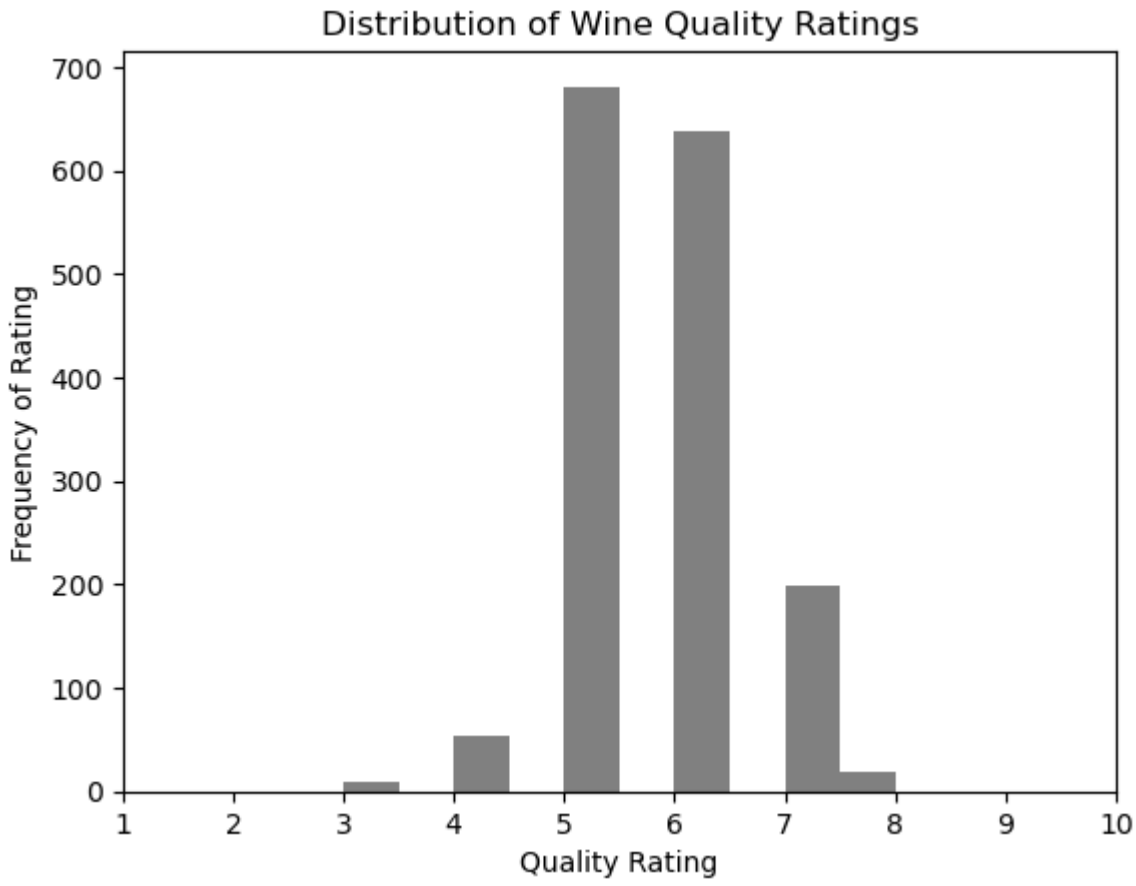
In [1]:
```
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.neural_network import MLPClassifier
from sklearn.pipeline import Pipeline
from sklearn.preprocessing import StandardScaler
from matplotlib import pyplot as plt
from sklearn.metrics import classification_report, accuracy_score, confusion
from sklearn.ensemble import RandomForestClassifier
from sklearn.preprocessing import StandardScaler
from sklearn.feature_selection import SelectKBest
from sklearn.feature_selection import chi2
from sklearn.model_selection import GridSearchCV
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay
from sklearn.decomposition import PCA
from sklearn.pipeline import make_pipeline

import matplotlib.pyplot as plt
from sklearn.datasets import make_classification
from sklearn.metrics import ConfusionMatrixDisplay
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC


data = pd.read_csv('winequality-red.csv', delimiter=';')
data.head()
```

Out[1]:

