Analysis_relg

November 29, 2021

1 Analysis

In this notebook we will take the data from the *Ego networks* notebook and make an analysis with the three different methods: a multinomial logistic model, a random forest method an an artificial neural network. First, we will load the data, we will check for outliers and then we will prepare and format the predictors in order to apply each one of these methods. The first step is loading the libraries, in this case we will use the standard numpy, pandas, matplotlib and seaborn for manipulating and plotting the data. In order to apply the different techniques of analysis, we will use sklearn, statsmodels and tensorflow.

Religion variable

The religion variable is divided in three big subgroups: christians, muslims and others. Agents are characterized by :

-Structural variables: the ones we have used in the nationality case: average degree, closeness, betweenness, load centrality, size of the largest component, degree assortativity.

-Assortativity variables: Probability of attachment between two agents that share a node attribute. If the assortative is positive, there is homophily around that attribute. If negative, preferential attachment goes towards people with a different attribute. If zero, there is no correlation.

We will represent all the results from the previous notebooks with these new variables.

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
# Sklearn
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split, cross_validate,␣
↪cross_val_predict
from sklearn.metrics import classification_report, confusion_matrix,␣
↪accuracy_score
from sklearn.dummy import DummyClassifier
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import GridSearchCV
# Statsmodels
import statsmodels.formula.api as smf
from statsmodels.api import MNLogit
```

```
# Just to print prettier. Uncomment to see all (not important) warnings
import warnings
warnings.filterwarnings('ignore')

%matplotlib inline
```

1.1 Load data

The next step is loading the .csv file from the previous notebook. Then we will select the columns we will use for the analysis, as the notebook contains a lot of information of the egos not related to the structural properties of their networks. Then we will map the categorical columns to a numerical encoding in the columns of : *Subject origin*, *Subject residence*, and *Regime*. This does not make a difference in the religion case, as the assortativity variables included are float numbers.

[2]:
```
#Include variable to analyze
def include_variable(variable,cutoff):
    df[variable] = df_2[variable].copy()
    count_variable = pd.get_dummies(df[variable]).sum()
    df[variable] = df[variable].apply(lambda x: 0 if (count_variable[x] <␣
 ↪cutoff) else x)
    dic_variable = dict(zip(list(np.sort(df[variable].
 ↪unique())),range(1,1+len(list(count_variable)))))
    df.replace(dic_variable,inplace = True)
    return df
```

[3]:
```
### Read data
df_2 = pd.read_csv('Redes_2_relg.csv')
### Drop Unnecessary Variables
df_2.drop('Unnamed: 0',axis=1, inplace=True)
df_2.columns = df_2.columns.str.replace("/","_")
###Take the necessary ones
df = df_2[df_2.columns[0:26]]
#df.drop(["EGOFIRST","EGOLAST"],inplace=True)
###Control variables
include_variable("EDUC",cutoff = 10)
include_variable("FMIG2",cutoff = 10)
include_variable("SEX",cutoff = 10)
###Analysis variables
analysis_variable = "RELG"
include_variable(analysis_variable,cutoff = 10)
###
####Structural variables: Subject_origin(homophily required),RELG,WREC,VEU,
###Not structural(at least without homophily): HEA, EMP,SEX,EDUC,REAS,RACE
###
```

```
### The numerical encoding
not_apply = ['Subject_origin','Subject_residence','Regime']
diccs = [0]*len(not_apply)
i = 0
for col in not_apply:
        uniques = list(df[col].unique())
        diccs[i] = {uniques[j]:uniques.index(uniques[j]) for j in␣
 ↪range(len(uniques)) }
        df[col] = df[col].map(diccs[i])
        i+=1

### Reset the datatype of the columns
df['Subject_origin'].astype('int64')
df['Subject_residence'].astype('int64')
df['EDUC'].astype('int64')
df['FMIG2'].astype('int64')
df['SEX'].astype('int64')
df['RELG'].astype('int64')
df['Regime'].astype('int64')
```

[3]:
```
0      0
1      0
2      1
3      0
4      2
      ..
468    2
469    2
470    2
471    2
472    0
Name: Regime, Length: 473, dtype: int64
```

1.2 Prepare and explore data

We make an overview of the main statistics of the data and the properties we have generated in the past notebook.

[4]:
```
df.describe(include='all')
```

[4]:
```
       Subject_origin  Subject_residence          Mu      Regime  \
count      473.000000         473.000000  473.000000  473.000000
mean         4.997886           0.596195   -0.726257    0.909091
std          2.781978           0.491179   13.526373    0.917221
min          0.000000           0.000000 -294.081935    0.000000
25%          2.000000           0.000000   -0.299994    0.000000
50%          5.000000           1.000000   -0.111711    1.000000
```

```
75%          8.000000           1.000000    0.111711    2.000000
max          9.000000           1.000000    2.302179    2.000000

       Average_degree  Betweenness   Closeness  Load_centrality  \
count      473.000000   473.000000  473.000000       473.000000
mean        23.907158     0.044918    1.127356         0.044493
std         13.602032     0.240131    1.005029         0.240201
min          2.628571     0.000163    0.130665         0.000070
25%         12.648649     0.007400    0.532497         0.006155
50%         19.066667     0.014181    0.632030         0.014094
75%         40.666667     0.021167    0.938077         0.021167
max         44.000000     2.000000    3.000000         2.000000

       Assortativity  Clustering  …  alter_origin  alter_residence  \
count     473.000000  473.000000  …    473.000000       473.000000
mean       -0.022917    0.645168  …      0.006906        -0.007034
std         0.231357    0.199511  …      0.534662         0.641897
min        -2.000000    0.206979  …     -2.000000        -2.000000
25%        -0.136488    0.506595  …     -0.022727        -0.022727
50%        -0.022727    0.661885  …      0.008609         0.042900
75%         0.018041    0.771862  …      0.205836         0.303908
max         0.974478    3.000000  …      3.000000         0.985396

             Clos        Asmo        Arac        Asex        EDUC       FMIG2  \
count  473.000000  473.000000  473.000000  473.000000  473.000000  473.000000
mean     0.000217   -0.088291   -0.148900   -0.009537    5.255814    2.336152
std      0.151908    0.417944    0.593169    0.149704    1.153519    1.962332
min     -2.000000   -2.000000   -2.000000   -2.000000    2.000000    1.000000
25%     -0.023999   -0.032954   -0.037886   -0.029268    4.000000    1.000000
50%     -0.021824   -0.022727   -0.022727   -0.022727    5.000000    1.000000
75%      0.023625    0.006434    0.004354    0.013147    6.000000    4.000000
max      0.486955    0.496721    3.000000    0.597828    7.000000    8.000000

              SEX         RELG
count  473.000000  473.000000
mean     1.448203    2.080338
std      0.497836    0.665345
min      1.000000    1.000000
25%      1.000000    2.000000
50%      1.000000    2.000000
75%      2.000000    3.000000
max      2.000000    3.000000

