COMPUTER SUBJECT: BASIC ML CONCEPTS

TYPE: GROUP WORK ASSIGNMENTS/DISCUSSION

IDENTIFICATION: CHAPTER 4 Logistic regression/MICL

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LEVEL: EASY

DURATION: 15-30 min

SIZE: 10 lines!!

OBJECTIVE: Understanding logistic regression elements

REQUIREMENTS: **ML Ch. 4**

COMMANDS:

IDENTIFICATION: LogisticRegression/MICL

ML Chapter 4 Assignments in Logistic Regresssion

The following assignments must be solved in smaller groups (2-4 students); and they are followed up by a short presentation/discussion in the class the very same day.

Useful links
https://towardsdatascience.com/introduction-to-logistic-regression-66248243c148
https://ml-cheatsheet.readthedocs.io/en/latest/loss_functions.html#mae-l1

Assignment 1
What is logistic regression ?

Assignment 2
What is the difference between linear regression and logistic regression ?

Assignment 3
Give some examples where logistic regression is applicable ?

Assignment 4
Take a look at the figure, 4.21, below.
What is the sigmoid function used for ?

Equation 4-14. Logistic function

$$\sigma(t) = \frac{1}{1 + \exp(-t)}$$

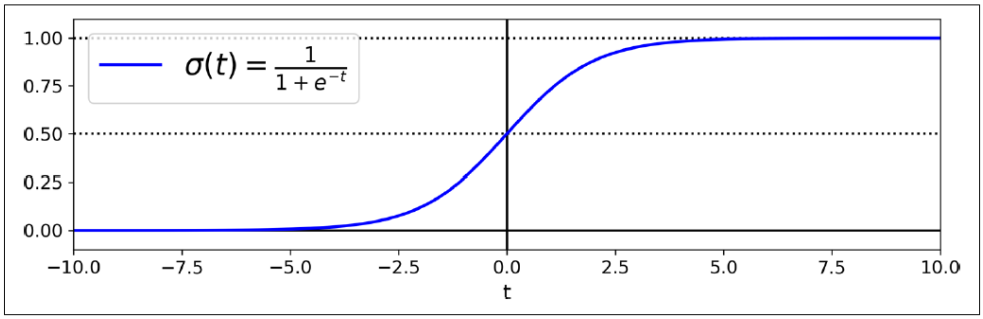

Figure 4-21. Logistic function

Fill out the following table:

Value t	-10.0	-5.0	-1.0	0.0	1.0	5.0	10.0
σ(t)							

Assignment 5

Take a look at the cost function, c, for a single training instance in equation, 4.16 below.

Equation 4-16. Cost function of a single training instance

$$c(\boldsymbol{\theta}) = \begin{cases} -\log(\hat{p}) & \text{if } y = 1 \\ -\log(1 - \hat{p}) & \text{if } y = 0 \end{cases}$$

Calculate the cost, c, for different probabilities, p, both for instances of a positive class (y=1) and for instances of a negative class (y=0). Do this by filling out the table:

Probability,p	0	0.1	0.3	0.5	0.7	0.9	1.0
y = 0							
y = 1							

Ring a bell ?

Assignment 6
What is l_1 penalty ?
What is l_2 penalty ?
Are the used in SkLearn logistic regression ?

Assignment 7
Suppose you want to classify people in a tourist place in Italy as tourist/native and Corona-case/not Corona case. What kind of classifier(s) would you use ?