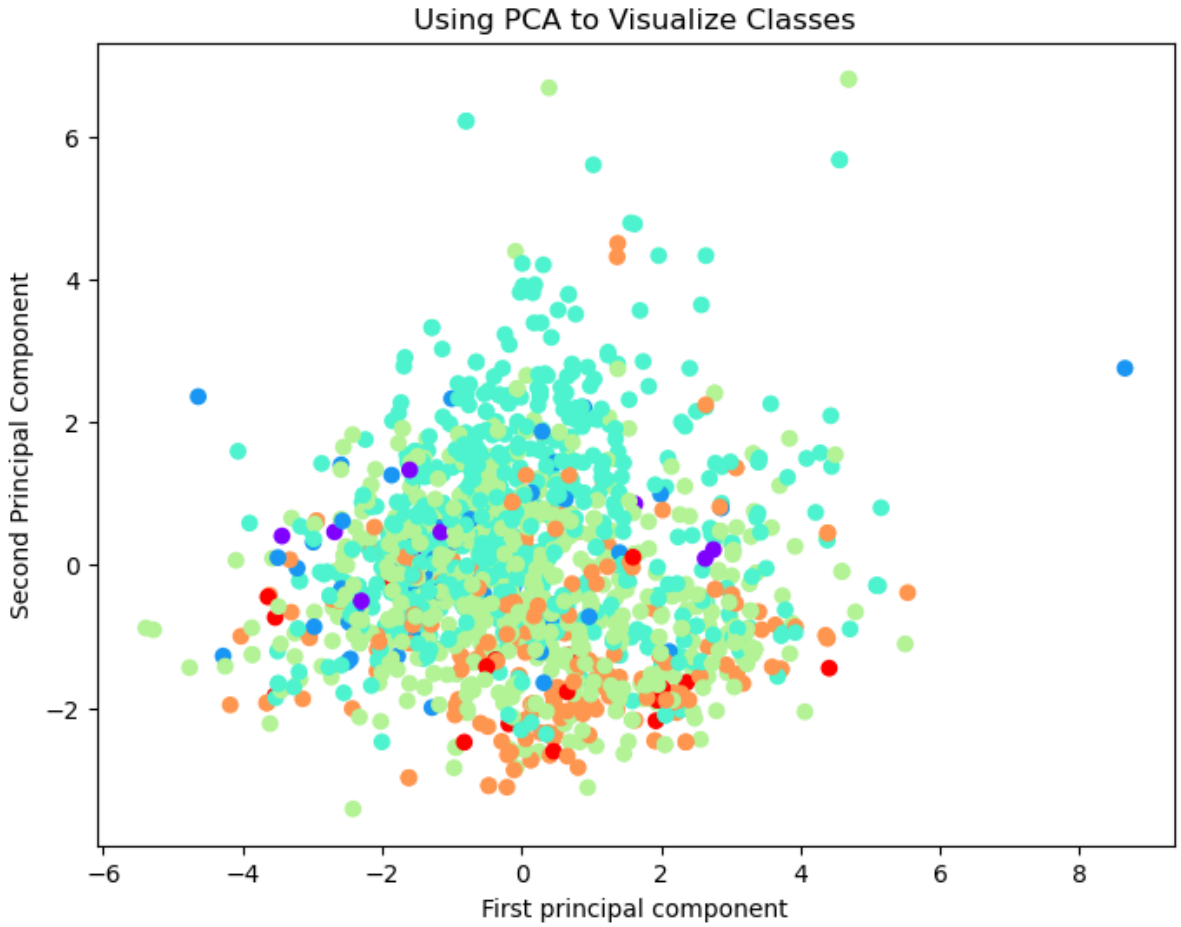
	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulphates	alc
0	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	
1	7.8	0.88	0.00	2.6	0.098	25.0	67.0	0.9968	3.20	0.68	
2	7.8	0.76	0.04	2.3	0.092	15.0	54.0	0.9970	3.26	0.65	
3	11.2	0.28	0.56	1.9	0.075	17.0	60.0	0.9980	3.16	0.58	
4	7.4	0.70	0.00	1.9	0.076	11.0	34.0	0.9978	3.51	0.56	

In [2]:
```
# create histogram of wine quality ratings

ax = data.hist(column='quality', bins=10, grid=False, color='grey')
plt.title('Distribution of Wine Quality Ratings')
plt.xlabel('Quality Rating')
plt.ylabel('Frequency of Rating')
plt.xlim([1,10])
plt.show()
```



In [3]:
```
X = data.drop('quality', axis=1)
y = data['quality']

data.fillna(0, inplace=True) #checking for nulls
```

