

## Homework 12

For this homework you will create an R Markdown document that outputs to a PDF and you will upload both the .Rmd and .pdf files to wolfware. Be sure to put your name in the title of the document.

The purpose of this homework is to get practice fitting classification trees, random forests, boosted trees, and bagged trees with the `caret` [package](#).

The data we'll use is available [here](#) including a description of variables.

Read in the data and split it into training and testing sets. Standardize the numeric predictors by centering and scaling. You'll use the training set for all model fits and then use the testing set for evaluation of models.

Use the `caret` package and the training data set to:

- fit a classification tree (use `method = rpart`: tuning parameter is `cp`)
- fit a bagged tree (use `method = treebag`: no tuning parameter)
- fit a random forest (use `method = rf`: tuning parameter is `mtry`)
- fit a boosted tree (use `method = gbm`: tuning parameters are `n.trees`, `interaction.depth`, `shrinkage`, and `n.minobsinnode`)

Use some form of metric to determine tuning parameter choices where appropriate (i.e. repeated 10 fold CV). Feel free to use the default grid of tuning parameters for each method. I just want you to get a chance to fit the models - in practice you'd need to look at each tuning parameter and think about a reasonable grid.

Evaluate the models' performance on the test set using the misclassification rate.