[8 rows x 30 columns]
```

Some values of `mu` are way out of range (min = -294). This is clearly from divergences in the model. We mark observations greater than 10 (in absolute value) as `nan`

[5]:
```
### Clean estimates for mu
df['Mu'] = df['Mu'].apply(lambda x: np.nan if x < -100 else x)
df['Mu'] = df['Mu'].apply(lambda x: np.nan if x > 100 else x)
### Check how many values have this problems
df.isnull().sum()
```

[5]:
```
Subject_origin            0
Subject_residence         0
Mu                        1
Regime                    0
Average_degree            0
Betweenness               0
Closeness                 0
Load_centrality           0
Assortativity             0
Clustering                0
Number_components         0
Size_largest_component    0
Closeness_residence       0
Number_residence          0
Closeness_origin          0
Number_origin             0
Afrq                      0
Aol2                      0
Apro                      0
Arel                      0
alter_origin              0
alter_residence           0
Clos                      0
Asmo                      0
Arac                      0
Asex                      0
EDUC                      0
FMIG2                     0
SEX                       0
RELG                      0
dtype: int64
```

We simply remove the observation having a nan (more sophisticated approaches could be done, as replacing its value with the median `mu` of the individuals in his same class)

[6]:
```
df.dropna(inplace = True)
#sns.pairplot(df,hue="SEX")
```

1.2.1 *Notes*

Interesting sigmoid relationship closeness origin ~ mu

Presence of severe collinearities in the data (this may cause numeric problems in linear models)

The conditional distributions show clear differences in some of the variables (Number origin, Average degree, clustering)

1.3 Group some nationalities in others group

We keep only classes with more than 50 observations. The rest of the classes will be considered as one called "others" .

There is no need to make it with the religion variable, as we have done it in the clean.py file.

[7]:
```
# There are few data on several Origins
count_origins = pd.get_dummies(df['Subject_origin']).sum()
t = 50 # threshold
df['Subject_origin'] = df['Subject_origin'].apply(lambda x: 10 if␣
 ↪(count_origins[x] < t) else x)
#pd.get_dummies(df['Subject_origin']).sum()
```

[8]:
```
### This is just to translate the encoding to the first five integers
dicc_traslation = {10:0,2:1,5:2,6:3,8:4,9:5}
dicc_final = {0:"Other",1:"Dominican",2:"PuertoRican",3:"Argentinean",4:
 ↪"Moroccan",5:"Senegambian"}
df['Subject_origin'] = df['Subject_origin'].map(dicc_traslation)
```

2 INFERENCE

At this point, we begin to include tools of inference, beginning by the multinomial logistic regression (MLN). The library used for this analysis is mainly *statsmodels* and the main function can be checked in this link: https://stats.idre.ucla.edu/stata/dae/multinomiallogistic-regression/

In this part of the notebook we will prepare the variables, execute the regression and save the results.

Comments related to the religion variable are similar to the nationality case, with the update on predictors.

[9]:
```
print('List of variables in data. The target is Subject_origin')
list(df.columns)
```

```
List of variables in data. The target is Subject_origin
```

[9]:
```
['Subject_origin',
 'Subject_residence',
 'Mu',
 'Regime',
 'Average_degree',
 'Betweenness',
 'Closeness',
```

```
 'Load_centrality',
 'Assortativity',
 'Clustering',
 'Number_components',
 'Size_largest_component',
 'Closeness_residence',
 'Number_residence',
 'Closeness_origin',
 'Number_origin',
 'Afrq',
 'Aol2',
 'Apro',
 'Arel',
 'alter_origin',
 'alter_residence',
 'Clos',
 'Asmo',
 'Arac',
 'Asex',
 'EDUC',
 'FMIG2',
 'SEX',
 'RELG']
```

Note: For model selection it is important to know how to justify the predictors we use. So far, I have used a somewhat ad-hoc selection. Using all predictors causes numerical errors (most likely due to collinearity). What we did was removing some until I got a model with interesting variables and no numerical errors.

[10]:
```
#predictors =␣
 ↪['Closeness','Closeness_residence','Closeness_origin','Clustering','Mu','Average_degree',
#              'Assortativity','Betweenness']
predictors = ['Mu', 'Average_degree','Betweenness', 'Closeness',␣
 ↪'Assortativity','Clustering',
       'Closeness_residence', 'Closeness_origin',
         'Afrq', 'Aol2', 'Apro', 'Arel', 'Clos', 'Arac', 'Asex'
             ]

predictors = list(df.columns)
predictors.remove(analysis_variable)
predictors.remove("Subject_origin")
predictors.remove("Subject_residence")
#predictors
```

2.0.1 Fit Multinomial Logistic Model

Note that 1 = Other , 2 = Christian , 3 = Muslim

https://www.statsmodels.org/stable/generated/statsmodels.discrete.discrete_model.MNLogit.html

[11]:
```
### Uses the list 'predictors' as independent variables
formula_predictors = ' + '.join(predictors)
model_variable = analysis_variable + "~ {}"
model = MNLogit.from_formula(model_variable.format(formula_predictors), df)
results = model.fit(maxiter=200)
```

```
Optimization terminated successfully.
         Current function value: 0.751844
         Iterations 9
```

Results

[12]:
```
print(results.summary())
```

```
                          MNLogit Regression Results
==============================================================================
Dep. Variable:                   RELG   No. Observations:                  472
Model:                        MNLogit   Df Residuals:                      416
Method:                           MLE   Df Model:                           54
Date:                Mon, 29 Nov 2021   Pseudo R-squ.:                  0.2409
Time:                        17:54:39   Log-Likelihood:                -354.87
converged:                       True   LL-Null:                       -467.51
Covariance Type:            nonrobust   LLR p-value:                 8.582e-23
==============================================================================
==========
                RELG=2       coef    std err          z      P>|z|      [0.025
0.975]
------------------------------------------------------------------------------
----------
Intercept                -2.8285      4.658     -0.607      0.544     -11.959
6.302
Mu                       -0.1046      0.391     -0.267      0.789      -0.872
0.663
Regime                   -0.1070      0.171     -0.627      0.530      -0.441
0.227
Average_degree            0.0193      0.029      0.657      0.511      -0.038
0.077
Betweenness              84.0570    116.653      0.721      0.471    -144.578
312.692
Closeness                -0.3583      0.402     -0.891      0.373      -1.147
0.430
Load_centrality         -83.6208    116.528     -0.718      0.473    -312.011
144.770
Assortativity             0.5226      0.788      0.663      0.507      -1.022
2.067
Clustering               -0.0994      0.978     -0.102      0.919      -2.017
1.818
```

