Cross Validated

sklearn.metrics.accuracy_score vs. LogisticRegression().score?

Asked 1 year ago Active 1 year ago Viewed 3k times

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I'm currently testing some models on a simple binary classification task, however, I've found a strange discrepancy between two accuracy score metrics from SK Learn: sk_learn.metrics.accuracy_score and the .score() method on the LogisticRegression class.

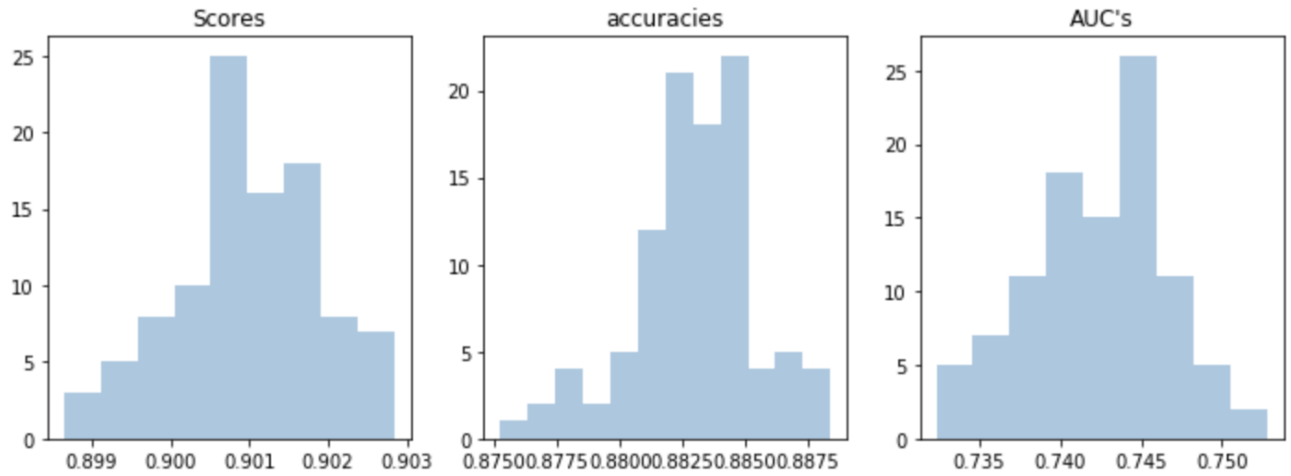
They are both supposed to be measuring "accuracy", but after juxtaposing the two, I can't find any obvious differences between them. Can someone help me explain why I'm getting different results for the two methods? And maybe provide a recommendation on which to use? Below is the function I called to run 100 trials of the model with randomized samples from my data set.

I'm also sharing screen shots of the resulting distributions of scores.

```
def lr_runner(data, ratio, kpi, dropper, d_var, sensitivity=.01):
scores =[]
accs =[]
AUCs = []
tprs = []
mean_fpr = np.linspace(0, 1, 100)
for i in tqdm_notebook(range(100)):
    train, test = randomizer(data, .66, kpi, sensitivity=sensitivity)
    train = pd.get_dummies(train, columns=['categorical_variable1',
'categorical_variable2'])
    test = pd.get_dummies(test, columns=['categorical_variable1',
'categorical_variable2'])
    X_train = train.drop(dropper, axis=1)
    X_train = sm.add_constant(X_train)
    X_test = test.drop(dropper, axis=1)
    X_test = sm.add_constant(X_test)
    y_train = train[d_var]
    y_test = test[d_var]
    results = LogisticRegression().fit(X_train, y_train)
    scores.append(results.score(X_train, y_train))
    accs.append(accuracy_score(y_test, results.predict(X_test)))
    probas_ = results.predict_proba(X_test)
    fpr, tpr, thresholds = roc_curve(y_test, probas_[:, 1])
    tprs.append(interp(mean_fpr, fpr, tpr))
    tprs[-1][0] = 0.0
    roc_auc = auc(fpr, tpr)
    AUCs.append(roc_auc)
print("mean score: {}\nmean acc: {}\nmean AUC: {}".format(np.mean(scores),
                                                           np.mean(accs),
                                                           np.mean(AUCs)))
fig, subplots = plt.subplots(1,3, figsize=(12, 4))
sns.distplot(scores, kde=False, ax=subplots[0])
subplots[0].set_title("Scores")
sns.distplot(accs, kde=False, ax=subplots[1])
subplots[1].set_title("accuracies")
sns.distplot(AUCs, kde=False, ax=subplots[2])
subplots[2].set_title("AUC's")
plt.show()
```

```
    fig.show()
    return scores, accs, AUCs, results
```

```
mean score: 0.9009828084691298
mean acc: 0.8829404135064671
mean AUC: 0.7422995463101976
```



logistic accuracy

asked Jul 5 '18 at 23:25

Victor Vulovic
51 1 5

1 Answer

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I wish I could just take this back...amazing what happens when you put your confusion down in writing (and read the source code).

One is testing accuracy, the other is training accuracy.

To clarify:

`results.score(X_train, y_train)` is the training accuracy, while

`accuracy_score(y_test, results.predict(X_test))` is the testing accuracy.

The way I found out that they do the same thing is by inspecting the SK Learn source code. Turns out that the `.score()` method in the LogisticRegression class directly calls the `sklearn.metrics.accuracy_score` method... I ran a test to double check and it's confirmed:

Training with LR.score:

```
model.score(X_train, y_train)
0.72053675612602097
```

Testing with LR.score:

```
model.score(X_test, y_test)
0.79582673005810878
```

Testing with accuracy_score:

```
accuracy_score(y_test, model.predict(X_test))
0.79582673005810878
```

edited Jul 6 '18 at 21:09

answered Jul 5 '18 at 23:31

Victor Vulovic

51 1 5

1 Could you clarify which function is measuring training accuracy and which is measuring testing accuracy? – Sycorax Jul 5 '18 at 23:32

just clarified further in the most recent edit. Thanks! – Victor Vulovic Jul 6 '18 at 21:09