Classification Trees

Data Mining 2015: assignment 1

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1 Introduction

This report is written for the first assignment of the Data Mining (2015) course at Utrecht University. The goal of this assignment was to write a function in the R programming language that constructs a classification tree on a certain dataset, and to figure out efficient parameters for this tree.

2 Data

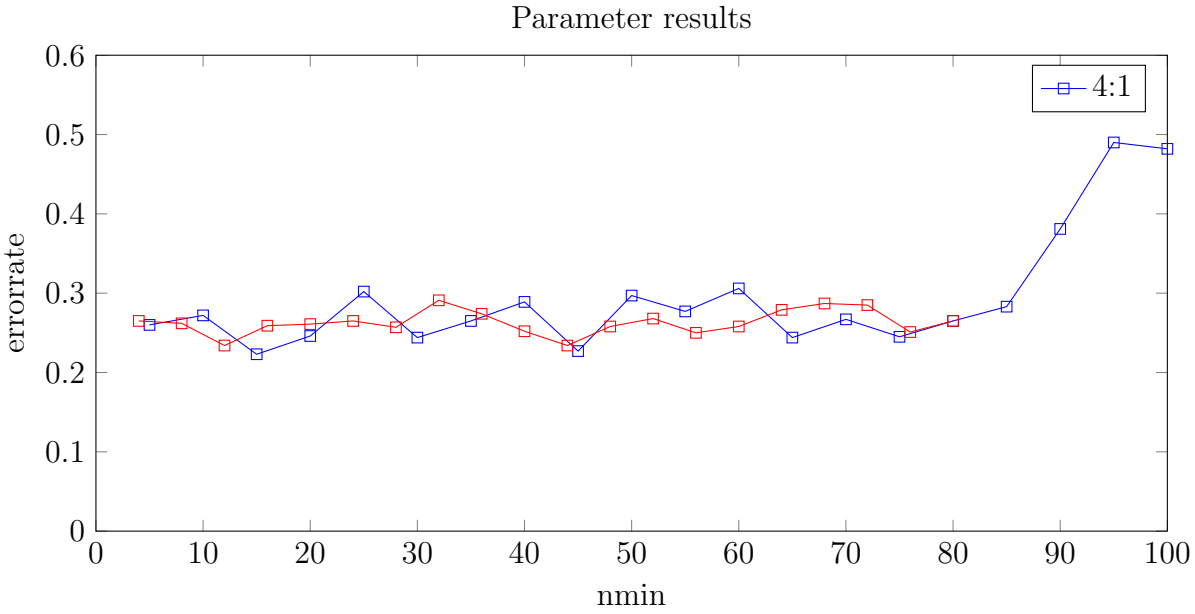
For this assignment we used the Heart Disease dataset from the University of California, Irvine machine learning repository. The preprocessed version for this assignment contains 297 instances and 14 attributes. A brief description of the used attributes:

1. Age, numeric attribute.
2. Sex, categorical attribute.
3. ChestPain, categorical attribute.
4. RestBP, numeric attribute, resting bloodpressure.
5. Chol, numeric attribute, serum cholesterol.
6. Fbs, categorical attribute, fasting bloodsugar test result.
7. RestECG, categorical attribute, resting electrocardiographic results.
8. MaxHR, numeric attribute, maximum heart rate achieved.
9. ExAng, categorical attribute, exercise induced angina.
10. Oldpeak, numeric attribute, exercise induced ST-depression.
11. Slope, categorical attribute, slope of the peak exercise ST segment.
12. Ca, numeric attribute, number of major vessels colored by flourosopy.
13. Thal, categorical attribute, thallium heart scan.
14. AHD, the class label for this assignment, heart disease diagnosis.

3 Experiments

The size of the classification tree is controlled by the *nmin* (minimum internal node size) and *minleaf* (minimum leaf size) parameters. Instead of brute forcing all possible values it is better to only try some sensible values and narrow down the optimal settings from there. It is possible to make a few observations regarding sensible parameter values (where n is the data set size):

- Both *nmin* and $minleaf$ should not be larger than $n/2$.
- The *minleaf* parameter should not be larger than $nmin/2$.



4 Results