```
Number_components          0.7524      0.957      0.786      0.432      -1.123
2.628
Size_largest_component     0.5139      0.555      0.926      0.355      -0.574
1.602
Closeness_residence       -0.1038      0.107     -0.971      0.331      -0.313
0.106
Number_residence           0.0017      0.019      0.086      0.932      -0.036
0.040
Closeness_origin          -0.2961      0.113     -2.613      0.009      -0.518
-0.074
Number_origin              0.0424      0.018      2.345      0.019       0.007
0.078
Afrq                      -2.3487      2.335     -1.006      0.314      -6.925
2.227
Aol2                      -2.4952      3.045     -0.819      0.413      -8.464
3.473
Apro                      -4.9584      1.763     -2.813      0.005      -8.414
-1.503
Arel                       0.4866      1.571      0.310      0.757      -2.593
3.567
alter_origin               0.3970      0.428      0.927      0.354      -0.442
1.236
alter_residence            0.1730      0.208      0.833      0.405      -0.234
0.580
Clos                       4.2523      2.057      2.067      0.039       0.220
8.285
Asmo                      -0.7034      0.555     -1.266      0.205      -1.792
0.385
Arac                      -0.1792      0.307     -0.583      0.560      -0.782
0.423
Asex                      -0.5066      1.572     -0.322      0.747      -3.587
2.574
EDUC                       0.0049      0.135      0.036      0.971      -0.260
0.269
FMIG2                     -0.0257      0.086     -0.299      0.765      -0.194
0.142
SEX                        0.2284      0.284      0.805      0.421      -0.328
0.784
------------------------------------------------------------------------------
----------
                RELG=3       coef    std err          z      P>|z|      [0.025
0.975]
------------------------------------------------------------------------------
----------
Intercept                 -1.8335      5.355     -0.342      0.732     -12.329
8.662
Mu                         0.0051      0.443      0.012      0.991      -0.863
0.874
```

Regime	0.0130	0.221	0.059	0.953	-0.420
0.446					
Average_degree	0.0654	0.035	1.857	0.063	-0.004
0.135					
Betweenness	70.6449	240.619	0.294	0.769	-400.960
542.250					
Closeness	-1.7356	0.616	-2.817	0.005	-2.943
-0.528					
Load_centrality	-69.2551	240.443	-0.288	0.773	-540.516
402.005					
Assortativity	0.6618	0.923	0.717	0.473	-1.147
2.470					
Clustering	-0.4162	1.372	-0.303	0.762	-3.105
2.272					
Number_components	0.3979	1.061	0.375	0.708	-1.681
2.477					
Size_largest_component	0.3399	0.640	0.531	0.596	-0.915
1.595					
Closeness_residence	-0.1483	0.125	-1.190	0.234	-0.393
0.096					
Number_residence	0.0778	0.037	2.083	0.037	0.005
0.151					
Closeness_origin	-0.4562	0.182	-2.502	0.012	-0.814
-0.099					
Number_origin	0.1217	0.032	3.855	0.000	0.060
0.184					
Afrq	2.9705	2.730	1.088	0.277	-2.381
8.322					
Aol2	-10.9473	4.377	-2.501	0.012	-19.526
-2.369					
Apro	-4.4932	1.878	-2.393	0.017	-8.173
-0.813					
Arel	-2.0520	1.943	-1.056	0.291	-5.861
1.757					
alter_origin	0.7741	0.484	1.598	0.110	-0.175
1.723					
alter_residence	-0.1583	0.331	-0.478	0.633	-0.808
0.491					
Clos	3.5932	2.335	1.539	0.124	-0.983
8.170					
Asmo	-0.1412	0.645	-0.219	0.827	-1.406
1.124					
Arac	-0.3207	0.326	-0.984	0.325	-0.960
0.318					
Asex	8.5421	2.235	3.821	0.000	4.161
12.923					
EDUC	-0.6106	0.164	-3.723	0.000	-0.932
-0.289					

```
FMIG2                          0.1388       0.094       1.484       0.138       -0.045
0.322
SEX                            0.2874       0.371       0.775       0.438       -0.439
1.014
==============================================================================
==========
```

[13]:
```
print('pseudo r-squared = {}'.format(np.round(results.prsquared,2)))
```

```
pseudo r-squared = 0.24
```

"While the R2 index is a more familiar concept to planner who are experienced in OLS, it is not as well behaved as the rho-squared measure, for ML estimation. Those unfamiliar with rho-squared should be forewarned that its values tend to be considerably lower than those of the R2 index...For example, values of 0.2 to 0.4 for rho-squared represent EXCELLENT fit."

https://stats.stackexchange.com/questions/82105/mcfaddens-pseudo-r2-interpretation

[14]:
```
results.llr_pvalue
```

[14]:
```
8.581884119064296e-23
```

The above result is the chi-squared probability of getting a log-likelihood ratio statistic greater than llr. llr has a chi-squared distribution with degrees of freedom df_model. The likelihood ratio chi-square with a p-value ~ 0 tells us that our model as a whole fits significantly better than an empty model (i.e., a model with no predictors). See the following links for more details:

https://stats.stackexchange.com/questions/82105/mcfaddens-pseudo-r2-interpretation

https://www.statsmodels.org/devel/generated/statsmodels.discrete.discrete_model.DiscreteResults.prsquared.htr

3 PREDICTION

We train and fit a powerful non-linear (and non-parametric) machine learnin classifier to the data; a Random Forest. There are many other alternatives, but tree based metods are very powerfull and there are new techniques to help identify relevant predictors.

In this section, we want to test wether this model can outperform significantly other null (dummy) classifiers. If that is the case (which it is), it confirms the hypothesis that the predictors have relevant information about the nationalities of the subjects.

3.0.1 Prepare data

[15]:
```
# Creating the Training and Test sets from data
# and splitting the data into independent and dependent variables
X = df[predictors]        # independent variables
y = df[analysis_variable]

test_size = 0.20 #maybe more is needed (20% is standard though)
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size =␣
↪test_size, random_state = 0)
```

[16]:
```
# Standar Scaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform (X_test)
```

3.0.2 Train and tune the model using k-cross fold validation

[17]:
```
scoring = 'accuracy' #'f1_macro' # This chooses the metric to optimise during␣
↪training (there are others!)
njobs=-1                          # This the number of cores used in your cpu␣
↪(-1 means "all of them")
cv=5                              # the k in k-cross-fold validation
# RANDOM FOREST
print('\nFitting Random Forest\n')

rfc=RandomForestClassifier(random_state=0)
# Parameter combinations to explore
param_grid = {
    'n_estimators': [75, 100,300,1000],
    'max_features': ['auto', None],
    'min_samples_split' :[2,6, 10, 14],
    'max_depth' : [10, 15, 30, 50,None],
    'max_samples' : [0.5 ,0.7, None],}


CV_rfc = GridSearchCV(estimator=rfc,
                  param_grid=param_grid,
                  scoring = scoring,
                  verbose=2,
                  n_jobs=njobs,
                  cv= cv)
CV_rfc.fit(X_train, y_train)

print('\nRandom Forest:')
print('Best Score: ', CV_rfc.best_score_)
print('Best Params: ', CV_rfc.best_params_)
```

```
Fitting Random Forest

Fitting 5 folds for each of 480 candidates, totalling 2400 fits
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   2.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
```

```
n_estimators=300; total time=   1.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.8s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=1000; total time=   7.9s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   2.8s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
```

```
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.2s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.9s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   2.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
```

