# Random_zer_search_cv

February 17, 2019

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In [1]: from sklearn.datasets import load_digits
        digits = load_digits()
        X, Y = digits.data, digits.target

        from sklearn import svm
        h = svm.SVC()
        hp = svm.SVC(probability=True, random_state=1)

        from sklearn.model_selection import RandomizedSearchCV
```

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D:\Python\Lib\importlib\_bootstrap.py:219: RuntimeWarning: numpy.ufunc size changed, may indica
  return f(*args, **kwds)
```

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In [9]: search_dict = {'kernel': ['linear', 'rbf'],
                       'C':[1, 10, 100, 1000],
                      'gamma':[0.01, 0.001, 0.0001]}
        scorer = 'accuracy'
        search_func = RandomizedSearchCV(estimator=h, param_distributions= search_dict, n_iter=
                                         iid=False, refit=True, cv=10, return_train_score=True)
        %timeit score = search_func.fit(X, Y)
        print(search_func.best_estimator_)
        print(search_func.best_params_)
        print(search_func.best_score_)
```

```
24.2 s ś 6.15 s per loop (mean ś std. dev. of 7 runs, 1 loop each)
SVC(C=10, cache_size=200, class_weight=None, coef0=0.0,
  decision_function_shape='ovr', degree=3, gamma=0.001, kernel='rbf',
  max_iter=-1, probability=False, random_state=None, shrinking=True,
  tol=0.001, verbose=False)
{'kernel': 'rbf', 'gamma': 0.001, 'C': 10}
0.981081122784369
```

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In [11]: search_func.cv_results_
```

```
Out[11]: {'mean_fit_time': array([0.03847549, 0.11503494, 0.05636449, 0.0412756 , 0.058866  ,
                 0.4989104 , 0.49272053, 0.1182354 , 0.0562727 , 0.49327948]),
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'std_fit_time': array([0.00120836, 0.00201938, 0.003291  , 0.00219518, 0.00429813,
       0.02196273, 0.00938432, 0.00430777, 0.00309858, 0.02815062]),
'mean_score_time': array([0.00469694, 0.01099095, 0.00739651, 0.00460277, 0.00779755
       0.02608569, 0.02418363, 0.01169271, 0.00829246, 0.02468376]),
'std_score_time': array([0.00045848, 0.00044925, 0.00048838, 0.00049094, 0.00097855,
       0.00291206, 0.00074941, 0.00100102, 0.0004567 , 0.00189976]),
'param_kernel': masked_array(data=['linear', 'rbf', 'rbf', 'linear', 'rbf', 'rbf', '
                   'rbf', 'rbf', 'rbf'],
             mask=[False, False, False, False, False, False, False, False,
                   False, False],
       fill_value='?',
            dtype=object),
'param_gamma': masked_array(data=[0.01, 0.001, 0.0001, 0.0001, 0.0001, 0.01, 0.01, 0
                   0.0001, 0.01],
             mask=[False, False, False, False, False, False, False, False,
                   False, False],
       fill_value='?',
            dtype=object),
'param_C': masked_array(data=[10, 10, 1000, 1, 100, 10, 1, 1000, 10, 100],
             mask=[False, False, False, False, False, False, False, False,
                   False, False],
       fill_value='?',
            dtype=object),
'params': [{'kernel': 'linear', 'gamma': 0.01, 'C': 10},
 {'kernel': 'rbf', 'gamma': 0.001, 'C': 10},
 {'kernel': 'rbf', 'gamma': 0.0001, 'C': 1000},
 {'kernel': 'linear', 'gamma': 0.0001, 'C': 1},
 {'kernel': 'rbf', 'gamma': 0.0001, 'C': 100},
 {'kernel': 'rbf', 'gamma': 0.01, 'C': 10},
 {'kernel': 'rbf', 'gamma': 0.01, 'C': 1},
 {'kernel': 'rbf', 'gamma': 0.001, 'C': 1000},
 {'kernel': 'rbf', 'gamma': 0.0001, 'C': 10},
 {'kernel': 'rbf', 'gamma': 0.01, 'C': 100}],
'split0_test_score': array([0.93513514, 0.96756757, 0.95135135, 0.93513514, 0.9513513
       0.70810811, 0.68648649, 0.96756757, 0.95135135, 0.70810811]),
'split1_test_score': array([0.99453552, 1.        , 1.        , 0.99453552, 1.
       0.86885246, 0.84699454, 1.        , 0.99453552, 0.86885246]),
'split2_test_score': array([0.9281768 , 0.95027624, 0.93370166, 0.9281768 , 0.9337016
       0.68508287, 0.67403315, 0.95027624, 0.91712707, 0.68508287]),
'split3_test_score': array([0.96111111, 0.99444444, 0.97777778, 0.96111111, 0.9777777
       0.68888889, 0.67777778, 0.99444444, 0.98333333, 0.68888889]),
'split4_test_score': array([0.96089385, 0.98324022, 0.98324022, 0.96089385, 0.9832402
       0.78212291, 0.77094972, 0.98324022, 0.97206704, 0.78212291]),
'split5_test_score': array([0.98882682, 0.98882682, 0.97206704, 0.98882682, 0.9720670
       0.69832402, 0.68715084, 0.98882682, 0.99441341, 0.69832402]),
'split6_test_score': array([0.96648045, 0.99441341, 0.98882682, 0.96648045, 0.9888268
       0.83240223, 0.82122905, 0.99441341, 0.98324022, 0.83240223]),
'split7_test_score': array([0.97752809, 0.99438202, 0.99438202, 0.97752809, 0.9943820
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       0.76404494, 0.75280899, 0.99438202, 0.99438202, 0.76404494]),
'split8_test_score': array([0.93220339, 0.97175141, 0.94915254, 0.93220339, 0.949152
       0.76836158, 0.76271186, 0.97175141, 0.93785311, 0.76836158]),
'split9_test_score': array([0.96590909, 0.96590909, 0.96590909, 0.96590909, 0.965909
       0.71590909, 0.6875    , 0.96590909, 0.96590909, 0.71590909]),
'mean_test_score': array([0.96108002, 0.98108112, 0.97164085, 0.96108002, 0.97164085
       0.75120971, 0.73676424, 0.98108112, 0.96942122, 0.75120971]),
'std_test_score': array([0.02191309, 0.01550682, 0.02044204, 0.02191309, 0.02044204,
       0.06000335, 0.06017913, 0.01550682, 0.0251793 , 0.06000335]),
'rank_test_score': array([ 6,  1,  3,  6,  3,  8, 10,  1,  5,  8]),
'split0_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99875931, 1.        ]),
'split1_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99814126, 1.        ]),
'split2_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99814356, 1.        ]),
'split3_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99752628, 1.        ]),
'split4_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99690977, 1.        ]),
'split5_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99814586, 1.        ]),
'split6_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99814586, 1.        ]),
'split7_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99691167, 1.        ]),
'split8_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99753086, 1.        ]),
'split9_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99814929, 1.        ]),
'mean_train_score': array([1.        , 1.        , 1.        , 1.        , 1.
       1.        , 1.        , 1.        , 0.99783637, 1.        ]),
'std_train_score': array([0.        , 0.        , 0.        , 0.        , 0.
       0.        , 0.        , 0.        , 0.00056849, 0.        ])}
```

In [ ]: