basic_model_comparison

February 19, 2020

[1]:
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# Compare Algorithms
import pandas as pd
import numpy as np

import matplotlib.pyplot as plt

from sklearn import model_selection
from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.naive_bayes import GaussianNB
from sklearn.svm import SVC
```

[5]:
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# Load dataset
X_train_raw_keyword = np.load(r"processed_data/raw_keyword_categorical_X_train.
 ↪npy", allow_pickle=True)
y_train = np.load(r"processed_data/raw_keyword_categorical_y_train.npy",␣
 ↪allow_pickle=True)
test_processed_raw_keyword = np.load(r"processed_data/
 ↪raw_keyword_categorical_test_processed_csr.npy", allow_pickle=True)

X_train_lemma_keyword = np.load(r"processed_data/
 ↪lemma_keyword_categorical_X_train_csr.npy", allow_pickle=True)
test_processed_lemma_keyword = np.load(r"processed_data/
 ↪lemma_keyword_categorical_test_processed_csr.npy", allow_pickle=True)
```

[6]:
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%%time
# Prepare configuration for cross validation test harness
seed = 42

# Prepare models
models = []
models.append(('LR', LogisticRegression()))
models.append(('LDA', LinearDiscriminantAnalysis()))
models.append(('KNN', KNeighborsClassifier()))
models.append(('CART', DecisionTreeClassifier()))
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models.append(('NB', GaussianNB()))
models.append(('SVM', SVC()))

# Evaluate each model in turn
results = []
names = []
scoring = 'accuracy'

for name, model in models:
    kfold = model_selection.KFold(n_splits=10, random_state=seed)
    cv_results = model_selection.cross_val_score(model, X_train_raw_keyword,␣
 ↪y_train, cv=kfold, scoring=scoring)
    results.append(cv_results)
    names.append(name)
    msg = "%s: %f (%f)" % (name, cv_results.mean(), cv_results.std())
    print(msg)

# Boxplot algorithm comparison
fig = plt.figure()
fig.suptitle('Algorithm Comparison')
ax = fig.add_subplot(111)
plt.boxplot(results)
ax.set_xticklabels(names)
plt.show()
```

```
/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/linear_model/_logistic.py:940: ConvergenceWarning: lbfgs failed
to converge (status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-
regression
  extra_warning_msg=_LOGISTIC_SOLVER_CONVERGENCE_MSG)
```

```
LR: 0.754755 (0.030745)
```

```
/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
random_state has no effect since shuffle is False. This will raise an error in
0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning
```

```
LDA: 0.478532 (0.066021)
```

```
/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
```

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random_state has no effect since shuffle is False. This will raise an error in
0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

KNN: 0.616953 (0.048250)

/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
random_state has no effect since shuffle is False. This will raise an error in
0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

CART: 0.671608 (0.023894)

/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
random_state has no effect since shuffle is False. This will raise an error in
0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

NB: 0.601349 (0.025804)

/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
random_state has no effect since shuffle is False. This will raise an error in
0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

SVM: 0.708116 (0.041352)
```

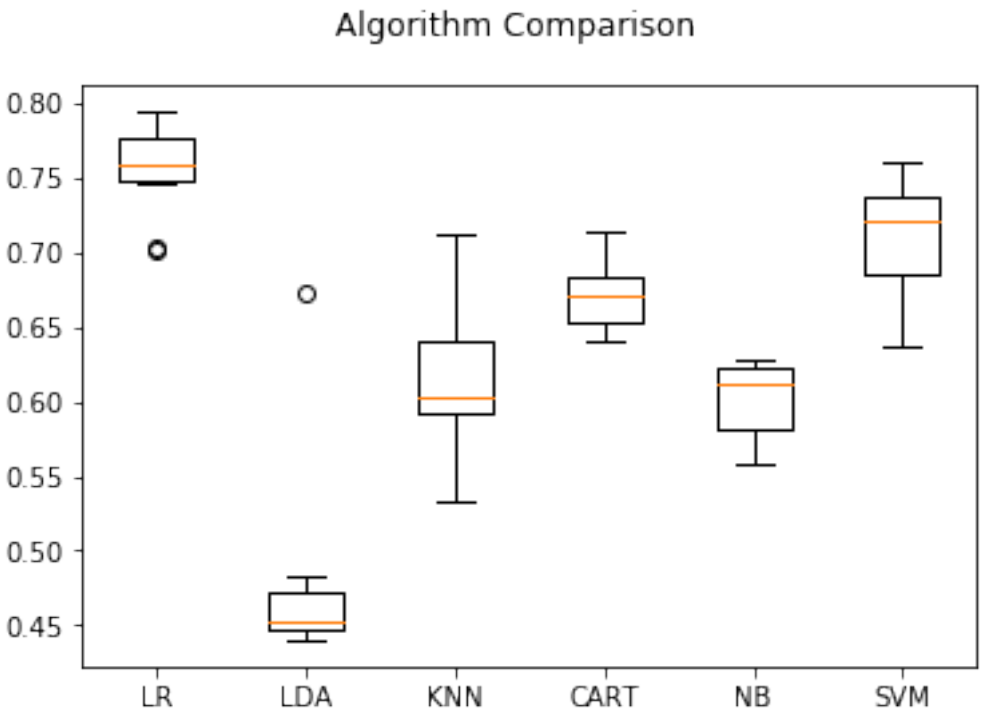

```
CPU times: user 5h 43min 21s, sys: 5min 48s, total: 5h 49min 9s
Wall time: 3h 52min 35s
```

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