L05 Logistic Regression

* **Objectives**

Generic Concepts applicable to all supervised learners: Performance, Comparative Analysis, Occam's Razor, No Free Lunch Theorem, Process

* + Develop the intuition
  + Understand the assumptions
  + Develop the Mathematics
  + Run the Algorithms
  + Learn to interpret the results
  + Predict using the model
  + Learn to determine the performance
  + Distinguish between training/testing error
  + Differentiate between overfitting/underfitting
  + Techniques to improve performance

**Recommended Reading**

Performance of classifiers: Logistic Regression, Rationale

ISLR Chapter 4 section 4.1,4.3

Required R package: glmnet, ROCR

https://www.r-bloggers.com/logistic-regression-with-r-step-by-step-implementation-part-2

http://pingax.com/wp-content/uploads/2013/12/data.csv # logistic regression

http://pingax.com/logistic-regression-wirh-r-step-by-step-implementation-part-1/

http://pingax.com/logistic-regression-r-step-step-implementation-part-2/

https://towardsdatascience.com/understanding-logistic-regression-9b02c2aec102

https://www.r-bloggers.com/an-example-of-roc-curves-plotting-with-rocr/

https://datascienceplus.com/how-to-perform-logistic-regression-lda-qda-in-r/

http://www.sci.utah.edu/~shireen/pdfs/tutorials/Elhabian\_LDA09.pdf

**Lecture Notes:Logistic Regression**

[LogisticRegression.pdf](https://github.com/samriti0202/DATA622/blob/main/L05%20Logistic%20Regression/LogisticRegression.pdf)

**R Script for Lecture**

* + [[File](https://bbhosted.cuny.edu/bbcswebdav/pid-49455076-dt-content-rid-393271787_1/xid-393271787_1) r-script-for-lecture.txt](https://github.com/samriti0202/DATA622/blob/main/L05%20Logistic%20Regression/r-script-for-lecture.txt) (4.209 KB)

[r-script-for-lecture.txt](https://bbhosted.cuny.edu/bbcswebdav/pid-49455076-dt-content-rid-393271756_1/xid-393271756_1)

Both Deepak and Jason/Doyle contributed to the revisions... thank you both.. constructive and useful appreciate that.

[**Resources**](https://bbhosted.cuny.edu/webapps/blackboard/content/listContent.jsp?course_id=_1915134_1&content_id=_49455077_1)

### [Understanding Logistic Regression](https://towardsdatascience.com/understanding-logistic-regression-9b02c2aec102)

"Logistic Regression is one of the basic and popular algorithm to solve a classification problem. It is named as ‘Logistic Regression’, because it’s underlying technique is quite the same as Linear Regression. The term “Logistic” is taken from the Logit function that is used in this method of classification.

This blog aims to answer following questions:

* 1. What is Classification problem?
  2. Why not use Linear Regression?
  3. Logistic Regression Algorithm?
  4. What is Decision Boundary?
  5. How to check model performance?"

### [Practical Guide to Logistic Regression Analysis in R](https://www.hackerearth.com/practice/machine-learning/machine-learning-algorithms/logistic-regression-analysis-r/tutorial/)

"In this article, you'll learn about Logistic Regression in detail.  Believe me, Logistic Regression isn't easy to master. It does follow some assumptions like Linear Regression. But its method of calculating model fit and evaluation metrics is entirely different from Linear/Multiple regression."

### [Logistic Regression with R: step by step implementation part-2](https://www.r-bloggers.com/logistic-regression-with-r-step-by-step-implementation-part-2/)

In this post, We will discuss on implementation of cost function, gradient descent using optim() function and calculate accuracy  in R. So, let’s start.