basic_model_comparison

February 19, 2020

```
[1]: # 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
```

```
[2]: # Load dataset
     X_train_raw_keyword = np.load(r"processed_data/
      ↪full_raw_keyword_pca_50_pipeline_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/
      ↪full_raw_keyword_pca_50_pipeline_test_processed.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)
```

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

     # Prepare models
     models = []
     models.append(('LR', LogisticRegression(verbose=51)))
     models.append(('LDA', LinearDiscriminantAnalysis()))
     models.append(('KNN', KNeighborsClassifier(n_jobs=-1)))
     models.append(('CART', DecisionTreeClassifier()))
```

```python
models.append(('NB', GaussianNB()))
models.append(('SVM', SVC(verbose=51)))

# 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()
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LR: 0.652692 (0.038095)
LDA: 0.583594 (0.034757)

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random_state has no effect since shuffle is False. This will raise an error in
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```
KNN: 0.689211 (0.028582)
```

```
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```

```
CART: 0.607112 (0.021714)
NB: 0.486153 (0.031019)
[LibSVM]
```

```
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```
[LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM]SVM:
0.701030 (0.026967)
```


Algorithm Comparison
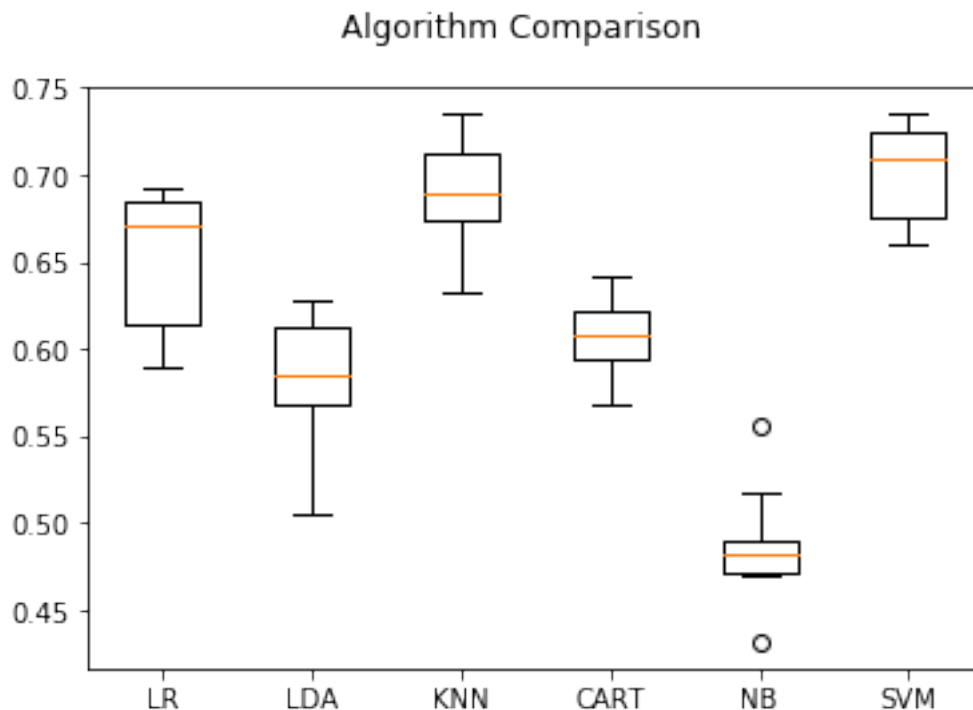
```
CPU times: user 2min 30s, sys: 12.3 s, total: 2min 42s
Wall time: 2min 19s
```

[4]:
```python
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```

[5]:
```python
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# Prepare configuration for cross validation test harness
seed = 42

# Prepare models
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models.append(('LDA', LinearDiscriminantAnalysis()))
models.append(('KNN', KNeighborsClassifier(n_jobs=-1)))
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scoring = 'accuracy'

for name, model in models:
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    cv_results = model_selection.cross_val_score(model, X_train_lemma_keyword,
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    results.append(cv_results)
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    msg = "%s: %f (%f)" % (name, cv_results.mean(), cv_results.std())
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# Boxplot algorithm comparison
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LR: 0.656243 (0.040266)
LDA: 0.586613 (0.033329)

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KNN: 0.683167 (0.027913)

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0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

CART: 0.628005 (0.039659)
NB: 0.518323 (0.046231)
[LibSVM]

/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.
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/home/alex/miniconda3/envs/spacy/lib/python3.7/site-
packages/sklearn/model_selection/_split.py:296: FutureWarning: Setting a
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0.24. You should leave random_state to its default (None), or set shuffle=True.
  FutureWarning

[LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM][LibSVM]SVM:
0.704710 (0.037455)
```
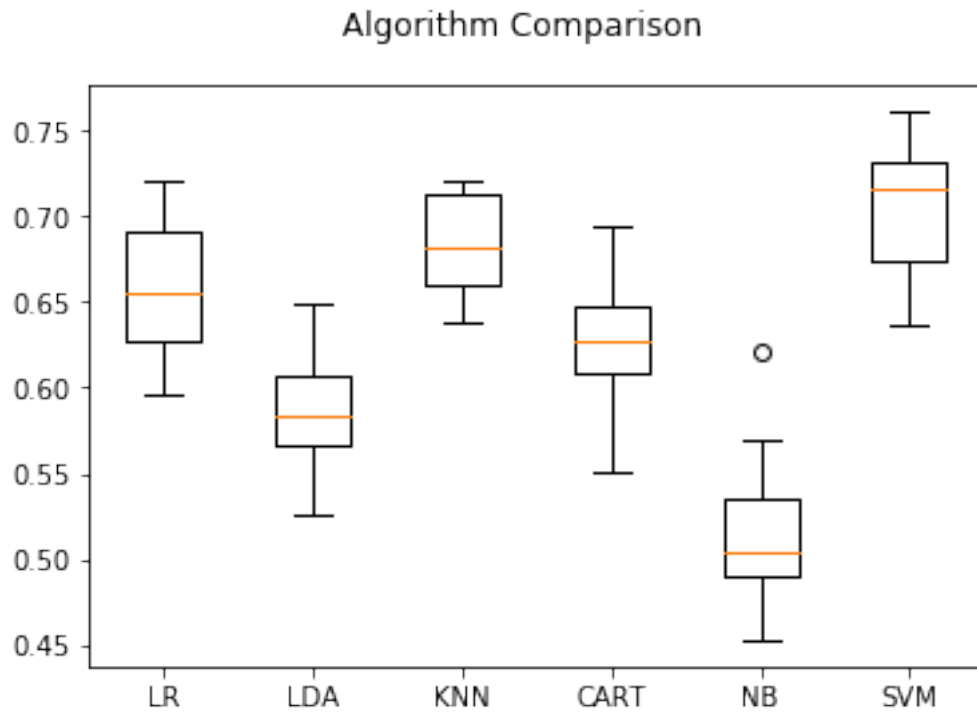
Algorithm Comparison

```
CPU times: user 2min 14s, sys: 11 s, total: 2min 25s
Wall time: 2min 4s
```

[ ]: