	learn: 102.5788577	total: 54.8ms	remaining: 2.14s
25:	learn: 100.9482894	total: 56.8ms	remaining: 2.13s
26:	learn: 99.2787387	total: 58.8ms	remaining: 2.12s
27:	learn: 98.1586486	total: 60.8ms	remaining: 2.11s
28:	learn: 96.2717877	total: 62.7ms	remaining: 2.1s
29:	learn: 94.6622190	total: 64.8ms	remaining: 2.1s
30:	learn: 93.2757426	total: 67ms	remaining: 2.1s
31:	learn: 91.9739067	total: 69.2ms	remaining: 2.09s
32:	learn: 90.6291749	total: 71.3ms	remaining: 2.09s
33:	learn: 89.2371496	total: 73.3ms	remaining: 2.08s
34:	learn: 87.6371851	total: 75.3ms	remaining: 2.08s
35:	learn: 86.2355443	total: 77.5ms	remaining: 2.07s
36:	learn: 85.0375673	total: 80.2ms	remaining: 2.09s
37:	learn: 83.9203439	total: 82.1ms	remaining: 2.08s
38:	learn: 82.9042824	total: 84ms	remaining: 2.07s
39:	learn: 81.6405024	total: 86ms	remaining: 2.06s
40:	learn: 80.4938968	total: 87.9ms	remaining: 2.06s
41:	learn: 79.6075154	total: 89.9ms	remaining: 2.05s
42:	learn: 78.5930131	total: 91.9ms	remaining: 2.05s
43:	learn: 77.4327065	total: 94ms	remaining: 2.04s
44:	learn: 76.3169341	total: 95.9ms	remaining: 2.04s
45:	learn: 75.0897076	total: 97.8ms	remaining: 2.03s
46:	learn: 74.0544879	total: 100ms	remaining: 2.03s
47:	learn: 73.2400823	total: 102ms	remaining: 2.02s
48:	learn: 72.3384012	total: 104ms	remaining: 2.02s
49:	learn: 71.6344082	total: 106ms	remaining: 2.01s
50:	learn: 70.7788526	total: 108ms	remaining: 2.01s
51:	learn: 70.0682551	total: 110ms	remaining: 2s
52:	learn: 69.1677731	total: 112ms	remaining: 1.99s
53:	learn: 68.5672320	total: 114ms	remaining: 1.99s
54:	learn: 67.9169748	total: 116ms	remaining: 1.99s
55:	learn: 66.9260415	total: 118ms	remaining: 1.98s
56:	learn: 66.0513741	total: 120ms	remaining: 1.98s
57:	learn: 65.4782499	total: 122ms	remaining: 1.98s
58:	learn: 64.9270208	total: 124ms	remaining: 1.98s
59:	learn: 64.1588681	total: 126ms	remaining: 1.97s
60:	learn: 63.5099226	total: 128ms	remaining: 1.98s
61:	learn: 62.8112865	total: 131ms	remaining: 1.98s
62:	learn: 62.1678745	total: 133ms	remaining: 1.98s
63:	learn: 61.5269143	total: 136ms	remaining: 1.99s

64:	learn: 60.8011269	total: 138ms	remaining: 1.99s
65:	learn: 60.2113804	total: 140ms	remaining: 1.98s
66:	learn: 59.6992955	total: 142ms	remaining: 1.98s
67:	learn: 59.0007880	total: 145ms	remaining: 1.98s
68:	learn: 58.4795250	total: 147ms	remaining: 1.98s
69:	learn: 57.7180137	total: 149ms	remaining: 1.98s
70:	learn: 57.0804373	total: 151ms	remaining: 1.98s
71:	learn: 56.5086332	total: 154ms	remaining: 1.98s
72:	learn: 55.9861950	total: 156ms	remaining: 1.98s
73:	learn: 55.4724912	total: 158ms	remaining: 1.98s
74:	learn: 54.9933892	total: 160ms	remaining: 1.98s
75:	learn: 54.5791438	total: 163ms	remaining: 1.98s
76:	learn: 54.1342255	total: 165ms	remaining: 1.98s
77:	learn: 53.5310910	total: 168ms	remaining: 1.99s
78:	learn: 52.9750501	total: 171ms	remaining: 1.99s
79:	learn: 52.4194663	total: 174ms	remaining: 2s
80:	learn: 51.9162582	total: 177ms	remaining: 2s
81:	learn: 51.6704066	total: 180ms	remaining: 2.01s
82:	learn: 51.0709090	total: 183ms	remaining: 2.02s
83:	learn: 50.5731895	total: 185ms	remaining: 2.02s
84:	learn: 50.1020437	total: 188ms	remaining: 2.02s
85:	learn: 49.6849600	total: 191ms	remaining: 2.02s
86:	learn: 49.3830361	total: 196ms	remaining: 2.06s
87:	learn: 49.0369385	total: 201ms	remaining: 2.08s
88:	learn: 48.8538364	total: 203ms	remaining: 2.08s
89:	learn: 48.5350687	total: 205ms	remaining: 2.07s
90:	learn: 48.2558969	total: 208ms	remaining: 2.07s
91:	learn: 47.9346070	total: 210ms	remaining: 2.07s
92:	learn: 47.5631325	total: 212ms	remaining: 2.07s
93:	learn: 47.2254702	total: 214ms	remaining: 2.06s
94:	learn: 46.7731070	total: 216ms	remaining: 2.06s
95:	learn: 46.3460508	total: 218ms	remaining: 2.06s
96:	learn: 46.1944071	total: 220ms	remaining: 2.05s
97:	learn: 45.8302399	total: 223ms	remaining: 2.06s
98:	learn: 45.4802524	total: 226ms	remaining: 2.06s
99:	learn: 45.2085587	total: 229ms	remaining: 2.06s
100:	learn: 44.9003801	total: 231ms	remaining: 2.06s
101:	learn: 44.5482387	total: 233ms	remaining: 2.05s
102:	learn: 44.0529924	total: 235ms	remaining: 2.05s
103:	learn: 43.7667685	total: 238ms	remaining: 2.05s
104:	learn: 43.4905877	total: 240ms	remaining: 2.04s
105:	learn: 43.2623136	total: 242ms	remaining: 2.04s
106:	learn: 42.9234561	total: 244ms	remaining: 2.04s
107:	learn: 42.4150069	total: 246ms	remaining: 2.03s
108:	learn: 42.1900618	total: 248ms	remaining: 2.03s
109:	learn: 41.8804566	total: 251ms	remaining: 2.03s
110:	learn: 41.5210346	total: 254ms	remaining: 2.03s
111:	learn: 41.3126197	total: 256ms	remaining: 2.03s
112:	learn: 41.0408374	total: 258ms	remaining: 2.02s
113:	learn: 40.9309219	total: 260ms	remaining: 2.02s
114:	learn: 40.7970071	total: 263ms	remaining: 2.02s
115:	learn: 40.4624778	total: 265ms	remaining: 2.02s
116:	learn: 40.2580206	total: 268ms	remaining: 2.02s
117:	learn: 40.0059598	total: 271ms	remaining: 2.02s
118:	learn: 39.8538651	total: 273ms	remaining: 2.02s
119:	learn: 39.4946759	total: 276ms	remaining: 2.02s
120:	learn: 39.3039351	total: 279ms	remaining: 2.02s
121:	learn: 39.0750984	total: 281ms	remaining: 2.02s
122:	learn: 38.7762250	total: 283ms	remaining: 2.02s
123:	learn: 38.6029670	total: 286ms	remaining: 2.02s
124:	learn: 38.3675759	total: 288ms	remaining: 2.01s
125:	learn: 38.1352360	total: 290ms	remaining: 2.01s
126:	learn: 37.9189190	total: 292ms	remaining: 2.01s
127:	learn: 37.7663381	total: 294ms	remaining: 2s
128:	learn: 37.5016525	total: 297ms	remaining: 2s
129:	learn: 37.3662633	total: 299ms	remaining: 2s
130:	learn: 37.1227026	total: 301ms	remaining: 2s
131:	learn: 36.9868518	total: 304ms	remaining: 2s
132:	learn: 36.7638906	total: 306ms	remaining: 1.99s
133:	learn: 36.5882345	total: 308ms	remaining: 1.99s
134:	learn: 36.3593926	total: 310ms	remaining: 1.99s
135:	learn: 36.0019787	total: 313ms	remaining: 1.99s
136:	learn: 35.7779144	total: 315ms	remaining: 1.98s
137:	learn: 35.6249734	total: 317ms	remaining: 1.98s
138:	learn: 35.4086083	total: 320ms	remaining: 1.98s
139:	learn: 35.1433981	total: 322ms	remaining: 1.98s
140:	learn: 34.9118771	total: 324ms	remaining: 1.97s
141:	learn: 34.6445410	total: 326ms	remaining: 1.97s
142:	learn: 34.4073283	total: 329ms	remaining: 1.97s
143:	learn: 34.1768546	total: 331ms	remaining: 1.97s
144:	learn: 33.9792883	total: 333ms	remaining: 1.96s
145:	learn: 33.8318372	total: 335ms	remaining: 1.96s
146:	learn: 33.5691534	total: 338ms	remaining: 1.96s
147:	learn: 33.3549957	total: 341ms	remaining: 1.96s
148:	learn: 33.1705202	total: 344ms	remaining: 1.96s
149:	learn: 32.9469501	total: 347ms	remaining: 1.96s
150:	learn: 32.7842686	total: 349ms	remaining: 1.96s
151:	learn: 32.5508934	total: 352ms	remaining: 1.97s
152:	learn: 32.3941858	total: 356ms	remaining: 1.97s

153:	learn:	32.2480464	total:	359ms	remaining:	1.97s
154:	learn:	32.0850392	total:	363ms	remaining:	1.98s
155:	learn:	31.9069084	total:	366ms	remaining:	1.98s
156:	learn:	31.8233217	total:	369ms	remaining:	1.98s
157:	learn:	31.7048366	total:	372ms	remaining:	1.98s
158:	learn:	31.5596756	total:	375ms	remaining:	1.98s
159:	learn:	31.3860011	total:	379ms	remaining:	1.99s
160:	learn:	31.2092610	total:	381ms	remaining:	1.99s
161:	learn:	30.9634016	total:	384ms	remaining:	1.99s
162:	learn:	30.7692757	total:	386ms	remaining:	1.98s
163:	learn:	30.5907506	total:	388ms	remaining:	1.98s
164:	learn:	30.3999005	total:	391ms	remaining:	1.98s
165:	learn:	30.1817350	total:	393ms	remaining:	1.98s
166:	learn:	30.0801927	total:	396ms	remaining:	1.97s
167:	learn:	29.9323991	total:	398ms	remaining:	1.97s
168:	learn:	29.7812267	total:	401ms	remaining:	1.97s
169:	learn:	29.6804558	total:	403ms	remaining:	1.97s
170:	learn:	29.4668588	total:	405ms	remaining:	1.96s
171:	learn:	29.2718243	total:	408ms	remaining:	1.96s
172:	learn:	29.1584533	total:	410ms	remaining:	1.96s
173:	learn:	28.9855512	total:	412ms	remaining:	1.96s
174:	learn:	28.7825441	total:	415ms	remaining:	1.96s
175:	learn:	28.5546687	total:	417ms	remaining:	1.95s
176:	learn:	28.3718987	total:	420ms	remaining:	1.95s
177:	learn:	28.2288826	total:	423ms	remaining:	1.95s
178:	learn:	28.0702823	total:	426ms	remaining:	1.95s
179:	learn:	27.9148238	total:	429ms	remaining:	1.95s
180:	learn:	27.7436086	total:	432ms	remaining:	1.95s
181:	learn:	27.6332654	total:	434ms	remaining:	1.95s
182:	learn:	27.4990035	total:	437ms	remaining:	1.95s
183:	learn:	27.4011389	total:	439ms	remaining:	1.95s
184:	learn:	27.2693913	total:	442ms	remaining:	1.95s
185:	learn:	27.1418778	total:	444ms	remaining:	1.94s
186:	learn:	27.0960346	total:	447ms	remaining:	1.94s
187:	learn:	26.9881984	total:	449ms	remaining:	1.94s
188:	learn:	26.8372308	total:	452ms	remaining:	1.94s
189:	learn:	26.8035266	total:	454ms	remaining:	1.94s
190:	learn:	26.7487573	total:	456ms	remaining:	1.93s
191:	learn:	26.6385763	total:	458ms	remaining:	1.93s
192:	learn:	26.4822932	total:	461ms	remaining:	1.93s
193:	learn:	26.3568198	total:	463ms	remaining:	1.92s
194:	learn:	26.2369917	total:	466ms	remaining:	1.92s
195:	learn:	26.1516999	total:	468ms	remaining:	1.92s
196:	learn:	26.0731878	total:	470ms	remaining:	1.92s
197:	learn:	26.0442224	total:	473ms	remaining:	1.91s
198:	learn:	25.9804361	total:	475ms	remaining:	1.91s
199:	learn:	25.8350500	total:	477ms	remaining:	1.91s
200:	learn:	25.6853602	total:	479ms	remaining:	1.91s
201:	learn:	25.5180039	total:	482ms	remaining:	1.9s
202:	learn:	25.3673046	total:	484ms	remaining:	1.9s
203:	learn:	25.2922305	total:	487ms	remaining:	1.9s
204:	learn:	25.1284566	total:	489ms	remaining:	1.9s
205:	learn:	25.0441871	total:	491ms	remaining:	1.89s
206:	learn:	24.9047403	total:	493ms	remaining:	1.89s
207:	learn:	24.8287976	total:	496ms	remaining:	1.89s
208:	learn:	24.7698408	total:	499ms	remaining:	1.89s
209:	learn:	24.7173460	total:	501ms	remaining:	1.89s
210:	learn:	24.6276768	total:	504ms	remaining:	1.88s
211:	learn:	24.5617675	total:	506ms	remaining:	1.88s
212:	learn:	24.4972738	total:	508ms	remaining:	1.88s
213:	learn:	24.3922695	total:	512ms	remaining:	1.88s
214:	learn:	24.3030303	total:	514ms	remaining:	1.88s
215:	learn:	24.2412405	total:	517ms	remaining:	1.88s
216:	learn:	24.1996618	total:	520ms	remaining:	1.88s
217:	learn:	24.0429777	total:	522ms	remaining:	1.87s
218:	learn:	24.0116883	total:	524ms	remaining:	1.87s
219:	learn:	23.8954084	total:	527ms	remaining:	1.87s
220:	learn:	23.7781937	total:	530ms	remaining:	1.87s
221:	learn:	23.7339876	total:	532ms	remaining:	1.86s
222:	learn:	23.7016977	total:	534ms	remaining:	1.86s
223:	learn:	23.5862213	total:	537ms	remaining:	1.86s
224:	learn:	23.4301876	total:	539ms	remaining:	1.86s
225:	learn:	23.2824279	total:	542ms	remaining:	1.85s
226:	learn:	23.2023362	total:	544ms	remaining:	1.85s
227:	learn:	23.1042647	total:	547ms	remaining:	1.85s
228:	learn:	22.9845774	total:	550ms	remaining:	1.85s
229:	learn:	22.9552458	total:	553ms	remaining:	1.85s
230:	learn:	22.8594285	total:	555ms	remaining:	1.85s
231:	learn:	22.8104841	total:	557ms	remaining:	1.84s
232:	learn:	22.6712070	total:	560ms	remaining:	1.84s
233:	learn:	22.5392625	total:	562ms	remaining:	1.84s
234:	learn:	22.4508492	total:	564ms	remaining:	1.84s
235:	learn:	22.4206628	total:	567ms	remaining:	1.83s
236:	learn:	22.2964855	total:	569ms	remaining:	1.83s
237:	learn:	22.2148002	total:	571ms	remaining:	1.83s
238:	learn:	22.1074206	total:	574ms	remaining:	1.83s
239:	learn:	22.0673287	total:	576ms	remaining:	1.82s
240:	learn:	22.0159384	total:	578ms	remaining:	1.82s
241:	learn:	21.9089285	total:	580ms	remaining:	1.82s

242:	learn: 21.8300328	total: 583ms	remaining: 1.81s
243:	learn: 21.7981993	total: 585ms	remaining: 1.81s
244:	learn: 21.6368216	total: 588ms	remaining: 1.81s
245:	learn: 21.5707454	total: 590ms	remaining: 1.81s
246:	learn: 21.5296975	total: 592ms	remaining: 1.8s
247:	learn: 21.4849623	total: 595ms	remaining: 1.8s
248:	learn: 21.4432367	total: 597ms	remaining: 1.8s
249:	learn: 21.4236202	total: 599ms	remaining: 1.8s
250:	learn: 21.3906065	total: 601ms	remaining: 1.79s
251:	learn: 21.2693139	total: 604ms	remaining: 1.79s
252:	learn: 21.2503570	total: 606ms	remaining: 1.79s
253:	learn: 21.2317409	total: 608ms	remaining: 1.78s
254:	learn: 21.2004612	total: 610ms	remaining: 1.78s
255:	learn: 21.0890983	total: 613ms	remaining: 1.78s
256:	learn: 21.0682866	total: 615ms	remaining: 1.78s
257:	learn: 21.0000861	total: 620ms	remaining: 1.78s
258:	learn: 20.8914779	total: 623ms	remaining: 1.78s
259:	learn: 20.7839701	total: 625ms	remaining: 1.78s
260:	learn: 20.7672518	total: 628ms	remaining: 1.78s
261:	learn: 20.6672710	total: 631ms	remaining: 1.78s
262:	learn: 20.6475415	total: 634ms	remaining: 1.77s
263:	learn: 20.5419692	total: 636ms	remaining: 1.77s
264:	learn: 20.5249056	total: 639ms	remaining: 1.77s
265:	learn: 20.4828871	total: 642ms	remaining: 1.77s
266:	learn: 20.4541745	total: 645ms	remaining: 1.77s
267:	learn: 20.3536158	total: 648ms	remaining: 1.77s
268:	learn: 20.3390041	total: 651ms	remaining: 1.77s
269:	learn: 20.2690453	total: 654ms	remaining: 1.77s
270:	learn: 20.1644287	total: 657ms	remaining: 1.77s
271:	learn: 20.0757010	total: 660ms	remaining: 1.77s
272:	learn: 19.9591798	total: 663ms	remaining: 1.77s
273:	learn: 19.9358330	total: 667ms	remaining: 1.77s
274:	learn: 19.8617522	total: 670ms	remaining: 1.76s
275:	learn: 19.7584979	total: 672ms	remaining: 1.76s
276:	learn: 19.6930147	total: 675ms	remaining: 1.76s
277:	learn: 19.6200627	total: 679ms	remaining: 1.76s
278:	learn: 19.5475098	total: 682ms	remaining: 1.76s
279:	learn: 19.4661671	total: 685ms	remaining: 1.76s
280:	learn: 19.4202876	total: 689ms	remaining: 1.76s
281:	learn: 19.3179582	total: 704ms	remaining: 1.79s
282:	learn: 19.2394367	total: 707ms	remaining: 1.79s
283:	learn: 19.1436925	total: 713ms	remaining: 1.8s
284:	learn: 19.0997811	total: 716ms	remaining: 1.8s
285:	learn: 19.0045916	total: 719ms	remaining: 1.79s
286:	learn: 18.9445960	total: 722ms	remaining: 1.79s
287:	learn: 18.8372168	total: 725ms	remaining: 1.79s
288:	learn: 18.7549485	total: 727ms	remaining: 1.79s
289:	learn: 18.6782802	total: 730ms	remaining: 1.79s
290:	learn: 18.5980809	total: 732ms	remaining: 1.78s
291:	learn: 18.5220805	total: 734ms	remaining: 1.78s
292:	learn: 18.4504190	total: 737ms	remaining: 1.78s
293:	learn: 18.4043606	total: 739ms	remaining: 1.77s
294:	learn: 18.3333668	total: 741ms	remaining: 1.77s
295:	learn: 18.2621833	total: 744ms	remaining: 1.77s
296:	learn: 18.2209285	total: 746ms	remaining: 1.76s
297:	learn: 18.1299840	total: 748ms	remaining: 1.76s
298:	learn: 18.0642296	total: 750ms	remaining: 1.76s
299:	learn: 18.0095207	total: 753ms	remaining: 1.76s
300:	learn: 17.9326490	total: 755ms	remaining: 1.75s
301:	learn: 17.9057726	total: 758ms	remaining: 1.75s
302:	learn: 17.8372136	total: 761ms	remaining: 1.75s
303:	learn: 17.8038442	total: 763ms	remaining: 1.75s
304:	learn: 17.7279532	total: 766ms	remaining: 1.75s
305:	learn: 17.6580971	total: 768ms	remaining: 1.74s
306:	learn: 17.5842838	total: 771ms	remaining: 1.74s
307:	learn: 17.5056312	total: 773ms	remaining: 1.74s
308:	learn: 17.4584683	total: 775ms	remaining: 1.73s
309:	learn: 17.4430994	total: 777ms	remaining: 1.73s
310:	learn: 17.4133300	total: 779ms	remaining: 1.73s
311:	learn: 17.3763853	total: 782ms	remaining: 1.72s
312:	learn: 17.3502230	total: 784ms	remaining: 1.72s
313:	learn: 17.2863472	total: 786ms	remaining: 1.72s
314:	learn: 17.2223447	total: 788ms	remaining: 1.71s
315:	learn: 17.1916778	total: 791ms	remaining: 1.71s
316:	learn: 17.0981797	total: 793ms	remaining: 1.71s
317:	learn: 17.0370549	total: 795ms	remaining: 1.7s
318:	learn: 16.9519267	total: 797ms	remaining: 1.7s
319:	learn: 16.9058083	total: 799ms	remaining: 1.7s
320:	learn: 16.8741514	total: 802ms	remaining: 1.7s
321:	learn: 16.7935486	total: 804ms	remaining: 1.69s
322:	learn: 16.7335292	total: 806ms	remaining: 1.69s
323:	learn: 16.7018224	total: 808ms	remaining: 1.69s
324:	learn: 16.6770753	total: 811ms	remaining: 1.68s
325:	learn: 16.6099385	total: 814ms	remaining: 1.68s
326:	learn: 16.5890695	total: 816ms	remaining: 1.68s
327:	learn: 16.5598430	total: 818ms	remaining: 1.68s
328:	learn: 16.5319626	total: 820ms	remaining: 1.67s
329:	learn: 16.5027340	total: 822ms	remaining: 1.67s
330:	learn: 16.4179158	total: 825ms	remaining: 1.67s

331:	learn:	16.3341425	total:	827ms	remaining:	1.66s
332:	learn:	16.2869278	total:	829ms	remaining:	1.66s
333:	learn:	16.2563301	total:	831ms	remaining:	1.66s
334:	learn:	16.2139027	total:	833ms	remaining:	1.65s
335:	learn:	16.1667367	total:	836ms	remaining:	1.65s
336:	learn:	16.1373983	total:	838ms	remaining:	1.65s
337:	learn:	16.1188388	total:	840ms	remaining:	1.65s
338:	learn:	16.0523508	total:	842ms	remaining:	1.64s
339:	learn:	16.0281875	total:	845ms	remaining:	1.64s
340:	learn:	15.9729637	total:	848ms	remaining:	1.64s
341:	learn:	15.9229970	total:	850ms	remaining:	1.64s
342:	learn:	15.8746551	total:	853ms	remaining:	1.63s
343:	learn:	15.8221266	total:	855ms	remaining:	1.63s
344:	learn:	15.8118220	total:	859ms	remaining:	1.63s
345:	learn:	15.7615882	total:	862ms	remaining:	1.63s
346:	learn:	15.7487471	total:	865ms	remaining:	1.63s
347:	learn:	15.7378720	total:	868ms	remaining:	1.63s
348:	learn:	15.7292143	total:	871ms	remaining:	1.63s
349:	learn:	15.7190052	total:	874ms	remaining:	1.62s
350:	learn:	15.7093778	total:	877ms	remaining:	1.62s
351:	learn:	15.6728397	total:	879ms	remaining:	1.62s
352:	learn:	15.6628790	total:	882ms	remaining:	1.62s
353:	learn:	15.6447510	total:	884ms	remaining:	1.61s
354:	learn:	15.6176744	total:	887ms	remaining:	1.61s
355:	learn:	15.5430945	total:	889ms	remaining:	1.61s
356:	learn:	15.5261454	total:	892ms	remaining:	1.6s
357:	learn:	15.4805451	total:	894ms	remaining:	1.6s
358:	learn:	15.4707085	total:	896ms	remaining:	1.6s
359:	learn:	15.4014274	total:	899ms	remaining:	1.6s
360:	learn:	15.3920873	total:	901ms	remaining:	1.59s
361:	learn:	15.3284965	total:	903ms	remaining:	1.59s
362:	learn:	15.3193460	total:	905ms	remaining:	1.59s
363:	learn:	15.2720973	total:	908ms	remaining:	1.58s
364:	learn:	15.2303998	total:	910ms	remaining:	1.58s
365:	learn:	15.2215149	total:	912ms	remaining:	1.58s
366:	learn:	15.2057007	total:	914ms	remaining:	1.58s
367:	learn:	15.1970404	total:	917ms	remaining:	1.57s
368:	learn:	15.1586887	total:	919ms	remaining:	1.57s
369:	learn:	15.1502875	total:	921ms	remaining:	1.57s
370:	learn:	15.1044194	total:	923ms	remaining:	1.56s
371:	learn:	15.0631014	total:	925ms	remaining:	1.56s
372:	learn:	15.0239219	total:	928ms	remaining:	1.56s
373:	learn:	14.9480154	total:	930ms	remaining:	1.56s
374:	learn:	14.9043544	total:	932ms	remaining:	1.55s
375:	learn:	14.8447400	total:	934ms	remaining:	1.55s
376:	learn:	14.8117703	total:	936ms	remaining:	1.55s
377:	learn:	14.7640331	total:	939ms	remaining:	1.54s
378:	learn:	14.7459850	total:	941ms	remaining:	1.54s
379:	learn:	14.7377960	total:	944ms	remaining:	1.54s
380:	learn:	14.6939865	total:	947ms	remaining:	1.54s
381:	learn:	14.6378967	total:	949ms	remaining:	1.54s
382:	learn:	14.6296045	total:	952ms	remaining:	1.53s
383:	learn:	14.5829751	total:	955ms	remaining:	1.53s
384:	learn:	14.5666959	total:	958ms	remaining:	1.53s
385:	learn:	14.5178318	total:	960ms	remaining:	1.53s
386:	learn:	14.5019949	total:	963ms	remaining:	1.52s
387:	learn:	14.4923028	total:	966ms	remaining:	1.52s
388:	learn:	14.4417841	total:	968ms	remaining:	1.52s
389:	learn:	14.4241070	total:	971ms	remaining:	1.52s
390:	learn:	14.3891012	total:	973ms	remaining:	1.51s
391:	learn:	14.3563411	total:	975ms	remaining:	1.51s
392:	learn:	14.3181864	total:	978ms	remaining:	1.51s
393:	learn:	14.2830901	total:	980ms	remaining:	1.51s
394:	learn:	14.2694006	total:	983ms	remaining:	1.5s
395:	learn:	14.2518913	total:	985ms	remaining:	1.5s
396:	learn:	14.2341754	total:	987ms	remaining:	1.5s
397:	learn:	14.1771068	total:	990ms	remaining:	1.5s
398:	learn:	14.1590606	total:	992ms	remaining:	1.49s
399:	learn:	14.1115813	total:	995ms	remaining:	1.49s
400:	learn:	14.1029563	total:	997ms	remaining:	1.49s
401:	learn:	14.0719123	total:	999ms	remaining:	1.49s
402:	learn:	14.0562129	total:	1s	remaining:	1.48s
403:	learn:	14.0402435	total:	1s	remaining:	1.48s
404:	learn:	14.0228738	total:	1s	remaining:	1.48s
405:	learn:	13.9621638	total:	1.01s	remaining:	1.47s
406:	learn:	13.9169963	total:	1.01s	remaining:	1.47s
407:	learn:	13.8922679	total:	1.01s	remaining:	1.47s
408:	learn:	13.8727456	total:	1.01s	remaining:	1.47s
409:	learn:	13.8532482	total:	1.02s	remaining:	1.46s
410:	learn:	13.8465155	total:	1.02s	remaining:	1.46s
411:	learn:	13.8273897	total:	1.02s	remaining:	1.46s
412:	learn:	13.7743607	total:	1.02s	remaining:	1.45s
413:	learn:	13.7563850	total:	1.02s	remaining:	1.45s
414:	learn:	13.7477834	total:	1.03s	remaining:	1.45s
415:	learn:	13.7233511	total:	1.03s	remaining:	1.45s
416:	learn:	13.7161600	total:	1.03s	remaining:	1.44s
417:	learn:	13.6838348	total:	1.03s	remaining:	1.44s
418:	learn:	13.6097844	total:	1.04s	remaining:	1.44s
419:	learn:	13.6039550	total:	1.04s	remaining:	1.44s

420:	learn: 13.5618102	total: 1.04s	remaining: 1.44s
421:	learn: 13.5449678	total: 1.05s	remaining: 1.43s
422:	learn: 13.5069760	total: 1.05s	remaining: 1.43s
423:	learn: 13.5006988	total: 1.05s	remaining: 1.43s
424:	learn: 13.4837921	total: 1.06s	remaining: 1.43s
425:	learn: 13.4661137	total: 1.06s	remaining: 1.43s
426:	learn: 13.4135035	total: 1.06s	remaining: 1.43s
427:	learn: 13.3771826	total: 1.06s	remaining: 1.42s
428:	learn: 13.3525311	total: 1.07s	remaining: 1.42s
429:	learn: 13.3335446	total: 1.07s	remaining: 1.42s
430:	learn: 13.3275503	total: 1.07s	remaining: 1.42s
431:	learn: 13.2863628	total: 1.07s	remaining: 1.41s
432:	learn: 13.2427687	total: 1.08s	remaining: 1.41s
433:	learn: 13.2336132	total: 1.08s	remaining: 1.41s
434:	learn: 13.2041656	total: 1.08s	remaining: 1.41s
435:	learn: 13.1674570	total: 1.08s	remaining: 1.4s
436:	learn: 13.1085466	total: 1.09s	remaining: 1.4s
437:	learn: 13.0630883	total: 1.09s	remaining: 1.4s
438:	learn: 13.0517885	total: 1.09s	remaining: 1.4s
439:	learn: 13.0298766	total: 1.09s	remaining: 1.39s
440:	learn: 13.0165373	total: 1.1s	remaining: 1.39s
441:	learn: 13.0066963	total: 1.1s	remaining: 1.39s
442:	learn: 12.9803143	total: 1.1s	remaining: 1.38s
443:	learn: 12.9362646	total: 1.1s	remaining: 1.38s
444:	learn: 12.8967235	total: 1.1s	remaining: 1.38s
445:	learn: 12.8842110	total: 1.11s	remaining: 1.38s
446:	learn: 12.8237881	total: 1.11s	remaining: 1.37s
447:	learn: 12.7685880	total: 1.11s	remaining: 1.37s
448:	learn: 12.7537359	total: 1.11s	remaining: 1.37s
449:	learn: 12.7404445	total: 1.12s	remaining: 1.36s
450:	learn: 12.6840562	total: 1.12s	remaining: 1.36s
451:	learn: 12.6715142	total: 1.12s	remaining: 1.36s
452:	learn: 12.6562277	total: 1.13s	remaining: 1.36s
453:	learn: 12.6384330	total: 1.13s	remaining: 1.36s
454:	learn: 12.6220841	total: 1.13s	remaining: 1.36s
455:	learn: 12.5967495	total: 1.14s	remaining: 1.35s
456:	learn: 12.5881226	total: 1.14s	remaining: 1.35s
457:	learn: 12.5824934	total: 1.14s	remaining: 1.35s
458:	learn: 12.5763301	total: 1.14s	remaining: 1.35s
459:	learn: 12.5486335	total: 1.15s	remaining: 1.35s
460:	learn: 12.5216657	total: 1.15s	remaining: 1.34s
461:	learn: 12.4583403	total: 1.15s	remaining: 1.34s
462:	learn: 12.4481543	total: 1.16s	remaining: 1.34s
463:	learn: 12.4315262	total: 1.16s	remaining: 1.34s
464:	learn: 12.4105386	total: 1.16s	remaining: 1.33s
465:	learn: 12.4052481	total: 1.16s	remaining: 1.33s
466:	learn: 12.3814553	total: 1.17s	remaining: 1.33s
467:	learn: 12.3510622	total: 1.17s	remaining: 1.33s
468:	learn: 12.3462953	total: 1.17s	remaining: 1.32s
469:	learn: 12.3321110	total: 1.17s	remaining: 1.32s
470:	learn: 12.3195173	total: 1.18s	remaining: 1.32s
471:	learn: 12.3031750	total: 1.18s	remaining: 1.32s
472:	learn: 12.2621436	total: 1.18s	remaining: 1.31s
473:	learn: 12.2382740	total: 1.18s	remaining: 1.31s
474:	learn: 12.2140112	total: 1.19s	remaining: 1.31s
475:	learn: 12.2054259	total: 1.19s	remaining: 1.31s
476:	learn: 12.1956670	total: 1.19s	remaining: 1.3s
477:	learn: 12.1856765	total: 1.19s	remaining: 1.3s
478:	learn: 12.1734145	total: 1.19s	remaining: 1.3s
479:	learn: 12.1380998	total: 1.2s	remaining: 1.3s
480:	learn: 12.0911416	total: 1.2s	remaining: 1.29s
481:	learn: 12.0728607	total: 1.2s	remaining: 1.29s
482:	learn: 12.0415441	total: 1.2s	remaining: 1.29s
483:	learn: 12.0208694	total: 1.21s	remaining: 1.28s
484:	learn: 12.0103676	total: 1.21s	remaining: 1.28s
485:	learn: 12.0005053	total: 1.21s	remaining: 1.28s
486:	learn: 11.9899539	total: 1.21s	remaining: 1.28s
487:	learn: 11.9774141	total: 1.22s	remaining: 1.28s
488:	learn: 11.9672376	total: 1.22s	remaining: 1.27s
489:	learn: 11.9502595	total: 1.22s	remaining: 1.27s
490:	learn: 11.9015207	total: 1.23s	remaining: 1.27s
491:	learn: 11.8964109	total: 1.23s	remaining: 1.27s
492:	learn: 11.8590848	total: 1.23s	remaining: 1.26s
493:	learn: 11.8209384	total: 1.23s	remaining: 1.26s
494:	learn: 11.7939055	total: 1.24s	remaining: 1.26s
495:	learn: 11.7711474	total: 1.24s	remaining: 1.26s
496:	learn: 11.7328376	total: 1.24s	remaining: 1.26s
497:	learn: 11.7160465	total: 1.24s	remaining: 1.25s
498:	learn: 11.6733890	total: 1.25s	remaining: 1.25s
499:	learn: 11.6484715	total: 1.25s	remaining: 1.25s
500:	learn: 11.5866887	total: 1.25s	remaining: 1.25s
501:	learn: 11.5562538	total: 1.25s	remaining: 1.24s
502:	learn: 11.5151757	total: 1.26s	remaining: 1.24s
503:	learn: 11.5064247	total: 1.26s	remaining: 1.24s
504:	learn: 11.4957453	total: 1.26s	remaining: 1.24s
505:	learn: 11.4880706	total: 1.26s	remaining: 1.23s
506:	learn: 11.4699762	total: 1.27s	remaining: 1.23s
507:	learn: 11.4425812	total: 1.27s	remaining: 1.23s
508:	learn: 11.4334734	total: 1.27s	remaining: 1.23s

