

Week 3

Notebook: Module 3 Notebook

1h

Module 3 Quiz

Video: Model Evaluation & Selection

Previous

Next

Video: Confusion Matrices & Basic Evaluation Metrics

12 min

Video: Classifier Decision Functions

7 min

Video: Precision-recall and ROC curves

6 min

Video: Multi-Class Evaluation

13 min

Video: Regression Evaluation

6 min

Reading: Practical Guide to Controlled Experiments on the Web (optional)

10 min

Video: Model Selection: Optimizing Classifiers for Different Evaluation Metrics

13 min

Quiz: Module 3 Quiz

14 questions

Assignment 3

Notebook: Assignment 3

1h

Programming Assignment: Assignment 3 Submission

3h

Module 3 Quiz

Total points 14

1. A supervised learning model has been built to predict whether someone is infected with a new strain of a virus. The probability of any one person having the virus is 1%. Using accuracy as a metric, what would be a good choice for a baseline accuracy score that the new model would want to outperform?
- 1 point

0.01

2. Given the following confusion matrix:
- 1 point

	Predicted Positive	Predicted Negative
Condition Positive	96	4
Condition Negative	8	19

Compute the accuracy to three decimal places.

0.905

3. Given the following confusion matrix:
- 1 point

	Predicted Positive	Predicted Negative
Condition Positive	96	4
Condition Negative	8	19

Compute the precision to three decimal places.

0.944

4. Given the following confusion matrix:
- 1 point

	Predicted Positive	Predicted Negative
Condition Positive	96	4
Condition Negative	8	19

Compute the recall to three decimal places.

0.941

Quiz • 28 min

Module 3 Quiz

- Using the fitted model `m` create a precision-recall curve to answer the following question:
- 1 point

For the fitted model `m`, approximately what precision can we expect for a recall of 0.8?

(Use `y_test` and `X_test` to compute the precision-recall curve. If you wish to view a plot, you can use `plt.show()`)

Submit your answer

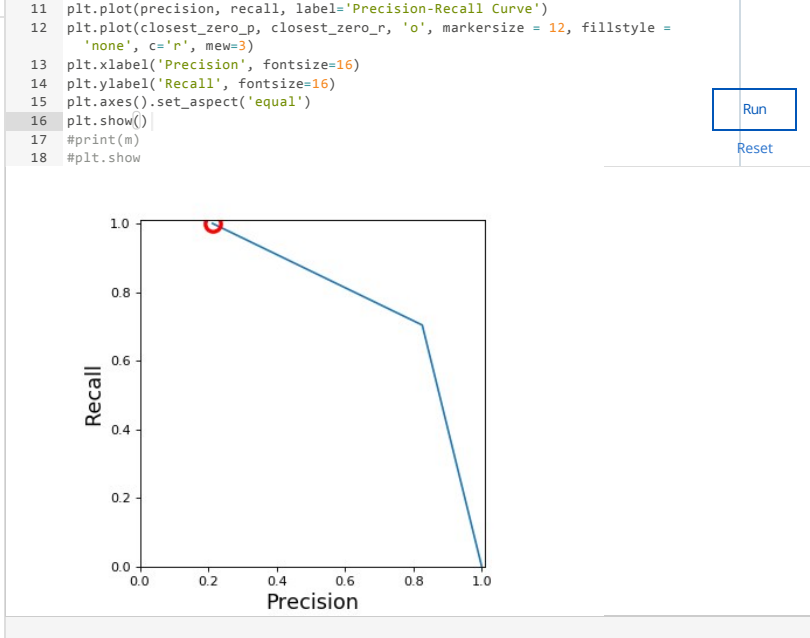
Due Apr 27, 3:59 AM -03

Receive grade

To Pass 80% correct

```
1 from sklearn.metrics import precision_recall_curve
2 preds = m.predict(X_test)
3 precision, recall, thresholds = precision_recall_curve(y_test, preds)
4 closest_zero = np.argmin(np.abs(thresholds))
5 closest_zero_p = precision[closest_zero]
6 closest_zero_r = recall[closest_zero]
7
8 plt.figure()
9 plt.xlim([0.0, 1.01])
10 plt.ylim([0.0, 1.01])
```