In [4]:
```
# PCA
X_pca = X.copy()
y_pca = y.copy()
X_pca = StandardScaler().fit_transform(X_pca)
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_pca)

plt.figure(figsize=( 8,6))
plt.scatter(X_pca[:, 0],X_pca[:,1],c=y_pca,cmap='rainbow')
plt.xlabel('First principal component' )
plt.ylabel('Second Principal Component' )
plt.title("Using PCA to Visualize Classes" )
plt.show()
```



In [5]:
```
print("PCA Components:\n ", pca.components_)
print("PCA Explained Variance Ratio:\n ", pca.explained_variance_ratio_)
print("PCA Explained Variance:\n ", pca.explained_variance_)
```

```
PCA Components:
  [[ 0.48931422 -0.23858436  0.46363166  0.14610715  0.21224658 -0.03615752
   0.02357485  0.39535301 -0.43851962  0.24292133 -0.11323206]
 [-0.11050274  0.27493048 -0.15179136  0.27208024  0.14805156  0.51356681
   0.56948696  0.23357549  0.00671079 -0.03755392 -0.38618096]]
PCA Explained Variance Ratio:
  [0.28173931 0.1750827 ]
PCA Explained Variance:
  [3.10107182 1.92711489]
```

In [6]:
```
#NO PARAM GRID EXAMPLE (LESS OPTIMAL)
param_grid = {
}
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, ran

rf = RandomForestClassifier()
rf.fit(X_train, y_train)
y_pred = rf.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
report = classification_report(y_test, y_pred)

print("====================RANDOM FOREST CLASSIFIER (NO OPTIMIZATION)======
```

```python
print("Accuracy: ", accuracy)
print('\nClassification Report: \n', report)
```

```
=====================RANDOM FOREST CLASSIFIER (NO OPTIMIZATION)============
=========

Accuracy:  0.6854166666666667

Classification Report: 
               precision    recall  f1-score   support

           3       0.00      0.00      0.00         1
           4       0.00      0.00      0.00         9
           5       0.77      0.76      0.77       203
           6       0.63      0.75      0.68       197
           7       0.60      0.47      0.52        60
           8       0.00      0.00      0.00        10

    accuracy                           0.69       480
   macro avg       0.33      0.33      0.33       480
weighted avg       0.66      0.69      0.67       480
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
l-defined and being set to 0.0 in labels with no predicted samples. Use `ze
ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
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ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```

In [7]:

```python
X_f = data.loc[:, 'fixed acidity':'alcohol']
y_f = data['quality']

bestFeaturesFit = SelectKBest(score_func=chi2, k=8).fit(X_f,y_f)
dfscores = pd.DataFrame(bestFeaturesFit.scores_)
dfcolumns = pd.DataFrame(X_f.columns)

category_values = pd.concat([dfcolumns,dfscores],axis=1)
category_values.columns = ['Feature','Score']
print(category_values.nlargest(dfscores.size,'Score'))
```

```
                  Feature        Score
6   total sulfur dioxide  2755.557984
5    free sulfur dioxide   161.936036
10               alcohol    46.429892
1       volatile acidity    15.580289
2            citric acid    13.025665
0          fixed acidity    11.260652
9              sulphates     4.558488
3         residual sugar     4.123295
4              chlorides     0.752426
8                     pH     0.154655
7                density     0.000230
```

In [8]:
```
data = data.drop('density', axis=1)
data = data.drop('pH', axis=1)
data = data.drop('chlorides', axis=1)

X = data.loc[:, 'fixed acidity':'alcohol']
y = data['quality']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,rand
```

In [9]:
```
param_grid = {
    'n_estimators': [50, 75, 100],
    'max_depth': [None, 5, 10, 20],
    'min_samples_split': [2, 5, 10],
    'min_samples_leaf': [1, 2, 4],
    'bootstrap': [True, False]
}

rf = RandomForestClassifier()
grid_search = GridSearchCV(estimator=rf, param_grid=param_grid, cv=5, n_jobs
grid_search.fit(X_train, y_train)

best_rf = grid_search.best_estimator_
print("Best Random Forest Parameters: ", best_rf)

y_pred = best_rf.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
report = classification_report(y_test, y_pred)

print("====================RANDOM FOREST CLASSIFIER (PARAMETER OPTIMIZATION
print("Accuracy: ", accuracy)
print('\nClassification Report: \n', report)
```

```
Best Random Forest Parameters:  RandomForestClassifier(max_depth=20, n_esti
mators=50)
=====================RANDOM FOREST CLASSIFIER (PARAMETER OPTIMIZATION)=====
================