```
n_estimators=1000; total time=   6.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   7.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.5s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   2.8s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.5s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   7.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   1.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.9s
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n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
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n_estimators=100; total time=   0.4s
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.0s
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n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
```

```
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[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   7.8s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   2.4s
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=None,
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[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
```

```
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[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.5s
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n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   0.8s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
```

```
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[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
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[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.9s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   2.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=75; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
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n_estimators=300; total time=   1.7s
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n_estimators=300; total time=   2.1s
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n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
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[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
```

```
n_estimators=1000; total time=   3.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.2s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   2.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   6.8s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   8.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
```

```
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.2s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   2.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
```

```
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.2s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.1s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.9s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
```

```
n_estimators=300; total time=   1.9s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   0.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.0s
[CV] END max_depth=10, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   2.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.9s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
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n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.2s
[CV] END max_depth=10, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=10, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.0s
[CV] END max_depth=10, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=auto, max_samples=None,
```

```
min_samples_split=10, n_estimators=1000; total time=   4.5s
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n_estimators=75; total time=   0.4s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   7.6s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=10, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   2.3s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.8s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=10, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=2,
```

```
n_estimators=1000; total time=   7.4s
[CV] END max_depth=10, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
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n_estimators=300; total time=   1.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.0s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
```

```
min_samples_split=10, n_estimators=300; total time=   2.1s
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min_samples_split=14, n_estimators=75; total time=   0.6s
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min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.6s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.9s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.8s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   6.5s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=1000; total time=   3.7s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.1s
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min_samples_split=10, n_estimators=300; total time=   1.2s
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[CV] END max_depth=15, max_features=auto, max_samples=None,
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[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
```

```
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n_estimators=300; total time=   2.0s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   2.2s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=10, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   6.8s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
```

```
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.6s
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n_estimators=75; total time=   0.3s
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n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
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n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
```

```
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   7.0s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
```

```
n_estimators=300; total time=   2.3s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.8s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.3s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.0s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
```

```
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.0s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   4.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.8s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.3s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   6.6s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
```

```
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=1000; total time=   6.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.6s
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n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
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min_samples_split=10, n_estimators=1000; total time=   6.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
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n_estimators=100; total time=   0.4s
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n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
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n_estimators=75; total time=   0.3s
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.0s
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.5s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
```

```
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[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.2s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
```

```
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[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=15, max_features=None, max_samples=None,
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[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.0s
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n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=75; total time=   0.3s
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.6s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
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[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
```

```
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n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
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n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.6s
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
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[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.6s
[CV] END max_depth=15, max_features=None, max_samples=None,
```

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min_samples_split=14, n_estimators=100; total time=   0.8s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.4s
[CV] END max_depth=15, max_features=None, max_samples=None,
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n_estimators=75; total time=   0.3s
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n_estimators=100; total time=   0.4s
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.9s
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
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n_estimators=75; total time=   0.3s
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=15, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   3.9s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.0s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.0s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.9s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
```

```
min_samples_split=10, n_estimators=300; total time=   2.0s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   6.9s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.0s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.4s
[CV] END max_depth=15, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.4s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.8s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=15, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=15, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.8s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
```

```
n_estimators=300; total time=   2.2s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.0s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.1s
[CV] END max_depth=15, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.0s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=1000; total time=   3.6s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
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n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
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[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
```

```
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[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
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min_samples_split=14, n_estimators=300; total time=   1.3s
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[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
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```

```
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
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n_estimators=100; total time=   0.7s
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n_estimators=300; total time=   1.8s
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
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n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
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[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
```

```
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n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=30, max_features=auto, max_samples=None,
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[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
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[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
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```

```
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
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[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
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[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
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[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
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[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
```

```
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=10,
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[CV] END max_depth=30, max_features=auto, max_samples=0.5, min_samples_split=14,
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[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=2,
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```

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n_estimators=75; total time=   0.3s
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n_estimators=75; total time=   0.3s
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n_estimators=100; total time=   0.4s
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[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=1000; total time=   6.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.8s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.3s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
```

```
n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.7s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
```

```
n_estimators=300; total time=   2.0s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.0s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.5s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.1s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   6.6s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=300; total time=   1.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.6s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.7s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=30, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.1s
[CV] END max_depth=30, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.7s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   6.9s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
```

```
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.9s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.2s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.9s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   7.4s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.6s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
```

```
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
```

```
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
```

```
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.5s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   4.9s
[CV] END max_depth=30, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.0s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=30, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.2s
[CV] END max_depth=30, max_features=None, max_samples=None,
```

```
min_samples_split=10, n_estimators=1000; total time=   7.3s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.7s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.0s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   4.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
```

```
n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.8s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.8s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
```

```
n_estimators=100; total time=   0.8s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.2s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.3s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.6s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.8s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.4s
[CV] END max_depth=30, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.0s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.9s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.9s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.1s
[CV] END max_depth=30, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=auto, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=300; total time=   1.1s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   3.9s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=None,
```

```
min_samples_split=10, n_estimators=1000; total time=   4.1s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.8s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.2s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   6.3s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   3.6s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   4.2s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   4.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
```

```
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.2s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
```

```
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.8s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.2s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=1000; total time=   3.8s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
```

```
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=1000; total time=   4.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.7s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=10,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
```

```
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.8s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.1s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
```

```
n_estimators=1000; total time=   6.8s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.0s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.5s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=1000; total time=   3.8s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=1000; total time=   4.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
```

```
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=1000; total time=   3.9s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=1000; total time=   4.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=auto, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
```

```
min_samples_split=10, n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.4s
[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.2s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   5.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.3s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
```

```
min_samples_split=14, n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.0s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=1000; total time=   4.0s
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min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.3s
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min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.4s
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min_samples_split=2, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=1000; total time=   4.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=1000; total time=   4.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
```

```
min_samples_split=2, n_estimators=75; total time=   0.3s
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min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=1000; total time=   4.3s
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min_samples_split=10, n_estimators=100; total time=   0.4s
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min_samples_split=10, n_estimators=100; total time=   0.4s
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min_samples_split=10, n_estimators=300; total time=   1.2s
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n_estimators=1000; total time=   4.2s
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n_estimators=1000; total time=   4.4s
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[CV] END max_depth=50, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.0s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=2,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=300; total time=   1.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=6,
n_estimators=1000; total time=   5.3s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
```

```
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=100; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.4s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=300; total time=   1.6s
[CV] END max_depth=50, max_features=None, max_samples=0.5, min_samples_split=14,
n_estimators=1000; total time=   5.2s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=2,
n_estimators=1000; total time=   6.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   6.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.6s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.8s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.3s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
```

```
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=1000; total time=   4.0s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=1000; total time=   4.0s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=1000; total time=   3.8s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=1000; total time=   4.5s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
```

```
min_samples_split=14, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.5s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=75; total time=   0.4s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   6.0s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=14,
n_estimators=1000; total time=   5.4s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=1000; total time=   6.7s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=1000; total time=   7.1s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.7s
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min_samples_split=14, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   7.5s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=1000; total time=   4.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=1000; total time=   3.8s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=1000; total time=   3.9s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
```

```
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min_samples_split=10, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=10, n_estimators=1000; total time=   4.0s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=1000; total time=   3.8s
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min_samples_split=2, n_estimators=1000; total time=   4.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=1000; total time=   4.1s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=75; total time=   0.3s
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min_samples_split=14, n_estimators=100; total time=   0.4s
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min_samples_split=14, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   3.9s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=2, n_estimators=300; total time=   1.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=100; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=300; total time=   1.7s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=300; total time=   1.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=10, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
```

```
min_samples_split=10, n_estimators=100; total time=   0.5s
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min_samples_split=10, n_estimators=100; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.4s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.6s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=14, n_estimators=1000; total time=   5.3s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   2.0s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=75; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=100; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=100; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=300; total time=   1.9s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=300; total time=   1.9s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=75; total time=   0.5s
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min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=300; total time=   1.8s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=300; total time=   1.8s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=1000; total time=   6.4s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=75; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=100; total time=   0.7s
[CV] END max_depth=None, max_features=None, max_samples=None,
```

```
min_samples_split=2, n_estimators=100; total time=   0.8s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=6,
n_estimators=1000; total time=   6.5s
[CV] END max_depth=50, max_features=None, max_samples=0.7, min_samples_split=10,
n_estimators=1000; total time=   5.8s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=2,
n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=100; total time=   0.6s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None, min_samples_split=6,
n_estimators=300; total time=   2.1s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=75; total time=   0.5s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=100; total time=   0.7s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   1.9s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=300; total time=   2.0s
[CV] END max_depth=50, max_features=None, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   7.6s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=2, n_estimators=1000; total time=   3.5s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
```

```
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=6, n_estimators=1000; total time=   4.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=10, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=300; total time=   1.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.5,
min_samples_split=14, n_estimators=1000; total time=   3.8s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=2, n_estimators=1000; total time=   4.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=6, n_estimators=1000; total time=   4.0s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=300; total time=   1.1s
[CV] END max_depth=None, max_features=auto, max_samples=0.7,
min_samples_split=14, n_estimators=1000; total time=   3.7s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=2, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.3s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=6, n_estimators=300; total time=   1.2s
[CV] END max_depth=None, max_features=auto, max_samples=None,
```

```
min_samples_split=6, n_estimators=1000; total time=   4.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=10, n_estimators=1000; total time=   4.4s
[CV] END max_depth=None, max_features=auto, max_samples=None,
min_samples_split=14, n_estimators=1000; total time=   4.0s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=2, n_estimators=1000; total time=   5.1s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=6, n_estimators=1000; total time=   5.1s
[CV] END max_depth=None, max_features=None, max_samples=0.5,
min_samples_split=10, n_estimators=1000; total time=   5.4s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=75; total time=   0.5s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=100; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=300; total time=   1.9s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=2, n_estimators=1000; total time=   6.5s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=6, n_estimators=1000; total time=   6.3s
[CV] END max_depth=None, max_features=None, max_samples=0.7,
min_samples_split=10, n_estimators=1000; total time=   6.1s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=75; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=75; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=100; total time=   0.8s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=300; total time=   2.4s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=2, n_estimators=300; total time=   2.3s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=6, n_estimators=75; total time=   0.6s
[CV] END max_depth=None, max_features=None, max_samples=None,
min_samples_split=6, n_estimators=100; total time=   0.8s

Random Forest:
Best Score:  0.673859649122807
Best Params:  {'max_depth': 30, 'max_features': 'auto', 'max_samples': None,
'min_samples_split': 6, 'n_estimators': 100}
```

3.0.3 Evaluating the algorithm performance in the test set (unseen data)

[18]:
```
y_pred = CV_rfc.predict(X_test)
print('Confusion Matrix:\n ', confusion_matrix(y_test,y_pred),'\n')
print(classification_report(y_test,y_pred),'\n')
print('Accuracy: {0:.2f}'.format(accuracy_score(y_test, y_pred),2))
```

```
Confusion Matrix:
  [[ 1 17  1]
 [ 2 41  7]
 [ 1 13 12]]

              precision    recall  f1-score   support

           1       0.25      0.05      0.09        19
           2       0.58      0.82      0.68        50
           3       0.60      0.46      0.52        26

    accuracy                           0.57        95
   macro avg       0.48      0.44      0.43        95
weighted avg       0.52      0.57      0.52        95


Accuracy: 0.57
```

Finally, accuracy improves a 5 percent with respect to the most frequent dummy classifier. Note that muslims are the class with the best precision.

3.0.4 Compare this performance with null models

[19]:
```
#  relative prevalence of each class
rel_prev = (y.value_counts() / len(y))
print(rel_prev)
```

```
2    0.552966
3    0.262712
1    0.184322
Name: RELG, dtype: float64
```

[20]:
```
# Uniform Dummy Classifier (classifies randomly with p = 1/6)

# If the classifier randomly guesses:
print('Acurracy of uniform dummy classifier: ',(((1/6) * y.value_counts()) /␣
 ↪len(y)).sum()) # = 1/6
```

```
Acurracy of uniform dummy classifier:  0.16666666666666666
```

[21]:
```
# Stratified Dummy Classifier (classifies randomly with p ~ prevalence of each␣
↪class)
print('Acurracy of stratified dummy classifier: ',(rel_prev * y.value_counts()).
↪sum() / len(y))
```

```
Acurracy of stratified dummy classifier:  0.4087636455041655
```

[22]:
```
# Most frequent Dummy Classifier (classifies always in the most frequent class)
print('Acurracy of Most freq dummy classifier: ',rel_prev.max() )
```

```
Acurracy of Most freq dummy classifier:  0.5529661016949152
```

[23]:
```
# SKLEARN versions of the dummy classifiers (to double check and for␣
↪convinience methods)

dummy = "stratified"# most_frequent, stratified, uniform
dummy_clf = DummyClassifier(strategy=dummy,random_state=0)



# Actual accuracy of the dummy in the same train-test split as the RF model
dummy_clf.fit(X_train, y_train)
dummy_score = dummy_clf.score(X_test, y_test)
print('Mean accuracy of null ' + dummy +' model: {0:.2f}'.
↪format(dummy_score),'\n')
print('Mean accuracy (in test) of RF model: {0:.2f}'.format(CV_rfc.
↪score(X_test, y_test)),'\n')
```

```
Mean accuracy of null stratified model: 0.39

Mean accuracy (in test) of RF model: 0.57
```

[24]:
```
# Confusion matrix and report of the selected dummy classifier

y_pred_dummy = dummy_clf.predict(X_test)
print('Confusion Matrix:\n\n ',confusion_matrix(y_test,y_pred_dummy),'\n')
print(classification_report(y_test,y_pred_dummy),'\n')
print('Accuracy: {0:.2f}'.format(accuracy_score(y_test, y_pred_dummy),2))
```

```
Confusion Matrix:

  [[ 3 12  4]
 [ 6 27 17]
 [ 3 16  7]]

              precision    recall  f1-score   support
```

```
              1       0.25      0.16      0.19        19
              2       0.49      0.54      0.51        50
              3       0.25      0.27      0.26        26

    accuracy                            0.39        95
   macro avg       0.33      0.32      0.32        95
weighted avg       0.38      0.39      0.38        95


Accuracy: 0.39
```

