In-class Exercise 8: Performance Metrics

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1. **For what class is class 4 most mistaken?**

**Class 13**

**Within the whole column of class 4, which predicted is the highest**

1. **Are classes 2 and 3 mistaken for class 12 at the same rate?**

No, class 2 has a total of 389 people whereas class 3 has a total of 391, thus they have different rates

16/389 = 0.0411

16/391 = 0.0409

1. **What is the true number of class 17s?**

**364**

* + **This is the total number of instances that actually belong to class 17, regardless of how they were predicted.**

1. **What is the predicted number of class 17s?**

**477**

* + **This whole row**

1. **Which class is least well classified, in absolute numbers?**

Class 20 because for the true class of 20 there were also other classes that have a high predicted class.

1. **Which class is least well classified, by percentage?**

Class 20 as well because of the explanation above, if you add up all the mis-classified it will have the worst percentage.



1. **Which class is mistaken for the highest number of other classes?**

Class 3 and 7

The class that has the lowest amount of zeros in the class

1. **Which class is most successfully recognized, by percentage?**

Class 11

Class with most TP

1. **Recast this problem as “class 7 or not class 7” and draw the corresponding 2×2 confusion matrix.**

**Reality/Predicted**



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1. **Calculate 𝑆𝑒, 𝑆𝑝, FPR, FNR, and 𝐹\_1.**

**Se = TP/TP+FN …. 235/382 = 0.6151**

**Sp = TN/TN+FP …… 7100/7123 = 0.997**

**FPR = 1-Sp = (FP-TN) = 0.003**

**FNR = 1-Se = (FN-FN+TP) 0.3849**

**F1 = TP/TP+(FN+FP/2)) = 235/235+(FN+FP/2) = 0.734**

1. **Draw three hypothetical but realistic ROC curves, with axes fully marked: one equivalent to random guessing, one equivalent to a decent ML system, one equivalent to a very good ML system, and one equivalent to a very poor ML system.**



1. **Comment on what you can do to easily improve the very poor system.** 
   * **Collect more data to train the model.**
   * **Address any class imbalance in the dataset.**
   * **Choose different predictors**