Accuracy:  0.73125

Classification Report:
               precision    recall  f1-score   support

           3       0.00      0.00      0.00         2
           4       0.00      0.00      0.00        12
           5       0.80      0.85      0.82       136
           6       0.69      0.79      0.74       129
           7       0.63      0.42      0.51        40
           8       0.00      0.00      0.00         1

    accuracy                           0.73       320
   macro avg       0.35      0.34      0.35       320
weighted avg       0.70      0.73      0.71       320
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
l-defined and being set to 0.0 in labels with no predicted samples. Use `ze
ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```
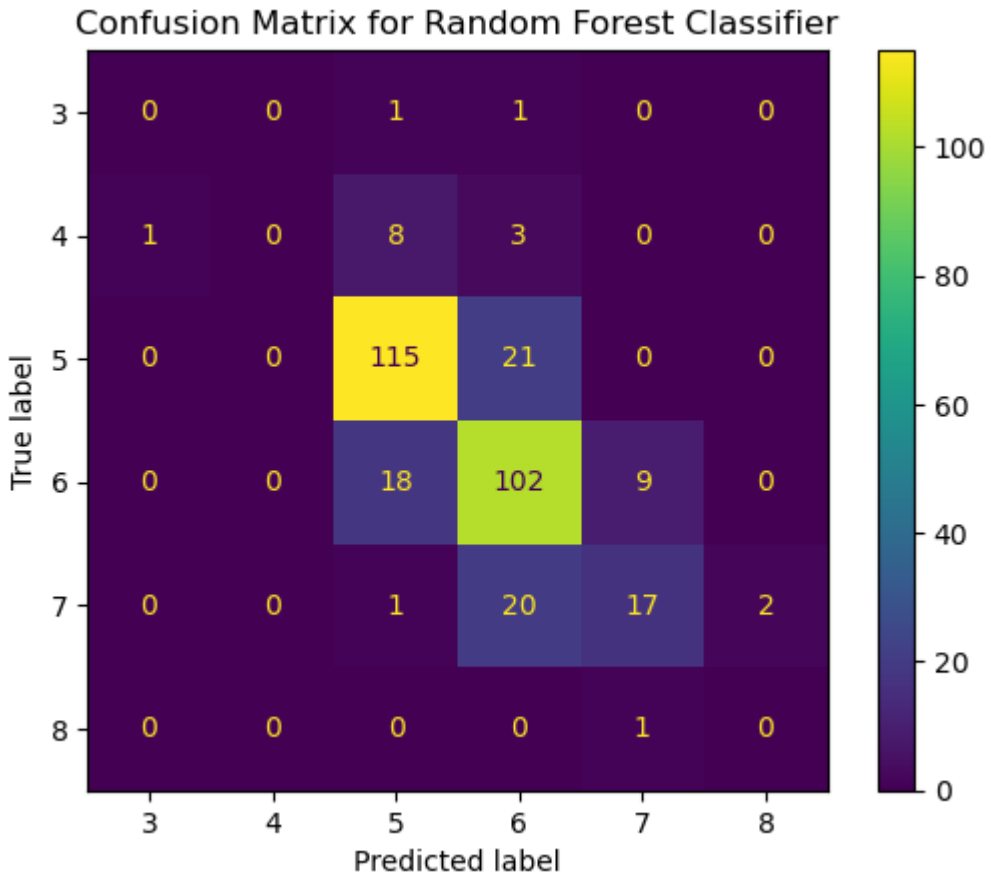

In [10]:

```
ConfusionMatrixDisplay.from_estimator(best_rf, X_test, y_test)
plt.title("Confusion Matrix for Random Forest Classifier")
plt.show()
```



In [16]:

```
#Getting the top features from the dataset
top_features = SelectKBest(score_func=chi2, k='all')

dfscores = pd.DataFrame(top_features.fit(X,y).scores_)  #Store predictor sco
dfcolumns = pd.DataFrame(X.columns)  #Store predictor variable names in a co

#List of features with heaviest weight/importance
predScores = pd.concat([dfcolumns,dfscores],axis=1)
predScores.columns = ['Predictor','Score']   #naming the dataframe columns
print(predScores.nlargest(11,'Score'))       #print top (by score) 10 featur

#Drop the bottom two features (smallest score)
data = data.drop('density', axis=1)
data = data.drop('pH', axis=1)

X= data.loc[:, 'fixed acidity':'alcohol']
y= data['quality']

# Split data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.7, ran

wine_dataset_file = "winequality-red.csv"

full_df = pd.read_csv(wine_dataset_file, header = 0, delimiter=";")
```

	Predictor	Score
5	total sulfur dioxide	2755.557984
4	free sulfur dioxide	161.936036
7	alcohol	46.429892
1	volatile acidity	15.580289
2	citric acid	13.025665
0	fixed acidity	11.260652
6	sulphates	4.558488
3	residual sugar	4.123295

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
/var/folders/5r/_tsdfg1s1ts77dxpnvb8p4xr0000gn/T/ipykernel_26563/347257114
6.py in <module>
     11
     12 #Drop the bottom two features (smallest score)
---> 13 data = data.drop('density', axis=1)
     14 data = data.drop('pH', axis=1)
     15

~/opt/anaconda3/lib/python3.9/site-packages/pandas/util/_decorators.py in w
rapper(*args, **kwargs)
    309                     stacklevel=stacklevel,
    310                 )
--> 311             return func(*args, **kwargs)
    312
    313         return wrapper

~/opt/anaconda3/lib/python3.9/site-packages/pandas/core/frame.py in drop(se
lf, labels, axis, index, columns, level, inplace, errors)
   4955                 weight  1.0     0.8
   4956         """
-> 4957         return super().drop(
   4958             labels=labels,
   4959             axis=axis,

~/opt/anaconda3/lib/python3.9/site-packages/pandas/core/generic.py in drop
(self, labels, axis, index, columns, level, inplace, errors)
   4265         for axis, labels in axes.items():
   4266             if labels is not None:
-> 4267                 obj = obj._drop_axis(labels, axis, level=level, err
ors=errors)
   4268
   4269         if inplace:

~/opt/anaconda3/lib/python3.9/site-packages/pandas/core/generic.py in _drop
_axis(self, labels, axis, level, errors, consolidate, only_slice)
   4309                 new_axis = axis.drop(labels, level=level, errors=er
rors)
   4310             else:
-> 4311                 new_axis = axis.drop(labels, errors=errors)
   4312             indexer = axis.get_indexer(new_axis)
   4313

~/opt/anaconda3/lib/python3.9/site-packages/pandas/core/indexes/base.py in
drop(self, labels, errors)
   6659         if mask.any():
   6660             if errors != "ignore":
-> 6661                 raise KeyError(f"{list(labels[mask])} not found in
axis")
   6662             indexer = indexer[~mask]
   6663         return self.delete(indexer)

KeyError: "['density'] not found in axis"
```

In [17]:

```
# Define the parameter grid for the ANN
param_grid = {
    'ann__hidden_layer_sizes': [(20,), (40,), (50,), (70,), (100,), (500,),
    'ann__activation': ['tanh', 'relu', 'logistic'],
    'ann__solver': ['sgd', 'adam'],
    'ann__alpha': [0.0001, 0.001, 0.01],
    'ann__learning_rate': ['constant', 'adaptive'],
    'ann__learning_rate_init' : [0.01, 0.1, 0.2, 0.5, 1]
}

pipe = Pipeline([("norm", StandardScaler()),
                 ("ann", MLPClassifier(max_iter=1000, random_state=42))])

# Perform grid search with cross-validation
grid_search = GridSearchCV(pipe, param_grid, cv=3, n_jobs=-1, verbose=2)
grid_search.fit(X_train, y_train)

# Get the best parameters
best_params = grid_search.best_params_
print("Best parameters found: ", best_params)


pipe.set_params(**best_params)
pipe.fit(X_train, y_train)
# Predict the test set
y_pred = pipe.predict(X_test)

# Calculate the evaluation metrics
accuracy = accuracy_score(y_test, y_pred)
conf_matrix = confusion_matrix(y_test, y_pred)
report = classification_report(y_test, y_pred)

print("====================ANN CLASSIFIER====================\n")

# Print the evaluation metrics
print("Accuracy: ", accuracy)
print("Classification Report: \n", report)




# ### HOW WE DID INITIAL TESTSING (AND GOT THE BEST OUTCOME)
# from sklearn.metrics import f1_score

# wine_dataset_file = "winequality-red.csv"
#
# full_df = pd.read_csv(wine_dataset_file, header = 0, delimiter=";")
#
# X = full_df.iloc[:, :-1]
# Y = full_df.iloc[:, -1]
#
# X_train, X_test, y_train, y_test = train_test_split(X, Y, train_size=0.7,
#
# train_score = []
```