[25]:
```
# Just for reference, the results of the RF Model

y_pred = CV_rfc.predict(X_test)
print('Confusion Matrix:\n\n ', confusion_matrix(y_test,y_pred),'\n')
print(classification_report(y_test,y_pred),'\n')
print('Accuracy: {0:.2f}'.format(accuracy_score(y_test, y_pred),2))
```

```
Confusion Matrix:

  [[ 1 17  1]
 [ 2 41  7]
 [ 1 13 12]]

              precision    recall  f1-score   support

              1       0.25      0.05      0.09        19
              2       0.58      0.82      0.68        50
              3       0.60      0.46      0.52        26

    accuracy                            0.57        95
   macro avg       0.48      0.44      0.43        95
weighted avg       0.52      0.57      0.52        95


Accuracy: 0.57
```

[26]:
```
dummy_report = pd.DataFrame(classification_report(y_test,dummy_clf.
 ↪predict(X_test), output_dict= True))

rfc_report = pd.DataFrame(classification_report(y_test,CV_rfc.predict(X_test),␣
 ↪output_dict= True))
```

Increase in prediction power (percentage with respect to null model) i.e. 100% means twice as good

[27]:
```
final_table = ((rfc_report - dummy_report)*100 / dummy_report).drop('support').
↪round(decimals=2)
final_table
```

[27]:

	1	2	3	accuracy	macro avg	weighted avg
precision	0.00	17.63	140.00	45.95	44.06	37.51
recall	-66.67	51.85	71.43	45.95	37.95	45.95
f1-score	-55.07	31.77	101.24	45.95	33.02	35.89

This significant increases further support the claim that the predictors (based on ego-network properties) have useful information to predict the countries of origin of the individuals)

3.1 Shap Values

Shap values are a tool to interpret our random forest model, in this case. They tell us some intuition about which part of the prediction belongs to each feature.

A positive (negative) SHAP value indicates that the value (in this case, probability of belonging to a certain country) is reinforced (diminished) by the feature.

We will use 2 kind of plots at this moment. The first one one is a summary plot, a violin plot of the distribution of SHAP values. The colour indicates the value of the feature indicated at the left. This plot let us see the which features contribute the most (this is, they have high SHAP values). Features are ordered according to their contribution to the global prediction.

The second kind of plot you will see several times after the summary plot is the dependence plot. They show the distribution of the SHAP values of a variable. The colormap plots another variable, the one the algorithm thinks it has more interaction with the current variable. It lets us distinguish between different regimes of the coloured variable.

[28]:
```
# explain the model's predictions using SHAP
##Shap values
import  shap

shap.initjs()
model = CV_rfc.best_estimator_
explainer = shap.TreeExplainer(model,X_train,check_additivity=False)
shap_values = explainer.shap_values(X_train,check_additivity=False)
```

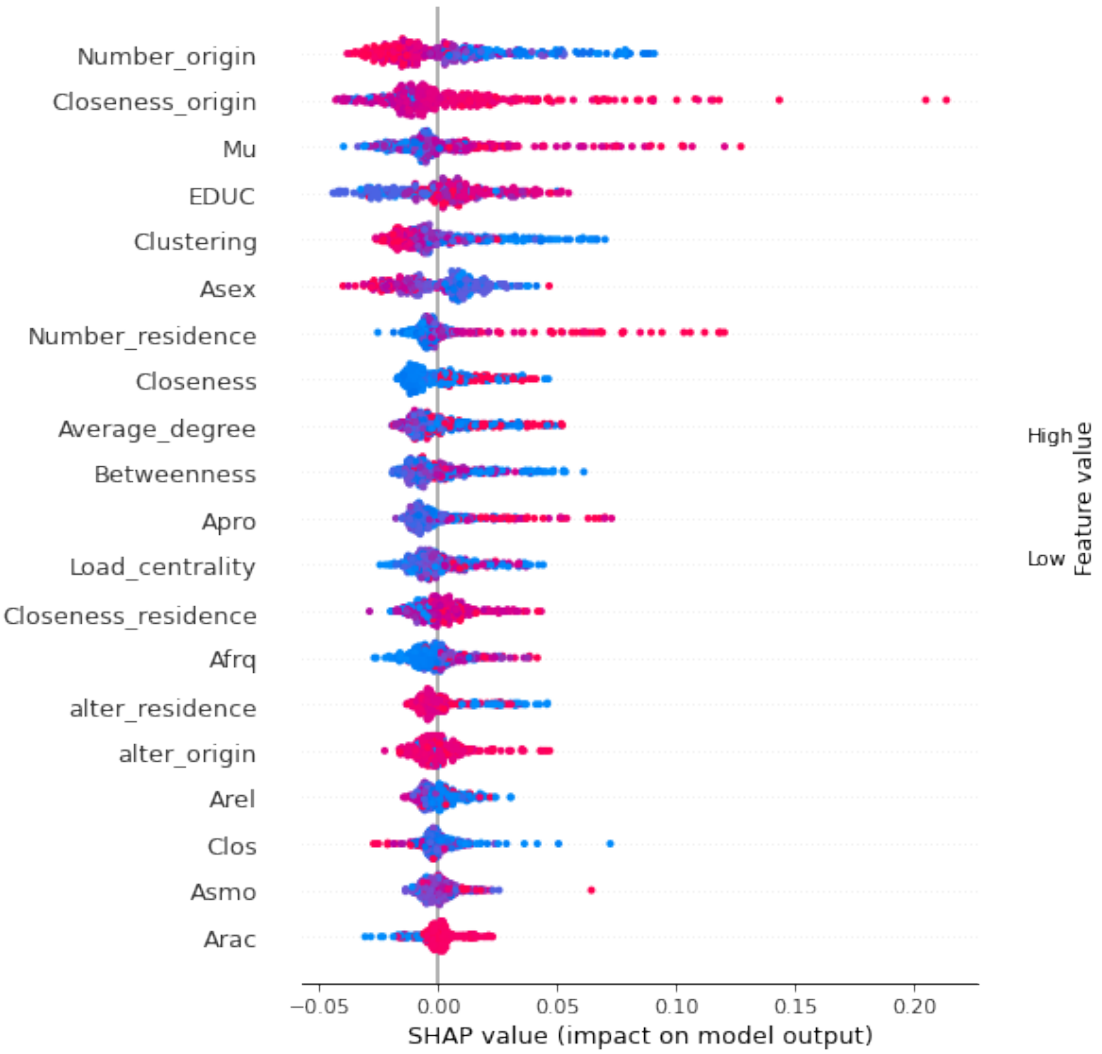
```
<IPython.core.display.HTML object>
```

```
 98%|===================| 1109/1131 [00:14<00:00]
```