509:	learn:	11.4219150	total:	1.27s	remaining:	1.22s
510:	learn:	11.3900472	total:	1.28s	remaining:	1.22s
511:	learn:	11.3649372	total:	1.28s	remaining:	1.22s
512:	learn:	11.3480012	total:	1.28s	remaining:	1.22s
513:	learn:	11.3066372	total:	1.28s	remaining:	1.22s
514:	learn:	11.3017903	total:	1.29s	remaining:	1.21s
515:	learn:	11.2671742	total:	1.29s	remaining:	1.21s
516:	learn:	11.2592539	total:	1.29s	remaining:	1.21s
517:	learn:	11.2496036	total:	1.3s	remaining:	1.21s
518:	learn:	11.2342606	total:	1.3s	remaining:	1.2s
519:	learn:	11.1956334	total:	1.3s	remaining:	1.2s
520:	learn:	11.1785964	total:	1.3s	remaining:	1.2s
521:	learn:	11.1307233	total:	1.31s	remaining:	1.2s
522:	learn:	11.1036891	total:	1.31s	remaining:	1.19s
523:	learn:	11.0986655	total:	1.31s	remaining:	1.19s
524:	learn:	11.0629387	total:	1.31s	remaining:	1.19s
525:	learn:	11.0192746	total:	1.32s	remaining:	1.19s
526:	learn:	10.9723695	total:	1.32s	remaining:	1.18s
527:	learn:	10.9647237	total:	1.32s	remaining:	1.18s
528:	learn:	10.9338716	total:	1.32s	remaining:	1.18s
529:	learn:	10.9097323	total:	1.33s	remaining:	1.18s
530:	learn:	10.8958628	total:	1.33s	remaining:	1.18s
531:	learn:	10.8820810	total:	1.33s	remaining:	1.17s
532:	learn:	10.8682949	total:	1.34s	remaining:	1.17s
533:	learn:	10.8565489	total:	1.34s	remaining:	1.17s
534:	learn:	10.8270150	total:	1.34s	remaining:	1.17s
535:	learn:	10.8039470	total:	1.35s	remaining:	1.17s
536:	learn:	10.7998974	total:	1.35s	remaining:	1.16s
537:	learn:	10.7912017	total:	1.35s	remaining:	1.16s
538:	learn:	10.7668632	total:	1.35s	remaining:	1.16s
539:	learn:	10.7516469	total:	1.36s	remaining:	1.16s
540:	learn:	10.7236650	total:	1.36s	remaining:	1.15s
541:	learn:	10.7170608	total:	1.36s	remaining:	1.15s
542:	learn:	10.6822791	total:	1.36s	remaining:	1.15s
543:	learn:	10.6667071	total:	1.37s	remaining:	1.15s
544:	learn:	10.6552044	total:	1.37s	remaining:	1.14s
545:	learn:	10.6397434	total:	1.37s	remaining:	1.14s
546:	learn:	10.6340860	total:	1.38s	remaining:	1.14s
547:	learn:	10.6116600	total:	1.38s	remaining:	1.14s
548:	learn:	10.5801224	total:	1.38s	remaining:	1.13s
549:	learn:	10.5658777	total:	1.38s	remaining:	1.13s
550:	learn:	10.5605838	total:	1.38s	remaining:	1.13s
551:	learn:	10.5236302	total:	1.39s	remaining:	1.13s
552:	learn:	10.5204710	total:	1.39s	remaining:	1.12s
553:	learn:	10.4974812	total:	1.39s	remaining:	1.12s
554:	learn:	10.4647086	total:	1.4s	remaining:	1.12s
555:	learn:	10.4501420	total:	1.4s	remaining:	1.12s
556:	learn:	10.4367166	total:	1.4s	remaining:	1.11s
557:	learn:	10.4103321	total:	1.4s	remaining:	1.11s
558:	learn:	10.3731374	total:	1.41s	remaining:	1.11s
559:	learn:	10.3516882	total:	1.41s	remaining:	1.11s
560:	learn:	10.3385449	total:	1.41s	remaining:	1.1s
561:	learn:	10.3353522	total:	1.41s	remaining:	1.1s
562:	learn:	10.3321879	total:	1.42s	remaining:	1.1s
563:	learn:	10.3202564	total:	1.42s	remaining:	1.1s
564:	learn:	10.3160483	total:	1.42s	remaining:	1.09s
565:	learn:	10.2834481	total:	1.43s	remaining:	1.09s
566:	learn:	10.2599203	total:	1.43s	remaining:	1.09s
567:	learn:	10.2352283	total:	1.43s	remaining:	1.09s
568:	learn:	10.2223189	total:	1.43s	remaining:	1.09s
569:	learn:	10.1846808	total:	1.44s	remaining:	1.08s
570:	learn:	10.1798961	total:	1.44s	remaining:	1.08s
571:	learn:	10.1600535	total:	1.44s	remaining:	1.08s
572:	learn:	10.1420313	total:	1.44s	remaining:	1.07s
573:	learn:	10.1003639	total:	1.45s	remaining:	1.07s
574:	learn:	10.0957399	total:	1.45s	remaining:	1.07s
575:	learn:	10.0835943	total:	1.45s	remaining:	1.07s
576:	learn:	10.0499560	total:	1.45s	remaining:	1.06s
577:	learn:	10.0129085	total:	1.46s	remaining:	1.06s
578:	learn:	10.0038641	total:	1.46s	remaining:	1.06s
579:	learn:	9.9969468	total:	1.46s	remaining:	1.06s
580:	learn:	9.9881342	total:	1.46s	remaining:	1.05s
581:	learn:	9.9762774	total:	1.46s	remaining:	1.05s
582:	learn:	9.9387540	total:	1.47s	remaining:	1.05s
583:	learn:	9.9057174	total:	1.47s	remaining:	1.05s
584:	learn:	9.8657139	total:	1.47s	remaining:	1.04s
585:	learn:	9.8548394	total:	1.47s	remaining:	1.04s
586:	learn:	9.8429102	total:	1.48s	remaining:	1.04s
587:	learn:	9.8104509	total:	1.48s	remaining:	1.03s
588:	learn:	9.7825809	total:	1.48s	remaining:	1.03s
589:	learn:	9.7567681	total:	1.48s	remaining:	1.03s
590:	learn:	9.7532279	total:	1.48s	remaining:	1.03s
591:	learn:	9.7402666	total:	1.49s	remaining:	1.02s
592:	learn:	9.7300814	total:	1.49s	remaining:	1.02s
593:	learn:	9.7193912	total:	1.49s	remaining:	1.02s
594:	learn:	9.7128309	total:	1.49s	remaining:	1.02s
595:	learn:	9.7017776	total:	1.5s	remaining:	1.01s
596:	learn:	9.6968316	total:	1.5s	remaining:	1.01s
597:	learn:	9.6687949	total:	1.5s	remaining:	1.01s

598:	learn: 9.6650669	total: 1.5s	remaining: 1s
599:	learn: 9.6385319	total: 1.5s	remaining: 1s
600:	learn: 9.6299241	total: 1.51s	remaining: 1s
601:	learn: 9.6137466	total: 1.51s	remaining: 999ms
602:	learn: 9.5897126	total: 1.51s	remaining: 996ms
603:	learn: 9.5677396	total: 1.51s	remaining: 994ms
604:	learn: 9.5332435	total: 1.52s	remaining: 991ms
605:	learn: 9.5275410	total: 1.52s	remaining: 989ms
606:	learn: 9.5079423	total: 1.52s	remaining: 987ms
607:	learn: 9.4818367	total: 1.53s	remaining: 984ms
608:	learn: 9.4511022	total: 1.53s	remaining: 982ms
609:	learn: 9.4422025	total: 1.53s	remaining: 979ms
610:	learn: 9.4127871	total: 1.53s	remaining: 977ms
611:	learn: 9.4018539	total: 1.54s	remaining: 974ms
612:	learn: 9.3913573	total: 1.54s	remaining: 972ms
613:	learn: 9.3845530	total: 1.54s	remaining: 969ms
614:	learn: 9.3549912	total: 1.54s	remaining: 967ms
615:	learn: 9.3429093	total: 1.55s	remaining: 964ms
616:	learn: 9.3380271	total: 1.55s	remaining: 962ms
617:	learn: 9.3322898	total: 1.55s	remaining: 959ms
618:	learn: 9.2989255	total: 1.55s	remaining: 956ms
619:	learn: 9.2945668	total: 1.56s	remaining: 954ms
620:	learn: 9.2823956	total: 1.56s	remaining: 951ms
621:	learn: 9.2503693	total: 1.56s	remaining: 950ms
622:	learn: 9.2177988	total: 1.56s	remaining: 947ms
623:	learn: 9.2100367	total: 1.57s	remaining: 945ms
624:	learn: 9.2045651	total: 1.57s	remaining: 943ms
625:	learn: 9.1845652	total: 1.57s	remaining: 941ms
626:	learn: 9.1579437	total: 1.58s	remaining: 940ms
627:	learn: 9.1488814	total: 1.58s	remaining: 938ms
628:	learn: 9.1241190	total: 1.58s	remaining: 935ms
629:	learn: 9.1206147	total: 1.59s	remaining: 933ms
630:	learn: 9.0913621	total: 1.59s	remaining: 930ms
631:	learn: 9.0830965	total: 1.59s	remaining: 928ms
632:	learn: 9.0461117	total: 1.6s	remaining: 925ms
633:	learn: 9.0062987	total: 1.6s	remaining: 924ms
634:	learn: 8.9991364	total: 1.6s	remaining: 921ms
635:	learn: 8.9911451	total: 1.6s	remaining: 919ms
636:	learn: 8.9625240	total: 1.61s	remaining: 917ms
637:	learn: 8.9571425	total: 1.61s	remaining: 914ms
638:	learn: 8.9467651	total: 1.61s	remaining: 912ms
639:	learn: 8.9279017	total: 1.62s	remaining: 909ms
640:	learn: 8.9131832	total: 1.62s	remaining: 907ms
641:	learn: 8.9088874	total: 1.62s	remaining: 905ms
642:	learn: 8.9040727	total: 1.62s	remaining: 902ms
643:	learn: 8.8946796	total: 1.63s	remaining: 900ms
644:	learn: 8.8731213	total: 1.63s	remaining: 898ms
645:	learn: 8.8679420	total: 1.63s	remaining: 895ms
646:	learn: 8.8643182	total: 1.64s	remaining: 893ms
647:	learn: 8.8560668	total: 1.64s	remaining: 890ms
648:	learn: 8.8446127	total: 1.64s	remaining: 887ms
649:	learn: 8.8285130	total: 1.64s	remaining: 885ms
650:	learn: 8.8083187	total: 1.65s	remaining: 882ms
651:	learn: 8.7996059	total: 1.65s	remaining: 880ms
652:	learn: 8.7823211	total: 1.65s	remaining: 877ms
653:	learn: 8.7621217	total: 1.65s	remaining: 874ms
654:	learn: 8.7383698	total: 1.66s	remaining: 872ms
655:	learn: 8.7242911	total: 1.66s	remaining: 869ms
656:	learn: 8.7079417	total: 1.66s	remaining: 867ms
657:	learn: 8.6801181	total: 1.66s	remaining: 864ms
658:	learn: 8.6753854	total: 1.67s	remaining: 862ms
659:	learn: 8.6616677	total: 1.67s	remaining: 862ms
660:	learn: 8.6536614	total: 1.68s	remaining: 861ms
661:	learn: 8.6319071	total: 1.68s	remaining: 858ms
662:	learn: 8.6245569	total: 1.68s	remaining: 855ms
663:	learn: 8.6065200	total: 1.69s	remaining: 853ms
664:	learn: 8.5845101	total: 1.69s	remaining: 850ms
665:	learn: 8.5759687	total: 1.69s	remaining: 847ms
666:	learn: 8.5711205	total: 1.69s	remaining: 845ms
667:	learn: 8.5660881	total: 1.69s	remaining: 842ms
668:	learn: 8.5513237	total: 1.7s	remaining: 840ms
669:	learn: 8.5438376	total: 1.7s	remaining: 838ms
670:	learn: 8.5370285	total: 1.7s	remaining: 835ms
671:	learn: 8.5321112	total: 1.71s	remaining: 833ms
672:	learn: 8.5240578	total: 1.71s	remaining: 830ms
673:	learn: 8.5195284	total: 1.71s	remaining: 828ms
674:	learn: 8.5155236	total: 1.71s	remaining: 825ms
675:	learn: 8.5051426	total: 1.72s	remaining: 823ms
676:	learn: 8.4977697	total: 1.72s	remaining: 820ms
677:	learn: 8.4908668	total: 1.72s	remaining: 818ms
678:	learn: 8.4863751	total: 1.72s	remaining: 815ms
679:	learn: 8.4763667	total: 1.73s	remaining: 813ms
680:	learn: 8.4727973	total: 1.73s	remaining: 811ms
681:	learn: 8.4639011	total: 1.73s	remaining: 808ms
682:	learn: 8.4583430	total: 1.74s	remaining: 806ms
683:	learn: 8.4480283	total: 1.74s	remaining: 804ms
684:	learn: 8.4434482	total: 1.74s	remaining: 801ms
685:	learn: 8.4345459	total: 1.75s	remaining: 799ms
686:	learn: 8.4249341	total: 1.75s	remaining: 797ms

687:	learn: 8.4002435	total: 1.75s	remaining: 795ms
688:	learn: 8.3912201	total: 1.75s	remaining: 793ms
689:	learn: 8.3825619	total: 1.76s	remaining: 790ms
690:	learn: 8.3783921	total: 1.76s	remaining: 788ms
691:	learn: 8.3656888	total: 1.76s	remaining: 785ms
692:	learn: 8.3624805	total: 1.77s	remaining: 783ms
693:	learn: 8.3593775	total: 1.77s	remaining: 780ms
694:	learn: 8.3429842	total: 1.77s	remaining: 778ms
695:	learn: 8.3398095	total: 1.77s	remaining: 775ms
696:	learn: 8.3305986	total: 1.78s	remaining: 773ms
697:	learn: 8.3176370	total: 1.78s	remaining: 771ms
698:	learn: 8.3020973	total: 1.78s	remaining: 768ms
699:	learn: 8.2840858	total: 1.79s	remaining: 766ms
700:	learn: 8.2579906	total: 1.79s	remaining: 763ms
701:	learn: 8.2450670	total: 1.79s	remaining: 761ms
702:	learn: 8.2244085	total: 1.79s	remaining: 758ms
703:	learn: 8.2121038	total: 1.8s	remaining: 756ms
704:	learn: 8.1955921	total: 1.8s	remaining: 753ms
705:	learn: 8.1925478	total: 1.8s	remaining: 751ms
706:	learn: 8.1859630	total: 1.81s	remaining: 749ms
707:	learn: 8.1712931	total: 1.81s	remaining: 746ms
708:	learn: 8.1674591	total: 1.81s	remaining: 744ms
709:	learn: 8.1637280	total: 1.81s	remaining: 741ms
710:	learn: 8.1541857	total: 1.82s	remaining: 739ms
711:	learn: 8.1483511	total: 1.82s	remaining: 736ms
712:	learn: 8.1366541	total: 1.82s	remaining: 734ms
713:	learn: 8.1154482	total: 1.82s	remaining: 731ms
714:	learn: 8.0982227	total: 1.83s	remaining: 729ms
715:	learn: 8.0916886	total: 1.83s	remaining: 726ms
716:	learn: 8.0881439	total: 1.83s	remaining: 724ms
717:	learn: 8.0677599	total: 1.84s	remaining: 721ms
718:	learn: 8.0642869	total: 1.84s	remaining: 719ms
719:	learn: 8.0609662	total: 1.84s	remaining: 717ms
720:	learn: 8.0414050	total: 1.84s	remaining: 714ms
721:	learn: 8.0223258	total: 1.85s	remaining: 712ms
722:	learn: 8.0195169	total: 1.85s	remaining: 709ms
723:	learn: 8.0170509	total: 1.85s	remaining: 707ms
724:	learn: 8.0061238	total: 1.86s	remaining: 704ms
725:	learn: 7.9763610	total: 1.86s	remaining: 702ms
726:	learn: 7.9704995	total: 1.86s	remaining: 699ms
727:	learn: 7.9679343	total: 1.86s	remaining: 697ms
728:	learn: 7.9652646	total: 1.87s	remaining: 694ms
729:	learn: 7.9376764	total: 1.87s	remaining: 692ms
730:	learn: 7.9301559	total: 1.87s	remaining: 689ms
731:	learn: 7.8985843	total: 1.88s	remaining: 687ms
732:	learn: 7.8917322	total: 1.88s	remaining: 685ms
733:	learn: 7.8816936	total: 1.88s	remaining: 682ms
734:	learn: 7.8782847	total: 1.88s	remaining: 680ms
735:	learn: 7.8754009	total: 1.89s	remaining: 677ms
736:	learn: 7.8693539	total: 1.89s	remaining: 675ms
737:	learn: 7.8534687	total: 1.89s	remaining: 672ms
738:	learn: 7.8258473	total: 1.9s	remaining: 669ms
739:	learn: 7.8119776	total: 1.9s	remaining: 667ms
740:	learn: 7.7962885	total: 1.9s	remaining: 664ms
741:	learn: 7.7854761	total: 1.9s	remaining: 662ms
742:	learn: 7.7657551	total: 1.91s	remaining: 659ms
743:	learn: 7.7621226	total: 1.91s	remaining: 656ms
744:	learn: 7.7408797	total: 1.91s	remaining: 654ms
745:	learn: 7.7076213	total: 1.91s	remaining: 651ms
746:	learn: 7.6774058	total: 1.92s	remaining: 649ms
747:	learn: 7.6560491	total: 1.92s	remaining: 646ms
748:	learn: 7.6302995	total: 1.92s	remaining: 644ms
749:	learn: 7.6188008	total: 1.92s	remaining: 642ms
750:	learn: 7.6150268	total: 1.93s	remaining: 639ms
751:	learn: 7.6055555	total: 1.93s	remaining: 636ms
752:	learn: 7.5879418	total: 1.93s	remaining: 634ms
753:	learn: 7.5860297	total: 1.93s	remaining: 631ms
754:	learn: 7.5669500	total: 1.94s	remaining: 628ms
755:	learn: 7.5630836	total: 1.94s	remaining: 626ms
756:	learn: 7.5535598	total: 1.94s	remaining: 623ms
757:	learn: 7.5343513	total: 1.94s	remaining: 621ms
758:	learn: 7.5162298	total: 1.95s	remaining: 618ms
759:	learn: 7.5005624	total: 1.95s	remaining: 615ms
760:	learn: 7.4909392	total: 1.95s	remaining: 613ms
761:	learn: 7.4679911	total: 1.95s	remaining: 610ms
762:	learn: 7.4664171	total: 1.96s	remaining: 608ms
763:	learn: 7.4450568	total: 1.96s	remaining: 605ms
764:	learn: 7.4392530	total: 1.96s	remaining: 602ms
765:	learn: 7.4376507	total: 1.96s	remaining: 600ms
766:	learn: 7.4263759	total: 1.97s	remaining: 597ms
767:	learn: 7.4230900	total: 1.97s	remaining: 594ms
768:	learn: 7.4217997	total: 1.97s	remaining: 592ms
769:	learn: 7.4141625	total: 1.97s	remaining: 589ms
770:	learn: 7.4084271	total: 1.97s	remaining: 587ms
771:	learn: 7.3913066	total: 1.98s	remaining: 584ms
772:	learn: 7.3897381	total: 1.98s	remaining: 581ms
773:	learn: 7.3729485	total: 1.98s	remaining: 579ms
774:	learn: 7.3594942	total: 1.98s	remaining: 576ms
775:	learn: 7.3557770	total: 1.99s	remaining: 573ms

776:	learn: 7.3481016	total: 1.99s	remaining: 571ms
777:	learn: 7.3360575	total: 1.99s	remaining: 568ms
778:	learn: 7.3327867	total: 1.99s	remaining: 566ms
779:	learn: 7.3299657	total: 2s	remaining: 563ms
780:	learn: 7.3045337	total: 2s	remaining: 560ms
781:	learn: 7.3010843	total: 2s	remaining: 558ms
782:	learn: 7.2902445	total: 2s	remaining: 555ms
783:	learn: 7.2853380	total: 2s	remaining: 552ms
784:	learn: 7.2586993	total: 2.01s	remaining: 550ms
785:	learn: 7.2569916	total: 2.01s	remaining: 547ms
786:	learn: 7.2368009	total: 2.01s	remaining: 545ms
787:	learn: 7.2254676	total: 2.01s	remaining: 542ms
788:	learn: 7.2129466	total: 2.02s	remaining: 539ms
789:	learn: 7.2076142	total: 2.02s	remaining: 537ms
790:	learn: 7.2060833	total: 2.03s	remaining: 536ms
791:	learn: 7.1969690	total: 2.03s	remaining: 534ms
792:	learn: 7.1817085	total: 2.03s	remaining: 531ms
793:	learn: 7.1722485	total: 2.04s	remaining: 529ms
794:	learn: 7.1505678	total: 2.04s	remaining: 526ms
795:	learn: 7.1441995	total: 2.04s	remaining: 523ms
796:	learn: 7.1387929	total: 2.04s	remaining: 521ms
797:	learn: 7.1374804	total: 2.05s	remaining: 518ms
798:	learn: 7.1327384	total: 2.05s	remaining: 516ms
799:	learn: 7.1211547	total: 2.05s	remaining: 513ms
800:	learn: 7.1116756	total: 2.05s	remaining: 510ms
801:	learn: 7.1076052	total: 2.06s	remaining: 508ms
802:	learn: 7.0917415	total: 2.06s	remaining: 505ms
803:	learn: 7.0831005	total: 2.06s	remaining: 503ms
804:	learn: 7.0811264	total: 2.06s	remaining: 500ms
805:	learn: 7.0755663	total: 2.07s	remaining: 497ms
806:	learn: 7.0654320	total: 2.07s	remaining: 495ms
807:	learn: 7.0476369	total: 2.07s	remaining: 492ms
808:	learn: 7.0458906	total: 2.07s	remaining: 490ms
809:	learn: 7.0381730	total: 2.08s	remaining: 487ms
810:	learn: 7.0297951	total: 2.08s	remaining: 484ms
811:	learn: 7.0249866	total: 2.08s	remaining: 482ms
812:	learn: 7.0166860	total: 2.08s	remaining: 479ms
813:	learn: 7.0085347	total: 2.09s	remaining: 477ms
814:	learn: 7.0072029	total: 2.09s	remaining: 474ms
815:	learn: 7.0057702	total: 2.09s	remaining: 472ms
816:	learn: 7.0003784	total: 2.1s	remaining: 470ms
817:	learn: 6.9829018	total: 2.1s	remaining: 467ms
818:	learn: 6.9589385	total: 2.1s	remaining: 465ms
819:	learn: 6.9554592	total: 2.1s	remaining: 462ms
820:	learn: 6.9393097	total: 2.11s	remaining: 459ms
821:	learn: 6.9349333	total: 2.11s	remaining: 457ms
822:	learn: 6.9333002	total: 2.11s	remaining: 454ms
823:	learn: 6.9296061	total: 2.11s	remaining: 452ms
824:	learn: 6.9054023	total: 2.12s	remaining: 449ms
825:	learn: 6.9027671	total: 2.12s	remaining: 446ms
826:	learn: 6.8859980	total: 2.12s	remaining: 444ms
827:	learn: 6.8797723	total: 2.12s	remaining: 441ms
828:	learn: 6.8568615	total: 2.13s	remaining: 439ms
829:	learn: 6.8517488	total: 2.13s	remaining: 436ms
830:	learn: 6.8494085	total: 2.13s	remaining: 433ms
831:	learn: 6.8473721	total: 2.13s	remaining: 431ms
832:	learn: 6.8332440	total: 2.14s	remaining: 428ms
833:	learn: 6.8262587	total: 2.14s	remaining: 426ms
834:	learn: 6.8225576	total: 2.14s	remaining: 423ms
835:	learn: 6.8061416	total: 2.14s	remaining: 420ms
836:	learn: 6.7942431	total: 2.15s	remaining: 418ms
837:	learn: 6.7922632	total: 2.15s	remaining: 415ms
838:	learn: 6.7840825	total: 2.15s	remaining: 412ms
839:	learn: 6.7764897	total: 2.15s	remaining: 410ms
840:	learn: 6.7584823	total: 2.15s	remaining: 407ms
841:	learn: 6.7571855	total: 2.16s	remaining: 405ms
842:	learn: 6.7537366	total: 2.16s	remaining: 402ms
843:	learn: 6.7395650	total: 2.16s	remaining: 400ms
844:	learn: 6.7234270	total: 2.16s	remaining: 397ms
845:	learn: 6.7158786	total: 2.17s	remaining: 394ms
846:	learn: 6.7037853	total: 2.17s	remaining: 392ms
847:	learn: 6.6896742	total: 2.17s	remaining: 389ms
848:	learn: 6.6885256	total: 2.17s	remaining: 387ms
849:	learn: 6.6811476	total: 2.18s	remaining: 384ms
850:	learn: 6.6623418	total: 2.18s	remaining: 381ms
851:	learn: 6.6579455	total: 2.18s	remaining: 379ms
852:	learn: 6.6500746	total: 2.18s	remaining: 376ms
853:	learn: 6.6323479	total: 2.18s	remaining: 374ms
854:	learn: 6.6310366	total: 2.19s	remaining: 371ms
855:	learn: 6.6299605	total: 2.19s	remaining: 368ms
856:	learn: 6.6265720	total: 2.19s	remaining: 366ms
857:	learn: 6.6204539	total: 2.19s	remaining: 363ms
858:	learn: 6.6171362	total: 2.2s	remaining: 361ms
859:	learn: 6.6143090	total: 2.2s	remaining: 358ms
860:	learn: 6.6112468	total: 2.2s	remaining: 355ms
861:	learn: 6.5970195	total: 2.2s	remaining: 353ms
862:	learn: 6.5852775	total: 2.21s	remaining: 350ms
863:	learn: 6.5810157	total: 2.21s	remaining: 348ms
864:	learn: 6.5785732	total: 2.21s	remaining: 345ms

865:	learn: 6.5719912	total: 2.21s	remaining: 342ms
866:	learn: 6.5704815	total: 2.21s	remaining: 340ms
867:	learn: 6.5695613	total: 2.22s	remaining: 337ms
868:	learn: 6.5686422	total: 2.22s	remaining: 335ms
869:	learn: 6.5675031	total: 2.22s	remaining: 332ms
870:	learn: 6.5549914	total: 2.23s	remaining: 330ms
871:	learn: 6.5345645	total: 2.23s	remaining: 327ms
872:	learn: 6.5203266	total: 2.23s	remaining: 325ms
873:	learn: 6.5166164	total: 2.23s	remaining: 322ms
874:	learn: 6.4970232	total: 2.24s	remaining: 320ms
875:	learn: 6.4839126	total: 2.24s	remaining: 317ms
876:	learn: 6.4799369	total: 2.24s	remaining: 314ms
877:	learn: 6.4763532	total: 2.24s	remaining: 312ms
878:	learn: 6.4624066	total: 2.25s	remaining: 309ms
879:	learn: 6.4559885	total: 2.25s	remaining: 307ms
880:	learn: 6.4499976	total: 2.25s	remaining: 304ms
881:	learn: 6.4316628	total: 2.25s	remaining: 302ms
882:	learn: 6.4146669	total: 2.26s	remaining: 299ms
883:	learn: 6.4137265	total: 2.26s	remaining: 296ms
884:	learn: 6.3913308	total: 2.26s	remaining: 294ms
885:	learn: 6.3873365	total: 2.26s	remaining: 291ms
886:	learn: 6.3813734	total: 2.27s	remaining: 289ms
887:	learn: 6.3784502	total: 2.27s	remaining: 286ms
888:	learn: 6.3653022	total: 2.27s	remaining: 284ms
889:	learn: 6.3575746	total: 2.28s	remaining: 281ms
890:	learn: 6.3386584	total: 2.28s	remaining: 279ms
891:	learn: 6.3200099	total: 2.28s	remaining: 276ms
892:	learn: 6.3096410	total: 2.28s	remaining: 274ms
893:	learn: 6.3016415	total: 2.29s	remaining: 271ms
894:	learn: 6.2863738	total: 2.29s	remaining: 268ms
895:	learn: 6.2809093	total: 2.29s	remaining: 266ms
896:	learn: 6.2729163	total: 2.29s	remaining: 263ms
897:	learn: 6.2706097	total: 2.29s	remaining: 261ms
898:	learn: 6.2651416	total: 2.3s	remaining: 258ms
899:	learn: 6.2593152	total: 2.3s	remaining: 256ms
900:	learn: 6.2568695	total: 2.3s	remaining: 253ms
901:	learn: 6.2446617	total: 2.31s	remaining: 250ms
902:	learn: 6.2267563	total: 2.31s	remaining: 248ms
903:	learn: 6.2231765	total: 2.31s	remaining: 245ms
904:	learn: 6.2142745	total: 2.31s	remaining: 243ms
905:	learn: 6.2132585	total: 2.31s	remaining: 240ms
906:	learn: 6.2119403	total: 2.32s	remaining: 238ms
907:	learn: 6.1951540	total: 2.32s	remaining: 235ms
908:	learn: 6.1864144	total: 2.32s	remaining: 232ms
909:	learn: 6.1677927	total: 2.32s	remaining: 230ms
910:	learn: 6.1613157	total: 2.33s	remaining: 227ms
911:	learn: 6.1551130	total: 2.33s	remaining: 225ms
912:	learn: 6.1490669	total: 2.33s	remaining: 222ms
913:	learn: 6.1402776	total: 2.33s	remaining: 219ms
914:	learn: 6.1271366	total: 2.33s	remaining: 217ms
915:	learn: 6.1247260	total: 2.34s	remaining: 214ms
916:	learn: 6.1119904	total: 2.34s	remaining: 212ms
917:	learn: 6.1067104	total: 2.34s	remaining: 209ms
918:	learn: 6.1005895	total: 2.34s	remaining: 207ms
919:	learn: 6.0995636	total: 2.35s	remaining: 204ms
920:	learn: 6.0928463	total: 2.35s	remaining: 201ms
921:	learn: 6.0882730	total: 2.35s	remaining: 199ms
922:	learn: 6.0850848	total: 2.35s	remaining: 196ms
923:	learn: 6.0670880	total: 2.35s	remaining: 194ms
924:	learn: 6.0530842	total: 2.36s	remaining: 191ms
925:	learn: 6.0439657	total: 2.36s	remaining: 189ms
926:	learn: 6.0429485	total: 2.36s	remaining: 186ms
927:	learn: 6.0377123	total: 2.36s	remaining: 183ms
928:	learn: 6.0257382	total: 2.37s	remaining: 181ms
929:	learn: 6.0185189	total: 2.37s	remaining: 178ms
930:	learn: 6.0169520	total: 2.37s	remaining: 176ms
931:	learn: 6.0037228	total: 2.37s	remaining: 173ms
932:	learn: 5.9985771	total: 2.38s	remaining: 171ms
933:	learn: 5.9845821	total: 2.38s	remaining: 168ms
934:	learn: 5.9801610	total: 2.38s	remaining: 166ms
935:	learn: 5.9673358	total: 2.38s	remaining: 163ms
936:	learn: 5.9587798	total: 2.38s	remaining: 160ms
937:	learn: 5.9492453	total: 2.39s	remaining: 158ms
938:	learn: 5.9439301	total: 2.39s	remaining: 155ms
939:	learn: 5.9338963	total: 2.39s	remaining: 153ms
940:	learn: 5.9311676	total: 2.39s	remaining: 150ms
941:	learn: 5.9287865	total: 2.4s	remaining: 148ms
942:	learn: 5.9268032	total: 2.4s	remaining: 145ms
943:	learn: 5.9174714	total: 2.4s	remaining: 143ms
944:	learn: 5.9118526	total: 2.4s	remaining: 140ms
945:	learn: 5.9053561	total: 2.41s	remaining: 137ms
946:	learn: 5.8898230	total: 2.41s	remaining: 135ms
947:	learn: 5.8856644	total: 2.41s	remaining: 132ms
948:	learn: 5.8803306	total: 2.41s	remaining: 130ms
949:	learn: 5.8737350	total: 2.42s	remaining: 127ms
950:	learn: 5.8706281	total: 2.42s	remaining: 125ms
951:	learn: 5.8544766	total: 2.42s	remaining: 122ms
952:	learn: 5.8389862	total: 2.42s	remaining: 120ms
953:	learn: 5.8267130	total: 2.43s	remaining: 117ms

```

954: learn: 5.8217580      total: 2.43s   remaining: 114ms
955: learn: 5.8077134      total: 2.43s   remaining: 112ms
956: learn: 5.8019392      total: 2.43s   remaining: 109ms
957: learn: 5.7897451      total: 2.44s   remaining: 107ms
958: learn: 5.7728414      total: 2.44s   remaining: 104ms
959: learn: 5.7691254      total: 2.44s   remaining: 102ms
960: learn: 5.7625293      total: 2.44s   remaining: 99.3ms
961: learn: 5.7608597      total: 2.45s   remaining: 96.8ms
962: learn: 5.7531612      total: 2.45s   remaining: 94.3ms
963: learn: 5.7478464      total: 2.46s   remaining: 91.7ms
964: learn: 5.7407112      total: 2.46s   remaining: 89.2ms
965: learn: 5.7358469      total: 2.46s   remaining: 86.6ms
966: learn: 5.7223195      total: 2.46s   remaining: 84.1ms
967: learn: 5.7188396      total: 2.47s   remaining: 81.6ms
968: learn: 5.7123524      total: 2.47s   remaining: 79ms
969: learn: 5.7061282      total: 2.47s   remaining: 76.4ms
970: learn: 5.6954583      total: 2.47s   remaining: 73.9ms
971: learn: 5.6925507      total: 2.48s   remaining: 71.4ms
972: learn: 5.6848697      total: 2.48s   remaining: 68.8ms
973: learn: 5.6735097      total: 2.48s   remaining: 66.3ms
974: learn: 5.6691825      total: 2.48s   remaining: 63.7ms
975: learn: 5.6604410      total: 2.49s   remaining: 61.2ms
976: learn: 5.6546128      total: 2.49s   remaining: 58.6ms
977: learn: 5.6505795      total: 2.49s   remaining: 56.1ms
978: learn: 5.6454318      total: 2.5s     remaining: 53.5ms
979: learn: 5.6380357      total: 2.5s     remaining: 51ms
980: learn: 5.6271931      total: 2.5s     remaining: 48.4ms
981: learn: 5.6193838      total: 2.5s     remaining: 45.9ms
982: learn: 5.6183518      total: 2.5s     remaining: 43.3ms
983: learn: 5.6096067      total: 2.51s     remaining: 40.8ms
984: learn: 5.6054620      total: 2.51s     remaining: 38.2ms
985: learn: 5.6030270      total: 2.51s     remaining: 35.7ms
986: learn: 5.5964393      total: 2.52s     remaining: 33.1ms
987: learn: 5.5893599      total: 2.52s     remaining: 30.6ms
988: learn: 5.5787165      total: 2.52s     remaining: 28ms
989: learn: 5.5756448      total: 2.52s     remaining: 25.5ms
990: learn: 5.5709130      total: 2.52s     remaining: 22.9ms
991: learn: 5.5668314      total: 2.53s     remaining: 20.4ms
992: learn: 5.5595141      total: 2.53s     remaining: 17.8ms
993: learn: 5.5417124      total: 2.53s     remaining: 15.3ms
994: learn: 5.5337983      total: 2.53s     remaining: 12.7ms
995: learn: 5.5247630      total: 2.54s     remaining: 10.2ms
996: learn: 5.5201147      total: 2.54s     remaining: 7.64ms
997: learn: 5.5137698      total: 2.54s     remaining: 5.09ms
998: learn: 5.5106445      total: 2.54s     remaining: 2.55ms
999: learn: 5.5073092      total: 2.55s     remaining: 0ms

```

```
Out[53]: <catboost.core.CatBoostRegressor at 0x22aaa7d2940>
```

```
In [54]: #Using gradientboosting regression
gradientBoost=GradientBoostingRegressor()
gradientBoost
```

```
Out[54]: GradientBoostingRegressor()
```

```
In [55]: X_col= X_train.columns
X_col
```

```
Out[55]: Index(['Year', 'Malaria_cases_reported',
               'Use_o_insecticide-treated bed nets (% of under-5 population)',
               'Children with fever receiving antimalarial drugs (% of children under age 5 with fever)',
               'Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women)',
               'People using safely managed drinking water services (% of population)',
               'People using safely managed drinking water services, rural (% of rural population)',
               'People using safely managed drinking water services, urban (% of urban population)',
               'People using safely managed sanitation services (% of population)',
               'People using safely managed sanitation services, rural (% of rural population)',
               'People using safely managed sanitation services, urban (% of urban population)',
               'Rural population (% of total population)',
               'Rural population growth (annual %)',
               'Urban population (% of total population)',
               'Urban population growth (annual %)',
               'People using at least basic drinking water services (% of population)',
               'People using at least basic drinking water services, rural (% of rural population)',
               'People using at least basic drinking water services, urban (% of urban population)',
               'People using at least basic sanitation services (% of population)',
               'People using at least basic sanitation services, rural (% of rural population)',
               'People using at least basic sanitation services, urban (% of urban population)',
               'latitude', 'longitude', 'Country_Name', 'Country_Code', 'geometry'],
              dtype='object')
```

```
In [56]: gbr=gradientBoost.fit(X_train,y_train)
gbr
```

```
Out[56]: GradientBoostingRegressor()
```

```
In [57]: preds=pd.DataFrame(y_test)
preds
```

Out[57]: Incidence_of_malaria_(per 1,000 population at risk)

441	167.28
325	180.90
541	228.91
463	391.83
268	186.70
...	...
142	0.00
175	469.27
251	389.92
128	145.95
160	172.00

173 rows × 1 columns

```
In [59]: y_pred=gbr.predict(X_test)
md=pd.DataFrame({'Predicted':y_pred,'actual_values':y_test})
md
```

Out[59]: Predicted actual_values

441	188.015372	167.28
325	213.346017	180.90
541	227.458043	228.91
463	362.250544	391.83
268	193.052457	186.70
...
142	22.845992	0.00
175	361.391458	469.27
251	350.381379	389.92
128	145.390164	145.95
160	236.333382	172.00

173 rows × 2 columns

```
In [61]: pred=[]
for i in range(0,len(X_col)):
    a= float(input(f'Enter {X_col[i]}:'))
    pred.append(a)
print(pred)
```

```
Enter Year:2019
Enter Malaria_cases_reported:3445.667
Enter Use_o_insecticide-treated bed nets (% of under-5 population):2355.67
Enter Children_with_fever_receiving_antimalarial_drugs (% of children under age 5 with fever):28945
Enter Intermittent preventive treatment (IPT) of malaria in pregnancy (% of pregnant women):34
Enter People using safely managed drinking water services (% of population):56
Enter People using safely managed drinking water services, rural (% of rural population):345
Enter People using safely managed drinking water services, urban (% of urban population):456
Enter People using safely managed sanitation services (% of population):234
Enter People using safely managed sanitation services, rural (% of rural population):6
Enter People using safely managed sanitation services, urban (% of urban population):43
Enter Rural population (% of total population):56765
Enter Rural population growth (annual %):23445
Enter Urban population (% of total population):234
Enter Urban population growth (annual %):345678
Enter People using at least basic drinking water services (% of population):23445
Enter People using at least basic drinking water services, rural (% of rural population):234566
Enter People using at least basic drinking water services, urban (% of urban population):233945
Enter People using at least basic sanitation services (% of population):3344
Enter People using at least basic sanitation services, rural (% of rural population):23
Enter People using at least basic sanitation services, urban (% of urban population):345
Enter latitude:34
Enter longitude:3
Enter Country_Name:2
Enter Country_Code:3
Enter geometry:234
[2019.0, 3445.667, 2355.67, 28945.0, 34.0, 56.0, 345.0, 456.0, 234.0, 6.0, 43.0, 56765.0, 23445.0, 234.0, 34567
8.0, 23445.0, 234566.0, 233945.0, 3344.0, 23.0, 345.0, 34.0, 3.0, 2.0, 3.0, 234.0]
```

```
In [62]: prd=cb.predict([pred])
print(f'Incidence_of_malaria_(per 1,000 population at risk) will be {prd}')
```

Incidence_of_malaria_(per 1,000 population at risk) will be [187.03988585]

In []:

In []: