Section 6.3: Classification

Duration: 2.5 hours

Concepts:
- Logistic regression
- Bayes classifier
- Linear discriminant analysis
- Quadratic discriminant analysis
- Naive Bayes
- K-nearest neighbours

Textbook section: An Introduction to Statistical Learning, Chapter 4 & Section 2.2.3

Materials and Resources	Learning Goals
● Computers for students with R Studio ● Classification Slides ● Classification Exercises R Markdown file	● Classification methods theory ● Bias-variance trade off ● Implementation of classification methods in R

Duration	Lesson Section	Learning Objectives
20 mins	Go through the introduction and logistic regression section of the slide deck.	● Logistic regression model ● Odds and log odds ● Making predictions ● Multiple predictors
20 mins	Go through the R Markdown Getting Started and Logistic Regression Sections as a class.	● Use `glm()` to fit a logistic regression ● Interpret summary ● Use `predict()` to find the training and test error rate
30 mins	Go through the linear discriminant analysis section of the slide deck.	● Bayes classifier ● LDA ● Confusion matrix ● Threshold ● ROC
15 mins	Go through the R Markdown “Linear Discriminant Analysis” section as a class.	● Use `lda()` to fit an LDA model ● Interpret the results ● `predict()` on test set ● Calculate test error rate
8 mins	Go through the Quadratic Discriminant Analysis section of the slide deck.	● LDA vs QDA
15 mins	Go through the R Markdown Quadratic Discriminant Analysis secion as a class.	● Use `qda()` to fit a a QDA
5 mins	Go through the Naive Bayes section of the slide deck.	● Naive Bayes

15 mins	Go through the R Markdown Naive Bayes section as a class.	● Use `naiveBayes()` to fit a naive Bayes model
8 mins	Go through the K-Nearest Neighbour section of the slide deck.	● KNN ● Indicator variable
15 mins	Go through the R Markdown K-Nearest Neighbours section as a class.	● Use `knn()` to fit a KNN model ● Compare results for different values of K