```
# test_score = []
# f1s = []
#
# # more layers does not improve test data
# layers = list(range(10,50,5))
# for i in layers:
#     # scaling / normalizing data helps increase test
#     pipe = make_pipeline(StandardScaler(), MLPClassifier(activation = 'log
#                                                          solver = 'sgd',
#                                                          hidden_layer_size
#                                                          alpha=1e-2,
#                                                          max_iter = 1000,
#                                                          learning_rate_ini
#
#     pipe.fit(X_train, y_train)
#     y_pred = pipe.predict(X_test)
#     train_score.append(pipe.score(X_train,y_train))
#     test_score.append(pipe.score(X_test,y_test))
#     f1s.append(f1_score(y_test, y_pred, average="micro"))
#
# plt.plot(layers,train_score,'.',label = 'train set')
# plt.plot(layers,test_score,'-',label = 'test set')
# plt.xlabel('layers')
# plt.ylabel('score')
# plt.legend()
#
# optimal_index = test_score.index(max(test_score))
# print(f'Best number of hidden nodes: {layers[optimal_index]}, with a test
#
# non_norm = MLPClassifier(activation = 'logistic',
#                          solver = 'sgd',
#                          hidden_layer_sizes = (layers[optimal_index]), #ti
#                          alpha=1e-2,
#                          max_iter = 1000,
#                          learning_rate_init = 0.2)
#
# non_norm.fit(X_train, y_train)
# y_pred = non_norm.predict(X_test)
# print(f'Non normalized test accuracy of {f1_score(y_test, y_pred, average=
```

```
Fitting 3 folds for each of 1440 candidates, totalling 4320 fits
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

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```

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work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
```

```
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   3.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   9.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=  10.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   4.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   4.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   3.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
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solver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
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[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
```

```
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   6.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   8.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   1.5s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
```

```
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=  10.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=  10.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   7.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

```
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=  10.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   4.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
```

```
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   7.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=  13.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   8.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
```

```
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  13.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=  12.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   4.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

```
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   3.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   9.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
```

```
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   6.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=  10.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   6.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
```

```
er=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=  11.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   8.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=  10.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   9.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
```

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[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
```

```
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   9.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=  11.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   4.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.8s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
```

```
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=  10.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   4.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=  12.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

```
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=  10.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.5s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=  13.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=  12.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   5.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
```

```
er=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   3.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   8.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.3s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
```

```
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  12.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  12.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   8.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   3.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   4.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
```

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[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
```

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r=sgd; total time=  11.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=  12.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   4.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   3.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.6s
```

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[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   8.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   4.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  12.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   5.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   4.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
```

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_solver=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

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0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   8.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=  13.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   4.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
```

```
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   7.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   9.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=  13.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   4.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
```

```
=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
```

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00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   7.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   3.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=  13.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   7.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
```

```
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=  10.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=  10.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=  10.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=  10.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
```

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[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
```

```
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=  12.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   9.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=  12.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   8.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.2s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
```

```
er=adam; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.9s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  12.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=  12.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   5.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

```
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   9.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
```

```
r=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   3.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   8.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   8.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=  10.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   9.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
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00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
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```

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[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
```

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sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
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sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
```

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0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  12.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   6.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   9.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
```

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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   7.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
```

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er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
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00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
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=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   4.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   5.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  15.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   6.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   4.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
```

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0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   8.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.4s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.9s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
```

```
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   7.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  15.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   3.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
```

```
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   9.5s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
```

```
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   6.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   9.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   5.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
```

```
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   7.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
```

```
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   7.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   4.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   4.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
```

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adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   6.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   6.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=  15.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

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(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.6s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
```

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er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   9.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   4.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   3.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   8.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

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0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   3.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
```

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[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
```

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adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   9.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  15.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   6.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
```

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0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   8.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   8.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.6s
```

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[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   9.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   4.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
```

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d; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
```

```
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   2.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   5.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   8.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   6.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   3.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
```

```
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
```

```
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.3s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   3.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   8.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
```

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=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   3.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  16.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=  11.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   4.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   8.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   3.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.6s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
```

```
r=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   9.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.8s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   9.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   3.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
```

```
am; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   9.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
```

```
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   7.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   7.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.6s
```

```
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   8.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solve
r=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   9.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   5.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
```

```
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   3.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   3.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
```

```
r: Maximum iterations (1000) reached and the optimization hasn't converged
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   8.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
```

```
d; total time=   1.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.8s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  16.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   1.5s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   8.0s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   3.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
```

```
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.9s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   8.4s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=tanh, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   8.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solve
r=sgd; total time=   1.0s
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   9.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   5.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
```

```
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   4.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   3.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   6.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   3.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
```

```
lver=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   6.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
```

```
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   6.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   3.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
```

```
ver=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   5.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.4s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   6.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   6.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
```

```
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.4s
```

```
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   3.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   4.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
```

```
lver=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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  warnings.warn(
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work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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  warnings.warn(
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   3.0s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   4.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
```

```
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
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[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
```

```
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   7.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   3.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
```

```
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
```

```
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.5s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   6.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   5.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   6.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
```

```
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
```

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0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   1.6s
```

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[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   8.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   7.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
```

```
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.0s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   9.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   3.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   8.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
```

```
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   8.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

```
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   5.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   6.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
```

```
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   7.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.7s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
```

```
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   8.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   4.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   4.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
```

```
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   2.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   6.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
```

```
sgd; total time=   4.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   7.3s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   3.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   4.9s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   4.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
```

```
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   8.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=s
gd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
```

```
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   5.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
```

```
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   9.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   3.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   4.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   3.7s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   5.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   3.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
```

```
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   1.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

```
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   8.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   3.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   4.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
```

```
=sgd; total time=   9.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   7.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   3.6s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.0001, ann__hidden_layer_sizes=
(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
```

```
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   8.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   6.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
```

```
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   5.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   5.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.6s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
```

```
sgd; total time=   9.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
```

```
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   7.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   3.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=adam; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.6s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   4.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
```

```
lver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   1.0s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
```

```
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=a
dam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solve
r=adam; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver
=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=s
gd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver
=sgd; total time=   6.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
00,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver
=sgd; total time=   4.0s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
```

```
olver=adam; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.001, ann__hidden_layer_sizes=(1
00, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   7.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(2
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(4
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
```

```
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   9.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.3s
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   3.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
```

```
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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```
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
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/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
```

```
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   0.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   8.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   4.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   3.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
```

```
ver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver
=sgd; total time=   1.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   5.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   3.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
```

```
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   0.5s
```

```
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   4.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann
__solver=sgd; total time=   3.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann_
_solver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann_
_solver=sgd; total time=   3.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann_
_solver=sgd; total time=   2.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann_
_solver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann_
_solver=sgd; total time=   3.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, a
nn__solver=adam; total time=   4.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, a
nn__solver=sgd; total time=   4.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, an
```

```
n__solver=sgd; total time=   6.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=sg
d; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(7
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
```

```
sgd; total time=   1.6s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   1.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=adam; total time=   1.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solver=
sgd; total time=   7.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=sg
d; total time=   3.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   3.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   0.9s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   6.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
```

```
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.9s
```

```
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   3.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=  11.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann
__solver=adam; total time=   3.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__s
```

```
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__s
olver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__s
olver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, a
nn__solver=sgd; total time=   3.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, an
n__solver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, an
n__solver=sgd; total time=   5.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, an
n__solver=sgd; total time=   5.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.5s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
```

```
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
```

```
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   1.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   3.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=  10.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann
__solver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann_
_solver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann_
_solver=adam; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann_
_solver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=sgd; total time=   3.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   8.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.0s
```

```
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
```

```
ver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   3.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   2.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
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es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.6s
```

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[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   5.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   7.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann_
_solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__s
olver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann
__solver=sgd; total time=   3.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=sgd; total time=   4.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, an
n__solver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann_
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_solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, a
nn__solver=sgd; total time=   3.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   8.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
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s=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   3.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   2.7s
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[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   2.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   3.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
```

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lver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   2.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   2.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=  11.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann
__solver=adam; total time=   3.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
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es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann_
_solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann_
_solver=adam; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann_
_solver=sgd; total time=   4.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann_
_solver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=sgd; total time=   3.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, an
n__solver=sgd; total time=   7.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, an
n__solver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, an
n__solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.5s
```

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[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
```

```
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   3.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   3.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
```

```
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann_
_solver=sgd; total time=   3.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   4.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__
solver=sgd; total time=   3.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, an
n__solver=sgd; total time=   3.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann
__solver=sgd; total time=   7.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann
__solver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann
__solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann
__solver=adam; total time=   0.5s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=   2.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solver=ad
am; total time=   0.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__solver
=sgd; total time=  10.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.3s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solver=
adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(50
0,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solver=
sgd; total time=   4.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   2.4s
```

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[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(5
0, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   5.0s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.7s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=relu, ann__alpha=0.01, ann__hidden_layer_sizes=(10
0, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
```

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lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solv
er=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   3.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
```

```
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann
__solver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann
__solver=adam; total time=   4.0s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann_
_solver=sgd; total time=   4.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann_
_solver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann_
_solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann_
_solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__s
olver=sgd; total time=   3.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.2, an
n__solver=sgd; total time=   6.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, an
n__solver=sgd; total time=   7.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
```

```
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__solve
```

```
r=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.4s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
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yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=sgd; total time=   2.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=sgd; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__
solver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__s
olver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__s
olver=adam; total time=   1.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__s
olver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann__sol
ver=sgd; total time=   7.6s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann_
_solver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann_
```

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_solver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann
__solver=adam; total time=   2.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann_
_solver=sgd; total time=   3.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, a
nn__solver=adam; total time=   3.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, an
n__solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann_
_solver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann_
_solver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann_
_solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, a
nn__solver=adam; total time=   4.5s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, an
n__solver=sgd; total time=   1.8s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, an
n__solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.0001, ann__hidden_layer_siz
es=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=1, ann_
_solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solve
r=sgd; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
```

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s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   1.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(40,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
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[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   1.9s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__so
lver=adam; total time=   2.0s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__so
lver=sgd; total time=   0.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__sol
ver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__sol
ver=sgd; total time=   1.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__sol
ver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(70,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__sol
ver=sgd; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.9s
```

```
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=sgd; total time=   0.8s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.5s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   2.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   2.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solv
er=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   1.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__s
olver=adam; total time=   0.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=sgd; total time=   1.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__so
lver=adam; total time=   2.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(500,), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann__so
lver=sgd; total time=   8.6s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=constant, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   3.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann_
_solver=adam; total time=   2.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(50, 50), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__
solver=sgd; total time=   3.4s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.01, an
```

```
n__solver=adam; total time=   3.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann
__solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann
__solver=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__
solver=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__
solver=sgd; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__
solver=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=constant, ann__learning_rate_init=1, ann__
solver=adam; total time=   0.3s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, an
n__solver=adam; total time=   5.1s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann
__solver=sgd; total time=   1.7s
[CV] END ann__activation=logistic, ann__alpha=0.001, ann__hidden_layer_size
s=(100, 100), ann__learning_rate=adaptive, ann__learning_rate_init=0.5, ann
__solver=sgd; total time=   5.2s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=constant, ann__learning_rate_init=0.5, ann__solv
er=adam; total time=   0.1s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=constant, ann__learning_rate_init=1, ann__solver
=sgd; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.01, ann__sol
ver=sgd; total time=   0.9s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.1, ann__solv
er=adam; total time=   0.2s
[CV] END ann__activation=logistic, ann__alpha=0.01, ann__hidden_layer_sizes
=(20,), ann__learning_rate=adaptive, ann__learning_rate_init=0.2, ann__solv
er=adam; total time=   0.1s
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
```

```
Best parameters found:  {'ann__activation': 'relu', 'ann__alpha': 0.001, 'a
nn__hidden_layer_sizes': (500,), 'ann__learning_rate': 'constant', 'ann__le
arning_rate_init': 0.01, 'ann__solver': 'sgd'}
=====================ANN CLASSIFIER=====================

Accuracy:  0.659375
Classification Report:
               precision    recall  f1-score   support

           3       0.00      0.00      0.00         2
           4       0.33      0.08      0.13        12
           5       0.72      0.81      0.76       136
           6       0.63      0.64      0.64       129
           7       0.53      0.42      0.47        40
           8       0.00      0.00      0.00         1

    accuracy                           0.66       320
   macro avg       0.37      0.33      0.33       320
weighted avg       0.64      0.66      0.64       320
```

```
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/neural_net
work/_multilayer_perceptron.py:692: ConvergenceWarning: Stochastic Optimize
r: Maximum iterations (1000) reached and the optimization hasn't converged
yet.
  warnings.warn(
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
l-defined and being set to 0.0 in labels with no predicted samples. Use `ze
ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
l-defined and being set to 0.0 in labels with no predicted samples. Use `ze
ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
/Users/ulysses/opt/anaconda3/lib/python3.9/site-packages/sklearn/metrics/_c
lassification.py:1318: UndefinedMetricWarning: Precision and F-score are il
l-defined and being set to 0.0 in labels with no predicted samples. Use `ze
ro_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```