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IE598 MLF F18

Module 7 Homework (Random Forest)

Using the Wine dataset, described in Raschka chapter 4 and 10 fold cross validation;

Part 1: Random forest estimators

Fit a random forest model, try several different values for N_estimators, report in-sample accuracies.

N_estimators	In-sample accuracy
1	0.90 (+/- 0.13)
2	0.86 (+/- 0.20)
5	0.96 (+/- 0.10)
10	0.97 (+/- 0.07)
15	0.98 (+/- 0.06)
25	0.97 (+/- 0.07)
50	0.97 (+/- 0.07)
100	0.97 (+/- 0.07)
250	0.97 (+/- 0.07)
500	0.97 (+/- 0.07)
1000	0.97 (+/- 0.07)

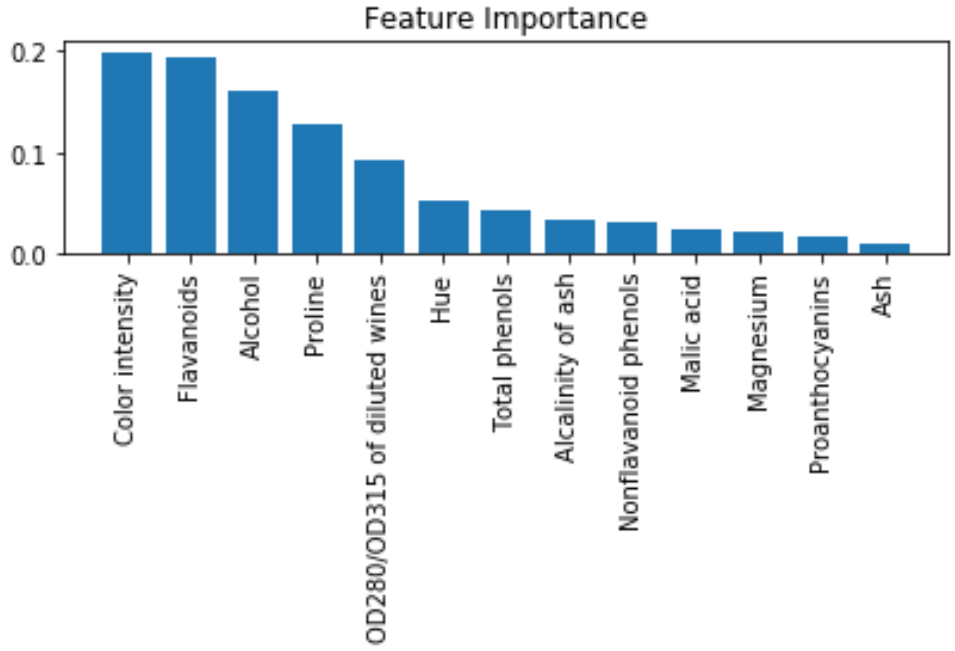
Part 2: Random forest feature importance

Display the individual feature importance of your best model in Part 1 above using the code presented in Chapter 4 on page 136. {importances=forest.feature_importances_ }

1) Color intensity	0.199674
2) Flavanoids	0.194217
3) Alcohol	0.160306
4) Proline	0.127067
5) OD280/OD315 of diluted wines	0.091433
6) Hue	0.051251
7) Total phenols	0.042253
8) Alcalinity of ash	0.033179
9) Nonflavanoid phenols	0.030194
10) Malic acid	0.023970
11) Magnesium	0.021691

12) Proanthocyanins 0.015880

13) Ash 0.008885



Part 3: Conclusions

Write a short paragraph summarizing your findings. What is the relationship between n_estimators, in-sample CV accuracy and computation time? What is the optimal number of estimators for your forest? Which features contribute the most importance in your model according to scikit-learn function? What is feature importance and how is it calculated? (If you are not sure, refer to the Scikit-Learn.org documentation.)

Overall, in-sample CV accuracy increases when the n estimator goes up. However, in terms of running time, the higher the n_estimator is, the longer the time is spent on computing. The optimal number of estimators for my forest is 15, considering both accuracy and computational complexity. Color intensity contributes the most importance in my model. Feature importance measures the relevant importance among different features. It is calculated as the mean decrease impurity over all trees in the random forest of ensemble.

Part 4: Appendix

Link to github repo: https://github.com/jzhuuhzj/IE598_F18_HW7.git