Start

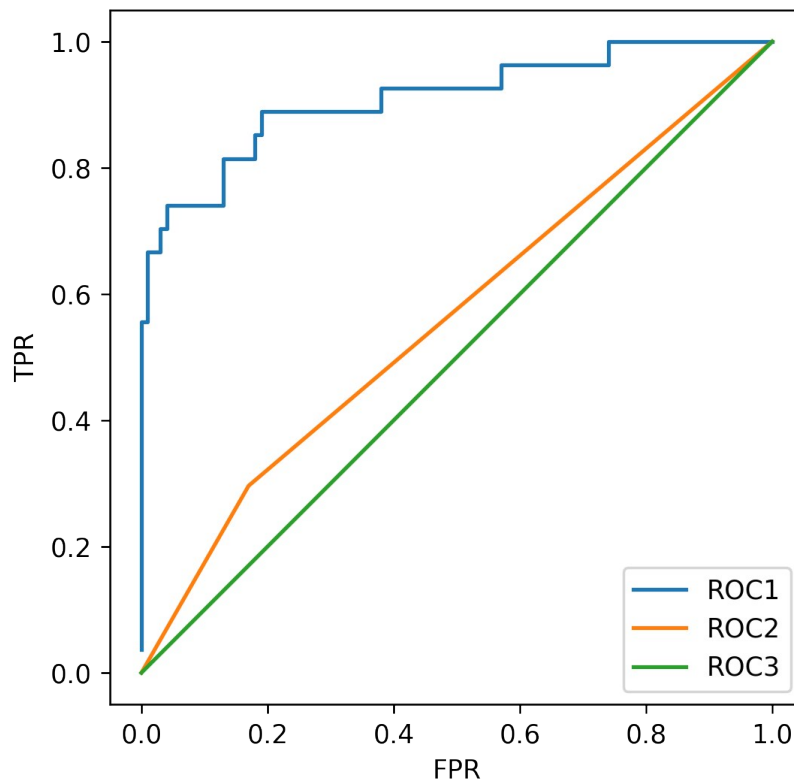


0.7

6. Given the following models and AUC scores, match each model to its corresponding ROC curve.

1 point

- Model 1 test set AUC score: 0.91
- Model 2 test set AUC score: 0.50
- Model 3 test set AUC score: 0.56



- Model 1: Roc 1
- Model 2: Roc 2
- Model 3: Roc 3



- Model 1: Roc 1
- Model 2: Roc 3

- Model 3: Roc 2



- Model 1: Roc 2
- Model 2: Roc 3
- Model 3: Roc 1



- Model 1: Roc 3
- Model 2: Roc 2
- Model 3: Roc 1

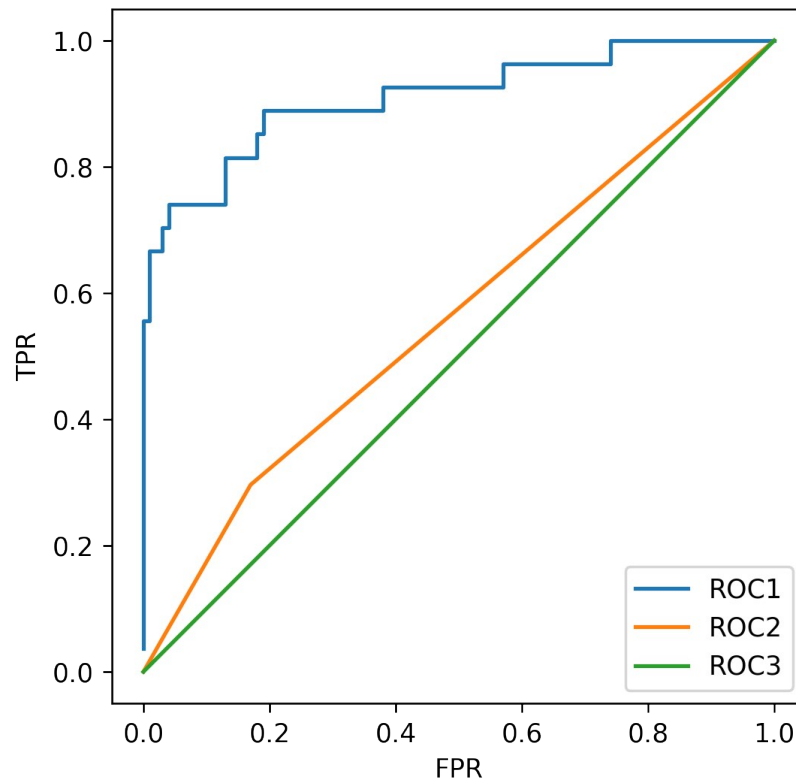


Not enough information is given.

7. Given the following models and accuracy scores, match each model to its corresponding ROC curve.

1 point

- Model 1 test set accuracy: 0.91
- Model 2 test set accuracy: 0.79
- Model 3 test set accuracy: 0.72



- Model 1: Roc 1
- Model 2: Roc 2
- Model 3: Roc 3



- Model 1: Roc 1
- Model 2: Roc 3
- Model 3: Roc 2



- Model 1: Roc 2

- Model 2: Roc 3
- Model 3: Roc 1



- Model 1: Roc 3
- Model 2: Roc 2
- Model 3: Roc 1



Not enough information is given.

8. Using the fitted model `m` what is the macro precision score?

1 point

(Use y_test and X_test to compute the precision score.)

```
1 pred = m.predict(X_test)
2 print('Macro-averaged precision = {:.2f} (treat classes equally)'
3     .format(precision_score(y_test, pred, average = 'macro')))
4 #print(m)
```

Macro-averaged precision = 0.81 (treat classes equally)

9. Which of the following is true of the R-Squared metric? (Select all that apply)

1 point



A model that always predicts the mean of y would get a score of 0.0



A model that always predicts the mean of y would get a negative score



The worst possible score is 0.0



The best possible score is 1.0

10. In a future society, a machine is used to predict a crime before it occurs. If you were responsible for tuning this machine, what evaluation metric would you want to maximize to ensure no innocent people (people not about to commit a crime) are imprisoned (where crime is the positive label)?

1 point



Accuracy



Precision



Recall



F1



AUC

11. Consider the machine from the previous question. If you were responsible for tuning this machine, what evaluation metric would you want to maximize to ensure all criminals (people about to commit a crime) are imprisoned (where crime is the positive label)?

1 point



Accuracy



Precision



Recall



F1



AUC

12. A classifier is trained on an imbalanced multiclass dataset. After looking at the model's precision scores, you find that the micro averaging is much smaller than the macro averaging score. Which of the following is most likely happening?

1 point



The model is probably misclassifying the infrequent labels more than the frequent labels.



The model is probably misclassifying the frequent labels more than the infrequent labels.

13. Using the already defined RBF SVC model `m`, run a grid search on the parameters C and gamma, for values [0.01, 0.1, 1, 10]. The grid search should find the model that best optimizes for recall. How much better is the recall of this model than the precision? (Compute recall - precision to 3 decimal places)

1 point

(Use y_test and X_test to compute precision and recall.)

1	<code>print(m)</code>	<div>Run</div> <div>Reset</div>
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Enter answer here

14. Using the already defined RBF SVC model `m`, run a grid search on the parameters C and gamma, for values [0.01, 0.1, 1, 10]. The grid search should find the model that best optimizes for precision. How much better is the precision of this model than the recall? (Compute precision - recall to 3 decimal places)

1 point

(Use y_test and X_test to compute precision and recall.)

1

`print(m)`

Run

Reset

Enter answer here

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