3.2 Example of summary plot

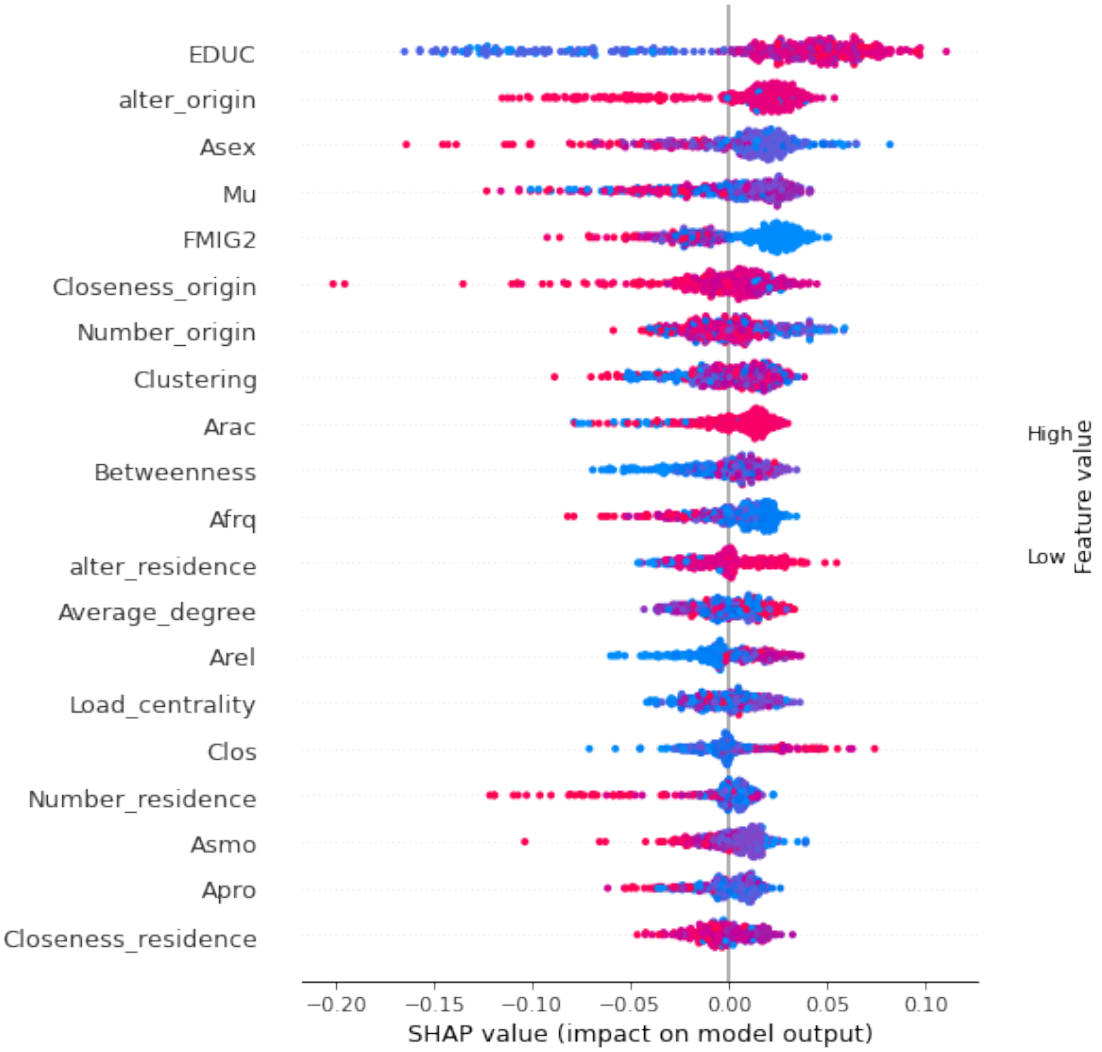
We extract the summary plots that summarizes the correlations for each nationality. (Religion). In the first one, we represent the SHAP values for the control group ("Others")

[29]:
```
shap.summary_plot(shap_values[0],X_train,feature_names = predictors)
```



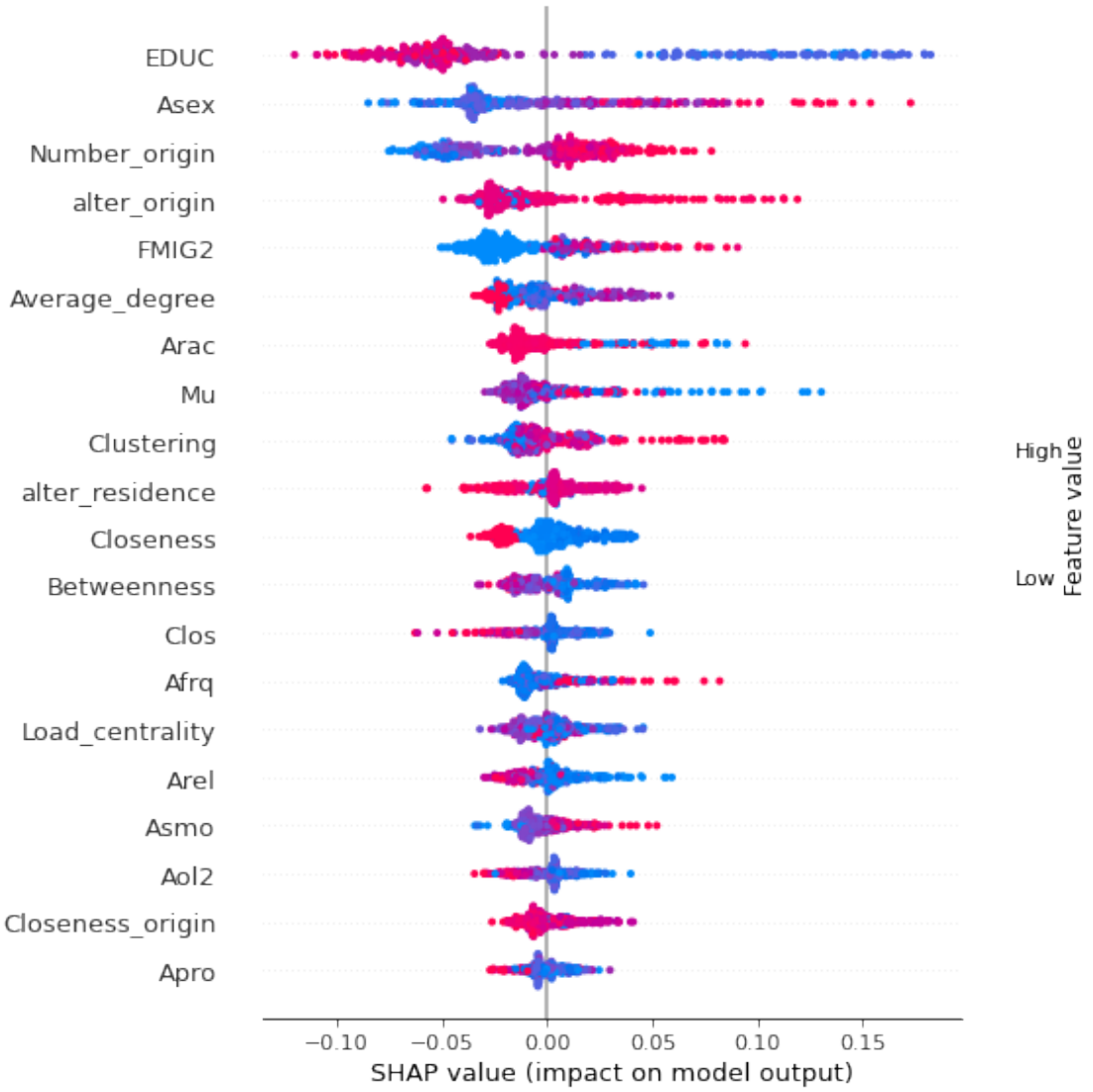
SHAP values for the christian class.

[30]:
```
shap.summary_plot(shap_values[1],X_train,feature_names = predictors)
```



SHAP values for muslims.

[31]:
```
shap.summary_plot(shap_values[2],X_train,feature_names = predictors)
```



4 LIME

LIME (Local Interpretable Model-agnostic Explanations), is an algorithm that takes the decision function from the classifier (decision = f(features)). This function may be complex, but the algorithm makes a linear regression around a single prediction, weighting the importance of the coefficients with the distance to this local prediction.

This kind of algorithm helps us to explain single predictions.

[32]:
```
##Using LIME to interpret
import lime
import lime.lime_tabular
```

[33]:
```
explainer = lime.lime_tabular.LimeTabularExplainer(X_train,␣
↪feature_names=predictors, discretize_continuous=True)
```

[34]:
```
i = np.random.randint(0, X_test.shape[0])
exp = explainer.explain_instance(X_test[i], CV_rfc.predict_proba,␣
↪num_features=3, top_labels=1)
```

[35]:
```
exp.show_in_notebook(show_table=True, show_all=True)
```

```
<IPython.core.display.HTML object>
```

4.1 Artificial neural network

As a complementary method, we train a simple ANN to provide a new method and give more strength to the previous results. In order to do that, we will preprocess the data, distinguishing the categorical and numerical predictors. Then we will split the dataset into the train and test parts and, finally, we will define the model and fit to obtain a final result for the accuracy.

[42]:
```
### Import the package tensorflow
import tensorflow as tf

### Recall what are our predictors and target variable
X = df[predictors]
Y = df[analysis_variable]

### Set the categorical variables
#X = pd.get_dummies(X,columns=["Regime","EDUC","SEX"])

###Split into train and test data
X_train,X_test,Y_train,Y_test = train_test_split(X,Y,test_size=test_size)
```

[67]:
```
###Define  a simple a ANN and fit our data
inputs = tf.keras.Input(shape=(len(predictors),))
x = tf.keras.layers.Dense(100,activation = "relu")(inputs)
x = tf.keras.layers.Dense(50,activation = "relu")(x)
x = tf.keras.layers.Dense(20,activation = "relu")(x)
outputs = tf.keras.layers.Dense(len(df[analysis_variable].
↪unique())+1,activation = "softmax")(x)
model_func = tf.keras.Model(inputs=inputs, outputs = outputs)


stat_accul = []
for ij in range(10):
    ###Compile the model
    model_func.compile(loss=tf.keras.losses.SparseCategoricalCrossentropy(),
                       optimizer=tf.keras.optimizers.Adam(learning_rate=0.001),
                       metrics=["accuracy"])
```

```
    ### We fit the model 100 times and take notes of the accuracy on the test␣
↪set

    history_accul = model_func.fit(X_train,
                                   Y_train,
                                   epochs=50,
                                   verbose=0,
                                   validation_data=(X_test,Y_test))
    stat_accul.append(model_func.evaluate(X_test,Y_test,verbose = 0)[1])
```

```
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f8401a91670> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING: AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f8401a91670> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8401292160> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING: AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8401292160> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
```

```
Model.make_train_function.<locals>.train_function at 0x7f84011f7af0> and will
run it as-is.
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Model.make_test_function.<locals>.test_function at 0x7f84012929d0> and will run
it as-is.
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output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f840103f550> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
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Cause: module 'gast' has no attribute 'Constant'
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@tf.autograph.experimental.do_not_convert
WARNING: AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f840103f550> and will
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Cause: module 'gast' has no attribute 'Constant'
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Model.make_test_function.<locals>.test_function at 0x7f84011a85e0> and will run
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Cause: module 'gast' has no attribute 'Constant'
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WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f84010658b0> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
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Cause: module 'gast' has no attribute 'Constant'
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Model.make_test_function.<locals>.test_function at 0x7f8400f230d0> and will run
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Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
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Cause: module 'gast' has no attribute 'Constant'
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WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f8400e56160> and will
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output.
Cause: module 'gast' has no attribute 'Constant'
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Cause: module 'gast' has no attribute 'Constant'
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WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8400e751f0> and will run
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Please report this to the TensorFlow team. When filing the bug, set the
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output.
Cause: module 'gast' has no attribute 'Constant'
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WARNING: AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8400e751f0> and will run
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Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
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Model.make_train_function.<locals>.train_function at 0x7f84012924c0> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
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Cause: module 'gast' has no attribute 'Constant'
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WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8401a6f550> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING: AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8401a6f550> and will run
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Cause: module 'gast' has no attribute 'Constant'
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WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f8401d9db80> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
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output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
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Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f840113dd30> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
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Model.make_test_function.<locals>.test_function at 0x7f840113dd30> and will run
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Cause: module 'gast' has no attribute 'Constant'
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@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f84015ca160> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
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Cause: module 'gast' has no attribute 'Constant'
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verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f840228ff70> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
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output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_train_function.<locals>.train_function at 0x7f8401afcee0> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
output.
Cause: module 'gast' has no attribute 'Constant'
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Model.make_train_function.<locals>.train_function at 0x7f8401afcee0> and will
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Cause: module 'gast' has no attribute 'Constant'
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@tf.autograph.experimental.do_not_convert
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Model.make_test_function.<locals>.test_function at 0x7f8401e39670> and will run
it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
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Cause: module 'gast' has no attribute 'Constant'
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Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
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WARNING:tensorflow:AutoGraph could not transform <function
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```
Model.make_train_function.<locals>.train_function at 0x7f84025ec9d0> and will
run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the
verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
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Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
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output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
WARNING:tensorflow:AutoGraph could not transform <function
Model.make_test_function.<locals>.test_function at 0x7f8402068b80> and will run
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verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full
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Cause: module 'gast' has no attribute 'Constant'
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output.
Cause: module 'gast' has no attribute 'Constant'
To silence this warning, decorate the function with
@tf.autograph.experimental.do_not_convert
```

4.2 Display the final results

[68]:
```
print(f"The final results for 100 training iterations is {np.
↪average(stat_accul):.3f} with a std of {np.std(stat_accul):.3f}")
```

```
The final results for 100 training iterations is 0.606 with a std of 0.027
```

[ ]:

[ ]: